Series 4000
Communication Control System
Installation and Configuration

025-9533Y

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Information on Disposal of Old Electrical and Electronic Equipment and Batteries (applicable for EU countries that have adopted separate waste collection systems)

Pb

Products and batteries with the symbol (crossed-out wheeled bin) cannot be disposed as household waste. Old electrical and electronic equipment and batteries should be recycled at a facility capable of handling these items and their waste byproducts.

Contact your local authority for details in locating a recycle facility nearest to you.

Proper recycling and waste disposal will help conserve resources whilst preventing detrimental effects on our health and the environment.

Notice: The sign "Pb" below the symbol for batteries indicates that this battery contains lead.

FCC Class A User Information

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Regulatory Compliance Markings

When required these products are provided with the following Product Certification Markings:

- FCC markings
- FCC Part 68 (USA)
- CS-03(Canada)

EMC Compliance

- FCC Part 15 - Radiated & Conducted Emissions (USA)
- ICES-003 - Radiated & Conducted Emissions (Canada)

Telecommunications Compliance

- FCC Part 68 (USA)
- CS-03 (Canada)

Safety Summary

Warning! For your safety and the protection of the equipment, observe these precautions when installing or servicing Zetron equipment:

- Follow all warnings and instructions marked on the equipment or included in documentation.
- Only technically qualified service personnel are permitted to install or service the equipment.
- Be aware of and avoid contact with areas subject to high voltage or amperage. Because some components can store dangerous charges even after power is disconnected, always discharge components before touching.
- Never insert objects of any kind through openings in the equipment. Conductive foreign objects could produce a short circuit that could cause fire, electrical shock, or equipment damage.
- Remove rings, watches, and other metallic objects from your body before opening equipment. These could be electrical shock or burn hazards.
- Ensure that a proper electrostatic discharge device is used, to prevent damage to electronic components.
- Do not attempt internal service of equipment unless another person, capable of rendering aid and resuscitation, is present.
- Do not work near rotating fans unless absolutely necessary. Exercise caution to prevent fans from taking in foreign objects, including hair, clothing, and loose objects.
- Use care when moving equipment, especially rack-mounted modules, which could become unstable. Certain items may be heavy. Use proper care when lifting.

Change List for Rev T, June 2013

- Updated *Orion Dual Channel Wireless Control Card Configuration* on page 133.
- Updated *Radio Programming* on page 145 with new step.
- Updated *Wireless Dual Channel Card Configuration (P/N 950-1113)* on page 147.
- Updated Figure 33 on page 151.
- Added *Harris Wireless Interface Module* on page 152

Change List for Rev U, July 2014

- Added the options available for dual RS-422 Serial Interfaces on page 239 and 242
- The IntegratorRD Workstation, P/N 901-9569 is obsolete and is removed from the PC Configuration section on page 246
- Change Minimum System requirements (per 011-0830_D) in Table 92 on page 246
- Include Win7 setup instructions in the Windows 7 Settings section on page 248

Change List for Rev V, December 2015

- In System Functions, under the subheading Patch Keys, removed a reference to an obsoleted option, the Quad Patch card, see *Patch Keys* on page 381

Change List for Rev W, February 2019

- Updated Limited Warranty statement
- Added support for Windows 10 in *Installation Notes* on page 252
- Clarified the UMS availability in Step 6 on Page 254

Change List for Rev X, July 2019

- Table 92, “Recommended Computer Specifications,” on page 246 is updated with Windows 10 PRO requirements.
- Clarified UMS support with Windows 10 in Caution statement on page 254

Change List for Rev Y, August 2020

- Updated Figure 40 on page 220.

Contents

Introduction

Overview

The Model 4048 and Model 4020 Common Control Equipment (CCE) are part of the Series 4000 Communication Control System. They enable one or more dispatchers to control a multi-channel radio system efficiently. These models may be tailored to meet a broad range of requirements for use in public safety applications, such as fire and police communications, as well as public service applications such as utility and industrial communications.

The CCE is the central interface that routes signals between radio channels and dispatch consoles. The Model 4048 (see Figure 1) contains up to 48 modular circuit cards. It handles up to 48 radio channels and up to 16 dispatch console positions. The Model 4048 is typically installed near the radio base station and telephone line terminations.

The Model 4020 Common Control Equipment (see Figure 2) provides the same functionality as the Model 4048, but is configured for smaller systems. A Model 4020 system contains up to 19 modular circuit cards, a maximum of twenty radio channels, and six dispatch console positions.

The CCE resides in a standard open-frame or fully enclosed 19-inch EIA equipment rack (not included as part of the system) and is typically located in a back room away from traffic and dust. The choice of an open or enclosed rack depends on the location and whether or not additional air filtration is required. The CCE consists of a set of modular 19-inch rack-mounted components. Depending on configuration, the Model 4048 CCE requires between 36.75 and 56 inches of vertical rack space. The Model 4020 CCE requires a minimum of 17.5 inches of vertical rack space.

Figure 1: Model 4048 Common Control Equipment (equipment rack not included)

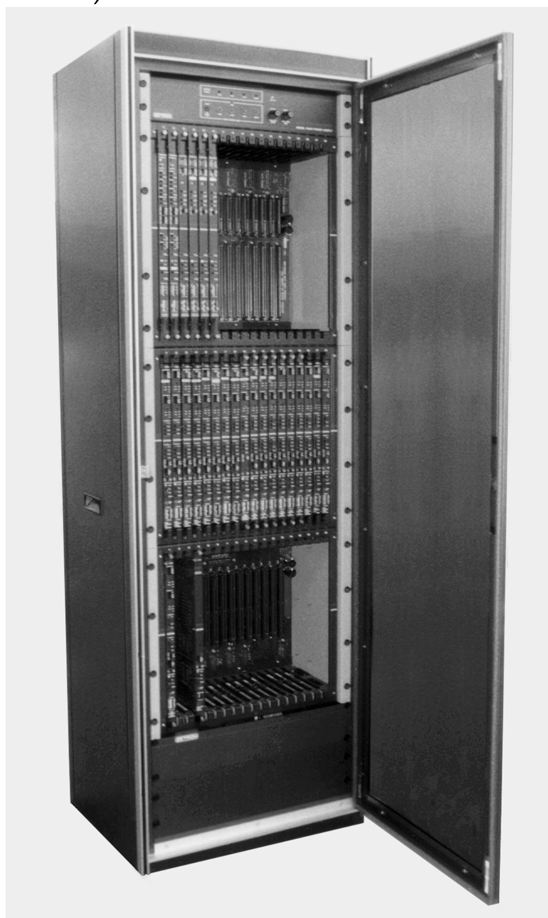


Figure 2: Model 4020 Common Control Equipment

System Overview

The communications control system consists of the Model 4048/4020 Common Control Equipment (CCE) cabinet and one or more console positions (see Figure 3). The CCE cabinet contains several slots for accepting various types of circuit cards. Types of cards include Dual Channel Cards (DCCs), Console Interface Cards (CICs), System Traffic Cards (STCs), Patch Cards, and Auxiliary I/O Cards. The dual channel cards interface the system to the radio base-stations. The console interface cards interface the system to the console positions. The STC is the main controller for the system. Patch cards allow the audio patches to be connected between various channels. The Auxiliary I/O Card adds external input and output control to the system.

The Model 4048 CCE has 54 card slots (48 usable), supports up to 48 channels, up to 16 console positions, and 1 Patch Card. The Patch Card uses one of the available console positions.

The Model 4020 CCE has 19 card slots, supports up to 20 channels, up to 6 console positions, and one Patch Card.

The radio connections at the CCE are made using 25-pair telephone-style cable with 50-conductor Amphenol-type connectors. The cabinet has one male 50-conductor plug for every four channels. The radio cables may be routed to a protective punch-down block, which will protect the equipment from gas-discharge and sneak-current problems.

Consoles may be desktop, rack-mount, or video-display type and may be combined in the same system. Each type, except the video-display type, consists of a console and up to three accessory control panels. The basic requirements for each type of console position are:

Desktop console positions require one Model 4018 Dispatch Console (see Figure 7).

Rack-mount console positions require one 4118 Dispatch Console and at least one Model 4115B Console Expander. Two additional Model 4115B Console Expanders may be added (see Figure 5 and Figure 6).

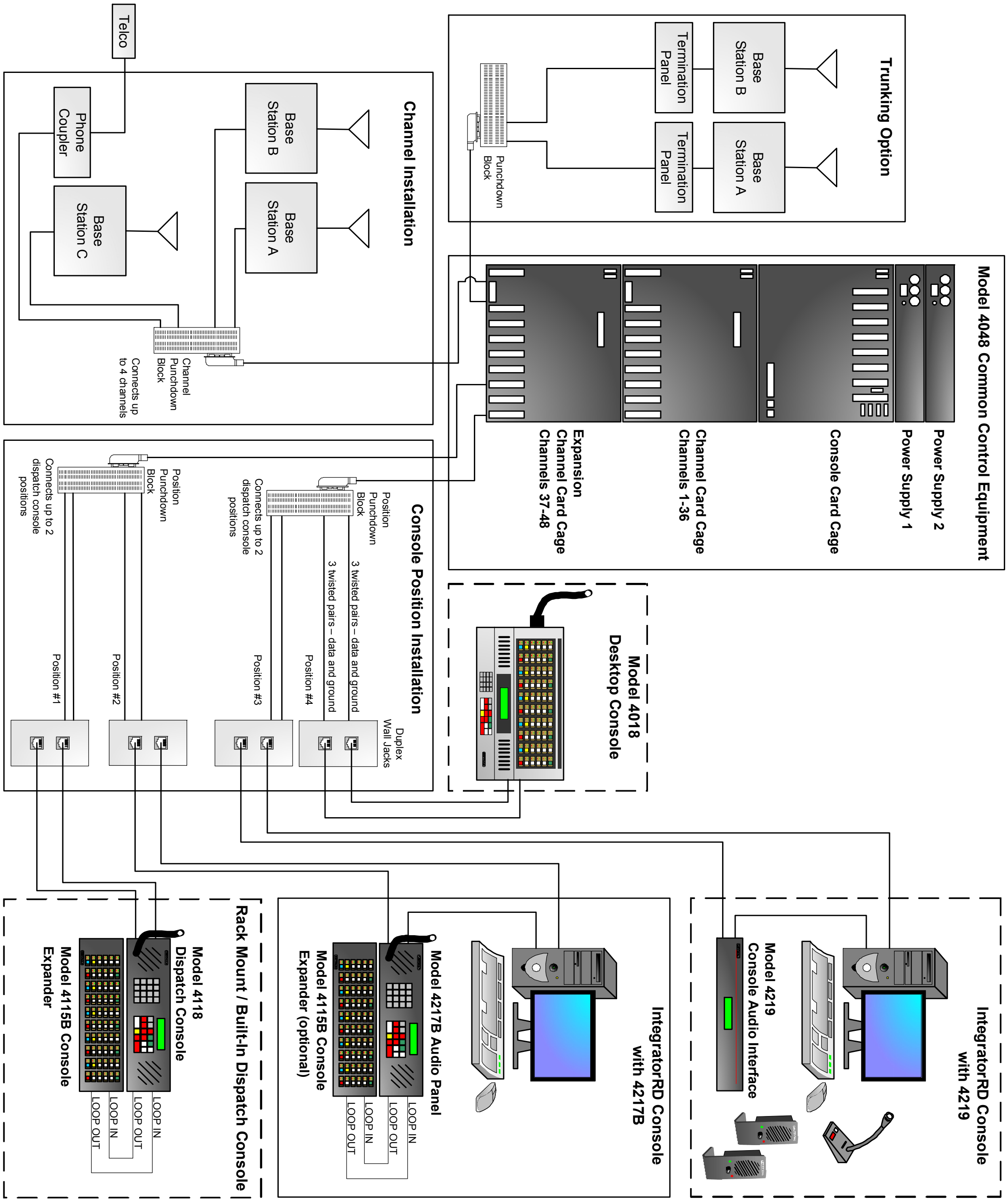
Video display console positions require either one Model 4217B Audio Panel (see Figure 8) or a Model 4219 Console Audio Interface (see Figure 9), a computer, and a monitor (see Figure 4). A mouse or trackball is normally supplied but is not necessary if the optional touchscreen is installed. For information about the video display console positions, refer to the appropriate manual listed in Table 1.

Note In mixed systems, an Integrator RD video console must be installed in position 1. This permits various advanced functions to work properly.

The CCE is connected to the dispatch console using six pairs of wire, which may be two 6-conductor modular telephone cables. The dispatch console is connected to the optional console expanders in a daisy-chained loop fashion. The loop cable is a 4-conductor cable, using 4-position modular telephone connectors.

The following figure provides an overview of a Series 4000 System. For significantly greater detail, see the *Series 4000 Interconnect Diagram* (P/N 024-0334).

Figure 3: System Overview



Identification of Console Models

Figure 4: Integrator RD Workstation

Figure 5: Model 4118 Dispatch Console

Figure 6: Model 4115B Console Expander

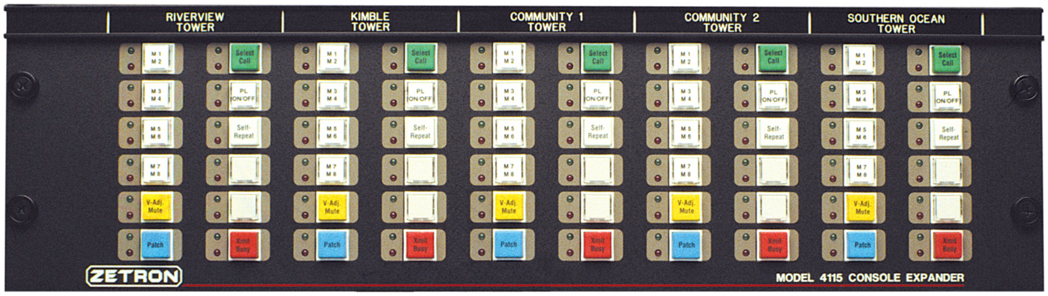


Figure 7: Model 4018 Desktop Console

Figure 8: Model 4217B Audio Panel

Figure 9: Model 4219 Console Audio Interface

The Model 4219 is used only in PC-based console positions. External amplified speakers are supplied with the unit. Speaker volume is controlled by means of controls on the external speakers. While a headset or desk microphone can be used with the Model 4219, the gooseneck microphone option of the Model 4217B is not available.

The LCD display on the Model 4219 is smaller than the display on the Model 4217B.

The Model 4219 can not be used with a Model 4115 Console Expander.

Installation Sequence

Before you begin installation, review this manual and the manuals listed in Table 1. This will help you understand the system and provide the necessary installation instructions. The sections in this manual are prepared in a sequence in which the system should be installed. If you need further assistance, please contact Zetron at http://www.zetron.com.

Planning

Installation begins with planning the system layout. The CCE is the central hub to which many channels and consoles connect. Consider carefully the locations of the CCE and consoles, the wiring between them, and the wiring to the radios.

Mounting

After the system has been thoroughly thought out, the placement, and mounting may begin. Locate the CCE in the equipment room where channel lines are terminated. Place consoles at convenient operating points.

Mapping and Installing Cards

Mapping the card-slots is the next step, once the cabinet has been mounted. Card-slot mapping allocates particular channel and console card slots to your base stations and console locations. It also creates a cross reference between the channel and console numbers used by the system, and the channel and position names that you are familiar with. After the card-slots have been mapped, the channel and console cards should be configured using their various jumpers and switches, then installed according to the mapping. In addition, before wiring starts, configure the jumpers on the consoles.

Wiring

After the system has been configured, the wiring of the system may begin. The system will require wiring between the CCE and the radio base station, between the CCE and the consoles, and between the consoles and their various accessory options (such as speakers, microphones, encoders).

Console Programming

Once the wiring is complete, the consoles can be programmed, if needed. In many cases consoles are configured at the factory. Button-based consoles are configured using CPS or CPSW. PC-based consoles are configured using IntegratorRDPS.

Note Every version of the IntegratorRDPS programming software is matched to a limited range of hardware and firmware. Check with Zetron Technical Support if you are upgrading or adding to a system.

Testing

When planning, mounting, configuring, and wiring have been completed, the system is ready for its first installed test. The system has been tested at the Zetron factory; this preliminary system check verifies proper configuration and wiring.

Level Setting

The last step is to adjust the audio levels in the system. Factory default settings are merely a starting point, as each site is unique. Adjustments must be performed at every "system port", which includes receive and transmit audio levels at every channel, and at every console.

Operation

During its initial operation, the system will operate according to the programming done at the Zetron factory. If you wish to alter operation through programming, consult the appropriate programming manual as listed in Table 1. Changes in the programming may be performed by Zetron, or you may make changes once the system has been installed. If necessary, contact Zetron for further assistance.

Manuals

The manuals identified in the following table may be necessary to install and operate the Model 4048/4020 CCE.

Table 1: Series 4000 System Manuals

Primary Manuals		
Title	**Part #**	**Description**
Series 4000 Communication Control System Installation and Configuration (this manual)	025-9533	Describes how to configure and install the Model 4048 and Model 4020 Common Control Equipment, IntegratorRD, Model 4018 and 4118 consoles, accessories, and related software such as Radio System Management.
Series 4000 Communication Control System Operation	025-9535	Describes how to operate the Series 4000 Communication Control System, and IntegratorRD.
Series 4000 Interconnect Diagram	024-0334	Shows a detailed diagram of a typical Series 4000 system and its interconnects.
Options		
Title	**Part #**	**Description**
Series 4000 VoIP Console Gateway Product Manual	025-9572	Describes how to install and configure the Series 4000 VoIP Console Gateway.
Modem Option for Series 4000 Communications Control System Technical Manual	025-9161	Contains installation procedures, parts lists, and schematics for the Modem Option for Series 4000.
Series 4000 and Model 4010 Intercom Interface Product Manual	025-9331	Rev C or newer describes how to install the intercom interface and contains schematic and parts lists.
Telephone Radio Headset Interface Product Manual	025-9553	Provides instructions for TRHI installation and configuration.
iDEN Interface Option Installation	025-9566	Rev B or newer describes how to install all versions of the iDEN interface option.
Intelligent Radio Interface Module for Kenwood Radios Product Manual	025-9520	Provides instructions for installation, configuration, and operation for Kenwood iRIM.
Intelligent Radio Interface Module for EFJohnson RS-5300 Series Radios Product Manual	025-9542	Provides instructions for installation, configuration, and operation for 5300 iRIM.

Specifications

Physical Specifications

Model 4048 Common Control Equipment	
Channel Card Cage	15.75 x 19 x 9.75 inches
Console Card Cage	17.5 x 19 x 9.75 inches
Power Supply	3.5 x 19 x 9.75 inches
Model 4020 Common Control Equipment	
Common Card Cage	17.5 x 19 x 9.75 inches
Audio Consoles	
Model 4018 Desktop Console	9 x 18 x 14 inches, 15 lbs.
Model 4116B Dispatch Console	5.25 x 19 x 5 inches, 5 lbs.
Model 4118 Dispatch Console	5.25 x 19 x 5 inches, 5 lbs.
Model 4115B Console Expander	5.25 x 19 x 2.25 inches, 3.5 lbs.
Model 4217B Audio Panel	5.25 x 19 x 5 inches, 5 lbs.
Model 4219 Audio Panel	1.75 x 15 x 6 inches

Transmit Electrical Specifications

Audio Output	+10 dBm max. into 600-ohm line
Output Impedance	Transmit: 600 ohm balanced. Idle: 600 or 3500 ohm
Distortion	<2% at full output. Signal-to-Noise > 50 dB. Hum, Cross-Talk all -50 dB at full output
Microphone Input	-40 dBm for full output
Headset Input	-10 dBm at full output
Auxiliary Input	-10 dBm, not compressed
Freq. Response	-3 to +1 dB from 300-3400 Hz (except GT notch)
Compression	Input level increase of 30 dB above knee of compression causes <3 dB output increase

Receive Electrical Specifications

Input Impedance	600 or 10 kΩ (4-wire)/3500 ohm (2-wire)
Line Balance	66 dB at 1000 Hz
Rx Sensitivity	-30 to -28 dBm max at knee of compression; adjustable
Freq. Response	-3 to +1 dB from 300-3400 Hz (except GT notch)
Compression	Input level increase of 30 dB above the knee of compression causes <3 dB output increase
Distortion	< 2%
Call Light Sensitivity	-20 dB below knee of compression
Audio Output	5 watts for each built-in speaker
Mute	Adjustable to -48 dB (with Individual Volume Control Option) or full mute. Mute time 1 sec to indefinite

Auxiliary Input/Output Electrical Specifications

Outputs (12 per card)	
Relay Contact Current	1.0 Amp
Isolation Voltage	50 Volt with respect to system ground and between contacts
Optically Isolated Inputs (8 per card)	
"On" Current Range	+5 to +25 mA
"Off" Current Range	-25 to +2 mA
Maximum Positive Current	+25 mA continuous, +40 mA peak
Maximum Negative Current	-25 mA continuous, -40 mA peak
Equivalent Series Resistance	405 ohms plus a 0.7 Volt drop (forward)
Isolation Voltage	50 Volt with respect to system ground
Non-Isolated Inputs (32 per card)	
"On" Voltage Range	+3.5 to +30 Volts
"Off" Voltage Range	-30 Volts to +0.9 Volts
Equivalent Parallel Resistance	5 kΩ pulled to +8.5 Volts

Other Electrical Specifications

Radio Control	Local (E&M), Tone Remote, DC Remote
Radio Channels	2-wire simplex/half-duplex or 4-wire half/full duplex
DC Control	Operable up to 8 kΩ loop resistance. Current programmable 15 mA max in 2.5 mA increments. Accuracy +/-0.25 mA
Tone Control	15 standard tones supported, programmable (no trimmer adjustment) 650-2050 Hz. High Level Guard Tone duration 120/600 millisecond. Function Tone Duration 40 millisecond. Guard Tone Freq. 2175 Hz, alterable (notch filter from 2120 Hz to 2230 Hz). Tone frequency accuracy +/- 0.2%; timing accuracy +/-1.0%
Local Control	PTT normally open relay contact rated 1.0 A at 24 VAC/DC
E & M Control	Tx control via PTT relay, external 48V required
Busy Chan. Detect	Local Cross-Busy detection; Guard Tone or DC Control detection (LOTL)
Recorder Outputs	1 per channel (Tx/Rx audio summation), plus 1 output per console (various combinations of select, unselect and mic audio). 0 dBm level, 600 ohm, single-ended outputs
Model 4048 Power Supply	
Input Power	95 to 240 VAC, 50/60 Hz, 240 Watts Maximum
Battery Power	13.5 V_{DC} nominal (11.5 minimum and 15.0 V_{DC} maximum) 15 Amps maximum
Model 4020 Dual Power Supply	
Input Power	95 to 240 VAC, 50/60 Hz, 120 Watts Maximum
Model 4020 Modular Power Supply	
Input Power	95 to 240 VAC, 50/60 Hz, 100 Watts Maximum

Note For a Model 4020 system with more than five DC channels, it is recommended to use the Model 4020 Dual Power Supply or the Model 4048 Power Supply.

Common Control Equipment Installation

In this chapter:

This chapter describes the initial setup, mounting, mapping, configuring, and wiring of the Model 4048/4020 Common Control Equipment (CCE).

The CCE is typically installed near the wire terminations for the remote radio base station or near the actual base station, if they are inside the same building. The metallic cabling between the CCE and the dispatch consoles should be less than 2000 feet, unless modems or optics are used for the data paths. Short Haul Modems (P/N 950-9222) are required beyond 2000 feet and up to 1 mile. The VoIP Console Gateway (P/N 905-0265) is required for distances longer than a mile.

The socket outlet for the AC input power shall be installed near the CCE and be easily accessible. The socket outlet shall be installed by authorized personnel. Refer to the electrical specification for power requirements.

Model 4048 Mounting

The Model 4048 CCE must be rack-mounted (see Figure 10).

The console interface cardcage (Part # 901-9462) is shipped with an extra top/bottom cover (Part # 415-0110). The extra cover should be mounted on the bottom of the lowest Channel Cardcage (Part # 950-9691), using the supplied mounting hardware (1 black 4-40 x ¼" screw and 6 standard 4-40 x ¼" screws). If the system has only one channel cardcage, mount the cover on the bottom of the cardcage. If the system has two channel cardcages, mount the cover on the bottom of the lower cardcage.

Each Channel Interface cardcage is shipped with a rear cover (part # 415-0119-1), which is mounted on the back to connect adjoining cardcages. This cover provides chassis ground between cardcages.

Power Supply

One or two Model 4048 power supply modules are installed at the top of the rack. For power supply fault tolerance, two modules can be installed in a load sharing arrangement. If either module fails, the remaining module powers the system avoiding interruptions.

CCE Console Cardcage

The Model 4048 CCE Console Cardcage, typically installed below the power supply modules, contains 18 card slots. The first two slots accept the Model 4048 System Traffic Card (STC). The STC manages communication between components of the CCE. Only one STC is required for normal operation; a secondary STC is installed to serve as a redundant backup if the primary STC fails. The remaining 16 slots accept the Model 4048 Console Interface Cards (CICs). The CIC cards interface the system to the console positions. The CCE accommodates a maximum of 16 console positions. If a patch card is used, it will occupy the right-most slot (slot 18). The CCE will then accommodate 15 console positions.

CCE Channel Cardcage

The Channel Cardcage is installed immediately below the Console Cardcage (Cage 1). It contains 18 card slots that each accommodate one Dual Channel Card (DCC). Each DCC can interface two base stations, making the channel cardcage capable of supporting up to 36 channels.

Note These are the same cards used in the Models 4024 and 4008 CCE.

When the first channel cardcage is mounted (Cage 2), connect the three ribbon cables between the console cardcage and the first channel cardcage.

If more than 36 channels are required, a second channel cardcage may be installed directly underneath Cage 2. The second channel cardcage (Cage 3) accommodates up to six additional DCCs (as well as up to six AUX I/O cards), increasing the maximum base station channel capacity to 48.

If your system includes a second expansion channel cardcage, carefully thread the expansion cage ribbon cables along the inside of the first channel cardcage (Cage 2).

After mounting the second channel cardcage (Cage 3), connect the expansion ribbon cables to the outer-most connectors (right and left) on the second channel cardcage (Cage 2). Finally, cover the ribbon cables that pass though the first channel cardcage (Cage 2) with the cover plates provided with the channel expansion kit.

Model 4048 CCE Set Up

Model 4048 Slot and Card Identification

The Model 4048 CCE has card slots in each cardcage, designated 1-18, from left to right. Since the system is assembled and tested at the Zetron factory, you will also find circuit cards already plugged into some slots. Several types of circuit card may be used in the cabinet. The cards are identified by a part number and name, located on the legend plate of the card. The part number is located at the top of the legend plate and the name at the bottom. Card names and part numbers are listed in Table 2.

Table 2: CCE Cards

Part Number	Card Name
950-9692	System Traffic Card (STC)
950-9695	Console Interface Card (CIC)
950-9694	Patch Card
950-9820	Dual Channel, Tone/Local

Part Number	Card Name
950-9867	Dual Channel T/R Control Card (EDACS/Orion)
950-9862	Dual Channel T/R Control Card (iDEN)
950-1091	Dual Channel T/R Control Card (iSpace)
950-0015	Dual Channel T/R Control Card (MAP27)
702-9105	Auxiliary Input/Output Card (AUX I/O)

Table 3 identifies the acceptable card types for the slots in each cardcage.

Table 3: Model 4048 Card Type/Slot Association

Cage	Slot	Card Type
Console	1-2	STC only
Console	3-17	CIC only (Positions 1 – 15)
Console	18	CIC (Position 16) or Patch
Channel #1	1-18	Dual Channel (Channels 1 – 36) or AUX I/O
Channel #2	1-6	Dual Channel (Channels 37 – 48)
Channel #2	7-12	AUX I/O only*
Channel #2	13-18	Not Used

* When installing two channel cages initially, the Aux I/O card(s) should be inserted in positions 7-12 to provide maximum radio channel capacity and avoid having to rearrange Aux I/O programming and terminal connections at a later date.

Model 4048 Power Supply

The Model 4048 Power Supply (Part # 950-9693) can operate from either a Universal AC input or a 12 V_{DC} input. The 12 V_{DC} source (13.5 V_{DC} nominal) has an input range of 11.5 to 15.0 V_{DC}. The supply arrives from the factory set to Universal AC operation. To operate from 12 V_{DC} or as a backup supply source, make the jumper selections identified in Table 6. These jumpers are located on the front panel circuit board, which is accessed by removing the top cover of the power supply.

Note The front panel fault LEDs will not reflect the correct status unless the jumpers are in the correct position.

Power Supply Connections

The two following tables give the pinouts for the two different types of output cable on a Model 4048 power supply. The connector part numbers listed in each figure are Zetron part numbers and are listed for reference only.

Table 4: Console Cardcage Power cable

<table>
<tr><th>Pin</th><th>Color</th><th>Purpose</th><th></th></tr>
<tr><td>1</td><td>Purple</td><td>Not Used</td><td rowspan="12">Connector Part Numbers:
• Connector: 401-0116
• Hood: 401-0117

Please check both connector markings and the silk screen on the cardcage to ensure proper alignment before installing cable.</td></tr>
<tr><td>2</td><td>White</td><td>Error Signal</td></tr>
<tr><td>3</td><td>Yellow</td><td>+12 V_{DC}</td></tr>
<tr><td>4</td><td>Blue</td><td>+5 V_{DC}</td></tr>
<tr><td>5</td><td>Brown</td><td>Ground</td></tr>
<tr><td>6</td><td>Black</td><td>Ground</td></tr>
<tr><td>7</td><td>Black</td><td>Ground</td></tr>
<tr><td>8</td><td>Brown</td><td>Ground</td></tr>
<tr><td>9</td><td>Blue</td><td>+5 V_{DC}</td></tr>
<tr><td>10</td><td>Yellow</td><td>+12 V_{DC}</td></tr>
<tr><td>11</td><td>Grey</td><td>-12 V_{DC}</td></tr>
<tr><td>12</td><td>Green</td><td>Not Used</td></tr>
</table>

Table 5: Channel Cardcage Power Cable

<table>
<tr><th>Pin</th><th>Color</th><th>Purpose</th><th></th></tr>
<tr><td>1</td><td>Yellow</td><td>+12 V_{DC}</td><td rowspan="8">Connector Part Numbers:
• Connector: 401-2649
• Hood: 401-2650

Please check both connector markings and the silk screen on the cardcage to ensure proper alignment before installing cable.</td></tr>
<tr><td>2</td><td>Red</td><td>+5 V_{DC}</td></tr>
<tr><td>3</td><td>Brown</td><td>Ground</td></tr>
<tr><td>4</td><td>Black</td><td>Ground</td></tr>
<tr><td>5</td><td>Black</td><td>Ground</td></tr>
<tr><td>6</td><td>Brown</td><td>Ground</td></tr>
<tr><td>7</td><td>Red</td><td>+5 V_{DC}</td></tr>
<tr><td>8</td><td>Yellow</td><td>+12 V_{DC}</td></tr>
</table>

Wiring the Model 4048 Power Supply

♦ To wire the power supply

1. Connect AC input power to the modular AC input jack on the back of each power supply.
2. Connect 12 V_{DC} power on the screw-terminal block on the back of each power supply.

   Both AC and DC inputs may be connected at the same time where the DC input provides a backup to the AC power source.
3. Connect the power cables (three wire bundles) exiting from the back of each Model 4048 power supply to each cardcage Refer to Figure 10.
4. Although the power supplies are factory adjusted, you may want to further adjust them once they are connected to load. See *Adjusting the Power Supply* on page 34.

Adding DC Backup

◆ **To use 12 V_{DC} as a backup to the AC supply**

1. Measure the voltage at the BATT terminal (on the front of the supply) relative to GND.
2. Measure the voltage at the +12V terminal.
3. Turn the 12V ADJ potentiometer clockwise until the +12V voltage is at least 0.2V higher than the BATT voltage.

Table 6: Power Support Voltage Selection

Input Supply	JP1	JP2
Universal AC	YES	NO
12 V_{DC} only	NO	YES
AC and DC	YES	YES

Adjusting the Power Supply

The test points on the front of the unit are used to monitor the voltage levels. The $+12V_{DC}$ has been set at the factory for $+13.5V_{DC}$. There is an adjustment potentiometer for this setting. The $-12V_{DC}$ supply has no adjustment and should be $-11.7 \pm 0.5\ V_{DC}$. The $5V_{DC}$ test point reads the common voltage in a two-power-supply system. Use the following adjustment procedure to verify the voltage being read is the supply being adjusted.

Note The $5V_{DC}$ supply has been adjusted to your system at the factory, but adding or removing cards changes the load and may require you to adjust the $5V_{DC}$ value.

Single Power Supply

◆ **To adjust a system with one power supply**

- Monitor the $+5V_{DC}$ test point and turn the ADJ potentiometer until the test point reads $5.18V_{DC}$.
- Monitor the $+12V_{DC}$ test point and turn the ADJ potentiometer until the test point reads $13.5V_{DC}$.

Dual Power Supplies

♦ To adjust a system with two power supplies

Note Power supply adjustment must be performed on one power supply at a time, with the other power supply disconnected from its power source.

1. Disconnect AC power from one power supply.
2. Monitor the $+5V_{DC}$ test point of the powered supply and turn the ADJ potentiometer until the test point reads $5.18V_{DC}$.

Caution! The adjustment direction of the $+5V_{DC}$ potentiometer varies depending on the version. Newer units require a counter-clockwise rotation to increase voltage.

Note If the $+5V_{DC}$ Fault LED is lit on a single power supply in a dual supply setup and the measured voltage is inside the normal range, this indicates there is imbalanced sharing. Increase the voltage on the supply with the lit LED.

3. Monitor the $+12V_{DC}$ test point of the powered supply and turn the ADJ potentiometer until the test point reads $13.5V_{DC}$.
4. Connect power to the disconnected supply and remove power from the adjusted supply.
5. Repeat Step 2 for the second power supply.
6. Both power supplies should now be adjusted. Reconnect power to the disconnected supply.

Low Voltage

If one or more cards in the common control equipment card cage has the red FAIL LED light turned on, the power supply level should be checked. The Fail LED is tied to a low voltage reset circuit that monitors the $+5V_{DC}$ supply to the card. Measure the output of the $+ 5V_{DC}$ power supply at the test point on the front of the power supply with all cards installed in the card cage. Adjust the $+5V_{DC}$ power supply according to the previous procedure.

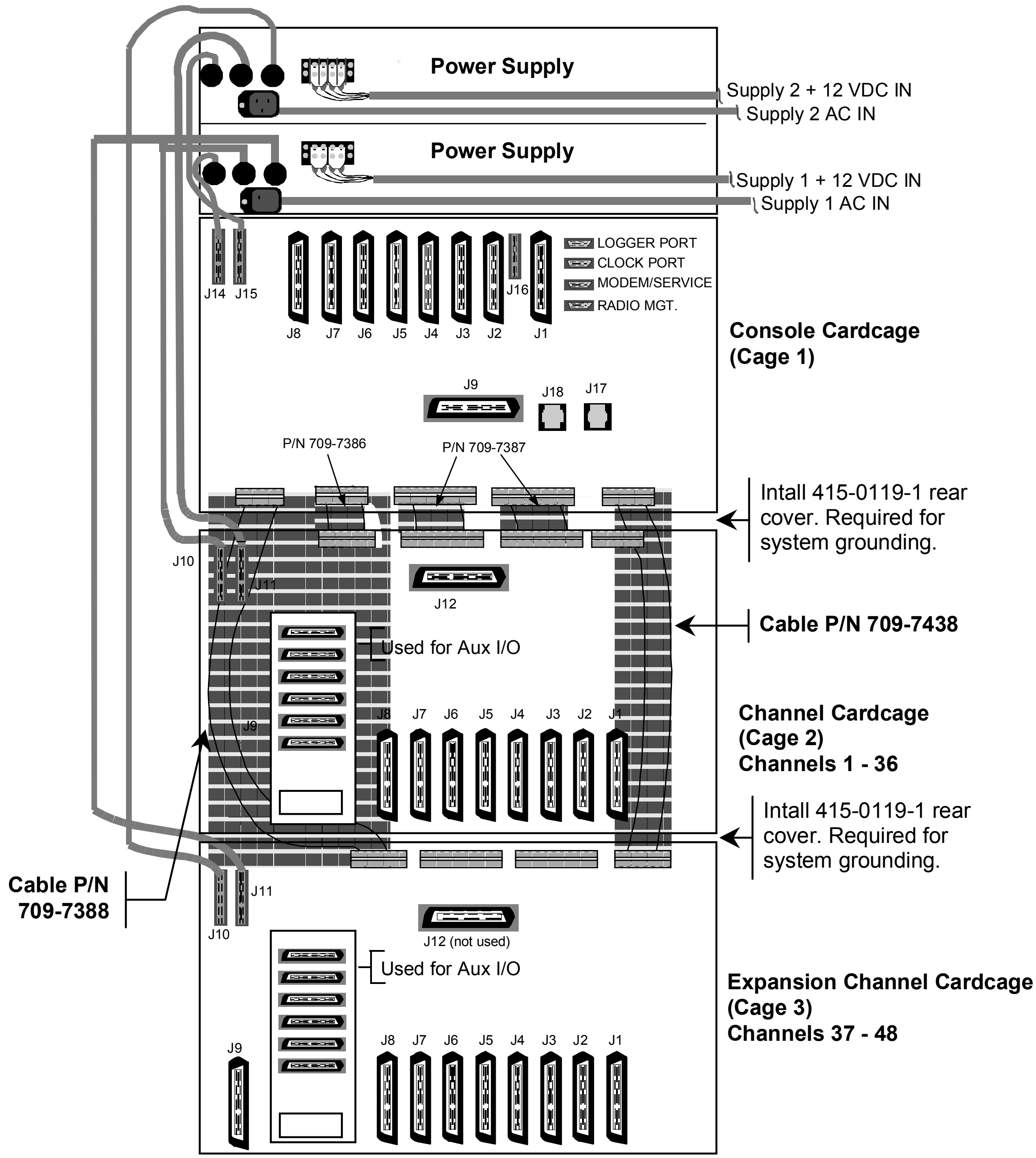
Overvoltage

When using older power supplies, adjusting the potentiometer too high will put the $5V_{DC}$ supply into overvoltage protection (no output voltage). If this happens, turn the ADJ potentiometer down and cycle the AC power. The $5V_{DC}$ supply will reset. Newer power supplies do not have this feature and cannot be adjusted beyond $5.3000V_{DC}$.

Console Cardcage

The Console Cardcage includes connectors for ribbon cables that interconnect the console cardcage with each of the two channel cardcages, which will be mounted below. Several ribbon cables are delivered with the system for this purpose. Figure 10 identifies these cables and their associated connector locations.

Figure 10: CCE Cable Connections



Channel Cardcage

If your system includes Auxiliary I/O (AUX I/O) capability, the AUX I/O adapter plate that accommodates the cable connectors has been installed at the factory.

Model 4020 CCE Set Up

The Model 4020 (Part # 901-9582) is a single rackmount cardcage that holds up to 19 circuit cards. The system cannot be expanded beyond this single cardcage. The circuit cards are identical to those used in the Model 4048. The Patch Card is the same circuit card for both systems, and may be ordered with the ability to manage several ranges of simultaneous patches.

Model 4020 Slot and Card Identification

Viewing the Model 4020 CCE from the front, you will notice that the nineteen card slots are labeled as to which type can be installed. Refer to Table 7 for the names and part numbers of the CCE cards. Table 7 specifies the card types that can be installed in the specified slots.

Table 7: Model 4020 Card Type/Slot Association

Slot	Card Type
STC 1, 2	STC only
Console 1-6	CIC only
PATCH	Patch only
Dual Channel Aux I/O 1-10*	Any Dual Channel or Aux I/O card

* Although slot 10 is compatible with Aux I/O cards, it is difficult to attach input cables.

Power Supplies for Model 4020 Systems

The Model 4020 CCE can use three different types of power supplies:

If ordered as part of the Model 4020 system, an internal modular power supply (Part # 950-0167) is shipped from the factory installed and tested. This universal supply is not capable of battery backup or of accommodating a backup supply. The Model 4020 Modular Power Supply has fixed voltage outputs with no adjustments, and only has enough capacity for small systems (five or less DC channels).

If more than five DC channels will be configured in the system, or if a backup supply is required, the internal modular power supply is insufficient. Install the Model 4020 Dual Power Supply (Part # 950-0265).

A pair of Model 4048 Power Supplies may also be used.

♦ To install or replace the internal Model 4020 Modular Power Supply

1. If the supply was not previously installed, a cover plate will have to be removed from the rear of the Model 4020.
2. Remove the top cover and partially slide the module through the back until the connector can be installed on J70, adjacent to the rear opening.
3. Verify the connector is properly aligned. Slide the module into the opening, making sure the hooks on the rear of the module are inserted into the retaining tabs near the front of the Model 4020.
4. Secure the module in place with the four thumbscrews. Replace the top cover.

♦ To install the Model 4020 Dual Power Supply

1. Locate the Model 4020 Dual Power Supply directly above the Model 4020 card cage. Connect the wiring harness from the dual power supply to one of the two connectors (labeled “Power Supply”) on the card cage, noting that the connector must be aligned properly, with the wires coming out the right side of the connector. Either one of the “Power Supply” connectors may be used.
2. Cap off the unused “Power Supply” connector on the card cage with the supplied 12-conductor cap.
3. Apply AC power to both AC power cords coming from the rear of the dual power supply.
4. Verify that both of the green “AC IN” LEDs are illuminated on the front panel, and that all of the red “FAULT” LEDs are extinguished.
5. No voltage adjustment of the supply should be necessary. The Model 4020 Dual Power Supply voltages should read:

   $+12.6 \pm 0.6\ V_{DC}$
   $+5.1 \pm 0.15\ V_{DC}$
   $-11.6 \pm 0.6\ V_{DC}$

♦ To install the Model 4048 Power Supply (for a Model 4020 System)

1. Locate the two Power Supply connectors on the rear of the Model 4020.
2. Connect the Model 4048 Power Supply to either connector, or to both if redundant supplies are used.
3. The Model 4048 Power Supply has features that are described in the Model 4048 section. For information on performing voltage checks, or to configure for battery backup, refer to *Adjusting the Power Supply* on page 34 and *Adding DC Backup* on page 34.

System Grounding

DANGER! Improper system grounding can cause electric shock to personnel, damage to equipment, and system malfunctions.

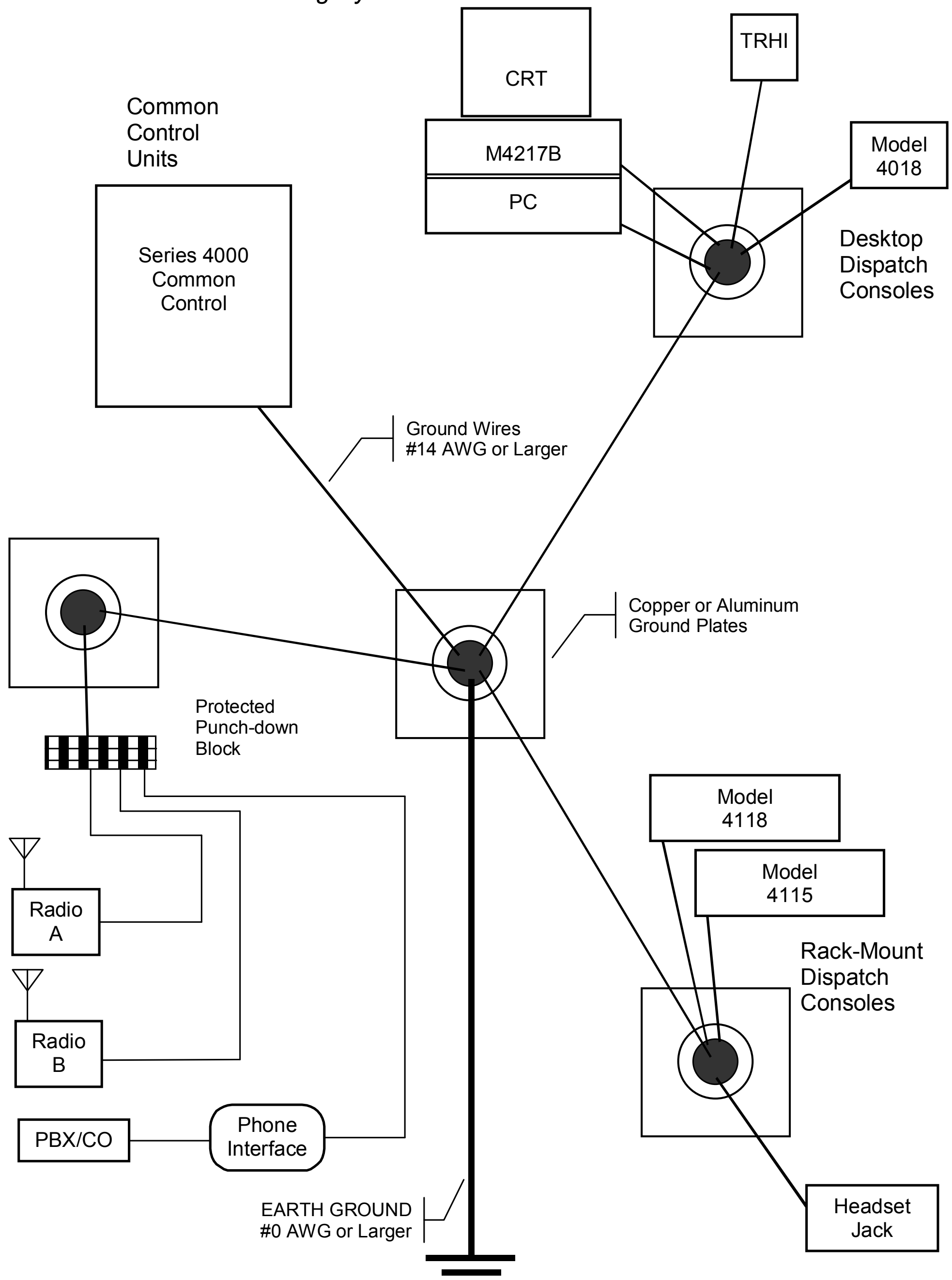
Proper earth grounding is an important electrical consideration. The earth ground protects the system and personnel from lightning strikes, provides a path for any electrostatic discharge (ESD), and provides a solid reference for the system. Improper grounding of the system could cause susceptibility to ESD, induced noise from input power wiring, and reduced effectiveness of lightning protection devices. Induced noise could cause false signal indications or a variety of system errors.

A “star” grounding system (a single point ground to which satellite grounds are connected) is the best grounding system. The central point must be firmly attached to a low-impedance earth ground point, such as a ground rod.

If protective punch-down blocks are used, a large diameter (6-gauge) copper conductor (or an equivalent braided strap/bus bar) must be connected between each block’s ground lug and the earth ground or central ground point. With the protected punch-down blocks, it is best to wire directly to earth ground if possible. Each piece of equipment should have its chassis grounded to the central point with a separate ground wire. The gauge of the wire depends on the length of the run; 12 gauge is adequate if the length is less than 15 feet. The length of the runs should be minimized. Securely connect a grounding wire to the case of each unit, making sure metal connection is made (no paint or oxidation layer). Most Zetron equipment provides a grounding stud. If the console includes a computer, connect an individual grounding wire to the computer chassis. Figure 11 shows a central “star” grounding system.

All earth grounds in the system should be isolated from signal lines. It is easy to couple ESD or lightning noise spikes if these lines run parallel for any distance. The AC power wires (and DC power to a lesser degree) should also be routed separately. AC lines can have large switching current noise spikes that could couple into signal lines.

Figure 11: Central “Star” Grounding System



Do not connect signal ground to the central “star” ground. The conditioning and reference of the signal grounds is controlled inside the Zetron equipment. The system will be more susceptible to noise interference.

Configuring the System Traffic Card (STC)

The system can have either one or two STC cards. A second card is used to improve system reliability. If a fault occurs in the STC card that has command of the system, the operation will revert to the secondary STC, and system operation will not be affected. Both STC cards should be configured identically.

STC Switches

Two sets of switches are used to set the data rate and default function of the four service ports accessible on the back of the unit.

The eight Data Rate switches are divided into four pairs labeled “L” (Logger), “C” (Clock), “M” (Modem/Service), and “R” (Radio Management). Each of these ports can be set to one of four data rates.

19.2K	9600	2400	1200	(Logger, Modem/Service, Radio Mgmt)
9600	4800	2400	1200	(Clock Port Only)
On Off	On Off	On Off	On Off	
☒ ☐ B	☒ ☐ B	☐ ☒ B	☐ ☒ B	
☒ ☐ A	☐ ☒ A	☒ ☐ A	☐ ☒ A	

The six Mode switches specify the default power-up and reset functions of the Logger, Modem, and Radio Management ports. Backplane monitor (service) information, radio system management information, and general logging information may be directed to any of these ports by setting the associated pair of switches.

Switch	Function
F	Backplane Monitor Destination
E	Backplane Monitor Destination
D	Radio System Management Report Destination
C	Radio System Management Report Destination
B	Logger Data Destination
A	Logger Data Destination

Note In order to activate backplane monitoring, you must log into the STC via one of the backplane ports and set up the appropriate parameters.

For each pair, data is directed to the ports according to the following table:

Switch	Radio Mgmt. Port	Modem Port	Logger Port	None
	On Off	On Off	On Off	On Off
F D or B	☒ ☐	☒ ☐	☐ ☒	☐ ☒
E C or A	☒ ☐	☐ ☒	☒ ☐	☐ ☒

Switches G and H are for factory use only. Both switches should be set to “OFF”.

Jumpers

There are three two-position jumpers on the card: JP1, JP2, and JP3. These jumpers should not require adjustment. Their function is described as follows.

JP1 A B	JP2 A B	JP3 A B	Mode
☒☒☐	☒☒☐	☒☒☐	Normal Operation
☒☒☐	☒☒☐	☐☒☒	Alternate Program Boot (Engineering use only)
☐☒☒	☐☒☒	☐☒☒	Production Test (Factory use only)

Configuring Console Cards

The first step in configuring your CICs is to label each card with the name of the associated console. This is helpful so that once the configuration and adjustments have been made, the card will not be placed in the wrong slot, which probably has different configuration and adjustment requirements.

CIC Switches

Select the console type by setting the upper set of switches. If an existing button console or 24-channel video console is to be used with the Model 4048 CCE, the 24/48-channel switch must be set accordingly.

24CH ☐☒ 48CH	48-Channel Mode, Use this for Video Consoles
24CH ☒☐ 48CH	24-Channel Mode, Use this for Button Console

The switch labeled “----”, immediately below the 24/48 channel mode switch, controls the setting of the cross-mute for positions 9-16 for any console position operating in 24-channel mode. The remaining five switches are for channel offset control. These switches are not required for the Model 4020 and must be left in the OFF position for 4020 installations. Verify no channel offset has been selected. For the Model 4048 system, the 24-channel console models only provide programmable selections for cross-muting positions 1-8. This switch allows you to enable or disable audio muting from positions 9-16 for these console types.

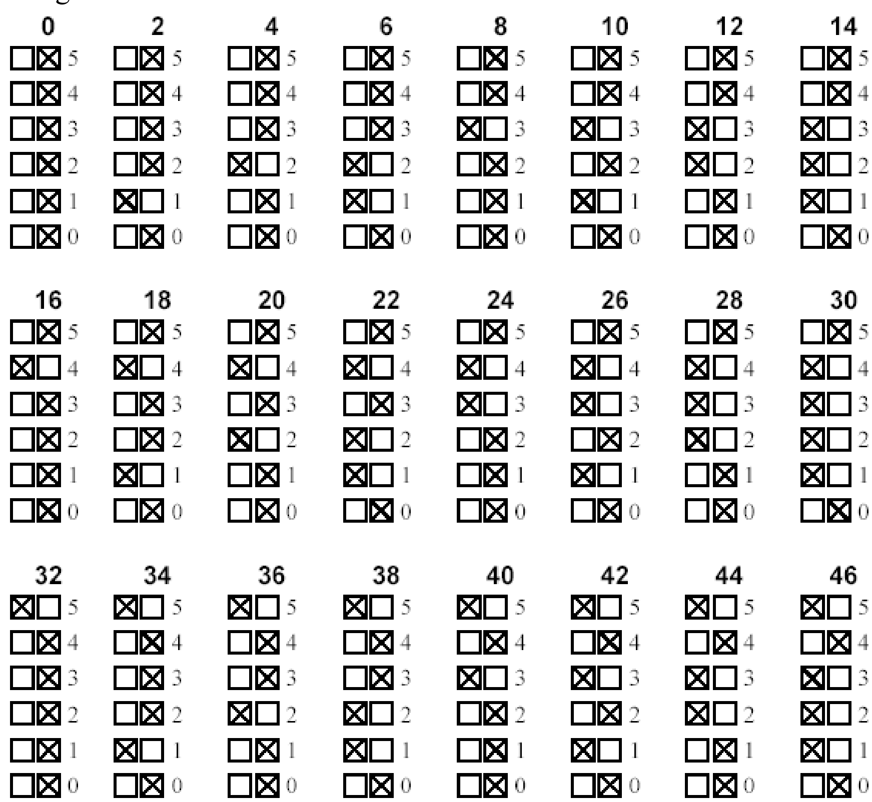
---- ☐☒ ---- Cross muting enabled for all positions 9 through 16

---- ☒☐ ---- Cross muting disabled for all positions 9 through 16

Regardless of the CIC position to which the console is connected, this switch does not affect the cross-muting programmed in the console configuration for positions 1-8. For example, a 24-channel console connected at position 11 will still have selectable muting of positions 1-8 but the muting of positions 9-16 are selected based on the switch setting described above.

If 24-channel operation is selected, the range of 24 channels within the 48-channel system must be selected using the lower six switches (labeled 0-5). These switches are used to specify a channel number offset for the 24-channel console. This offset is used to compute the actual physical channel. For example, if position 3 is a Model 4118 button console configured to control Channels 1-12, but the channels are physically installed as Channels 23-35, the offset would be “22”.

The switches allow you to select an offset in even number increments, such as: +0, +2, +4. The maximum offset is +46. The switches are set using binary arithmetic where switch 0 is the least significant bit. Possible switch selections are:

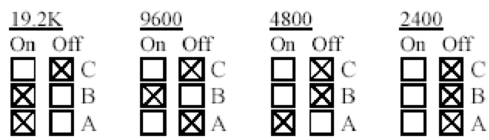


The CIC-to-Console data rate is specified by the three switches labeled 19.2K, 9600, and 1200. Only one of these switches should be switched “ON”. The default is 9600. The 19.2K switch is not currently used. The 1200 switch should be used with Zetron long haul modems for remote console installations.

The CIC Mode switches are used for engineering diagnostics. The position of these switches does not affect console operation.

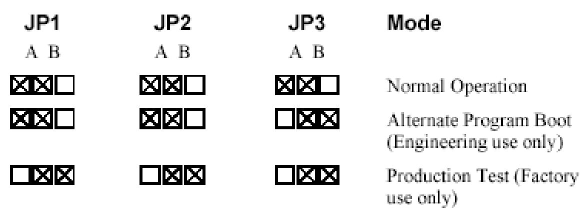
Switch	Function
D	Reset on Backplane Error
C	Engineering Service Port Rate
B	Engineering Service Port Rate
A	Engineering Service Port Rate
---	Spare

Engineering Service Port Data Rate



CIC Jumpers

There are three two-position jumpers on the card: JP1, JP2, and JP3, which should not require adjustment. All three jumpers should be in the A position for normal operation. The following table, included for reference only, shows the other modes selected by these jumpers.



Configuring the Patch Card

Patch Card Switches

The eight position front panel “MODE” switches select functions used by the factory. During normal use they should be in the “OFF” position.

The four-position switch labeled “SW4” on the circuit board is used by the factory to indicate the type and number of patch circuits installed on the patch card.

Switch	Function [Factory Default]
H	Select Alternate Program Boot (Engineering use only) [OFF]
G	Disable Reset on Fault [OFF]
F	Spare
E	Spare
D	Spare
C	Spare
B	Spare
A	Spare

Switch	Function (Factory Default)	Model 4020 or Model 4048
1	Enable first 8 patch circuits	ON
2	Enable second 8 patch circuits	Per order
3	Enable third 8 patch circuits	Per Order
4	Crosspoint type (not implemented)	OFF

Patch Card Jumpers

Jumper JP1 enables or disables access to the programming port. The programming port is for factory use only, so JP1 should stay in the "Normal operation" position.

JP1 A B	Mode
☒☒☐	Normal operation
☐☒☒	Programming port enabled

Connector Identification

On the back of the rack are several 50-conductor, male Amphenol-type plugs used to connect the CCE to consoles and radios. There are several 9-pin D-sub connectors, two RJ11 modular connectors, and accessory connectors.

For the Model 4048, Table 8 identifies the function of each connector found on the back of the console cardcage (Cage 1). Table 9 identifies the first channel cardcage (Cage 2) connector destination/purpose, and Table 10 identifies the second channel cardcage (Cage 3) connector destination/purpose.

For the Model 4020, Table 11 identifies cardcage connector destination/purpose.

Table 8: Model 4048 Console Cardcage Connector Identification

Connector	Connector Destination and/or Purpose
J1	Consoles 1 & 2
J2	Consoles 3 & 4
J3	Consoles 5 & 6
J4	Consoles 7 & 8
J5	Consoles 9 & 10
J6	Consoles 11 & 12
J7	Consoles 13 & 14
J8	Consoles 15 & 16
J9	Recorder audio out (Channels 25 to 48)
J10	Logger (serial data), to computer or printer
J11	Clock (serial data), from optional NetClock 2 clock source
J12	Modem/service (serial data), to/from computer or modem
J13	Radio Management (serial data), to computer or printer
J14	Power input, from first (lower) power supply
J15	Power input, from second (upper) power supply
J16	Alarm relay out and external alarm in
J17	Intercom PTT handset, primary STC
J18	Intercom PTT handset, secondary STC

Table 9: Model 4048 Channel Cardcage #1 Connector Identification

Connector	Connector Destination and/or Purpose
J1	Radio Channels 1-4 or AUX I/O outputs
J2	Radio Channels 5-8 or AUX I/O outputs
J3	Radio Channels 9-12 or AUX I/O outputs
J4	Radio Channels 13-16 or AUX I/O outputs
J5	Radio Channels 17-20 or AUX I/O outputs
J6	Radio Channels 21-24 or AUX I/O outputs
J7	Radio Channels 25-28 or AUX I/O outputs
J8	Radio Channels 29-32 or AUX I/O outputs
J9	Radio Channels 33-36 or AUX I/O outputs
J10	Power input, from first (lower) power supply
J11	Power input, from second (upper) power supply
J12	Recorder audio out (Channels 1 to 24)

Table 10: Model 4048 Channel Cardcage #2 Connector Identification

Connector	Connector Destination and/or Purpose
J1	Radio Channels 37-40
J2	Radio Channels 41-44
J3	Radio Channels 45-48
J4, J5, J6	AUX I/O outputs
J7, J8, J9, J12	(Not used)

Table 11: Model 4020 Console Cardcage Connector Identification

Connector	Connector Destination and/or Purpose
J1	Consoles 1 & 2
J2	Consoles 3 & 4
J3	Consoles 5 & 6
J4	Radio channels 1-4 or AUX I/O outputs
J5	Radio channels 5-8 or AUX I/O outputs
J6	Radio channels 9-12 or AUX I/O outputs
J7	Radio channels 13-16 or AUX I/O outputs
J8	Radio channels 17-20 or AUX I/O outputs
J9	Recorder audio out (Channels 1 to 20)
J10	Logger (serial data), to computer or printer
J11	Clock (serial data), from optional NetClock 2 clock source
J12	Modem/service (serial data), to computer or modem
J13	Radio Management (serial data), to computer or printer
J14	Power input, from first (lower) power supply
J15	Power input, from second (upper) power supply
J16	Alarm relay out and external alarm in
J17	Intercom PTT handset, primary STC
J18	Intercom PTT handset, secondary STC

Configuring Channel Cards

Note To configure a Dual Channel Wireless Control Card (P/N 950-0015), **used for Tait T2030, T2035, T2040, or TM-8255 series radios**; **Zetron Model 427 dispatcher ports**; **or Motorola GM1200 and GM1200E radios**, see *MAP27 Wireless Interface Option* on page 111.

Note To configure a Dual Channel Wireless Control Card (P/N 950-9867), **used for Harris M7100, Jaguar 725M, or an Orion radio**, see *Orion Dual Channel Wireless Control Card Configuration* on page 133.

Note To configure a Dual Channel Wireless Control Card (P/N 905-0372) **for Harris M7300 series radios**, see *Series 4000 Installation Kit for Harris M7300 Radios* (P/N 011-0828).

You can configure each Dual Channel Card (DCC) installed into the channel cardcage to meet the requirements of the channel pairs. Card configuration is typically not performed at the Zetron factory, so even if the system has been assembled and programmed by Zetron, you need to configure the cards.

Label each card with your names for Channel “A” and Channel “B”. When you finish configuring the cards, place the cards in the slots they came from. This will prevent conflicting configurations.

The DCCs have several jumpers and switch-selectable options. Table 12 shows the options. Each type of channel card may have different designators for jumpers and switches.

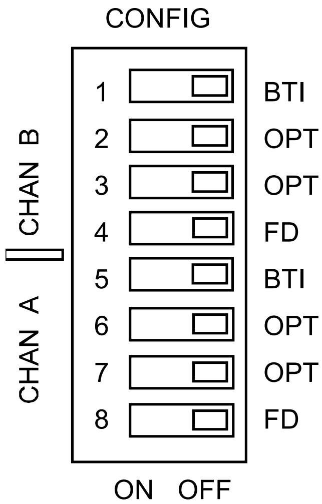
The DCC configuration switches are located at the bottom of the legend plate. The switches are labeled “CONFIG” (see Table 13). There are eight switches. The top four are labeled “CHAN B” and the bottom four are labeled “CHAN A”.

Table 12: Dual Channel Card Configuration Selections

Option	Selection Device
Line Termination	Jumper
Channel Cross-Mute	Switch
Call Source	Jumper
Busy Transmit Inhibit	Switch
Duplex	Switch
High-Level-Guard-Tone Duration	Switch (Tone and T/R control only)
Transmit Audio Record	Jumper

Option	Selection Device
Motorola/GE Current Conversion	Switch (DC Control Only)

Figure 12: Dual Channel Card Configuration Switches Using a Tone or DC Card for Local Control



There may be times when it is desirable to use a tone or DC channel card to control a local control channel, for example when interfacing to a telephone channel or intercom. For Tone/Local cards (P/N 950-9820), changing the control type of a channel is a software configuration item. See *Tone/Local Software Configuration* on page 54.

Line Termination

The transmit audio output and receive audio input may be configured for low impedance or high impedance. For systems with only one control point on a channel, the channel should be configured for low impedance (600Ω). For systems with multiple control points on a channel, all but one parallel-connected channel should be configured for high impedance (see Table 13). One control point in a multiple control point system should be configured for low impedance termination, and this should be the channel card at the far end of the transmission line from the base station.

Low-impedance configurations present a 600Ω impedance on the transmit and receive lines at all times. High-impedance configurations present a 3500Ω (or greater) impedance on the transmit/2-wire receive line while idle, and 600Ω while transmitting. On the 4-wire receive line, a high-impedance is 10,000Ω- at all times.

Table 13: Tone/Local Dual Channel Card (P/N 950-9820), Line-Impedance Jumpers

Channel A	
Tx/2W-Rx High-Impedance	JP5-A
Tx/2W-Rx Low-Impedance	JP5-B*
4W-Rx High-Impedance	JP9-N
4W-Rx Low-Impedance	JP9-Y*
Channel B	
Tx/2W-Rx High-Impedance	JP6-A
Tx/2W-Rx Low-Impedance	JP6-B*
4W-Rx High-Impedance	JP8-N
4W-Rx Low-Impedance	JP8-Y*
* default normal factory setting ** for trunking cards use same settings as tone cards	

Channel Cross-Mute

Each channel may be configured so that the external Cross-Busy Input (X-Busy In) will mute the audio of the channel to all console positions (see Table 14). This is useful to prevent audio feedback between two channels on the same frequency at the same console, or to prevent audio feedback between the Zetron consoles and other consoles present in the same room. Each DCC has the same option.

Table 14: Dual Channel Card, Channel Cross-Mute Switch

Channel A	
Channel Cross-Mute	**Switch Position**
Cross-Mute Enabled	“OPT” (switch 7) On
Cross-Mute Disabled	“OPT” (switch 7) Off*
Channel B	
Channel Cross-Mute	**Switch Position**
Cross-Mute Enabled	“OPT” (switch 3) On
Cross-Mute Disabled	“OPT” (switch 3) Off*
* default factory setting	

Call Source

Each channel typically has its Call indicator source come from voice activity on the channel (VOX) or from carrier activity on the channel Carrier Operated Relay (COR). A carrier operated call requires an extra signal from the base station COR output. Normally, each channel is configured for VOX operation, since extra signals are required for COR operation. Switching between COR and VOX operation is a software configuration item. See *Tone/Local Software Configuration* on page 54.

There is also an Enhanced Call Detection mode available that provides a more precise call detection method, provided certain requirements are met. For more information, see *Enhanced Call Detection Mode* on page 62.

Busy Transmit Inhibit

Each channel may be configured to allow or inhibit transmission on a "Busy" channel (see Table 15). A channel is "Busy" whenever its cross-busy-input (X-Busy In) is activated by a locally paralleled control point, or when its line-operated-transmit-lamp (LOTL) is activated by a remotely paralleled control point. Usually, inhibiting while busy is desired to prevent confused communications and to keep proper line terminations and levels. However, when line conditions cause falsing of the LOTL, it is desirable to be able to transmit even while busy.

Note Only one console within the CCE may transmit on a channel at a time. Each Dual Channel Card has the same option.

Table 15: Dual Channel Card, Busy Transmit Inhibit Switch

Channel A	
Busy Transmit	**Switch Position**
Busy Transmit Inhibit	"BTI" (switch 5) On
Busy Transmit OK	"BTI" (switch 5) Off*
Channel B	
Busy Transmit	**Switch Position**
Busy Transmit Inhibit	"BTI" (switch 1) On
Busy Transmit OK	"BTI" (switch 1) Off*
* factory default	

Duplex

Each channel may be configured for full duplex or simplex operation (see Table 16). Full duplex operation requires a 4-wire system and allows the dispatcher to transmit and receive simultaneously (like a telephone). Simplex (or half-duplex) operation may either be a 2- or 4-wire system, and allows the dispatcher to transmit or receive but not both simultaneously. This switch-selectable option prevents dispatchers in full duplex operation from hearing themselves, and thus prevents feedback. Each DCC has the same option.

Table 16: Dual Channel Card, Duplex Switch

Channel A	
Duplex	**Switch Position**
Full Duplex Operation	“FD” (switch 8) On
Simplex Operation	“FD” (switch 8) Off*
Channel B	
Duplex	**Switch Position**
Full Duplex Operation	“FD” (switch 4) On
Simplex Operation	“FD” (switch 4) Off*
* factory default	

High Level Guard Tone Duration

The optional HLGT duration for tone channels (when front panel switch is on) defaults to the software configuration setting for the Tone/Local DCC (P/N 950-9820). The HLGT duration may be changed from 100 ms to 790 ms. See *Tone/Local Software Configuration* on page 54.

Table 17: Dual Channel Card, HLGT Duration Switch

Channel A	
HLGT Duration	**Switch Position**
HLGT Duration = programmable setting	“OPT” (switch 6) On
HLGT Duration = 120 ms	“OPT” (switch 6) Off*
Channel B	
HLGT Duration	**Switch Position**
HLGT Duration = programmable setting	“OPT” (switch 2) On
HLGT Duration = 120 ms	“OPT” (switch 2) Off*
* factory default	

Guard Tone Frequency

The guard tone frequency for tone channels defaults to 2175 Hz (notch filter from 2120 Hz to 2230 Hz) but is a software configuration item for the Universal Tone/Local DCC (P/N 950-9819 and 950-9820). The guard tone frequency can be changed to one of six other values as described in the Universal Tone/Local DCC Software section.

Low Level Guard Tone Amplitude

The Low Level Guard Tone Amplitude (LLGT) for tone channels defaults to -30 dB but is a software configuration item for the Universal Tone/Local DCC (P/N 950-9819 and 950-9820). The LLGT can be changed from -20 to -34 dB in 2 dB increments as described in the Universal Tone/Local DCC Software section.

LOTL Disable

When parallel control points are used, the FCC requires that the LOTL function be enabled. If no parallel control points are installed, disable the LOTL function because, when enabled, the LOTL function operates even when this console is transmitting.

For Tone/Local Cards (950-9820) using tone control, LOTL enable/disable is configured in software. Refer to *Type* on page 56 for information about the **tone-Custom** parameters used to enable and disable tone LOTL.

Channel VOX Hang Time

VOX hang time refers to the few seconds of call indication after voice activity has stopped. Normal VOX hang time on each channel is about two seconds, which may be too long for radio channel to radio channel or radio channel to telephone patching. VOX hang time is a software configuration item and can be modified as described in *Channel Configuration* on page 56.

Dual Channel Recorder Output Audio

Each channel has a recorder output on which the receive audio is always present. The transmit audio may or may not be present depending on the jumper settings, as shown in Table 18.

Table 18: Dual Channel Recorder Output Audio Selection

Applicable Cards	Tone/Local, and Wireless cards with part numbers: 950-9820, 950-9867, 950-0015, 950-0172	
Channel A	Output Level Adjust (0 to -10 dB) = Rx154	
Channel A	Tx audio off	JP1-C
Channel A	Tx audio on	—
Channel A	Tx audio on	With Guard tone, JP1-B
Channel A	Tx audio on	Without Guard tone, JP1-A
Channel A	Rx audio on	With Guard tone, without IRR, JP21-B
Channel A	Rx audio on	Without Guard tone, with IRR, JP21-A
Channel B	Output Level Adjust (0 to -10 dB) = Ry155	
Channel B	Tx audio off	JP4-C
Channel B	Tx audio on	—
Channel B	Tx audio on	With Guard tone, JP4-B
Channel B	Tx audio on	Without Guard tone, JP4-A
Channel B	Rx audio on	With Guard tone, without IRR, JP22-B
Channel B	Rx audio on	Without Guard tone, with IRR, JP22-A

Note If S4000 Channel Check IRR Option 930-0052 is configured on Dual Channel Cards, any IRR playback audio at dispatch position will be sent to RECORDER / LOGGER output.

LOGGER recordings will contain the audio that was received "live" and for any subsequent IRR playbacks. The IRR recordings are differentiated by audible start and stop markers.

To disable all IRR playback audio being sent to RECORDER/ LOGGER, set RX jumper (JP22) to "without IRR" (position B).

Tone/Local Software Configuration

The basic operating mode and optional features of the Universal and Tone/Local DCCs are configured through the serial port. This requires an ASCII terminal or a computer running a terminal emulation program and the Zetron Serial Interface Cable (Part # 709-7452).

The following features may be enabled using the channel card configuration interface:

- Independent channel type selection
- Tone or Local (Part # 950-9820)
- Automatic Number Identification (ANI) decoding
- DTMF, 5/6 Tone, MDC-1200, GE-Star
- Call detect
- VOX, COR, or LLGT

- Channel Transmit Delay

Note Since the final step in any configuration process results in a card reset, make sure both channels are inactive before making any configuration changes.

♦ To start the configuration software

1. Switch all SW4 switches OFF.
2. Connect the DCC serial port labeled MONITOR to the appropriate serial port on the computer, using the serial interface cable. Run the terminal emulation program on the computer, making sure its serial port is configured to 19.2 Kbps and 8N1. Turn off any hardware/software handshake protocols.
3. Press the ESC key. This information is displayed by the DCC:

```
uDCC88 v2.37  -----  dSP v3.01
--Press <ESC> anytime to return to this menu--
?,Config :
```

Note Your software version number may not match the example shown above.

Navigation

Configuration and option choices are accessed by using single keystrokes to navigate a hierarchical menu structure. The valid choices at any point are displayed in the last line of output from the DCC. Press the capitalized letter to make a selection. Lowercase input is treated the same as uppercase. The ESC key will return to the main menu from any other menu level. The BACKSPACE key will cancel the current selection and return to the previous menu.

Press “?” (question mark) to display the channel card’s current configuration.

Example:

```
DCC Serial_No:: 0000F0E6
--- DCC ChA/B number = 5/6
Active ChA config. ________
 Ch Type = TONE
 ANI   = DTMF
 Call = VOX,-30dB
 TX delay = 0.75sec
 AGC decay = 2.0sec
Active ChB config. ________
 Ch Type = TONE
 ANI   = 5-Tone,ZVEI-1
 Call = VOX,-30dB
 TX delay = none
 AGC decay = 0.50sec
AudioDRAM installed = 1 Mbyte
AudioDRAM is Opt'l
4 Mbyte IRR memory enabled.
```

Channel Configuration

♦ To configure the operating mode of each channel

1. From the main menu, press C.
2. Press A or B to configure Channel A or Channel B. The following menu is displayed:

   `Define,Review,Store,Init,Log, <BS> :`

   - Pressing 'R' displays the new configuration.
   - Pressing 'I' resets the new configuration to the current configuration.
   - Pressing 'S' makes the new configuration permanent and resets the card.

   Note A new configuration will have no effect on the channel until it is stored by this command.

   - Pressing 'L' displays a logging submenu:

     `Ani,Call,<BS> : C`

     - Pressing 'A' displays the option to log ANIs from this channel.
     - Pressing 'C' displays the option to log calls from this channel.
3. Press D to define a new configuration. The following menu appears:

   `Type,Call,agcPeak,Ani,txDly,<BS> :`

Type

♦ To assign a channel type

1. Press T. The following menu appears:

   `Dc,Tone-std,tone-Custom,Local,<BS> :`
2. If this is a Tone/Local DCC, press T, C, or L to select this channel's control type. Do not choose option D, which is intended only for certain legacy cards.

   If 'Tone-std' is selected, a standard tone channel is configured with these default characteristics:

Guard Tone	2175 Hz*
High-Level GT duration when 'OPT' switch is ON	600 ms
Low-Level GT amplitude	-30 dB
LOTL	Enabled
Remote Function	Enabled
GT/Remote voice delay	Enabled

   * With a 2175 Hz Guard Tone, there is a notch filter from 2120 Hz to 2230 Hz.
3. To change these default values, select tone-Custom. The following menu is displayed:

   ```
   gtFreq,hlgtDur,llgtLevel,disable_loTl,
   disableRemote,disableGt_dly,<BS> :
   ```

a. Press F to define a Guard Tone frequency.

```
A:2100,B:2175,C:2300,D:2325,E:2600,F:2800,G:2970,<BS> :
```

b. Press D to define a custom High-Level duration GT.

```
enter '10' to '79' (duration in 10 ms units),<BS> :
```

c. Press L to define a custom Low-Level GT amplitude (dB relative to High Level Guard Tone).

```
A:-20dB,B:-22,C:-24,D:-26,E:-28,F:-30,G:-32,H:-34,<BS> :
```

4. Press T to disable the line operated transmit light (LOTL) for tone channels.
5. Press R to disable the Remote Function Tone burst.
6. Press G to disable the Guard Tone / Remote Function voice delay.

Warning! If you are using the IRR option, disable the guard tone delay. Doing so prevents an echo effect on the IRR outputs.

7. Backspace to the following menu.

```
Type,Call,Ani,txDly,<BS> :
```

Call

♦ To define the channel's Call input source

1. Press C. This menu appears:

```
Vox-std,vox-Delay,vox-Thresh,vox-Input,Cor,voxAndcor<BS>:
```

2. Press V, D, T, I, C, or A to select the channel calls input source. If 'Vox-std' is selected, the VOX hang time will default to 2.0 seconds and the VOX threshold will default to -28dB. This can be changed by selecting 'vox-Delay' instead and then choosing a custom delay from the following menu:

```
delay (sec.) = A:0.5,B:1.0,C:1.5,D:2.0,E:2.5,F:3.0,G:3.5,
H:4.0,<BS> :
```

Note Selecting V (Vox-std) in this menu sets all other settings in the call menu to default. This includes connecting the VOX input to the AGC output.

The 'voxAndcor' call mode is only used for Enhanced Call Detection mode. Additional settings must be configured for this mode. For more information, see *Enhanced Call Detection Mode* on page 62.

3. Press T to adjust the threshold.

```
A=-18dB,B=-20,C=-22,D=-24,E=-26,F=-28,G=-30,H=-32,<BS> :
```

4. Press I to connect VOX input to AGC *input*. By default, VOX input is connected to AGC *output*.
5. Backspace to the main menu.

```
Type,Call,Ani,txDly,<BS> :
```

AGC Peak Detector Decay

Setting a higher decay time will cause the locked AGC gain to be lower when the audio input level drops towards zero. This will reduce the background noise level when the channel is idle but slightly reduce the AGC response time.

♦ To set the AGC Peak Detector Decay

1. Press P to set the AGC Peak Detector Decay:

   ```
   decay (sec.) = A:0.25, B:0.5, C:1.0, D:2.0, E:3.0, F:4.0,
   G:5.0, H:6.0,<BS> :
   ```

2. Choose the number of seconds for the delay and press the appropriate letter A-H.

Set ANI Options

♦ To select an ANI decoding mode

1. Press A to set the ANI decoding mode.

   ```
   None,Dtmf,Five,Mdc,Gstar,Ss1,<BS> :
   ```

2. Press N to disable all ANI decoding, D to enable DTMF ANI decoding, F to enable 5/6-Tone ANI decoding, M to enable MDC-1200 ANI decoding, G to enable GE-Star.
3. ANI decoding, or S to enable SS1 Selective Signaling decoding.

5/6-Tone ANI Decoding

♦ To set 5/6 Tone options

1. Press F to choose a 5/6-Tone tone set.

   ```
   A:eia,B:ccir100,C:zvei1,D:eea,E:zvei2,
   F:dzvei,G:pzvei,H:ccir70,<BS>:
   ```

2. Choose a tone set from those listed in Table 89.
3. Press the letter that corresponds to the desired tone set.

MDC-1200 ANI Decoding

♦ To set MDC options

1. Press **M** to set MDC-1200 options:

   ```
   Emerg,Muting<BS> :
   ```

2. Press **M** to enable or disable muting

   ```
   Enable,Disable<BS> :
   ```

   Note The muting option is only functional if the SIMM option is installed.

3. Backspace to the MDC-1200 menu.
4. Press **E** to choose an Emergency ANI behavior:

```
EMERG: All,Only_1st,Timed,<BS> :
```

Option	Result
A	All emergency ANI numbers are reported
O	Only the first occurrence of an emergency ANI number is reported. Subsequent repeats are ignored until a different ANI number is received.
T	A timer starts when an emergency ANI number is received. Repeats of that number are ignored for the duration of the timer. Any other emergency ANI number is reported and restarts the timer.

5. If you choose the timed option, select the timer duration.

```
60sec,30sec,15sec,5sec,<BS>
```

GE-Star ANI Decoding

The GE-Star ANI output format is described in *GE-Star ANI Decoding* on page 233.

♦ To set GE-Star options

1. Press G to select GE-Star decoding.

```
Mode,Emerg,muTing<BS> :
```

2. Press M to access the GE-Star decode format menu.

```
A:system0,B:system1,C:system2,D:system3,E:11bit,
F:12bit,G:13bit,H:gs#4,I:gs#3,J:is#1,K:nysp<BS> :
```

3. Press a letter to choose a GE-Star format.

A	Multi-System 0	12-bit decode
B	Multi-System 1	12-bit decode
C	Multi-System 2	12-bit decode
D	Multi-System 3	12-bit decode
E	Standard	11-bit decode
F	Mobile/Portable	12-bit decode
G	Mobile/Portable	13-bit decode
H	GE-Star #4	14-bit decode
I	GE-Star #3	14-bit decode
J	ID Star #1	14-bit decode
K	NYSP	See note.

Note GE-Star NYSP (format K) is a special format reserved for NYSP. Using this format requires a separate Zetron software license.

4. Backspace to the GE-Star menu.

5. Press E to define the desired Emergency ANI behavior from the following menu:

   `All,Only_1st,Timed,<BS> :`

Option	Result
A	All emergency ANI numbers are reported
O	Only the first occurrence of an emergency ANI number is reported. Subsequent repeats are ignored until a different ANI number is received.
T	A timer starts when an emergency ANI number is received. Repeats of that number are ignored for the duration of the timer. Any other emergency ANI number is reported and restarts the timer.

6. If you choose the timed option, select the timer duration.

   `60sec,30sec,15sec,5sec,<BS>`

7. Backspace to the GE-Star menu.
8. Press **M** to enable or disable muting

   `Enable,Disable<BS> :`

Note The muting option is only functional if the SIMM option is installed.

SS1 Selective Signaling Decoding

♦ To set SS1 options

1. Press S to enable SS1 ANI decoding.

   `1digit,2digit,3digit,<BS>`

2. Select 1-digit, 2-digit, or 3-digit decoding.

Transmit Delay

Transmit delay is a fixed audio delay that may be programmed for each channel. It is programmable in 0.25-second increments from none to 3.75 seconds. Transmit audio is buffered for the programmed interval then sent to the channel. This allows the operator to begin speaking immediately upon keyup without regard of any delays imposed by the radio network.

♦ To select the transmit delay for the current channel

1. Press D. The following menu appears:

   ```
   delay(sec.)= A:none, B:0.25-2.0,
   C:2.25-3.75, <BS> :
   ```

2. Select A, B, or C, depending on the range of delay desired.
3. Select the final value from the options presented.

Review and Save Channel Configuration

♦ To make the configuration permanent and active

1. Backspace until the following menu is displayed:
   `Define,Review,Store,Init,<BS> :`
2. Press R to review and verify the new configuration. Then press S.

Options Configuration

♦ To configure the channel card audio memory options

1. From the main menu, press C and then O.
   `Dram,enableIrr,Store,<BS> :`
2. Press D to set the DRAM option.

   This menu is displayed: `Reqd,Optl,<BS> :`

   Press R to specify that the audio memory module is required. The entire channel card is disabled if the memory module is missing or bad.
3. OR

   Press O to specify that the audio memory module is optional. Only the Instant Recall Recorder and Voice Delay features are disabled if the memory module is missing or bad.

Note The following configurations support the Instant Recall Recorder option:

Support IRR Option

4018, 4118, or 4116B consoles w/ software version 1.50 or higher
4118/4018 CPSW software version 1.4 or higher
All 4217B consoles and IntegratorRD workstations

4. Press I to enable the Instant Recall Recorder option for both channels. This is usually done at the factory when the option is ordered but may be done later as an upgrade.
5. Enter the Access Code received from the factory and press Enter.

   The following message is displayed:
   `4 Mbyte IRR memory enabled.`

   Then the following menu is displayed:
   `Dram,enableIrr,Store,<BS> :`
6. Press S (Store) to enable the option and make it permanent.

Warning! When using the IRR option, disable the guard tone delay. Doing so prevents an echo effect on the IRR outputs. To disable the guard tone delay, see Step 6 in section *Type* on page 56.

DSP Trace Output

The DSP trace output feature is for factory use only. It should only be used when prompted to do so by Zetron Technical Support. Normally this feature should be turned off. It is configured via the diagnostic port as follows:

```
uDCC88 v2.79 ------  dSP v3.17
Press "<ESC>,C,T" to enter the DSP Trace main menu:
---Press <ESC> anytime to return to this menu--- ?,Config : C
chA,chB,Options,Flash,dspTrace,<BS> : T
oN, oFF, Addr_list, Interval,<BS> :
```

At this menu you can turn DSP trace output on or off by pressing **N** or **F** respectively.

Enhanced Call Detection Mode

Overview

Enhanced Call Detection uses a combination of VOX detection, COR or LLGT detection, and the channel's patch state.

Enhanced Call Detection (VOX+COR or VOX+LLGT) operates as follows: When the channel is patch-enabled, the start of a call is only recognized when either COR or LLGT goes active (active-going VOX transitions are ignored). When the channel is not patched, the start of a call is recognized when one of COR, VOX, or LLGT go active. The end of a call is recognized only when COR, VOX, and LLGT are all inactive, no matter what the channel's patch-state is.

LLGT detection, available only with an iRIM, does not require a preceding HLGT burst and is set to a default threshold of -35 dBm. The iRIM is programmed to output its LLGT signal to the UDCC at -25 dBm, which is 18 dBm below the **Audio Level To Console** parameter, configurable in the iRIM.

When the VOX+COR/LLGT mode is enabled, if either COR or LLGT is active, the UDCC will deny all transmit requests if the BTI switch is ON (see *Busy Transmit Inhibit* on page 51).

Requirements

- Universal Dual Channel Card with firmware version 2.78 or newer
- The VOX+COR method requires a radio with COR output
- The VOX+LLGT method requires a Zetron iRIM for Kenwood or EFJohnson radios with firmware version 1.68 or newer

Configuration

There are two methods of detection that can be configured: VOX+COR or VOX+LLGT. Some steps in the procedure can be skipped depending on which method you are using; this is identified at each step.

♦ To configure Enhanced Call Detection mode

1. Configure the Universal Dual Channel Card (UDCC).

> **Note** Step 1 applies to both VOX+COR and VOX+LLGT detection methods.

   a. Connect to the UDCC from a maintenance PC using a serial cable and terminal software set to 19200-8-N-1-NONE.
   b. Press **ESC** to bring up the main menu.
   c. Navigate to **Call** menu and configure VOX defaults by pressing the following keys: (C)onfig, channel (A) or (B), (D)efine, (C)all, (V)ox_std. This sets the VOX threshold to -28 dBm.
   d. Store the new configuration: Press **Backspace** until the following menu is displayed: `Define,Review,Store,Init,<BS> :`

      ...then press (S)tore.
   e. Press **ESC** to bring up the main menu.
   f. Navigate to the Call menu by pressing the following keys: (C)onfig, either channel (A) or (B), (D)efine, (C)all.
   g. Select a detection method:
      - For the VOX+COR detection method, press vox(A)ndcor.
      - For the VOX+LLGT detection method, press vox(A)ndcor, then vox(I)nput.
   h. Store the new configuration: Press **Backspace** until the following menu is displayed: `Define,Review,Store,Init,<BS> :`

      ...then press (S)tore.
2. Disable LOTL.

> **Note** Step 2 only applies to the VOX+COR detection method. For VOX+LLGT, skip to Step 3.

   a. Press **ESC** to bring up the main menu.
   b. Press (C)onfig, either channel (A) or channel (B), (D)efine, (T)ype, tone-(C)ustom, disable_lo(T)l.
   c. Store the new configuration: Press **Backspace** until the following menu is displayed: `Define,Review,Store,Init,<BS> :`

      ...then press (S)tore.
   d. Skip to Step 6.

3. Configure the iRIM for LLGT.

> **Note** Step 3 only applies to the VOX+LLGT method of detection. For VOX+COR, skip to Step 6.

Configuring the iRIM requires that you have a working network connection from a maintenance PC to an installed iRIM. If you do not, see *Intelligent Radio Interface Module for Kenwood Radios* (P/N 025-9520) for connection information.

a. Open a web browser, such as Internet Explorer, and connect to the iRIM. The default address is **http://192.168.0.133/** and the default password is **8206363**.

b. Click **View or Modify Configuration**.

c. Depending on the channel you need to configure, click **Channel A Parameters** or **Channel B Parameters**.

d. Set **Audio Level To Console** to **-7** dBm (the default value).

e. Enable **Guard Tone To Console On COR**. This enables LLGT output from the iRIM. Note there is no level setting for the LLGT; the iRIM always generates LLGT at -18dB below the **Audio Level To Console** setting. This means that the iRIM shall generate the LLGT at a level of -25dBm if the iRIM device generates an **Audio Level To Console** signal at a level of -7dBm by the default parameter level setting.

4. Configure the channel with IntegratorRDPS.

> **Note** Step 4 only applies to the VOX+LLGT method of detection. For VOX+COR, skip to Step 6.

a. Using IntegratorRDPS, make sure the channel is programmed as a Tone channel with iRIM enabled (see *Defining the Channel* on page 269).

5. Adjust and test the configuration.

> **Note** Step 5 only applies to the VOX+LLGT method of detection. For VOX+COR, skip to Step 6.

a. Key up a remote radio, but do not speak. This causes the low level guard tone to be sent.

b. Adjust the UDCC Rx level pot so that the Rx test point reads -44.4 dBm (4.7 mV rms). This is a simple way to adjust Rx audio level when using an iRIM, the resulting Rx level should be the same as if it was adjusted using the normal Rx adjustment procedure (40% deviation is at the knee of the AGC).

6. Make some radio calls and confirm correct operation.

LED Error Display

If a critical error occurs during reset or power-up of a Universal or Tone/Local DCC, its front panel ERROR LED illuminates. Certain other LEDs flash to indicate which error occurred, as shown in Table 19. The channel card is disabled as long as the error is active. Try resetting the channel card to clear the error. If the error persists, it indicates a hardware failure, which requires factory service.

Table 19: Dual Channel Card Error LED Error Display

Error LED	Channel A		Channel B		Meaning
	LOTL LED	Call LED	LOTL LED	Call LED	
ON	FAST	FAST	OFF	OFF	Master DSP Initialization failure (U10)
ON	OFF	OFF	FAST	FAST	Slave DSP Initialization failure (U26)
ON	SLOW	SLOW	OFF	OFF	Non-Volatile Memory Read failure
ON	OFF	OFF	SLOW	SLOW	Non-Volatile Memory Read failure
ON	FAST	FAST	FAST	FAST	Required Audio Memory is bad or missing (U4)
ON	SLOW	SLOW	SLOW	SLOW	Card is plugged into wrong slot
FAST	OFF	OFF	OFF	OFF	Internal System RAM failure (U22)
Notes: ON = LED is continuously on OFF = LED is continuously off SLOW = LED is blinking slowly (1 blink/sec.) FAST = LED is blinking quickly (3 blinks/sec.)					

Wiring to the Channels

The radio channel interface is performed by the DCC. Each DCC has terminations for two transmit/receive channels known as “Channel A” and “Channel B”. A number refers to all 48 channels in the system, channels 1-48. The channel numbers that a DCC controls are determined by the card slot into which the channel card is plugged. The connections between the DCC and the radio base stations are made through the 50-conductor male plugs on the back of the channel cardcage. The connections for a pair of DCCs (four channels) are carried by one of these 50-conductor plugs. An AUX I/O in a slot will output its 12 relays to the 50-conductor plug.

Table 20 shows the channel allocations by slot designator and plug designator for the Model 4048. Table 21 shows the channel allocations by slot designator and plug designator for the Model 4020.

Note This section describes the signal connections for conventional channels. Signal connections for trunked radio applications can be found in *Wireless Interface Options* on page 111.

Table 20: Model 4048 Channel Slot/Plug Cross-reference

	Channel Numbers		
Card Slot	**Channel Rack #1**	**Channel Rack #2**	**Plug**
1	1/2	37/38	J1
2	3/4	39/40	J1
3	5/6	41/42	J2
4	7/8	43/44	J2
5	9/10	45/46	J3
6	11/12	47/48	J3
7	13/14	AUX I/O Only	J4
8	15/16	AUX I/O Only	J4
9	17/18	AUX I/O Only	J5
10	19/20	AUX I/O Only	J5
11	21/22	AUX I/O Only	J6
12	23/24	AUX I/O Only	J6
13	25/26	Not Used	J7
14	27/28	Not Used	J7
15	29/30	Not Used	J8
16	31/32	Not Used	J8
17	33/34	Not Used	J9
18	35/36	Not Used	J9

Table 21: Model 4020 Channel Slot/Plug Cross-reference

Card Slot	Channel Numbers	Plug
1	1/2	J1
2	3/4	J1
3	5/6	J2
4	7/8	J2
5	9/10	J3
6	11/12	J3

Each 50-conductor plug carries four radio channels, referred to as Channel A, B, C and D. Each channel includes twelve signals.

Figure 13 is a schematic of conventional signals, equivalent circuits, and the plug connections on which they are found.

Table 22 is a summary of the signals found on each channel plug. Table 22 also contains the wire colors for the 25-pair cables typically used to connect to the plugs. Figure 14 and Figure 15 show the corresponding punch-down connections.

Figure 13: Channel Signal Equivalent Circuits

50-Pin Connector Pin Numbers				
Ch-A	**Ch-B**	**Ch-C**	**Ch-D**	**Signal**
1	7	13	19	PTT +
26	32	38	44	PTT –
2	8	14	20	COR +
27	33	39	45	COR –
3	9	15	21	Aux Output
28 gnd	34 v+	40 gnd	46 v+	Ground or V+
4	10	16	22	Tx Audio +
29	35	41	47	Tx Audio –
5	11	17	23	Rx Audio +
30	36	42	48	Rx Audio –
6	12	18	24	X-Busy Input
31	37	43	49	X-Busy Output

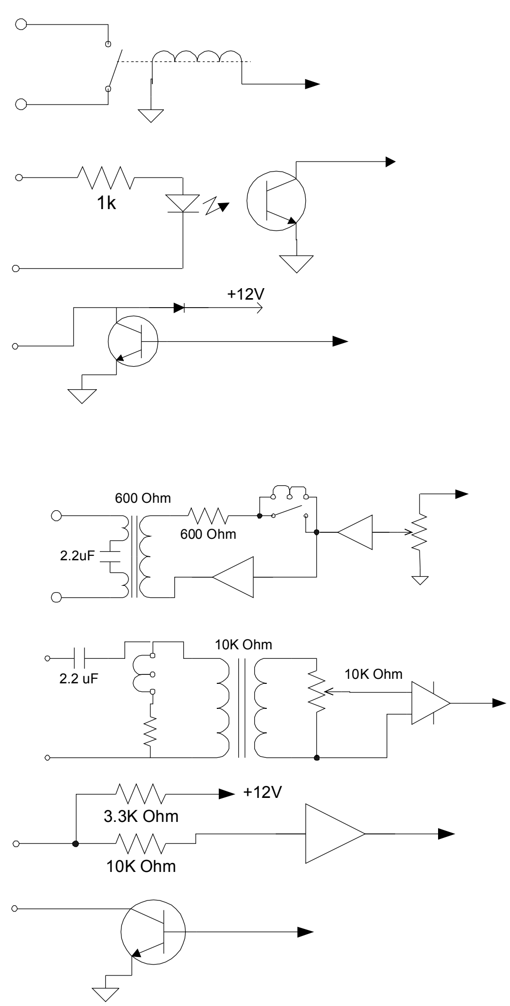


Table 22: 50-Conductor Plug, Channel Signal Summary

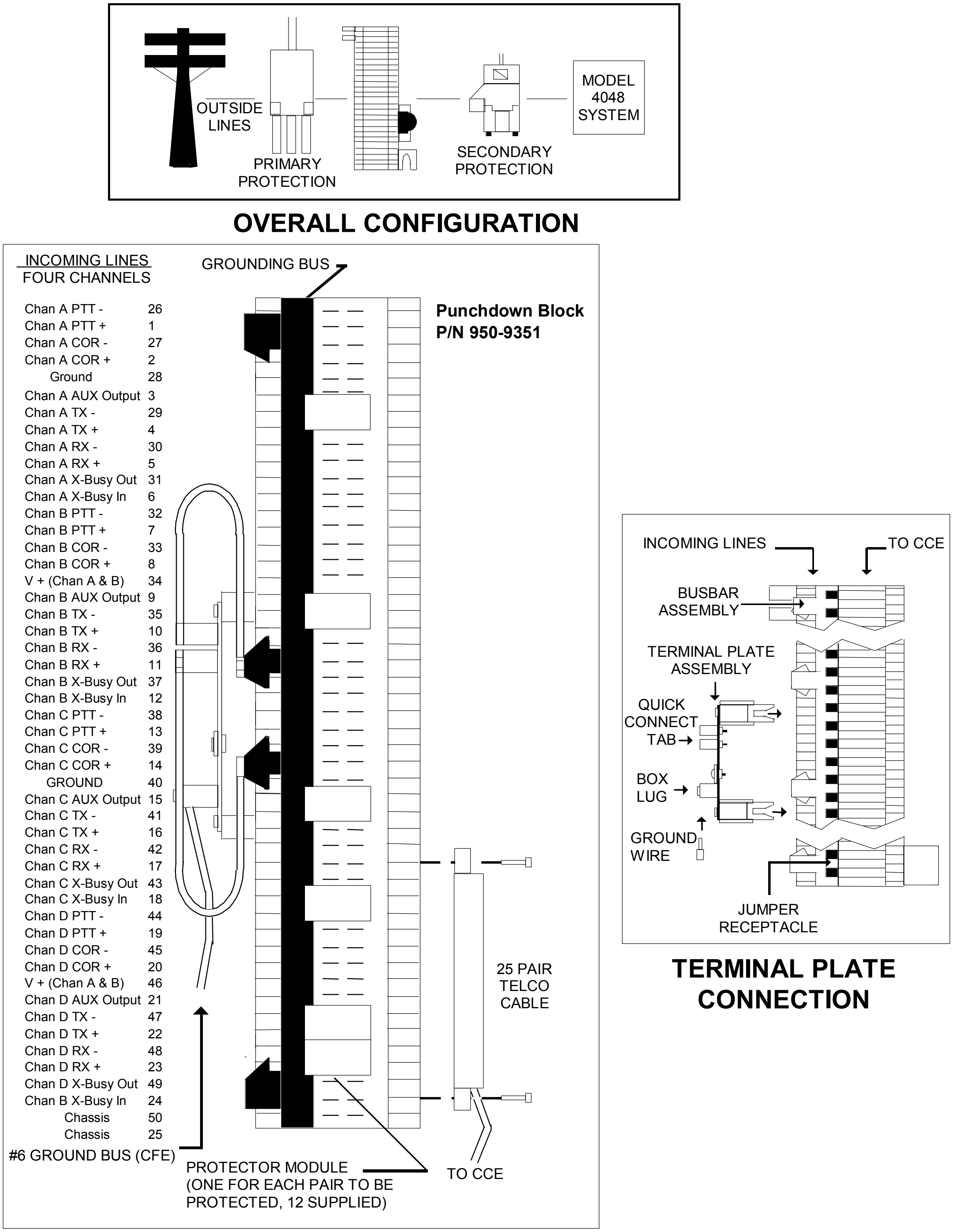
Signal	Wire Color	Connector		Wire Color*	Signal
Chan A. PTT-	Wht/Blu	26	1	Blu/Wht	Chan A. PTT+
Chan A. COR-	Wht/Org	27	2	Org/Wht	Chan A. COR+
Ground	Wht/Grn	28	3	Grn/Wht	Chan A. Aux Output
Chan A. Tx -	Wht/Brn	29	4	Brn/Wht	Chan A. Tx +
Chan A. Rx -	Wht/Slt	30	5	Slt/Wht	Chan A. Rx +
Chan A. X-Busy Out	Red/Blu	31	6	Blu/Red	Chan A. X-Busy In
Chan B. PTT-	Red/Org	32	7	Org/Red	Chan B. PTT+
Chan B. COR-	Red/Grn	33	8	Grn/Red	Chan B. COR+
V+	Red/Brn	34	9	Brn/Red	Chan B. Aux Output
Chan B. Tx -	Red/Slt	35	10	Slt/Red	Chan B. Tx +
Chan B. Rx -	Blk/Blu	36	11	Blu/Blk	Chan B. Rx +
Chan B. X-Busy Out	Blk/Org	37	12	Org/Blk	Chan B. X-Busy In
Chan C. PTT-	Blk/Grn	38	13	Grn/Blk	Chan C. PTT+
Chan C. COR-	Blk/Brn	39	14	Brn/Blk	Chan C. COR+
Ground	Blk/Slt	40	15	Slt/Blk	Chan C. Aux Output
Chan C. Tx -	Yel/Blu	41	16	Blu/Yel	Chan C. Tx +
Chan C. Rx -	Yel/Org	42	17	Org/Yel	Chan C. Rx +
Chan C. X-Busy Out	Yel/Grn	43	18	Grn/Yel	Chan C. X-Busy In
Chan D. PTT-	Yel/Brn	44	19	Brn/Yel	Chan D. PTT+
Chan D. COR-	Yel/Slt	45	20	Slt/Yel	Chan D. COR+
V+	Vio/Blu	46	21	Blu/Vio	Chan D. Aux Output
Chan D. Tx -	Vio/Org	47	22	Org/Vio	Chan D. Tx +
Chan D. Rx -	Vio/Grn	48	23	Grn/Vio	Chan D. Rx +
Chan D. X-Busy Out	Vio/Brn	49	24	Brn/Vio	Chan D. X-Busy In
Chassis	Vio/Slt	50	25	Slt/Vio	Chassis
* Wht = white, Red = red, Blk = black, Yel = yellow, Vio = violet Blu = blue, Org = orange, Grn = green, Brn = brown, Slt = slate First color is main color and the second color is stripe.					

Figure 14: Split 50 66m Type Punch-down (P/N 950-9351) for Signals for Eight Channels

FOUR CHANNELS			ADJACENT FOUR CHANNELS
Chan. A PTT -		26	Chan. A PTT -
Chan. A PTT +		1	Chan. A PTT +
Chan. A COR -		27	Chan. A COR -
Chan. A COR +		2	Chan. A COR +
Ground	28	28	Ground
Chan. A Aux Output		3	Chan. A Aux Output
Chan. A Tx -		29	Chan. A Tx -
Chan. A Tx +		4	Chan. A Tx +
Chan. A Rx -		30	Chan. A Rx -
Chan. A Rx +	5	5	Chan. A Rx +
Chan. A X-Busy Out		31	Chan. A X-Busy Out
Chan. A X-Busy In		6	Chan. A X-Busy In
Chan. B PTT -		32	Chan. B PTT -
Chan. B PTT +		7	Chan. B PTT +
Chan. B COR -	33	33	Chan. B COR -
Chan. B COR +		8	Chan. B COR +
V +		34	V +
Chan. B Aux Output		9	Chan. B Aux Output
Chan. B Tx -		35	Chan. B Tx -
Chan. B Tx +	10	10	Chan. B Tx +
Chan. B Rx -		36	Chan. B Rx -
Chan. B Rx +		11	Chan. B Rx +
Chan. B X-Busy Out		37	Chan. B X-Busy Out
Chan. B X-Busy In		12	Chan. B X-Busy In
Chan. C PTT -	38	38	Chan. C PTT -
Chan. C PTT +		13	Chan. C PTT +
Chan. C COR -		39	Chan. C COR -
Chan. C COR +		14	Chan. C COR +
Ground		40	Ground
Chan. C Aux Output	15	15	Chan. C Aux Output
Chan. C Tx -		41	Chan. C Tx -
Chan. C Tx +		16	Chan. C Tx +
Chan. C Rx -		42	Chan. C Rx -
Chan. C Rx +		17	Chan. C Rx +
Chan. C X-Busy Out	43	43	Chan. C X-Busy Out
Chan. C X-Busy In		18	Chan. C X-Busy In
Chan. D PTT -		44	Chan. D PTT -
Chan. D PTT +		19	Chan. D PTT +
Chan. D COR -		45	Chan. D COR -
Chan. D COR +	20	20	Chan. D COR +
V +		46	V +
Chan. D Aux Output		21	Chan. D Aux Output
Chan. D Tx -		47	Chan. D Tx -
Chan. D Tx +		22	Chan. D Tx +
Chan. D Rx -	48	48	Chan. D Rx -
Chan. D Rx +		23	Chan. D Rx +
Chan. D X-Busy Out		49	Chan. D X-Busy Out
Chan. D X-Busy In		24	Chan. D X-Busy In
Chassis		50	Chassis
Chassis	25	25	Chassis

9068-24A

Figure 15: Protected Punch-down Block for Radio Channels



The following signals are available on all channel cards regardless of type.

Push-to-Talk +/-

The dry contacts across these two signals close whenever the channel is transmitting. This may be used for a single function, local transmitter keying, or E&M signaling. The contacts will handle 1A at 48V. While the PTT contacts are closed, the “XMIT” indicator on the channel card is on.

Carrier Operated Relay +/-

Normally, the console derives its call indication from a VOX circuit connected to the Rx Audio. However, for a more positive call indication, this signal may be connected to a local transceiver’s carrier operated relay (COR) circuit. This may also be used in E&M signaling systems. Note that the voltage from COR+ to COR- must be between 5 and 20V to indicate “CALL ON”, and between 0.7 and 0 to indicate “CALL OFF”. A negative voltage or a voltage greater than 25V should never be placed across the COR inputs. While COR is indicating “CALL ON”, the CALL indicators on the channel card and the "CALL" text in IntegratorRD are active.

Auxiliary Output

This open-collector output pulls to ground when the standby-base feature for the channel is activated. This output will sink 500 mA to 0.8V when active, and will withstand no more than 12V when inactive.

Transmit Audio +/-

This is the balanced source for transmit audio. Normally, the impedance of this output is 600Ω, however, with the replacement of a jumper, this output can be set to 3500Ω when not actually sourcing audio. This can be useful for paralleling control stations on the same set of wires. The output is isolated for voltages up to 1500 VAC. The transmit audio level may be adjusted as high as +10 dBm using the “TX” adjustment on the channel card.

The Tx Audio signals are also used for receiving audio in a 2-wire system. The 2-wire receive sensitivity may be adjusted to -30 dBm using the “2W RX” adjustment on the channel card.

Receive Audio +/-

This is the balanced input for receive audio in a 4-wire system. Normally, the impedance of this input is 600Ω, however, with the replacement of a jumper, this input can be made to go to 10,000Ω when not actually sourcing audio. This can be useful for paralleling multiple control points. The output is isolated for voltages up to 1500 VAC. The 4-wire receive sensitivity may be adjusted to -30 dBm using the “4W RX” adjustment on the channel card edge.

STOP **Warning!** Do not parallel a DC Dual Channel Card with a Tone Control Dual Channel Card. The interface could be damaged.

Cross-Busy Input/Output

This input/output pair is used for cross-busy handshaking for multiple parallel control point arbitration. The X-Busy Output sinks current to ground when the channel is transmitting. The X-Busy Input inhibits transmission on the channel while the input is grounded (or within 1 volt). The output will sink up to 0.5 A to 0.8V when active, and will tolerate no more than 12V when inactive. While the X-Busy Input is active, the “BSY-I” indicator on the channel card is on. If enabled through switch, the X-Busy Input will also mute the channel audio when the input is active.

Base Station Installation

For single frequency/single receiver base stations, connect the Tx and Rx audio pair. See Figure 14 on 69 and Figure 15 on 70 for the location of the connections on the punch-down block.

For two transmitter/multiple frequency base stations, see *T2-2R Base Station Installation* on page 228.

Auxiliary I/O Card Installation (Optional)

Overview

The Auxiliary Input/Output Card (Part # 950-0293) is designed to provide a means for the Series 4000 Communications Control System to monitor external on/off inputs and control external on/off outputs. Each Auxiliary I/O card contains 12 SPST relay outputs, 8 optically isolated inputs, and 32 non-isolated inputs. The Model 4020 and Model 4048 system supports up to six Auxiliary I/O cards, providing a total of 72 outputs and 240 inputs.

The Auxiliary Input/Output Card has an IRIG B decoder as well as a power line 50-60 hertz timekeeping circuit. A console clock can be accurately synchronized to either the IRIG B encoder or the 50-60 hertz from the power line (use a 9-12 VAC output step-down transformer). Timing input can be connected to any one of the six cards. Only one kind of timing input should be connected to an Auxiliary Card.

Intercom Interface

The instructions in this section are somewhat generic. If you are configuring an Aux I/O Card specifically for use with a Zetron Intercom Interface, see the *Series 4000 and Model 4010 Intercom Interface Product Manual* (P/N 025-9331 rev C or newer). That manual provides installation, configuration, and programming instructions that are much more specific to that task.

Electrical Specifications

Outputs

(12 per card)

Relay Contact Current:	1.0 A
Isolation Voltage:	50V with respect to system ground and between contacts

Optically Isolated Inputs

(8 per card)

"On" Current Range:	+5 to +10 mA
"Off" Current Range:	-15 to +1 mA
Maximum Positive Current:	+15 mA continuous, +40 mA peak
Maximum Negative Current:	-15 mA continuous, -40 mA peak
Equivalent Series Resistance:	405Ω plus a 0.7-volt drop (forward)
Isolation Voltage:	100V with respect to system ground

Nonisolated Inputs

(32 per card)

Inactive Voltage Range:	+3.5 to +30V
Active Voltage Range:	-30V to +0.9V
Equivalent Parallel Resistance:	8.2KΩ pulled to +11.5V

IRIG B Decoder

(One connection per system)

Input Amplitude:	1 to 4 V_{pp}

Power Line 60 Hz Synchronization

(Use a 110/220 Step-Down Transformer)

Input Voltage: 9 or 12V AC with 50-60 Hz/sec

Configuring the Auxiliary Input/Output Card

The only configurable items on the Aux I/O Card are the card's address and 50/60-Hz timing selection. Since the system may have up to six Aux I/O Cards, the card's address selection switches are used to set the Aux I/O Card number. The bank of dip switches used for this is labeled SW1, located at the bottom of the card's legend plate. Table 23 shows the allowed switch settings that result in valid card addresses. Setting switches 1-3 in any combination not shown in Table 23 will disable the card.

Table 23: Auxiliary Input/Output Card, Address Switches

Card Address	SW1 Switch Positions		
0	1 OFF	2 OFF	3 OFF
1	1 ON	2 OFF	3 OFF
2	1 OFF	2 ON	3 OFF
3	1 ON	2 ON	3 OFF
4	1 OFF	2 OFF	3 ON
5	1 ON	2 OFF	3 ON
Using any switch combination not listed here disables the card.			

Switch 4 of SW 1 is used to select 50 Hz or 60 Hz timing if input #39 is used for line input timing (see the following table).

Table 24: Auxiliary Input/Output Card, Frequency Switch

Frequency	SW1 Switch 4 Position
50 Hz	ON
60 Hz	OFF

The factory configuration and field programming documentation refers to the inputs and outputs as pure numbers, without regard to the Aux
I/O Card on which they belong. The outputs are numbered from 1 to 72. The inputs are numbered from 1 to 240. Use Table 25 and Table 26 to convert between the system I/O numbers and Card I/O-Card Address numbers.

Table 25: Auxiliary Output System-To-Card Conversion

Card Address ⇒ **Output #** ⇓	**0**	**1**	**2**	**3**	**4**	**5**
1	1	13	25	37	49	61
2	2	14	26	38	50	62
3	3	15	27	39	51	63
4	4	16	28	40	52	64
5	5	17	29	41	53	65
6	6	18	30	42	54	66
7	7	19	31	43	55	67
8	8	20	32	44	56	68
9	9	21	33	45	57	69
10	10	22	34	46	58	70
11	11	23	35	47	59	71
12	12	24	36	48	60	72

Table 26: Auxiliary Input System-To-Card Conversion

Card Address ⇒ Card Input # ⇓	**0**	**1**	**2**	**3**	**4**	**5**
1	1	41	81	121	161	201
2	2	42	82	122	162	202
3	3	43	83	123	163	203
4	4	44	84	124	164	204
5	5	45	85	125	165	205
6	6	46	86	126	166	206
7	7	47	87	127	167	207
8	8	48	88	128	168	208
9	9	49	89	129	169	209
10	10	50	90	130	170	210
11	11	51	91	131	171	211
12	12	52	92	132	172	212
13	13	53	93	133	173	213
14	14	54	94	134	174	214
15	15	55	95	135	175	215
16	16	56	96	136	176	216
17	27	57	97	137	177	217
18	18	58	98	138	178	218
19	19	59	99	139	179	219
20	20	60	100	140	180	220
21	21	61	101	141	181	221
22	22	62	102	142	182	222
23	23	63	103	143	183	223
24	24	64	104	144	184	224
25	25	65	105	145	185	225
26	26	66	106	146	186	226
27	27	67	107	147	187	227
28	28	68	108	148	188	228
29	29	69	109	149	189	229
30	30	70	110	150	190	230
31	31	71	111	151	191	231
32	32	72	112	152	192	232
*33	33	73	113	153	193	233
*34	34	74	114	154	194	234
*35	35	75	115	155	195	235
*36	36	76	116	156	196	236
♦*37	37	77	117	157	197	237
♦*38	38	78	118	158	198	238
♦*39	39	79	119	159	199	239
♦*40	40	80	120	160	200	240

* Card Inputs 33-40 are optically isolated
♦ Input for time synchronization.

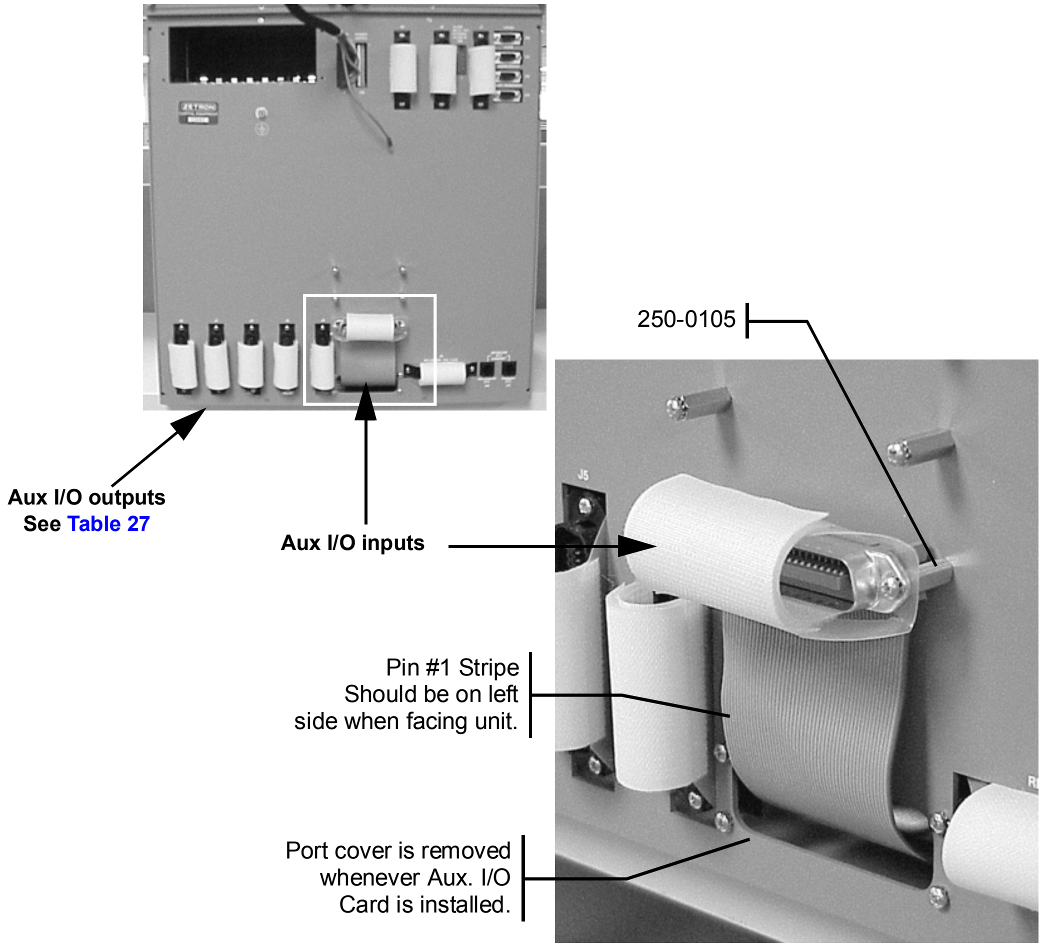
Wiring to the Auxiliary Input/Output Card

Each Aux I/O Card uses two connectors inside the CCE. The card's outputs use half of one of the 50-conductor plugs, depending on which channel slot has the card inserted into it. The card's inputs use a special ribbon cable, with a red stripe on the edge, that is supplied with the card. One end of the cable is split and terminated in two 26-pin connectors. The other end contains a 50-conductor plug, like connectors J17-J22.

When shipped from the factory, the cable is generally installed on the card. For field installation of the cable, the card must first be installed in the desired card slot. Any free card-slot may be used since the address of the Aux I/O card is set by a switch. The cards in the slots to the right of the Aux I/O card slot will have to be removed to install the cable connectors. The split-end of the cable should be threaded through the two holes in the bottom card cage bracket. The two small connectors on the split-end of the cable are labeled "P2" and "P3" and should mate with the corresponding receptacles on the Aux I/O card.

The ribbon cable should be secured with tie-wraps. The cable may be folded in fourths in order to make it a convenient bundle. Secure the 50-conductor plug at the other end of the cable to the mounting holes of the CCE with the hardware provided. See the following figures for the various mounting locations.

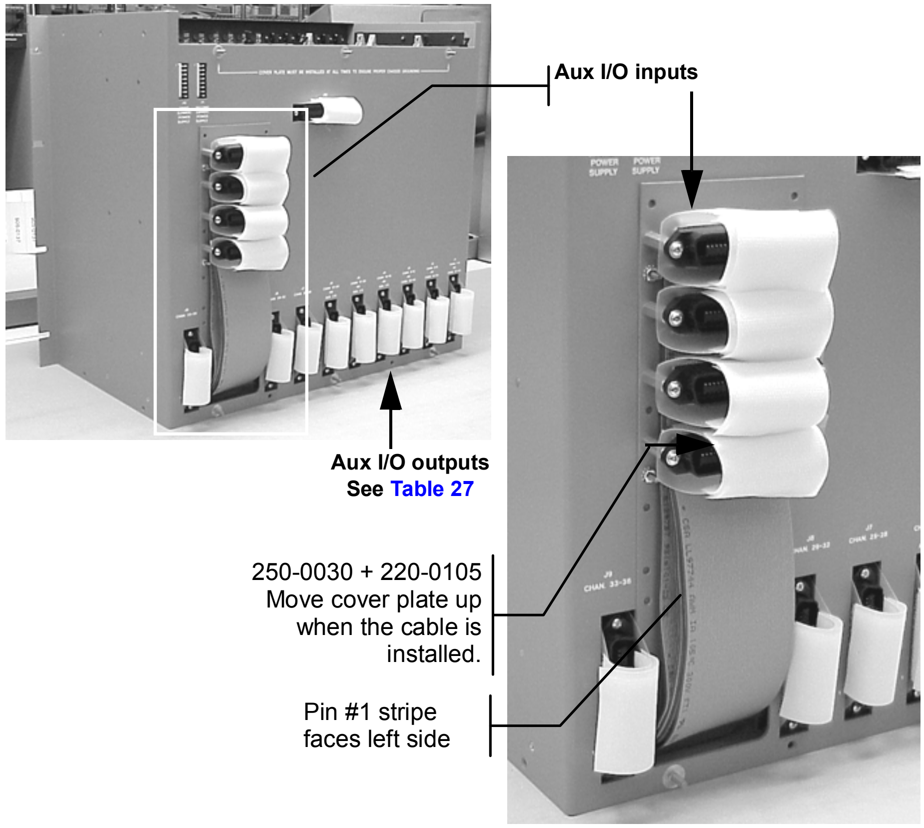
Figure 16: Model 4020 50-Conductor Plug Mounting



Note The connector ports used for Aux I/O inputs are optional and are only installed when Aux I/O cards are installed. Systems without Aux I/O cards will not have these connectors installed.

These connector ports are multipurpose connectors. Connector functionality depends on the type of cards installed. See Table 27 for Aux I/O use.

Figure 17: Model 4048 50-Conductor Plug Mounting



Note The connector ports used for Aux I/O inputs are optional and are only installed when Aux I/O cards are installed. Systems without Aux I/O cards will not have these connectors installed.

These connector ports are multipurpose connectors. Connector functionality depends on the type of cards installed. See Table 27 for Aux I/O use.

Relay Output Connections

The plug, at which the outputs from the Aux I/O Card may be found, is dependent on the slot into which it is plugged. Table 27 will help you locate the proper plug. Table 28 identifies the pin number of the plug on which to find the desired output signals.

Table 27: Aux I/O Card Slots and Outputs

Card Slot	Output Plug	Card Slot	Output Plug
Model 4008		**Model 4020**	
5	J11-Top	1	J4-Top
6	J11-Bottom	2	J4-Bottom
		3	J5-Top
		4	J5-Bottom
		5	J6-Top
		6	J6-Bottom
		7	J7-Top
		8	J7-Bottom
		9	J8-Top
		10	J8-Bottom
Model 4024		**Model 4048**	
1	J17-Top	1	J1-Top
2	J17-Bottom	2	J1-Bottom
3	J18-Top	3	J2-Top
4	J18-Bottom	4	J2-Bottom
5	J19-Top	5	J3-Top
6	J19-Bottom	6	J3-Bottom
7	J20-Top	7	J4-Top
8	J20-Bottom	8	J4-Bottom
9	J21-Top	9	J5-Top
10	J21-Bottom	10	J5-Bottom
11	J22-Top	11	J6-Top
12	J22-Bottom	12	J6-Bottom

Table 28: Auxiliary Outputs, 50-Conductor Plugs

Aux I/O Card in odd slot	— Top Half of Punch Block —							
	Output	**Relay**	**Signal**	**Pin**	**Wire Color**	**Signal**	**Pin**	**Wire Color**
	1	K6	1A	1	Blue/White	1B	26	White/Blue
	2	K12	2A	2	Orange/White	2B	27	White/Orange
	3	K5	3A	3	Green/Orange	3B	28	White/Green
	4	K11	4A	4	Brown/White	4B	29	White/Brown
	5	K4	5A	5	Slate/White	5B	30	White/Slate
	6	K10	6A	6	Blue/Red	6B	31	Red/Blue
	7	K3	7A	7	Orange/Red	7B	32	Red/Orange
	8	K9	8A	8	Red/Green	8B	33	Red/Green
	9	K2	9A	9	Brown/Red	9B	34	Red/Brown
	10	K8	10A	10	Slate/Red	10B	35	Red/Slate
	11	K1	11A	11	Blue/Black	11B	36	Black/Blue
	12	K7	12A	12	Orange/Black	12B	37	Black/Orange
Aux I/O Card in even slot	— Bottom Half of Punch Block —							
	Output	**Relay**	**Signal**	**Pin**	**Wire Color**	**Signal**	**Pin**	**Wire Color**
	1	K6	1A	13	Green/Black	1B	38	Black/Green
	2	K12	2A	14	Brown/Black	2B	39	Black/Brown
	3	K5	3A	15	Slate/Black	3B	40	Black/Slate
	4	K11	4A	16	Blue/Yellow	4B	41	Yellow/Blue
	5	K4	5A	17	Orange/Yellow	5B	42	Yellow/Orange
	6	K10	6A	18	Green/Yellow	6B	43	Yellow/Green
	7	K3	7A	19	Brown/Yellow	7B	44	Yellow/Brown
	8	K9	8A	20	Slate/Yellow	8B	45	Yellow/Slate
	9	K2	9A	21	Blue/Violet	9B	46	Violet/Blue
	10	K8	10A	22	Orange/Violet	10B	47	Violet/Orange
	11	K1	11A	23	Green/Violet	11B	48	Violet/Green
	12	K7	12A	24	Brown/Violet	12B	49	Violet/Brown
			Ground	25	Slate/Violet	Ground	50	Violet/Slate

Note **Signal** refers to the relay signals shown in Figure 18.

The first wire color is the main color; the second color is the stripe.

Auxiliary Relay Output Jumper Setting

Each relay output has two sets of jumpers, as shown in Figure 18. Figure 19 gives a detailed view of how the current position of a jumper is determined.

Figure 18: A Typical Relay Diagram

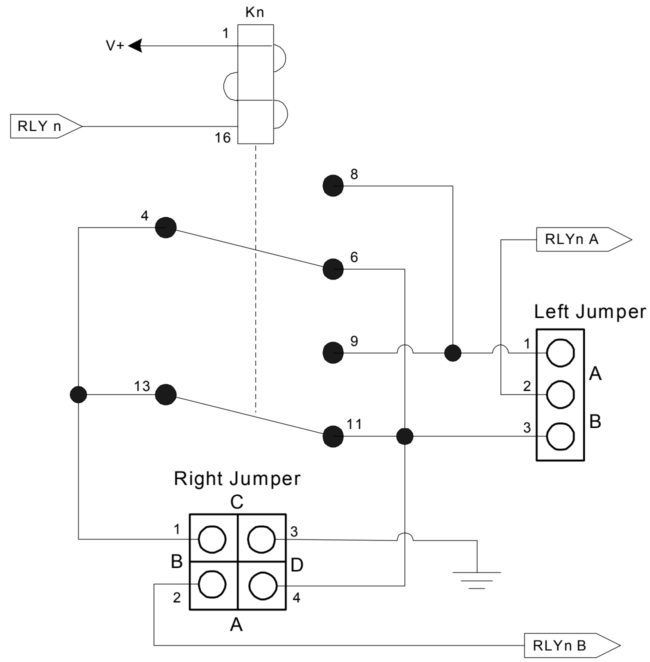
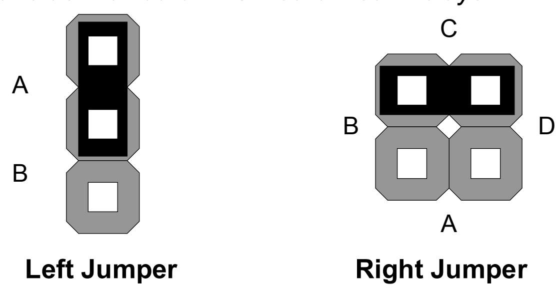


Figure 19: Jumper Pairs as Viewed on PC Board Near Relays



By arranging these jumpers each relay output can be configured as shown in Table 29. The individual jumper numbering for each relay is shown in Table 30.

Table 29: Relay Jumper Configuration

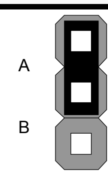
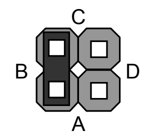
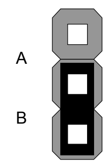
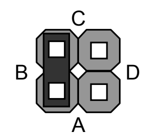
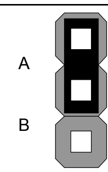
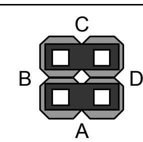
Relay Contact Configuration	Left Jumper	Right Jumper
Relay off, A & B signals open Relay on, A & B signals connected		
Relay off, A & B signals connected Relay on, A & B signals open		
Relay off, A signal open, B signal grounded Relay on, A signal grounded, B signal open		

Table 30: Relay Jumper Number Assignments

Output	Relay	Left Jumper #	Right Jumper #
1	K6	JP25	JP26
2	K12	JP37	JP38
3	K5	JP23	JP24
4	K11	JP35	JP36
5	K4	JP21	JP22
6	K10	JP33	JP34
7	K3	JP19	JP20
8	K9	JP31	JP32
9	K2	JP17	JP18
10	K8	JP29	JP30
11	K1	JP15	JP16
12	K7	JP27	JP28

Input and Timing Input Connections

The 50-conductor plug at the end of the special ribbon cable attached to the Aux I/O Card carries all of the card's input signals. 32 of the inputs are single-ended and are referenced to the system's ground. The remaining eight inputs are optically isolated, each requiring two signals: a current input (+) and output (-). Table 31 identifies the pin number of the plug on which to find the desired input signals.

Table 31: Auxiliary Inputs, Special 50-conductor Plug

Input	Punch Block Pin	Wire Color	Input	Punch Block Pin	Wire Color
2	26	White/Blue	**1**	1	Blue/White
4	27	White/Orange	**3**	2	Orange/White
6	28	White/Green	**5**	3	Green/White
8	29	White/Brown	**7**	4	Brown/White
10	30	White/Slate	**9**	5	Slate/White
12	31	Red/Blue	**11**	6	Blue/Red
14	32	Red/Orange	**13**	7	Orange/Red
16	33	Red/Green	**15**	8	Green/Red
18	34	Red/Brown	**17**	9	Brown/Red
20	35	Red/Slate	**19**	10	Slate/Red
22	36	Black/Blue	**21**	11	Blue/Black
24	37	Black/Orange	**23**	12	Orange/Black
25	38	Black/Green	**Ground**	13	Green/Black
27	39	Black/Brown	**26**	14	Brown/Black
29	40	Black/Slate	**28**	15	Slate/Black
31	41	Yellow/Blue	**30**	16	Blue/Yellow
33+	42	Yellow/Orange	**32**	17	Orange/Yellow
34+	43	Yellow/Green	**33-**	18	Green/Yellow
35+	44	Yellow/Brown	**34-**	19	Brown/Yellow
36+	45	Yellow/Slate	**35-**	20	Slate/Yellow
37+	46	Violet/Blue	**36-**	21	Blue/Violet
38+	47	Violet/Orange	**37-**	22	Orange/Violet
39+	48	Violet/Green	**38-**	23	Green/Violet
40+	49	Violet/Brown	**39-♦**	24	Brown/Violet
Ground	50	Violet/Slate	**40-***	25	Slate/Violet

* Input 40- (Ring 25) connect IRIG B - (ground)
Input 40+ (Tip 49) connect IRIG B + (IRIG B input signals)
JP3, JP4 on Auxiliary I/O Card must also be set at B position

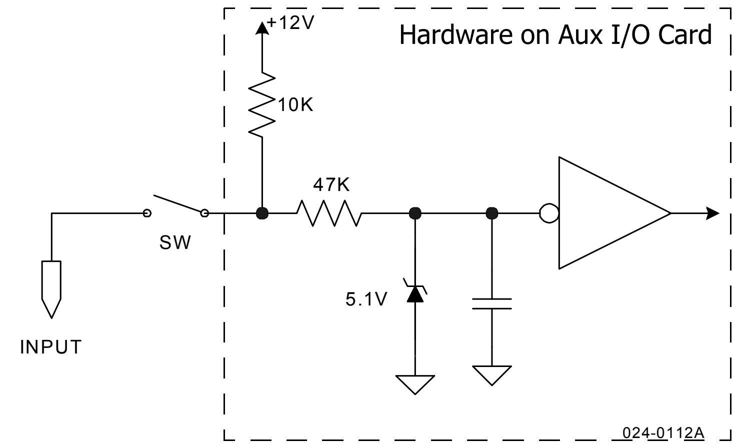
♦ Input 39- (Ring 24) connect 9 or 12 V_{AC} at 60Hz
Input 39+ (Ring 48) connect 9 or 12 V_{AC} at 60 Hz
JP1, JP2 on Auxiliary I/O Card must also be set at B position

Note The first wire color is the main color; the second color is the stripe.

Standard Input Connections

By making the connections shown in Figure 20, the indicator on the operator console is active when the switch is closed. The input circuitry is active low and does not require 12 VDC applied externally. The components shown to the right of the switch are part of the AUX I/O card.

Figure 20: Standard Input Connection



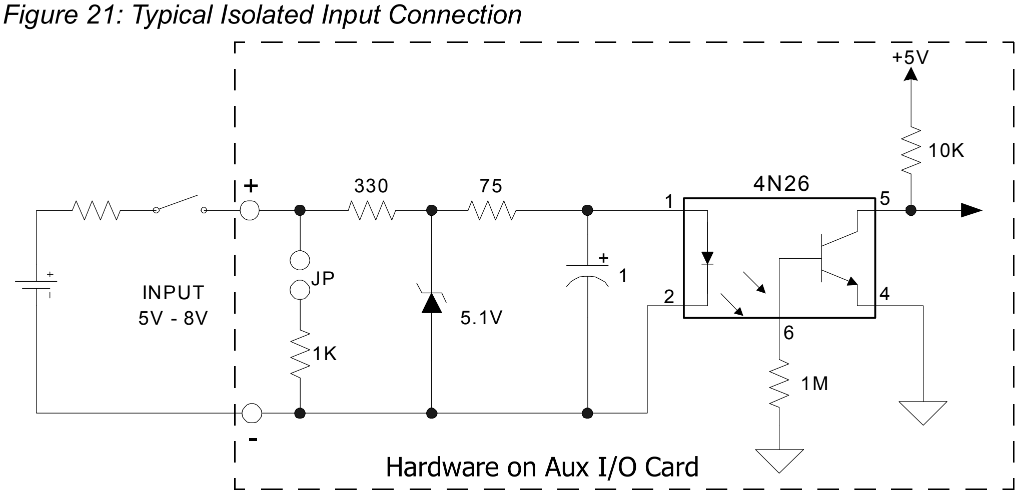
Isolated Input Connections

To activate the isolated inputs, a current of 5-10 mA is typically required. (See Figure 21.)

Warning! Under no circumstances should an input current of 20 mA be exceeded.

A 1 kΩ resistor in parallel with the inputs can be used with an external resistor to create the proper divider.

Figure 21: Typical Isolated Input Connection



Wiring to the Consoles

Each Console Interface Card (CIC) interfaces one dispatch console to the system. Each console is referred to by console number 1-16 for the Model 4048 and 1-6 for the Model 4020. The console that a CIC is controlling is determined by the card slot into which the console card is plugged. The connections between the CIC and the console are made through the 50-pin male plugs (J1-J8) on the back of the console card cage. Table 32 summarizes the signals for even-numbered (2, 4, …16) and odd-numbered (1, 3, …15) consoles. Figure 23 shows the corresponding punch-down connections.

Table 32: Model 4048/4020 Console Signal Summary

Pos #	Signal	Wire Color*	Connector		Wire Color	Signal
Even		Wht/Blu	26	1	Blu/Wht	
Even		Wht/Org	27	2	Org/Wht	
Even		Wht/Grn	28	3	Grn/Wht	
Even		Wht/Brn	29	4	Brn/Wht	
Even	Mon B+	Wht/Slt	30	5	Slt/Wht	Mon B-
Even	Mon A-	Red/Blu	31	6	Blu/Red	Mon A+
Even	IC Data -	Red/Org	32	7	Org/Red	IC Data +
Even	CI Data -	Red/Grn	33	8	Grn/Red	CI Data +
Even	Ground (Data)	Red/Brn	34	9	Brn/Red	Ground (Data)
Even	Mic Voice +	Red/Slt	35	10	Slt/Red	Mic Voice -
Even	Unselect Voice +	Blk/Blu	36	11	Blu/Blk	Unselect Voice -
Even	Select Voice -	Blk/Org	37	12	Org/Blk	Select Voice +
Odd		Blk/Grn	38	13	Grn/Blk	
Odd		Blk/Brn	39	14	Brn/Blk	
Odd		Blk/Slt	40	15	Slt/Blk	
Odd		Yel/Blu	41	16	Blu/Yel	
Odd	Mon B+	Yel/Org	42	17	Org/Yel	Mon B-
Odd	Mon A-	Yel/Grn	43	18	Grn/Yel	Mon A+
Odd	IC Data -	Yel/Brn	44	19	Brn/Yel	IC Data +
Odd	CI Data -	Yel/Slt	45	20	Slt/Yel	CI Data +
Odd	Ground (Data)	Vio/Blu	46	21	Blu/Vio	Ground (Data)
Odd	Mic Voice +	Vio/Org	47	22	Org/Vio	Mic Voice -
Odd	Unselect Voice +	Vio/Grn	48	23	Grn/Vio	Unselect Voice -
Odd	Select Voice -	Vio/Brn	49	24	Brn/Vio	Select Voice +
All	Chassis	Vio/Slt	50	25	Slt/Vio	Chassis

*First color is main color; second color is stripe. Wht = white, Red = red, Blk = black, Yel = yellow, Vio = violet, Blu = blue, Org = orange, Grn = green, Brn = brown, Slt = slate

Wire Distribution

The connection between the CCE and the consoles is made by connecting the 50-conductor plugs to punch-down blocks, and then through normal twisted-pair distribution to modular duplex wall jacks near the console. From the wall jacks, two half-twist, 6-conductor modular telephone cables connect to the two modular jacks on the back of the dispatch console control panel. Alternatively, if the physical location of the equipment allows it, the modular cords from the back of the console may be wired directly to the punch-down blocks.

Table 33 and Figure 22 show the wiring of a duplex wall jack.

Table 33: Console Duplex Wall Jack, VOICE and DATA Connections

Console Signal	Pin #	Wall Jack Wire Color
VOICE (to Dispatch Console Jack P8)		
Unselect Voice -	1	White
Unselect Voice +	2	Black
Microphone Voice -	3	Red
Microphone Voice +	4	Green
Select Voice -	5	Yellow
Select Voice +	6	Blue
DATA (to Dispatch Console Jack P9)		
Ground (Data)	1	White
CI Data -	2	Black
CI Data +	3	Red
IC Data -	4	Green
IC Data +	5	Yellow
Ground (Data)	6	Blue

Figure 22: Console Duplex Wall Jacks

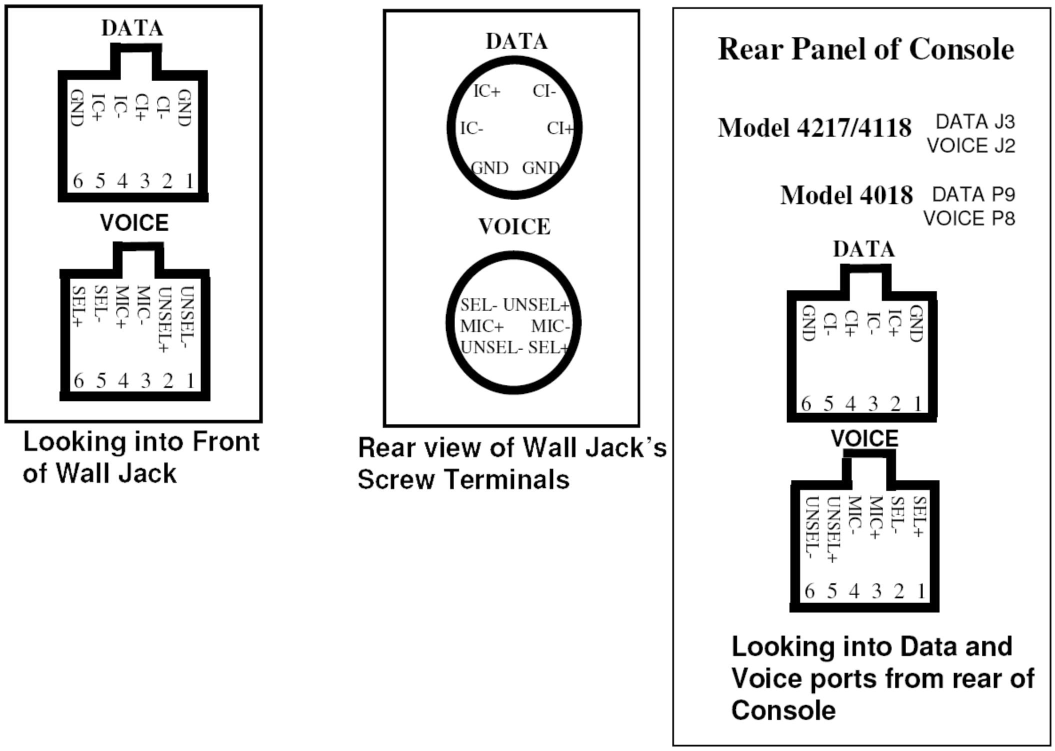
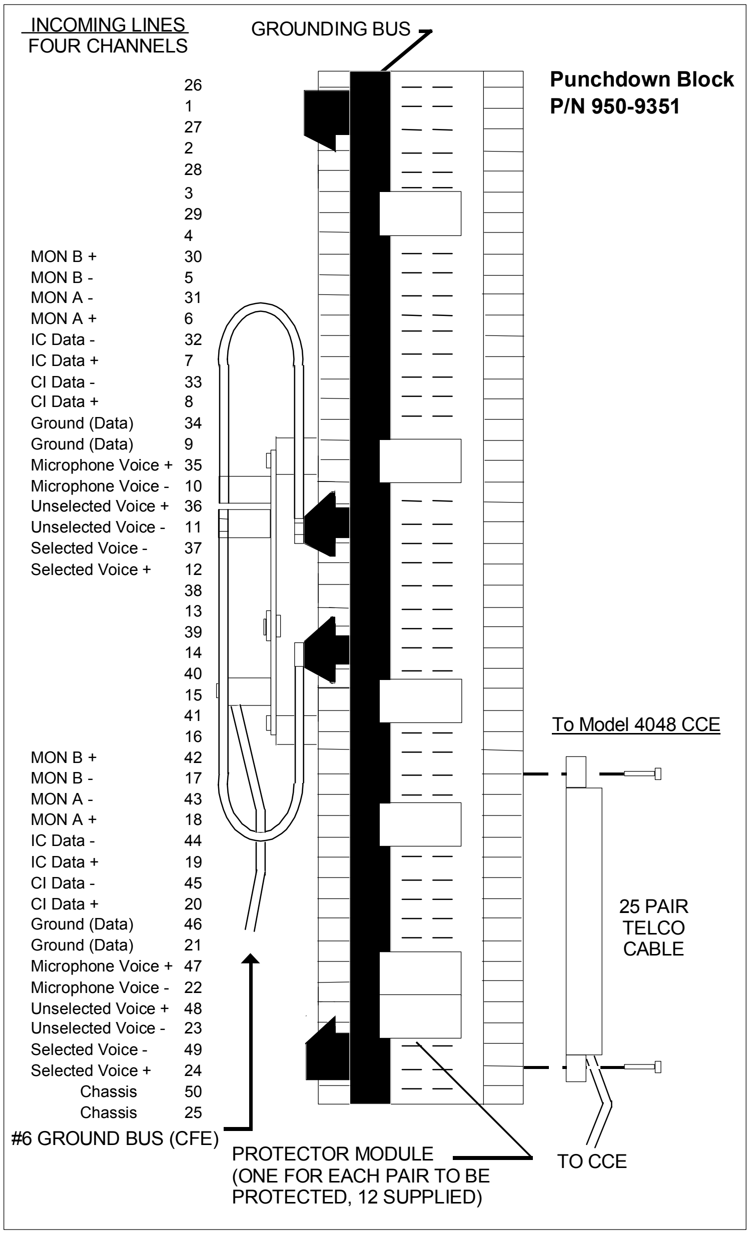
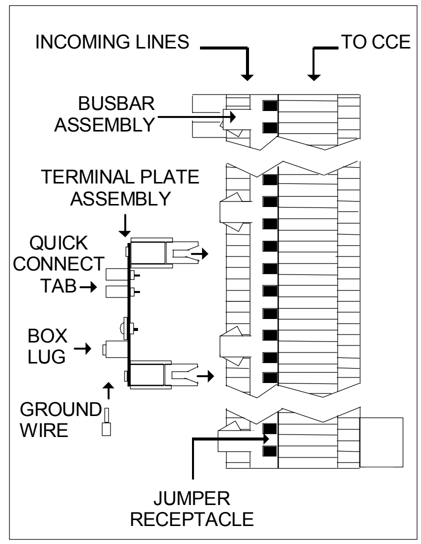


Figure 23: Protected Punch-down Blocks for Consoles





TERMINAL PLATE CONNECTION

Console Signal Descriptions

The following signals are available on all channel cards.

Select Voice +/- (Sel +/-)

This balanced pair of audio signals from the CIC provides the dispatch console with a nominal 0 dBm output of the selected channel's receive audio. It is important that these two signals are physically paired (twisted) for most of the wiring run.

Unselect Voice +/- (Uns +/-)

This balanced pair of audio signals from the CIC provides the dispatch console with a nominal 0 dBm output of the unselected channel’s receive audio. It is important that these two signals are physically paired (twisted) for most of the wiring run.

Microphone Voice +/- (Mic +/-)

This balanced pair of audio signals from the dispatch console provides the CIC with a nominal 0 dBm output of the microphone’s transmit audio. It is important that these two signals are physically paired (twisted) for most of the wiring run.

IC Data +/- (IC +/-)

This differential pair of data signals from the CIC provides the dispatch console with status of the system. The data rate is selectable between 1200 and 9600 baud. It is important that these two signals are physically paired (twisted) for most of the wiring run.

CI Data +/- (CI +/-)

This differential pair of data signals from the dispatch console provides the CIC controls of the system. The data rate is selectable between 1200 and 9600 baud. It is important that these two signals are physically paired (twisted) for most of the wiring run.

Ground-Data (GND)

These two signals carry a ground reference for the data signals between the CIC and the dispatch console. Ground signals are required when passing the data directly over metallic connections.

Mon A Audio (MON A +/-)

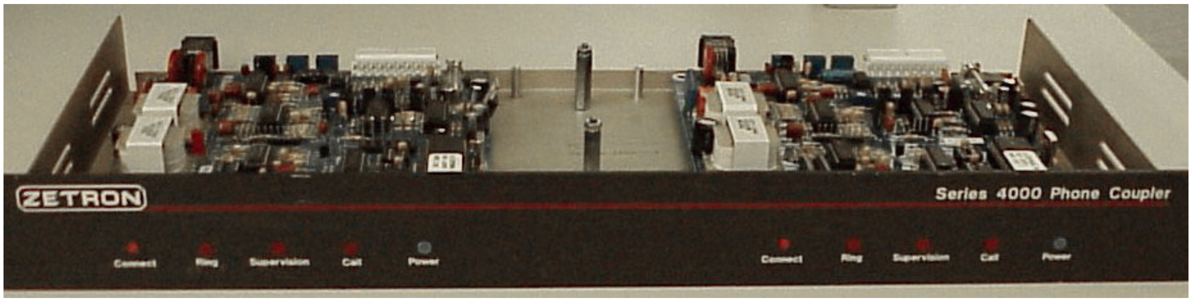
This balanced pair of audio signals from the console interface card provides receive audio to an external speaker. The source of this audio is programmable by the operator.

Mon B Audio (MON B +/-)

This balanced pair of audio signals from the console interface card provides receive audio to an external speaker. The source of this audio is programmable by the operator.

Series 4000 Phone Coupler (Optional)

Figure 24: Series 4000 Phone Coupler



The Series 4000 Phone Coupler enables a dispatcher to originate or answer a phone call and then patch the call through to a radio channel. It is designed to be used in a Series 4000 Communication Control System in conjunction with a Zetron IntegratorRD workstation or Zetron Model 4018 or 4118 button console. It can also be used with the standalone Zetron Model 4010 Radio Dispatch console if more than two phone lines are needed.

Specifications

Table 34: Series 4000 Phone Coupler Specifications

General	
Power	11-16 VDC, 200 mA
Temperature	0-65° C, 32-149° F
Size	19” W x 7.4” D x 1.7” H
Weight	2.5 lbs., 1.1 kg
Phone Interface	
Line Type	One End-to-End (B1) phone line
Connector	RJ11C modular jack
Incoming Call	Ring detection on tip-ring pair
Call Answer	Manual
Call Disconnect	Manual
Call Progress Tones	Dial tone, ringing
Hybrid	Two-transformer, high-performance design
Secondary Protection	High-voltage clamps with protective fusing elements
Console Interface	
Connector	10-lug crimped connector
PTT	FET pull-down to ground
Carrier Detect	External COR input

Tx Audio	-40 to +6 dBm, HI/LO selector, 1 k output impedance
Rx Audio	-40 to +10 dBm, HI/LO selector, 50 k input impedance, 25 mV to 6 Vpp
Front Panel	
Power LED	Indicates 12 VDC power applied
Ring LED	Blinks when an incoming call is detected
Supervision LED	On when Off Hook signal is present from console
Call LED	On when phone is taken off hook
Connect Button	Takes the phone off hook and keeps it off as long as the button is depressed. The Call LED illuminates to show that the phone is actually off hook. Also used for diagnostics.

Installation

STOP **Warning!** This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instruction manual, it may cause interference with radio communications. Installation of the phone coupler should only be attempted by qualified radio service personnel.

Dual-Channel Control Card Settings

The coupler interfaces the console using half of a dual-channel card. The coupler can be installed to interface either the A or B channel (see *Channel Configuration* on page 56).

Local Control

The channel card must be set to local control. See *Dual Channel Card Configuration Switches Using a Tone or DC Card for Local Control* on page 49.

Full Duplex

Full duplex mode is recommended. This is activated by the **FD** switch on the front panel of the channel card. Note that each channel has its own **FD** switch.

Call Source

The newer cards (Universal (950-9819) and Tone/Local (950-9820)) have a programmable COR/VOX setting. Use COR wherever possible. For use with the Model 4010 or for simplex (half duplex) channel patching, VOX mode is required. Otherwise, the patch will not switch between radio and phone.

Coupler Wiring

Connection to the console is made using a type 66 punch-down block (refer to Figure 25 on page 97).

The following table indicates signal names, wire colors, and exact pin location relative to the phone coupler product's connector.

Table 35: Connectors and signal names.

Connector	Color	Signal Name
P1-1	Red	12 VDC+ input
P1-2	Black	12 VDC- (GND)
P1-3	White	Receive audio from console (Audio In)
P1-4	Shield	Shield
P1-5	Blue	Transmit Audio to Console (Audio Out)
P1-6	(no connection)	(no connection)
P1-7	Orange	PTT Out (COR- on channel card). Note: COR+ on channel card must be connected to V+. This connector has no connection when used with VOX or with the Model 4010.
P1-8	Yellow	Off Hook (Supervise)
P1-9	Brown	Dial Mode Control With JP-4 in position B (the default): Tone (DTMF): no connection Rotary Dial: ground With JP-4 in position A: Tone (DTMF): ground Rotary Dial: no connection
P1-10	(no connection)	(no connection)

Console Keys

To control the phone coupler from the console, the channel must be defined and keys assigned. The minimum functions required for operating the phone coupler are:

On Button Consoles	On Video Consoles	Function
Select	Answer/Hold	Select the phone channel for transmission, and steer the phone audio to the “selected” speaker.
On Hook/Off Hook	Release	Generate the signal to take the phone line off hook.

Other useful functions are:

On All Consoles	Function
Volume Adjust	Allow receive level to be set from the console.
Mute	Allow the phone channel to be muted by the console operator.
Instant Transmit	Allow transmission on the phone channel without “selecting” the channel.
Patch	Allow the phone channel to be “patched” to a radio channel.

These functions can be assigned to console keys through the programming utility supplied with the system.

Hybrid Adjustment

A hybrid adjustment needs to be done on any system that is supporting full duplex operation. See the following section.

Testing

Diagnostic Tests and Adjustments

Note The tests and adjustments described in this section assume that the dual channel card has been calibrated. See *Audio Level Adjustments* on page 177.

The phone coupler has three primary modes:

- Idle
- Call Active
- Diagnostic

In Idle and Call Active modes, the **Ring** LED indicates an incoming call. In Diagnostic mode, the **Ring** LED uses different styles of blinking to indicate the current mode.

When testing and adjusting the phone coupler, the **Connect** button has several functions, depending on when it is pressed and how long it is held. You use it to initiate Diagnostic mode and to select tests. (You can enter a DTMF pound sign (#) from the console instead of pressing the **Connect** button, wherever the **Connect** button is called for in these procedures.)

There are three diagnostic tests. The test selected depends on how many times you press the **Connect** button. The tests, in the order they are selected, are as follows:

1. Transmit Audio Gain
2. Repeat Audio Gain

3. Hybrid Adjustment

Note Tests 1 and 2 are performed at the factory. These two gain settings should never again need to be adjusted. Test 3 needs to be performed during installation.

Each test runs for up to 3 minutes. During that time, if the **Connect** button is pressed again, the next test will commence. The unit will return to normal operation mode in any of these cases:

- The **Connect** button is pressed during test 3.
- The current test is allowed to time out.
- The **Connect** button is pressed and held for 3 seconds. Holding the **Connect** button down to return to normal operation mode is acknowledged by a rapid blinking of the **Ring** LED. The rapid blinking stops and the **Ring** LED goes out when the **Connect** button is released.

Each test indicates that it is running by blinking its test number of $^1/_3$-second blinks (1, 2, or 3$^1/_3$-second blinks) every 3 seconds.

Accessing the Test Points

To perform the tests and adjustments, the cover of the phone coupler must be removed to gain access to the test points and some of the potentiometers.

♦ To remove the cover

1. Disconnect the power cord from the unit.
2. Disconnect the phone line(s).
3. Disconnect all cabling.
4. Remove the three Phillips-head screws on the rear of the unit.
5. Slide the cover back, then lift it to remove it.
6. Reconnect the power cord and interface cables to P1.
7. Reconnect the phone line to the modular connector of each channel.

Test Points

Table 36: Test points

TP1	Rx audio from the console at the output of the first gain stage.
TP2	Power Up Reset circuit. +5 VDC = Reset; 0 VDC = Operate.
TP3	Dial Click Decode circuit, after sensitivity adjustment.
TP4	Tx audio from the phone just after the hybrid.
TP5	“VP” bias voltage. Should be +2 VDC.

Setting Initial Receive Level

Note This value is set at the factory and should never need to be adjusted again.

To perform the diagnostic tests, it is necessary to do a rough setup of the Receive Gain sensitivity. Connect an oscilloscope to TP1. Set the scope for 0.5 VAC per division. From the console, generate a 1 KHz tone at approximately 2 Vpp to the coupler.

While supplying this signal, adjust the Receive Gain (R2) for a 1 Vpp signal at TP1. JP-1 sets the discriminator buffer gain. If you are not able to reach this level, move the jumper at JP-1 from position A to B.

If an oscilloscope is not available, a VOM set for AC volts can be used. Adjust the Receive Gain (R2) for a 0.3 VAC-RMS signal at TP1.

Accessing the Diagnostic Tests

To access the tests, power up the unit while holding the **Connect** button down. Continue to hold it down for at least 3 seconds. When the **Ring** LED starts blinking rapidly, you may release the **Connect** button. The **Ring** LED should continue to blink. The phone coupler is now in diagnostic mode.

Test 1: Transmit Audio Gain

Note This test is performed at the factory and should never need to be done again.

1. Begin with jumper JP7 in the A (HI gain) position. Verify that the **Ring** LED is blinking rapidly. Press the **Connect** button to begin the test. Verify that Test 1 is running: you should see one $^1/_3$-second blink of the **Ring** LED every 3 seconds.
2. Test 1 sends a 1 kHz test tone to the console. Using an oscilloscope, adjust the transmit level potentiometer (R3) for 0.5 Vpp at the connector P1-5.
3. Next, monitor the audio level on the Series 4000 dual-channel card AGC test point. Adjust the 4W Rx potentiometer for knee of compression.
4. The test will run for 3 minutes and then time out, unless the **Connect** button is pressed again. If the test is allowed to time out, the system will return to normal service. If the **Connect** button is pressed before the test times out, Test 2 will start.

Test 2: Repeat Audio Gain

Note This test is performed at the factory and should never need to be done again.

1. Advance to Test 2 by pressing the **Connect** button. Verify that Test 2 is running: you should see two $^{1}/_{3}$-second blinks of the **Ring** LED every 3 seconds.
2. From the console, take the phone coupler off hook and transmit a steady 1 kHz tone. Observe the 1 kHz tone on the Rx connector and on the Tx connector. This is a verification test only.
3. The test will time out after 3 minutes, unless the **Connect** button is pressed again. If the test is allowed to time out, the system will return to normal service. If the **Connect** button is pressed before the test times out, Test 3 will start.

Test 3: Hybrid Adjustment

Note This test needs to be performed during installation.

1. This adjustment needs to be done on any system that will be supporting full duplex operation. It will reduce the amount of audio reflected back to the console from the hybrid.
2. Connect an oscilloscope to TP4.
3. Place a phone call to the coupler from another phone. While the phone line is ringing, press the **Connect** button to advance to Test 3. Verify that Test 3 is running: you should see three $^{1}/_{3}$-second blinks of the **Ring** LED every 3 seconds. The coupler will now answer the ringing phone line and emit a dual-tone signal comprised of a 400 Hz tone and a 2500 Hz tone. Adjust the two hybrid potentiometers, R95 and R96, to obtain the lowest deviation on the coupler or the lowest signal at pin 5 of P1. It is necessary to repeatedly adjust the potentiometers to obtain the lowest signal level.
4. The test tone is available on the Rx input to the dual-channel card and can be heard on the console speaker. It can be used to adjust the hybrid by adjusting to minimum speaker output.

Coupler Signals

The following table identifies the punch-down block connections required for the Phone Coupler.

Note On any single channel, the black connections are jumpered together and the red connections are jumpered together.

Figure 25: Split 50, 66M-type punch-down blocks (P/N 950-9351)

Connections to Channels A and C

Channel A			•==•	26	Chan A. PTT –
			•==•	1	Chan A. PTT +
	Orange P1-7		•==•	27	Chan A. COR –
	Red P1-1		•==•	2	Chan A. COR +
	Black P1-2	28	•==•	28	Ground
	Yellow P1-8		•==•	3	Chan A. Aux Output
	Black P1-2		•==•	29	Chan A. Tx –
	White P1-3		•==•	4	Chan A. Tx +
	Black P1-2		•==•	30	Chan A. Rx –
	Blue P1-5	5	•==•	5	Chan A. Rx +
			•==•	31	Chan A. X-Busy Out
			•==•	6	Chan A. X-Busy In
			•==•	32	Chan B. PTT –
			•==•	7	Chan B. PTT +
		33	•==•	33	Chan B. COR –
			•==•	8	Chan B. COR +
	Red P1-1		•==•	34	V +
			•==•	9	Chan B. Aux Output
			•==•	35	Chan B. Tx –
		10	•==•	10	Chan B. Tx +
			•==•	36	Chan B. Rx –
			•==•	11	Chan B. Rx +
			•==•	37	Chan B. X-Busy Out
			•==•	12	Chan B. X-Busy In
Channel C		38	•==•	38	Chan C. PTT –
			•==•	13	Chan C. PTT +
	Orange P1-7		•==•	39	Chan C. COR –
	Red P1-1		•==•	14	Chan C. COR +
	Black P1-2		•==•	40	Ground
	Yellow P1-8	15	•==•	15	Chan C. Aux Output
	Black P1-2		•==•	41	Chan C. Tx –
	White P1-3		•==•	16	Chan C. Tx +
	Black P1-2		•==•	42	Chan C. Rx –
	Blue P1-5		•==•	17	Chan C. Rx +
		43	•==•	43	Chan C. X-Busy Out
			•==•	18	Chan C. X-Busy In
			•==•	44	Chan D. PTT –
			•==•	19	Chan D. PTT +
			•==•	45	Chan D. COR –
		20	•==•	20	Chan D. COR +
	Red P1-1		•==•	46	V +
			•==•	21	Chan D. Aux Output
			•==•	47	Chan D. Tx –
			•==•	22	Chan D. Tx +
		48	•==•	48	Chan D. Rx –
			•==•	23	Chan D. Rx +
			•==•	49	Chan D. X-Busy Out
			•==•	24	Chan D. X-Busy In
			•==•	50	Chassis
		25	•==•	25	Chassis

Connections to Channels B and D

Channel B			•==•	26	Chan A. PTT –
			•==•	1	Chan A. PTT +
			•==•	27	Chan A. COR –
			•==•	2	Chan A. COR +
	Black P1-2	28	•==•	28	Ground
			•==•	3	Chan A. Aux Output
			•==•	29	Chan A. Tx –
			•==•	4	Chan A. Tx +
			•==•	30	Chan A. Rx –
		5	•==•	5	Chan A. Rx +
			•==•	31	Chan A. X-Busy Out
			•==•	6	Chan A. X-Busy In
			•==•	32	Chan B. PTT –
			•==•	7	Chan B. PTT +
	Orange P1-7	33	•==•	33	Chan B. COR –
	Red P1-1		•==•	8	Chan B. COR +
	Red P1-1		•==•	34	V +
	Yellow P1-8		•==•	9	Chan B. Aux Output
	Black P1-2		•==•	35	Chan B. Tx –
	White P1-3	10	•==•	10	Chan B. Tx +
	Black P1-2		•==•	36	Chan B. Rx –
	Blue P1-5		•==•	11	Chan B. Rx +
			•==•	37	Chan B. X-Busy Out
			•==•	12	Chan B. X-Busy In
Channel D		38	•==•	38	Chan C. PTT –
			•==•	13	Chan C. PTT +
			•==•	39	Chan C. COR –
			•==•	14	Chan C. COR +
	Black P1-2		•==•	40	Ground
		15	•==•	15	Chan C. Aux Output
			•==•	41	Chan C. Tx –
			•==•	16	Chan C. Tx +
			•==•	42	Chan C. Rx –
			•==•	17	Chan C. Rx +
		43	•==•	43	Chan C. X-Busy Out
			•==•	18	Chan C. X-Busy In
			•==•	44	Chan D. PTT –
			•==•	19	Chan D. PTT +
	Orange P1-7		•==•	45	Chan D. COR –
	Red P1-1	20	•==•	20	Chan D. COR +
	Red P1-1		•==•	46	V +
	Yellow P1-8		•==•	21	Chan D. Aux Output
	Black P1-2		•==•	47	Chan D. Tx –
	White P1-3		•==•	22	Chan D. Tx +
	Black P1-2	48	•==•	48	Chan D. Rx –
	Blue P1-5		•==•	23	Chan D. Rx +
			•==•	49	Chan D. X-Busy Out
			•==•	24	Chan D. X-Busy In
			•==•	50	Chassis
		25	•==•	25	Chassis

Jumper Switch Settings

Table 37: Jumper switch settings

Switch	Description	Settings
JP1	Receive gain	A = LO * B = HI
JP2	Not installed	N/A
JP3	Source for Off Hook signal	A = Internal B = External *
JP4	Selects decode polarity for the external tone decoder	A = Valid Low B = Valid High *
JP5	Selects proper de-emphasis network for receive audio	A = Speaker audio * B = Discriminator audio
JP6	Sets polarity for Off Hook input	A = High B = Low *
JP7	Transmit gain setting	A = HI * B = LO
JP8	N/A	N/A

* Factory default setting.

Variable Resistors

Table 38: Variable resistors

Resistor	Description
R1 *	Sets the threshold for the internal carrier detector circuit.
R2	Sets the receive level from the console. The range over which this control acts is set by JP1.
R3	Sets the transmit level to the console. The range over which this control acts is set by JP7.
R43 *	Sets the VOX circuit threshold.
R46	Sets the threshold on the external COR input.
R95	BAL R — used with BAL C to balance the hybrid (match the coupler to the phone line).
R96	BAL C — used with BAL R to balance the hybrid (match the coupler to the phone line).
R100 *	Sets the sensitivity of the Dial Click decoder circuit.
* Not used in normal operation of the phone coupler.	

Wiring to the Logging Recorder

Each channel provides a logging recorder audio output which is the summation of the transmit and receive audio for the channel. The outputs are single-ended (not balanced), DC blocked, and provide about 0 dBm (0.75 Vrms into 600Ω). All recorder outputs are avail-able on one or two 50-conductor plugs, J12 on channel cardcage #1 for channels 1-24 and J9 on the console cardcage #2 for Channels 25-48 (see Table 39). For the Model 4020, J9 contains channels 1-20 (see Table 40). In addition to the channel recorder outputs, each dispatch console provides a console recorder output of the select and microphone audio from the position. Wiring the console recorder output is described in *Recorder Connections* on page 166.

Table 39: Model 4048 Common Control Recorder Output Plug

Signal	Wire Color	Connector		Wire Color	Signal
Channel 24/48 Record	Wht/Blu	26	1	Blu/Wht	Audio Return
Channel 23/47 Record	Wht/Org	27	2	Org/Wht	Audio Return
Channel 22/46 Record	Wht/Grn	28	3	Grn/Wht	Audio Return
Channel 21/45 Record	Wht/Brn	29	4	Brn/Wht	Audio Return
Channel 20/44 Record	Wht/Slt	30	5	Slt/Wht	Audio Return
Channel 19/43 Record	Red/Blu	31	6	Blu/Red	Audio Return
Channel 18/42 Record	Red/Org	32	7	Org/Red	Audio Return
Channel 17/41 Record	Red/Grn	33	8	Grn/Red	Audio Return
Channel 16/40 Record	Red/Brn	34	9	Brn/Red	Audio Return
Channel 15/39 Record	Red/Slt	35	10	Slt/Red	Audio Return
Channel 14/38 Record	Blk/Blu	36	11	Blu/Blk	Audio Return
Channel 13/37 Record	Blk/Org	37	12	Org/Blk	Audio Return
Channel 12/36 Record	Blk/Grn	38	13	Grn/Blk	Audio Return
Channel 11/35 Record	Blk/Brn	39	14	Brn/Blk	Audio Return
Channel 10/34 Record	Blk/Slt	40	15	Slt/Blk	Audio Return
Channel 9/33 Record	Yel/Blu	41	16	Blu/Yel	Audio Return
Channel 8/32 Record	Yel/Org	42	17	Org/Yel	Audio Return
Channel 7/31 Record	Yel/Grn	43	18	Grn/Yel	Audio Return
Channel 6/30 Record	Yel/Brn	44	19	Brn/Yel	Audio Return
Channel 5/29 Record	Yel/Slt	45	20	Slt/Yel	Audio Return
Channel 4/28 Record	Vio/Blu	46	21	Blu/Vio	Audio Return
Channel 3/27 Record	Vio/Org	47	22	Org/Vio	Audio Return
Channel 2/26 Record	Vio/Grn	48	23	Grn/Vio	Audio Return
Channel 1/25 Record	Vio/Brn	49	24	Brn/Vio	Audio Return
Audio Return (GND)	Vio/Slt	50	25	Slt/Vio	Audio Return(GND)

* First color is main color and the second color is stripe. Wht = white, Red = red, Blk = black, Yel = yellow, Vio = violet, Blu = blue, Org = orange, Grn = green Brn = brown, Slt = slate.

Each channel has a jumper that allows the transmit audio to be excluded from the recorder.

Table 40: Model 4020 Common Control Recorder Output Plug — J9

Signal	Wire Color	Connector		Wire Color	Signal
Channel 20 Record	Wht/Slt	30	5	Slt/Wht	Audio Return
Channel 19 Record	Red/Blu	31	6	Blu/Red	Audio Return
Channel 18 Record	Red/Org	32	7	Org/Red	Audio Return
Channel 17 Record	Red/Grn	33	8	Grn/Red	Audio Return
Channel 16 Record	Red/Brn	34	9	Brn/Red	Audio Return
Channel 15 Record	Red/Slt	35	10	Slt/Red	Audio Return
Channel 14 Record	Blk/Blu	36	11	Blu/Blk	Audio Return
Channel 13 Record	Blk/Org	37	12	Org/Blk	Audio Return
Channel 12 Record	Blk/Grn	38	13	Grn/Blk	Audio Return
Channel 11 Record	Blk/Brn	39	14	Brn/Blk	Audio Return
Channel 10 Record	Blk/Slt	40	15	Slt/Blk	Audio Return
Channel 9 Record	Yel/Blu	41	16	Blu/Yel	Audio Return
Channel 8 Record	Yel/Org	42	17	Org/Yel	Audio Return
Channel 7 Record	Yel/Grn	43	18	Grn/Yel	Audio Return
Channel 6 Record	Yel/Brn	44	19	Brn/Yel	Audio Return
Channel 5 Record	Yel/Slt	45	20	Slt/Yel	Audio Return
Channel 4 Record	Vio/Blu	46	21	Blu/Vio	Audio Return
Channel 3 Record	Vio/Org	47	22	Org/Vio	Audio Return
Channel 2 Record	Vio/Grn	48	23	Grn/Vio	Audio Return
Channel 1 Record	Vio/Brn	49	24	Brn/Vio	Audio Return
Audio Return (GND)	Vio/Slt	50	25	Slt/Vio	Audio Return(GND)

* First color is main color and the second color is stripe. Wht = white, Red = red, Blk = black, Yel = yellow, Vio = violet, Blu = blue, Org = orange, Grn = green Brn = brown, Slt = slate.

Each channel has a jumper that allows the transmit audio to be excluded from the recorder.

Wiring to the Service Ports

The CCE provides several 9-pin “D-type” female receptacles, J10 – J13, for connecting to service ports. The connectors are located on the top right-hand side of the back of the console cardcage (see Table 41 and Table 42).

Table 41: Logger, Modem, and RSM Serial Signals

Pin	Signal Name	Signal Function
1	No Connection	
2	Rx Data	Receive Data signal from external device
3	Tx Data	Transmit Data signal to external device
4	DTR	Pulled to plus voltage
5	Signal Ground	Ground to external device
6	No Connection	
7	RTS	Request-To-Send.
8	CTS	Clear-To-Send
9	No Connection	

Table 42: Clock Serial Signals

Pin	Signal Name	Signal Function
1	No Connection	
2	Rx Data	Connect to TDATA on NETCLOCK (Pin 5 of Remote Output)
3	No Connection	
4	No Connection	
5	Signal Ground	Connect to Ground on NETCLOCK (Pin 9 at Remote Output)
6	No Connection	
7	No Connection	
8	No Connection	
9	No Connection	

The baud rate for each port is selectable using the Data Rate switches on the front panel of the STC card. The protocol for each port is 8 data bits, 1 stop bit, and no parity.

Wiring to the Alarm Circuit

The alarm circuitry of the CCE can be used to give an external indication of both external and internal events. Alarm sources include an external contact monitor, a monitor of circuit card "ERROR" indicators, and a low-voltage monitor for the Model 4048 Power Supply. When an alarm condition is detected, a relay contact closes and may activate a lamp and/or beeper to give visual and/or audible indication to operators and/or service personnel. When enabled, the voltage monitor signal from the Model 4048 Power Supply will alarm if the voltage drops below a fixed threshold. Table 43 shows the Model 4048 Power Supply voltage alarm thresholds as measured at front panel test points. The Model 4020 Modular Power Supply does not generate a voltage monitor signal.

Table 43: Power Voltage Alarm Thresholds

Power Supply	Alarm Threshold
+12V	11.95
+5V	4.6
-12V	-11.00
Battery	11.1

The external contact monitor is always enabled. However, jumpers are used to enable or disable monitoring of "ERROR" indicators and low-voltage. Table 44 shows the various positions of the jumpers. The jumpers are located on the card cage backplane near J16 at the top left corner.

Table 44: Common Control Alarm Enable/Disable Jumpers

Alarm Status	Jumper Position
"ERROR ALARM" enabled	JP2-ON
"ERROR ALARM" disabled	JP2-OFF*
"VOLTAGE ALARM" enabled	JP1-ON
"VOLTAGE ALARM" disabled	JP1-OFF*
* factory default	

The external alarm input signals and the alarm output signals are located at connector J16 on the top left corner of the back of the console card cage. The connector is a removable terminal block. Table 45 shows the signal connections of the alarm connector.

Table 45: Model 4048 Common Control Alarm Connector Signals

Pin	Signal
J16-1 (bottom)	Ground
J16-2	Alarm Input (active when shorted to ground)
J16-3	Ground
J16-4	Alarm Output Contact, Normally Closed
J16-5	Alarm Output Contact, Common
J16-6 (top)	Alarm Output Contact, Normally Open

The contact ratings for the alarm relay are:

Initial Contact Resistance, Max.	50 MΩ
Rating (Resistive)	
Max. Switching Power	60 W, 125 V AC
Max. Switching Voltage	220 V DC, 250 V AC
Max. switching Current	2 A, DC
Max. Carrying Current	3 A, DC, AC
UL/CSA Rating	0.6 A, 125 V AC 0.6 A, 110 V DC 2.0 A, 30 V DC

Modem Configuration

If a modem is delivered with the system, it was configured to operate with the Model 4048 CCE. If the modem is no longer configured or must be replaced, the following steps will reconfigure the modem.

The modem must be connected to a terminal or a computer running a terminal-emulation program such as HyperTerminal. Type the following commands, pressing Enter after each.

Command	Description
AT&F0	Reloads default settings (gets back to a known state)
ATS0=1	Enables auto answer for 1 ring
AT&K3	Enables RTS/CTS flow control
ATQ1	Disables result messages
ATE0	Disables command echo
AT&W0	Saves settings to profile 0

Type AT&V and press Enter.

The modem should respond by displaying the following configuration:

```
ACTIVE PROFILE:
B1 E0 L2 M1 Q1 V1 W0 X4  &B1 &C1 &D0 &G0 &L0 &P0 &R0 &S0 &X0 &Y0
S00:001 S01:000 S02:043 S03:013 S04:010 S05:008 S06:002 S07:050 S08:002
S09:006 S10:014 S11:095 S12:050 S18:000 S25:005 S26:001 S37:000 S72:000

STORED PROFILE 0:
B1 E0 L2 M1 Q1 V1 W0 X4  &B1 &C1 &D0 &G0 &L0 &P0 &R0 &S0 &X0
S00:001 S02:043 S03:013 S04:010 S05:008 S06:002 S07:050 S08:002
S09:006 S10:014 S11:095 S12:050 S18:000 S25:005 S26:001 S37:000 S72:000

STORED PROFILE 1:
B1 E1 L2 M1 Q0 V1 W0 X4  &B1 &C1 &D2 &G0 &L0 &P0 &R0 &S0 &X0
S00:000 S02:043 S03:013 S04:010 S05:008 S06:002 S07:050 S08:002
S09:006 S10:014 S11:095 S12:050 S18:000 S25:005 S26:001 S37:000 S72:000

TELEPHONE NUMBERS:
&Z0=
&Z1=
&Z2=
&Z3=
```

Modem and Service Port Operation

The Model 4048/4020 Modem/Service Port provides a diagnostics interface to a modem or computer connected through a standard PC-to-PC DB9 serial cable.

Modem and Computer Setup

Setup for a modem is detailed in *Modem Configuration* on page 104.

Run HyperTerminal or a similar serial communications program with the following settings: No Parity, 8 data bits, 1 stop bit. Set baud rate to match the settings on the STC card.

Operation

Once connected, press Enter. A prompt similar to the following should be displayed.

```
( 2 Oct 1998 08:23:09.66) Zetron M4048 Service Port (STC1 rev 01.05E)
Enter command (? = help):
```

The version information (in this case "STC1 rev 1.05E*"*) shows which STC (1 or 2) is in control of the system and the software version of that STC. The current system date and time are displayed at the beginning of the prompt. This will default to Jan. 1, 1980, 00:00:00 when the system is reset. Once a time update is received, this line will display the correct time and date.

Type *"?"* and press ENTER to display the diagnostics menu:

```
$Version: V1.05 09/22/98 10:38:25 $
```

```
L) Login (enter user name)
H) History log functions
P) Port configuration menu
O) ANI display option
G) Goodbye (log out)

( 2 Oct 1998 08:23:09.66) Zetron M4048 Service Port (STC1 rev 01.05E)
Enter command (? = help):
```

The $Version line displays the current STC code version.

Note The Login and Goodbye options are not used in normal operation. In case of system problems, Zetron Service employees can use these options to access special features of the system.

History Log Functions

To access the History Log features, type H and press Enter. The following menu is displayed.:

```
F) Forward chronological review
R) Reverse chronological review
I) Include card configuration report in review
X) Exclude card configuration report from review
```

Note History Log data is sent to the Logger output, so if the Logger data is not directed to the Modem/Service port, no data can be seen at a computer or modem connected to the Modem/Service port.

To view the History Log data:

Type F or R and press Enter. (Forward starts at the beginning of the log; Reverse starts with the most recent data). A prompt asking for the beginning date appears.

Enter beginning date, as YY, YY MM, or YY MM DD (or enter ‘80’ for all). Figure 26 shows an example history file. The date is shown whenever it changes and all messages are time-stamped.

Figure 26: Example History File

```
23 Sep 1998
08:49:00.42 ( 112) This is STC1, in control of the system
08:49:00.00 ( 113) This is STC1, NOT in control of the system
08:48:59.32 ( 103) Clock source = Console
22 Sept 1998
00:00:13.30 (  94) Console  2 CIC-OC console retry timeout error
00:00:13.28 ( 124) Console cardcage ERROR turned on
00:00:12.45 ( 112) This is STC1, in control of the system
00:00:12.03 ( 113) This is STC1, NOT in control of the system
00:00:09.82 ( 125) Console cardcage ERROR turned off
10:31:14.53 (  91) Cage 2, slot  8 Inactive
10:31:17.90 (  93) Channel 15 card reset
10:31:24.07 (  90) Cage 2, slot  1 Active
10:31:24.07 (  90) Cage 2, slot  8 Active
10:31:24.08 (  90) Cage 2, slot  9 Active
10:31:24.08 (  90) Cage 2, slot 11 Active
10:31:24.09 (  90) Cage 2, slot 15 Active
10:31:24.09 (  90) Cage 3, slot  7 Active
10:31:24.10 (  90) Cage 1, slot  3 Active
10:31:24.10 (  90) Cage 1, slot  4 Active
10:31:24.11 (  90) Cage 1, slot 10 Active
10:31:24.11 (  90) Cage 1, slot 11 Active
10:31:24.12 (  90) Cage 1, slot 12 Active
10:31:24.12 (  90) Cage 1, slot 18 Active
10:31:26.11 (  96) M4048 Card Configuration Report follows:

 Cage/Slot  Card description     Ver BTI Card-unique  Crossmute Duplex
 --------- --------------------- --- --- ------------ --------- ------
   1 /  1  System traffic         1
   1 /  2  System traffic         1
   1 /  3  Console  1 Interface   1
   1 /  4  Console  2 Interface   1
   1 / 10  Console  8 Interface   1
   1 / 11  Console  9 Interface   1
   1 / 12  Console 10 Interface   1
   1 /     Patch card             1     24 patches
   2 /  1  Channel  1 Local type  5 Off              Disabled  Half
   2 /  1  Channel  2 Local type  5 Off              Disabled  Half
   2 /  8  Channel 15 Tone  type  5 Off 120ms G.T.   Disabled  Full
   2 /  8  Channel 16 Tone  type  5 Off 120ms G.T.   Disabled  Full
   2 /  9  Channel 17 Tone  type  5 Off 120ms G.T.   Disabled  Full
   2 /  9  Channel 18 Tone  type  5 Off 120ms G.T.   Disabled  Full
   2 / 11  Channel 21   MAP27    10 Off              Disabled  Full
   2 / 11  Channel 22   MAP27    10 Off              Disabled  Full
   2 / 15  Channel 29 Tone  type 10 Off 120ms G.T.   Disabled  Half
   2 / 15  Channel 30 Tone  type 10 Off 600ms G.T.   Enabled   Half
           Aux-I/O addr  5        2

Touch <enter> for more data, or q + <enter> to quit.
```

The I and X options toggle whether or not the card configuration reports are included in the display of the history log. If they are excluded, the history log will only show system changes and errors. After typing *I* or *X* to change these options, you will exit the history log menu. Press *H* to re-enter the menu.

Port Configuration Menu

To access the Port features, type P and press Enter. The following menu is displayed:

```
D) Display current port configuration
L) Logger port select
B) Backplane monitor port select
R) Radio system management port select
Enter desired port option:
```

To list the ports and what types of data are sent to them, type D and press Enter. The following menu is displayed.

Note On system reset, the port configurations are set as determined by the switches on the front of the STC card. Settings changed using the following menus is effective until the system is reset again, but the STC switches should be modified if permanent changes are desired. (Backplane information is only active when a Zetron service employee is assisting with system diagnostics).

```
Report function    Physical port assigned
-----------------  ----------------------
Logger             MODEM/SERVICE
Backplane monitor  MODEM/SERVICE
Radio Management   RADIO MANAGEMENT

( 2 Oct 1998 08:24:11.74) Zetron M4048 Service Port (STC1 rev 01.05E)
Enter command (? = help):
```

To change a port setting, type P <port> and press Enter, where <port> is L, B, or R. (Select the port that you want to change). The following menu shows the ports to which you can direct the Logger output after typing “P L” and ENTER.

```
N) None (disabled)
L) LOGGER port
M) MODEM/SERVICE port
R) RADIO MANAGEMENT port

Enter desired physical port
```

ANI Display Option

When enabled, the ANI display option sends ANI logging information to the Radio Management Port (J13), a standard RS-232 serial port. The formatting of the ANI information is described in *ANI Log* on page 355.

To enable or disable the ANI Display Option, press O followed by Enter. Then press E to enable or D to disable, followed by Enter.

Logger Port Function

The Model 4048 and Model 4020 systems diagnostics log (output of the Logger port) shows system configuration changes (slots going active or inactive) and errors. This is the same output as the history log with Card Configuration reports included.

ANI Signaling

Automatic Number Identification (ANI) signals are voice band data signals that are transmitted from a mobile or portable radio to the consoles. The types of signaling methods are DTMF, 5/6 Tone, GE-STAR, and MDC-1200. ANI signaling is decoded on the DCC and forwarded to each console via the CIC card.

For more information about ANI and signaling methods, see *Console ANI Programming* on page 231.

Wireless Interface Options

There are several wireless interface options available for the Series 4000. This chapter includes instructions for the following wireless interfaces:

- *MAP27 Wireless Interface Option* on page 111
- *Harris M7100 Wireless Interface Option* on page 132
- *Harris M7300 Wireless Interface Option* on page 144

For Kenwood, EFJohnson, or iDEN radios, see the appropriate manual listed in the following table:

Title	P/N
Intelligent Radio Interface Module for Kenwood Radios	025-9520
Intelligent Radio Interface Module for EFJohnson RS-5300 Series Radios	025-9542
iDEN Interface Option Installation	025-9566

MAP27 Wireless Interface Option

Introduction

The Zetron Series 4000 MAP27 Wireless Interface Option is designed to interface a Model 4217B or Model 4219 console to a MAP27 radio. Supported radios include:

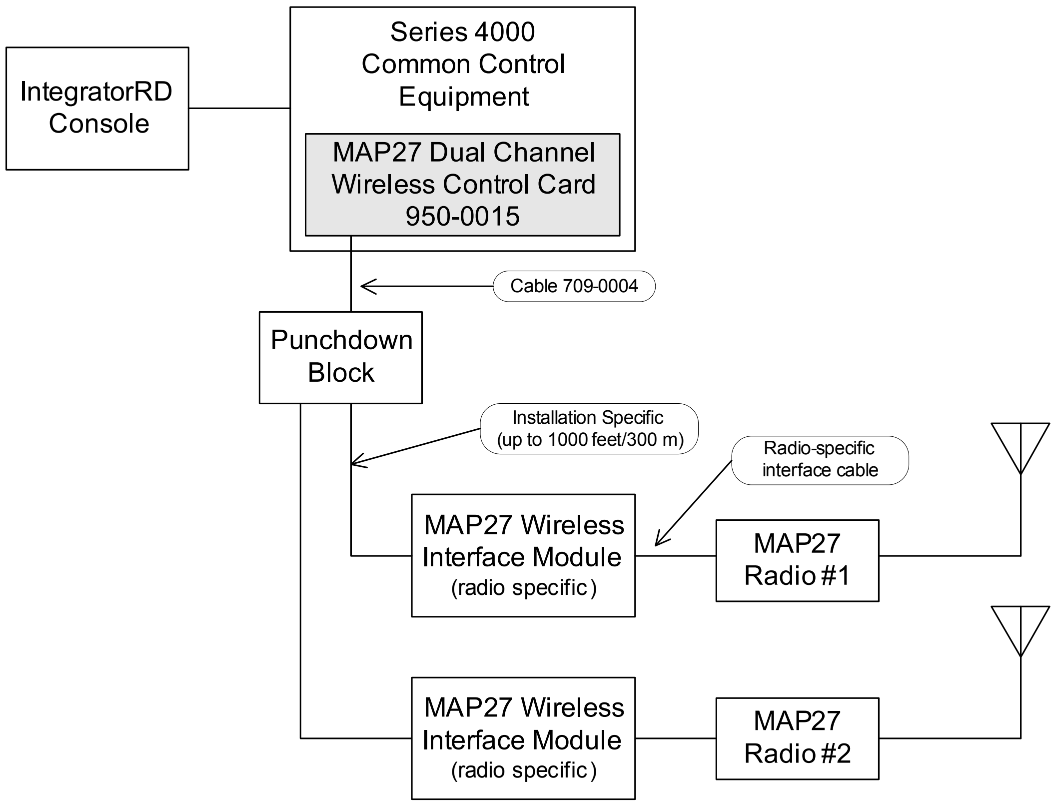
- Tait T2030, T2035, and T2040
- Tait TM-8255 series
- Zetron Model 427 dispatcher ports
- Motorola GM1200 and GM1200E

The MAP27 Wireless Control Card (P/N 950-0015) is a dual channel card capable of interfacing two MAP27 radios. Each radio requires one of the Zetron MAP27 Wireless Interface Modules and cables listed in Table 46.

The MAP27 Wireless Control Card is installed in the Series 4000 Common Control Equipment (CCE) rack. The interface module and MAP27 radio are located within 1000 feet (300 m) of the common control equipment rack. Each interface module is provided with a cable to connect the radios (see Table 46). Figure 27 shows the option components.

The MAP27 Wireless Interface Module (WIM) provides level conversion and 4-wire audio from the MAP27 Wireless Control Card to the MAP27 radio.

Figure 27: Series 4000 MAP27 Wireless Interface Option Components



The MAP27 Wireless Interface Option can be added to existing IntegratorRD console systems with the addition of the MAP27 Wireless Control Card, the Zetron MAP27 Wireless Interface Module, software upgrades to the Console Interface Card, and the console itself. Adding the MAP27 capability to an existing system has no effect on the existing channels and other console functions are not affected.

Note Do not mix old system (4024) cards with new system (4020/4048) cards in this process.

Both channels on the MAP27 Wireless Control Card must be MAP27 interface channels. The MAP27 interface can coexist with other conventional channel interfaces.

Required Equipment and Recommended Documentation

- Series 4000 with MAP27 Wireless Control Card
- IntegratorRD console with Model 4217B or 4219
- Punchdown block (P/N 950-9351) and wire
- Zetron MAP27 Wireless Interface Option including:
    - The proper Wireless Interface Module for your radio
    - The proper Wireless Interface Module cable for your radio
    - Zetron cable 709-0004
- Compatible MAP27 radio with the following:
    - Radio programming software
    - Radio programming cable
    - Radio manual

Table 46: MAP27 Wireless Interface Modules and Cables

Radio	WIM P/N	Cable P/N
Tait T2030, T2035, T2040	950-0241	709-7534
Tait TM-8255 series	950-0985	709-7874
Zetron M427 dispatcher ports	950-0273	709-7554
Motorola GM1200	950-0014	709-7477
Motorola GM1200E	950-0242	709-7543
The cables listed here are the WIM-to-radio cables.		

Installation

MAP27 Dual Channel Control Card Configuration

The MAP27 Wireless Control Card must be configured before installing it in the Series 4000 system. The card has four switches for each of the two channels. The switches are located at the bottom of the legend plate under the label "Config." Use the values shown in Table 47 to configure the card.

Table 47: Channel Options

Channel	Switch	Label	Type of Selection
B	1	BTI	PTT Command Enable
	2	OPT (upper)	TX blocking
	3	OPT (lower)	Tait (MPT Radio) Gateway
	4	FD	Full Duplex, set ON
A	5	BTI	PTT Command Enable
	6	OPT (upper)	TX blocking
	7	OPT (lower)	Tait (MPT Radio) Gateway
	8	FD	Full Duplex, set ON

Switches 1 and 5 (**BTI**) should always be set to the **ON** position to allow the console to perform a 'Software Controlled PTT' of the attached radio or radio gateway. If either is set to the **OFF** position, then the PTT action is controlled through hardware.

Switches 2 and 6 (**OPT** upper) should always be set to the **OFF** position so that the console operator can perform a transmit (TX) action on the applicable channel through the attached radio or radio gateway. If either of these switches are set to the **ON** position, then the channel is not allowed to transmit when the channel has a **CALL** indication in its channel box icon display.

Switches 3 and 7 (**OPT** lower) should be set to the **ON** position only when the applicable S4000 Channel is being connected to a Tait (MPT Radio) Gateway. These switches should be set to the **OFF** position in all other cases.

Switches 4 and 8 (**FD**) should be set to the **ON** position so that the card operates in the Full - Duplex mode, thus allowing the operator to hear the GATT (Go - Ahead - To - Talk) tone when the radio has acquired the trunked channel for transmission. Each of the switches may be placed into the **OFF** position so that all of the console positions can hear the intercom call audio from other console positions.

Installation Connections

CCE Interconnects

Connection to each channel of the MAP27 Wireless Control Card in the CCE rack is made through a punchdown block (see Table 48, Table 50, Figure 28, and Figure 29).

Table 48: Punchdown Block (P/N 950-9351) Connections for GM1200E or Tait radios

Signal Name	Punchdown 1A|1B|2A|2B	WIM ConnectorP2
TX Data +	26|32|38|44	1
TX Data -	1| 7|13|19	2
RX Data +	27|33|39|45	3
RX Data -	2| 8|14|20	4
Busy Out +	3| 9|15|21	5
Busy Out -	28|34|40|46	6
Busy In +	31|37|43|49	7
Busy In -	6|12|18|24	8
TX Audio +	4|10|16|22	9
TX Audio -	29|35|41|47	10
RX Audio +	5|11|17|23	11
RX Audio -	30|36|42|48	12

Table 49: Punchdown Block (P/N 950-9351) Connections for M427 Dispatcher Port

Signal Name	Punchdown 1A|1B|2A|2B	WIM ConnectorP2
TX Data +	26|32|38|44	1
TX Data -	1| 7|13|19	2
RX Data +	27|33|39|45	3
RX Data -	2| 8|14|20	4
—	-| -| -| -	5
—	-| -| -| -	6
—	-| -| -| -	7
—	-| -| -| -	8
TX Audio +	4|10|16|22	9
TX Audio -	29|35|41|47	10
RX Audio +	5|11|17|23	11
RX Audio -	30|36|42|48	12

Table 50: Punchdown Block (P/N 950-9351) Connections for GM1200 radio

Signal Name	Punchdown 1A|1B|2A|2B	WIM ConnectorP2
TX Data +	1| 7|13|19	1
TX Data -	26|32|38|44	2
RX Data +	2| 8|14|20	3
RX Data -	27|33|39|45	4
Busy Out +	3| 9|15|21	5
Busy Out -	28|34|40|46	6
Busy In +	31|37|43|49	7
Busy In -	6|12|18|24	8
TX Audio +	4|10|16|22	9
TX Audio -	29|35|41|47	10
RX Audio +	5|11|17|23	11
RX Audio -	30|36|42|48	12

Figure 28: Punchdown Block (P/N 950-9351) Connections for GM1200E or Tait radios

Chan 1A. TX Data +		•====• 26	Chan 1A. TX Data +	1
Chan 1A. TX Data -		•====• 1	Chan 1A. TX Data -	2
Chan 1A. RX Data +		•====• 27	Chan 1A. RX Data +	3
Chan 1A. RX Data -		•====• 2	Chan 1A. RX Data -	4
Chan 1A. Busy Out -	28	•====• 28	Chan 1A. Busy Out -	6
Chan 1A. Busy Out +		•====• 3	Chan 1A. Busy Out +	5
Chan 1A. TX Audio -		•====• 29	Chan 1A. TX Audio -	10
Chan 1A. TX Audio +		•====• 4	Chan 1A. TX Audio +	9
Chan 1A. RX Audio -		•====• 30	Chan 1A. RX Audio -	12
Chan 1A. RX Audio +	5	•====• 5	Chan 1A. RX Audio +	11
Chan 1A. Busy In +		•====• 31	Chan 1A. Busy In +	7
Chan 1A. Busy In -		•====• 6	Chan 1A. Busy In -	8
Chan 1B. TX Data +		•====• 32	Chan 1B. TX Data +	1
Chan 1B. TX Data -		•====• 7	Chan 1B. TX Data -	2
Chan 1B. RX Data +	33	•====• 33	Chan 1B. RX Data +	3
Chan 1B. RX Data -		•====• 8	Chan 1B. RX Data -	4
Chan 1B. Busy Out -		•====• 34	Chan 1B. Busy Out -	6
Chan 1B. Busy Out +		•====• 9	Chan 1B. Busy Out +	5
Chan 1B. TX Audio -		•====• 35	Chan 1B. TX Audio -	10
Chan 1B. TX Audio +	10	•====• 10	Chan 1B. TX Audio +	9
Chan 1B. RX Audio -		•====• 36	Chan 1B. RX Audio -	12
Chan 1B. RX Audio +		•====• 11	Chan 1B. RX Audio +	11
Chan 1B. Busy In +		•====• 37	Chan 1B. Busy In +	7
Chan 1B. Busy In -		•====• 12	Chan 1B. Busy In -	8
Chan 2A. TX Data +	38	•====• 38	Chan 2A. TX Data +	1
Chan 2A. TX Data -		•====• 13	Chan 2A. TX Data -	2
Chan 2A. RX Data +		•====• 39	Chan 2A. RX Data +	3
Chan 2A. RX Data -		•====• 14	Chan 2A. RX Data -	4
Chan 2A. Busy Out -		•====• 40	Chan 2A. Busy Out -	6
Chan 2A. Busy Out +	15	•====• 15	Chan 2A. Busy Out +	5
Chan 2A. TX Audio -		•====• 41	Chan 2A. TX Audio -	10
Chan 2A. TX Audio +		•====• 16	Chan 2A. TX Audio +	9
Chan 2A. RX Audio -		•====• 42	Chan 2A. RX Audio -	12
Chan 2A. RX Audio +		•====• 17	Chan 2A. RX Audio +	11
Chan 2A. Busy In +	43	•====• 43	Chan 2A. Busy In +	7
Chan 2A. Busy In -		•====• 18	Chan 2A. Busy In -	8
Chan 2B. TX Data +		•====• 44	Chan 2B. TX Data +	1
Chan 2B. TX Data -		•====• 19	Chan 2B. TX Data -	2
Chan 2B. RX Data +		•====• 45	Chan 2B. RX Data +	3
Chan 2B. RX Data -	20	•====• 20	Chan 2B. RX Data -	4
Chan 2B. Busy Out -		•====• 46	Chan 2B. Busy Out -	6
Chan 2B. Busy Out +		•====• 21	Chan 2B. Busy Out +	5
Chan 2B. TX Audio -		•====• 47	Chan 2B. TX Audio -	10
Chan 2B. TX Audio +		•====• 22	Chan 2B. TX Audio +	9
Chan 2B. RX Audio -	48	•====• 48	Chan 2B. RX Audio -	12
Chan 2B. RX Audio +		•====• 23	Chan 2B. RX Audio +	11
Chan 2B. Busy In +		•====• 49	Chan 2B. Busy In +	7
Chan 2B. Busy In -		•====• 24	Chan 2B. Busy In -	8
Chassis		•====• 50	Chassis	
Chassis	25	•====• 25	Chassis	

Figure 29: Punchdown Block Connections (P/N 950-9351) for M427 Dispatcher Port

Chan 1A. TX Data +		•====•	26	Chan 1A. TX Data +	1
Chan 1A. TX Data -		•====•	1	Chan 1A. TX Data -	2
Chan 1A. RX Data +		•====•	27	Chan 1A. RX Data +	3
Chan 1A. RX Data -		•====•	2	Chan 1A. RX Data -	4
Chan 1A. Busy Out -	28	•====•	33	-	6
Chan 1A. Busy Out +		•====•	–	-	5
Chan 1A. TX Audio -		•====•	29	Chan 1A. TX Audio -	10
Chan 1A. TX Audio +		•====•	4	Chan 1A. TX Audio +	9
Chan 1A. RX Audio -		•====•	30	Chan 1A. RX Audio -	12
Chan 1A. RX Audio +	5	•====•	5	Chan 1A. RX Audio +	11
Chan 1A. Busy In +		•====•	–	-	7
Chan 1A. Busy In -		•====•	–	-	8
Chan 1B. TX Data +		•====•	32	Chan 1B. TX Data +	1
Chan 1B. TX Data -		•====•	7	Chan 1B. TX Data -	2
Chan 1B. RX Data +	33	•====•	33	Chan 1B. RX Data +	3
Chan 1B. RX Data -		•====•	8	Chan 1B. RX Data -	4
Chan 1B. Busy Out -		•====•	–	-	6
Chan 1B. Busy Out +		•====•	–	-	5
Chan 1B. TX Audio -		•====•	35	Chan 1B. TX Audio -	10
Chan 1B. TX Audio +	10	•====•	10	Chan 1B. TX Audio +	9
Chan 1B. RX Audio -		•====•	36	Chan 1B. RX Audio -	12
Chan 1B. RX Audio +		•====•	11	Chan 1B. RX Audio +	11
Chan 1B. Busy In +		•====•	–	-	7
Chan 1B. Busy In -		•====•	–	-	8
Chan 2A. TX Data +	38	•====•	38	Chan 2A. TX Data +	1
Chan 2A. TX Data -		•====•	13	Chan 2A. TX Data -	2
Chan 2A. RX Data +		•====•	39	Chan 2A. RX Data +	3
Chan 2A. RX Data -		•====•	14	Chan 2A. RX Data -	4
Chan 2A. Busy Out -		•====•	–	-	6
Chan 2A. Busy Out +	15	•====•	–	-	5
Chan 2A. TX Audio -		•====•	41	Chan 2A. TX Audio -	10
Chan 2A. TX Audio +		•====•	16	Chan 2A. TX Audio +	9
Chan 2A. RX Audio -		•====•	42	Chan 2A. RX Audio -	12
Chan 2A. RX Audio +		•====•	17	Chan 2A. RX Audio +	11
Chan 2A. Busy In +	43	•====•	–	-	7
Chan 2A. Busy In -		•====•	–	-	8
Chan 2B. TX Data +		•====•	44	Chan 2B. TX Data +	1
Chan 2B. TX Data -		•====•	19	Chan 2B. TX Data -	2
Chan 2B. RX Data +		•====•	45	Chan 2B. RX Data +	3
Chan 2B. RX Data -	20	•====•	20	Chan 2B. RX Data -	4
Chan 2B. Busy Out -		•====•	–	-	6
Chan 2B. Busy Out +		•====•	–	-	5
Chan 2B. TX Audio -		•====•	47	Chan 2B. TX Audio -	10
Chan 2B. TX Audio +		•====•	22	Chan 2B. TX Audio +	9
Chan 2B. RX Audio -	48	•====•	48	Chan 2B. RX Audio -	12
Chan 2B. RX Audio +		•====•	23	Chan 2B. RX Audio +	11
Chan 2B. Busy In +		•====•	–	-	7
Chan 2B. Busy In -		•====•	–	-	8
Chassis		•====•	50	Chassis	
Chassis	25	•====•	25	Chassis	

Figure 30: Punchdown Block Connections (P/N 950-9351) for GM1200 radio

Chan 1A. TX Data -	•====• 26	Chan 1A. TX Data -	2
Chan 1A. TX Data +	•====• 1	Chan 1A. TX Data +	1
Chan 1A. RX Data -	•====• 27	Chan 1A. RX Data -	4
Chan 1A. RX Data +	•====• 2	Chan 1A. RX Data +	3
Chan 1A. Busy Out -	28 •====• 28	Chan 1A. Busy Out -	6
Chan 1A. Busy Out +	•====• 3	Chan 1A. Busy Out +	5
Chan 1A. TX Audio -	•====• 29	Chan 1A. TX Audio -	10
Chan 1A. TX Audio +	•====• 4	Chan 1A. TX Audio +	9
Chan 1A. RX Audio -	•====• 30	Chan 1A. RX Audio -	12
Chan 1A. RX Audio +	5 •====• 5	Chan 1A. RX Audio +	11
Chan 1A. Busy In +	•====• 31	Chan 1A. Busy In +	7
Chan 1A. Busy In -	•====• 6	Chan 1A. Busy In -	8
Chan 1B. TX Data -	•====• 32	Chan 1B. TX Data -	2
Chan 1B. TX Data +	•====• 7	Chan 1B. TX Data +	1
Chan 1B. RX Data -	33 •====• 33	Chan 1B. RX Data -	4
Chan 1B. RX Data +	•====• 8	Chan 1B. RX Data +	3
Chan 1B. Busy Out -	•====• 34	Chan 1B. Busy Out -	6
Chan 1B. Busy Out +	•====• 9	Chan 1B. Busy Out +	5
Chan 1B. TX Audio -	•====• 35	Chan 1B. TX Audio -	10
Chan 1B. TX Audio +	10 •====• 10	Chan 1B. TX Audio +	9
Chan 1B. RX Audio -	•====• 36	Chan 1B. RX Audio -	12
Chan 1B. RX Audio +	•====• 11	Chan 1B. RX Audio +	11
Chan 1B. Busy In +	•====• 37	Chan 1B. Busy In +	7
Chan 1B. Busy In -	•====• 12	Chan 1B. Busy In -	8
Chan 2A. TX Data -	38 •====• 38	Chan 2A. TX Data -	2
Chan 2A. TX Data +	•====• 13	Chan 2A. TX Data +	1
Chan 2A. RX Data -	•====• 39	Chan 2A. RX Data -	4
Chan 2A. RX Data +	•====• 14	Chan 2A. RX Data +	3
Chan 2A. Busy Out -	•====• 40	Chan 2A. Busy Out -	6
Chan 2A. Busy Out +	15 •====• 15	Chan 2A. Busy Out +	5
Chan 2A. TX Audio -	•====• 41	Chan 2A. TX Audio -	10
Chan 2A. TX Audio +	•====• 16	Chan 2A. TX Audio +	9
Chan 2A. RX Audio -	•====• 42	Chan 2A. RX Audio -	12
Chan 2A. RX Audio +	•====• 17	Chan 2A. RX Audio +	11
Chan 2A. Busy In +	43 •====• 43	Chan 2A. Busy In +	7
Chan 2A. Busy In -	•====• 18	Chan 2A. Busy In -	8
Chan 2B. TX Data -	•====• 44	Chan 2B. TX Data -	2
Chan 2B. TX Data +	•====• 19	Chan 2B. TX Data +	1
Chan 2B. RX Data -	•====• 45	Chan 2B. RX Data -	4
Chan 2B. RX Data +	20 •====• 20	Chan 2B. RX Data +	3
Chan 2B. Busy Out -	•====• 46	Chan 2B. Busy Out -	6
Chan 2B. Busy Out +	•====• 21	Chan 2B. Busy Out +	5
Chan 2B. TX Audio -	•====• 47	Chan 2B. TX Audio -	10
Chan 2B. TX Audio +	•====• 22	Chan 2B. TX Audio +	9
Chan 2B. RX Audio -	48 •====• 48	Chan 2B. RX Audio -	12
Chan 2B. RX Audio +	•====• 23	Chan 2B. RX Audio +	11
Chan 2B. Busy In +	•====• 49	Chan 2B. Busy In +	7
Chan 2B. Busy In -	•====• 24	Chan 2B. Busy In -	8
Chassis	•====• 50	Chassis	
Chassis	25 •====• 25	Chassis	

Tait T2030, T2035, T2040 (Equipped With T2000-60 Dual Port UART)

Connection from the interface module 10-pin connector to the Tait radio 15-pin connector is made with Zetron cable P/N 709-7534 supplied with the interface module. The connections are listed in Table 51.

Table 51: Interface Module Connections (Tait T2000 series radios)

WIM Connector P1		Tait T2000 Series DB-15 Connector	
No Connection	1	-	
No Connection	2	-	
RX Data (RS232)	3	8	TXDA
TX Data (RS232)	4	7	RXDA
RX Audio	5	5	RX-AUDIO
TX Audio	6	15	TX-AUDIO
PTT	7	13	PTT-FRM-OPT
Digital GND	8	2	DGND
Analog GND	9	10	OPTIONS-GND
Power (+12V)	10	4	+13.8V-SW

Tait TM8255

Connection from the interface module 10-pin connector to the Tait radio 15-pin connector is made with Zetron cable P/N 709-7874 supplied with the interface module. The connections are listed in Table 52.

Table 52: Interface Module Connections (Tait TM8255 radios)

WIM Connector P1		Tait TM8255 DB-15 Connector	
No Connection	1	-	
No Connection	2	-	
RX Data (RS232)	3	11	AUX_TXD
TX Data (RS232)	4	3	AUX_RXD
RX Audio	5	13	AUD_TAP_OUT
TX Audio	6	7	AUD_TAP_IN
PTT	7	-	
Digital GND	8	-	
Analog GND	9	15	AGND
Power (+12V)	10	8	+13V8_SW

Motorola GM1200

Connection from the interface module 10-pin connector to the MAP radio 25-pin connector is made with the cable (P/N 709-7477) supplied with the interface module. The connections are listed in Table 53.

Table 53: Interface Module Connections (GM1200 radio)

WIM Connector P1		GM1200 Radio DB-25 Connector	
No Connection	1	-	
CTS	2	8	CTS
RX Data	3	20	TX Data
TX Data	4	19	RX Data
RX Audio	5	11	Filtered Audio
TX Audio	6	23	2nd Mic
PTT	7	21	PTT
Digital GND	8	4,9	Dig GND
Analog GND	9	10	An GND
Power (+12V)	10	14	SW B+ +12V
-		Pins 1 & 2 tied	

Motorola GM1200E

Connection from the interface module 10-pin connector to the GM1200E radio 16-pin connector is made with the cable (P/N 709-7543) supplied with the interface module. The connections are listed in Table 54.

Table 54: Interface Module Connections (GM1200E radio)

WIM Connector P1		GM1200E Radio DB-25 Connector	
No Connection	1	-	-
CTS	2	12	CTS
RX Data	3	8	TX Data
TX Data	4	6	RX Data
RX Audio	5	16	ext. speaker+
TX Audio	6	2	ext. mic audio
PTT	7	3	ext. PTT
Digital GND	8	7	A/D GND
Analog GND	9	7	A/D GND
Power (+12V)	10	13	SW B+ +12V

M427 Dispatcher Port

Connection from the interface module 10-pin connector to an M427 Dispatcher Port (1 of 4 available) is made with the cable supplied with the interface module (Zetron P/N 709-7554). The connections are listed in Table 55.

Table 55: Interface Module Connections (M427 Dispatcher Port)

Signal Name	WIM P1	M427 Port DB9 Connector	M427 Port 8-pin Modular Connector
RX Audio -	1	—	6 (RX aud -)
RX Audio +	2	—	3 (RX aud +)
RX Data (RS232)	3	2 (TX Data)	—
TX Data (RS232)	4	3 (RX Data)	—
TX Audio -	5	—	5 (TX aud -)
TX Audio +	6	—	4 (TX aud +)
No Connection	7	—	—
Digital GND	8, 9	4 (DC GND) & 5 (Dig GND)	—
Power (+12V)	10	9 (+12VDC)*	—

* M427 internal jumper JP5 must be set to the B position to supply 12VDC to RS232 pin 9

Radio Programming

TAIT T2030/T2035/T2040 Settings and Programming

Note The radio must be equipped with the T2000-60 Dual-port UART kit. This kit supplies the connection to signals required for MAP27 operation.

The T2000-60 must be configured as follows:

Link 3: 'B' (processed Rx audio)
Link 4: 'A' (processed Tx audio)
Link 8: OPEN to enable TX audio from console
Link 9: CLOSED to enable the line termination resistor
Link 10: OPEN to enable RX audio at console

Set the following parameters in the Tait radio programming software:

Note Many of the radio programming parameters are not listed below; either they don't apply to the Zetron Console application, or they are dependent on the individual user's trunking environment and personal preferences.

Set Specifications / MAP27 Interface to **ENABLED**
Set Miscellaneous Controls / PTT Initiation of Call to **ENABLED**
Set UIM Setup / UIM to **DUAL PORT**
Set UIM Setup / MAP27 Data Rate to **9600**
Set Unit – Identity / Call Queuing to **UNANSWERED or NONE**
Set Unit – Identity / Radio is a Dispatcher to **DISABLED**
Set Own fleet parameters / Full off air call setup to **DISALLOWED**

Tait TM8255 Programming

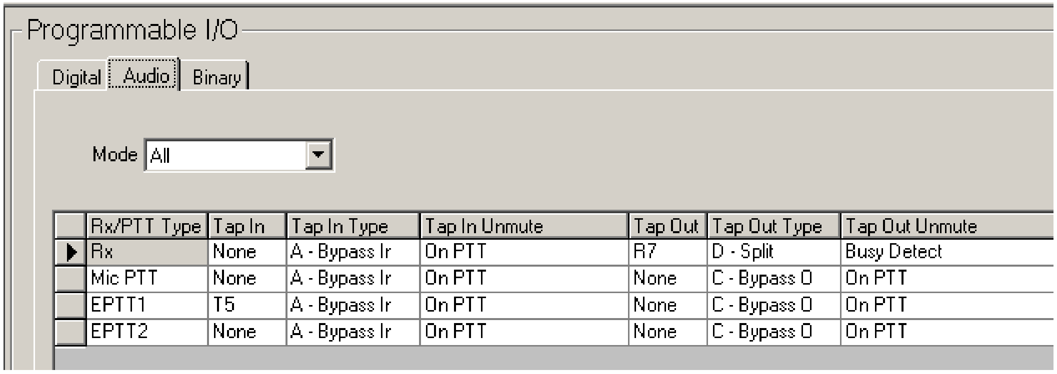
External audio connections to the transceiver are not pre-configured from the factory and must be both enabled and customized via the proper Tait programming software. This pertains particularly to lines 7 and 13 (AUD_TAP_IN & AUD_TAP_2). Set the following parameters in the Tait radio programming software:

Note Many radio settings are not mentioned in the following procedure; either those settings don't apply to the Zetron Console application, or they are dependent on the individual user's trunking environment and personal preferences.

Note This procedure is based on v5.8.0.1 of the TM8200 Programming Application. Other versions of the application may have different names or locations for settings.

1. Click **Global Features** on the left, then the **MAP27** tab.
2. Set the following:
    a. **MAP27 Enabled** = (yes)
    b. **MAP27 Port** = **AUX**
    c. **Baud Rate** = **9600**
    d. **Link Layer Type** = **Full 1.5**
3. Click **PTT** on the left, then the **External PTT (1)** tab.
4. Set the following:
    a. **Audio Source** = **Audio Tap In**
5. Click **Programmable I/O** on the left, then the **Audio** tab.

6. Ensure that the matrix table for the **RX**, **Mic PTT**, **EPTT1**, and **EPTT2** are set exactly as shown in the following figure.



Note The "Tap Points" within the audio chain for Tx and Rx audio are variable (see pages 80-85 of the Tait Application Manual). Tap points R7 (Rx) and T5 (Tx) are known to work. Although other points may function, we believe these to be optimum for Integrator RD console operation.

Motorola GM1200/GM1200E Programming

The Motorola GM1200/GM1200E radio must be programmed to support the interface to a Zetron console. Set the following parameters in the Motorola DPS1200/DPS1200E Dealer Programming software:

Note Many of the radio programming parameters are not listed below; either they don't apply to the Zetron Console application, or they are dependent on the individual user's trunking environment and personal preferences.

1. Under Edit, MPT Personality, Personality Data:
   Set Prefix, Ident, Fleet, etc. according to the trunking system used.
2. Under Edit, MPT Personality, Call Timers:
   Set "Call in Absence" to DISABLED.
   Set "External Emergency Line" to DISABLED.
   Set "External Alarm" to DISABLED.
   Set all other parameters as desired (call limit times, etc.)
3. Under Edit, MPT Personality, Keypad Call Enable:
   Set ALL Call types to ENABLED.
4. Under Edit, MPT Personality, Own Group Numbers:
   Enter the fixed groups that this radio should respond to (up to 25 groups). For any groups added to the list, set "Group Callable" to TRUE.
5. Under Edit, MPT Personality, Text Related Status:
   These entries apply to the radio itself but will not be translated to the Zetron console. The aliases for the status messages that appear at the console are

programmed in RDPS. If desired, the status aliases for the radio can be programmed to match the RDPS file.

6. Under Edit, MPT Personality, MAP27 – Data Calls:

Note ENABLED is a checked box, DISABLED is an unchecked box.

- Set “MAP27 Interface Enabled” to **ENABLED**.
- Set “MAP27 Link Establishment Timer (T0)” to **0.1 sec**.
- Set “MAP27 Link Activity Timer (T3)” to **8 sec**.
- Set “MAP27 Max. Number of Retries (N2)” to **3**.
- Set “MAP27 Link Activity Count (N3)” to **3**.
- Set “MAP27 Baud Rate” to **9600**.
- Set “Alert Tones in NPD Calls” to **DISABLED**.
- Set “Alert tones in short data calls” to **DISABLED**.
- Set “MAINT Telegrams in NPD Calls” to **DISABLED**.
- Set “TGI” to **5**.
- Set “TGG” to **10**.
- Set “NPD Call Duration Timer (TU)” to **DISABLED**.

Zetron Model 427 Peripheral Interface Programming

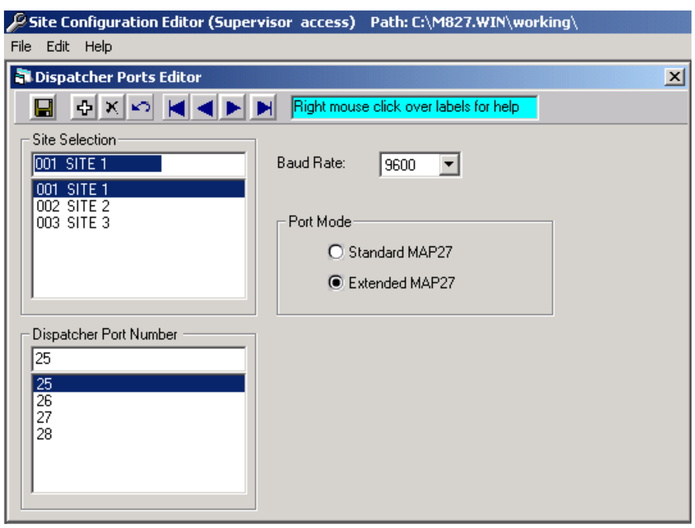
Note Many of the dispatcher programming parameters are not listed below; either they don't apply to the Zetron Console application, or they are dependent on the individual user's trunking environment and personal preferences.

To configure the Model 427, use the *Zetron M827Base for Windows* programming software as described in the following procedures.

First the Zetron M427 dispatcher port must be programmed to support the interface to a Zetron console.

♦ To configure the Dispatcher Port

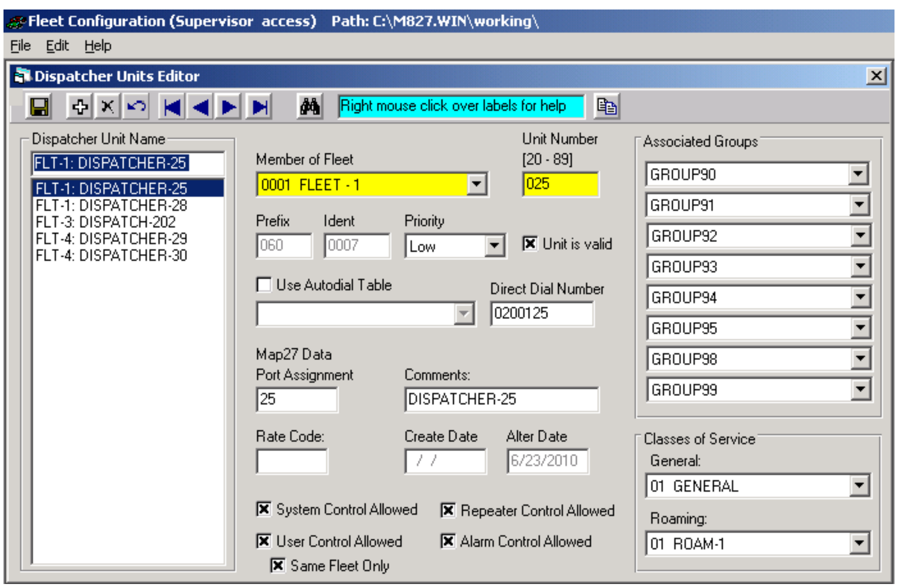
1. Start the *M827BASE for Windows* application.
2. Navigate to **Site Configuration Editor**, **Edit**, **Dispatcher Ports Editor**.
3. Define the **Site Selection** number that is being configured to work with the S4000 / IntegratorRD console system.
4. Define the **Dispatcher Port Number**. This is the M427 data port connected to the M4217.
5. Ensure that the **Baud Rate** is set to **9600**.
6. Ensure that **Port Mode** is set to **Extended MAP27**.
7. Save the entries.



Next, add a dispatcher assigned to the associated Map27 port and set the privileges and associated groups for this user.

♦ To configure the Dispatcher Units

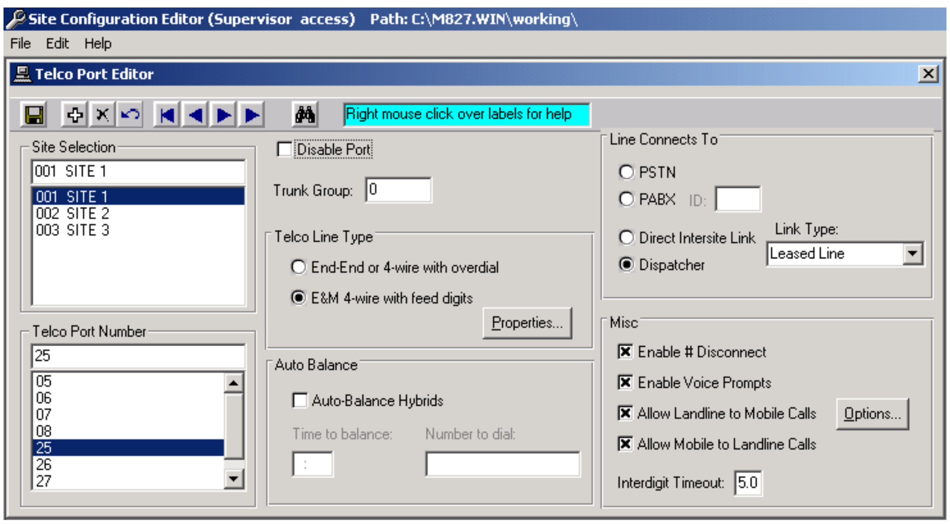
1. Start the *M827BASE for Windows* application.
2. Navigate to **Fleet Configuration Editor**, **Edit**, **Dispatcher Units Editor**.
3. Select the **Dispatcher Unit Name**, the **Member of Fleet** number (Fleets must be defined with their applicable Sites), and the **Unit Number**.
4. Enable **Unit is valid**.
5. Enter the **MAP27 Data Port Assignment**.
6. Enter the **Direct Dial Number**.
7. Define the user-defined control capabilities by enabling the appropriate controls (System Control Allowed, Repeater Control Allowed, User Control Allowed (with or without Same Fleet Only, and/or Alarm Control Allowed).
8. Assign the **Associated Groups**.
9. Select the General and Roaming **Classes of Service** (COS).
10. Save the data record to the database.



Next, add a Map27 telephone port for the connected M4217 dispatcher.

♦ To configure the Telco Port

1. Start the *M827BASE for Windows* application.
2. Navigate to **Site Configuration Editor**, **Edit**, **Telco Ports Editor**.
3. Define the **Site Selection**.
4. Define the **Telco Port Number**. This is the M427 audio port connected to the M4217.
5. Set **Line Connects To** to **Dispatcher**.
6. Set **Link Type** to **Leased Line** or **Microwave Link**. Neither of these options should have **E&M** listed in it.
7. Save the entry updates to this data record.



MAP27 Audio Level Settings

The MAP27 Wireless Control Card uses a different level setting procedure than the Universal Dual Channel Card. There are gain setting provisions for both the Rx audio level and the Tx audio level at both ends of the console-to-M427 audio link. Because of this there is more than one correct way to set the audio gains. The following procedures set the M427 gains about midway up (28 out of 64) prior to the actual audio level adjustments using the pots on the front of the MAP27 channel card. In each direction a sine wave tone is enabled at the transmitter and an adjustment is made to a hardware pot on the front of the MAP27 card while monitoring the received audio level.

Before starting, the console mic level must be set correctly and the console must be configured such that it can send a 1kHz alert tone. The console will not send an alert tone unless a destination radio can be reached, so the console, the M427, and the radio must be configured so that it is possible to make a call from the console to a remote radio through the M427. The Console Rx level, however, can be adjusted without being able to make a call because the M427 has an independent test mode to enable a test tone.

There are no audio gain adjustments in the Map27 wireless interface module, audio always passes straight through the WIM.

Required Tools

- A PC or laptop with a serial port and Windows XP
- Zetron M827Base for Windows (version 3.60.146 or later)
- Serial cable (straight-through serial extension cable)
- Small flat bladed screw driver to adjust gain pots on front of MAP27 card (0.12” max blade width)
- At least one configured MAP27 radio that can be connected
- A digital voltmeter able to read low AC sine wave levels (about 77 mV RMS)

M427 to Console Audio Level Adjustment

This procedure causes the M427 to output a test tone so that the Rx gain at the MAP27 channel card can be adjusted. The *Fluke 189 True RMS (Digital) Multimeter* or equivalent device has the accuracy required for the measurements in this procedure. An oscilloscope can also be used to perform this test, provided it has sufficient accuracy to measure such small audio signal levels.

1. Connect the **COM1** serial port on the PC or laptop to the M427 front panel serial port using a straight cable.
2. Start the Zetron utility program **M827Base**.
3. Click **FILE**, **CONNECT**, **SITE LIST**, **CONNECT** in order to select the **Communications Utility** and connect to the M427 being setup.
4. Once connected, click **TELCO LEVELS**, **LINE**, **AUDIO TO PHONE** in order to select the **LEVELS** menu and navigate to the dialog that outputs a tone.
5. Set the M427 output slider level to **28**.
6. Click the **ON** radio button to turn on the test tone.
7. At the S4000 MAP27 channel card, connect the AC meter to the front panel **RX** and **GND** test points.
8. At the S4000 MAP27 channel card, adjust the 4-wire **RX** pot until the meter reads 245 mV (= -10 dBu). 245mV is a RMS level which corresponds to -10 dBu for sine waves. For sine waves the "peak to peak" level is 2.825 times higher than the RMS level, so it would be 692 millivolt peak to peak for -10 dBu (= about 700 mVpp).
9. Click **OFF** at the PC to turn off the test tone.
10. Close the **Levels** menu.
11. Click **FILE**, **DISCONNECT**.
12. Close the **M827Base** program.

This completes the M427 to console audio level adjustment. The Rx level now set should be such that a sine wave 60% radio channel deviation causes a -20 dBu level (77 mV RMS) at the MAP27 Rx test point. This is the same Rx level as the dual channel card audio level setup (see *Dual Channel Card Audio Levels* on page 181).

Console to M427 audio level adjustment

This procedure causes the console to output a tone so that the Tx gain at the MAP27 channel card can be adjusted to give the desired level at the M427 input. It assumes a typical line length and sets the M427 input gain about midway up (28 out of 64). For very long lines it may be necessary to increase the M427 input gain, but only if there is not enough adjustment at the MAP27 channel card.

1. Connect the **COM1** serial port on the PC or laptop to the M427 front panel serial port using a straight cable.
2. Start the Zetron utility program **M827Base**.
3. Click **FILE**, **CONNECT**, **SITE LIST**, **CONNECT** in order to select the **Communications Utility** and connect to the M427 being setup.
4. Once connected, click **TELCO LEVELS**, **LINE**, **AUDIO FROM PHONE** in order to select the **LEVELS** menu and navigate to the dialog that displays the input level of a tone.
5. Set the M427 input slider level to **28** (for normal length lines).
6. The bar below the level slider will now display the level of the received audio, we want this to end up reading **-10**.
7. Make a call from the console to a MAP27 radio that goes through the M427 and then key up the 1 kHz alert tone (using a previously configured on screen button).
8. While observing the M427 level meter on the PC or laptop, at the S4000 MAP27 channel card adjust the **TX** level pot until the meter reads **-10**.
9. At the PC or laptop, terminate the test by closing the dialog box.
10. Close the **Levels** menu.
11. Click **FILE**, **DISCONNECT**.
12. Close the **M827Base** program.

This completes the Console to M427 audio level adjustment. The Tx level now set should be such that a Tx sine wave alert tone causes a 60% radio channel deviation. This is the same Tx level as the dual channel card audio level setup (see *Dual Channel Card Audio Levels* on page 181).

Operation

Programming the Console

The Integrator Radio Dispatch Programming Software (RDPS) includes programming selections for the type of MAP27 channel card, associated channel control buttons, and the following entries:

- MAP27 radio groups
  see *Defining MAP27 Radio Groups* on page 291
- Subscriber ID aliases (radio or group IDs)
  see *Entering Subscriber ID Definitions* on page 293

- Status ID aliases and button definitions
  see *Entering Status ID Definitions* on page 297
- Talkgroup aliases (for display of groups)
  see *Entering Talk Group Definitions* on page 298
- SST Text button definitions
  see *Entering MAP27 Short Status Text Definitions* on page 301
- Dynamic Regroup button definitions
  see *Entering Dynamic Group Definitions (MAP27 Channels)* on page 302

See *IntegratorRDPS Programming* on page 259 for information about creating configuration files using RDPS and for MAP27-specific programming details.

Video Console Operation

Refer to *Series 4000 Operation Manual* (P/N 025-9535) for general information on console operation and for MAP27-specific details.

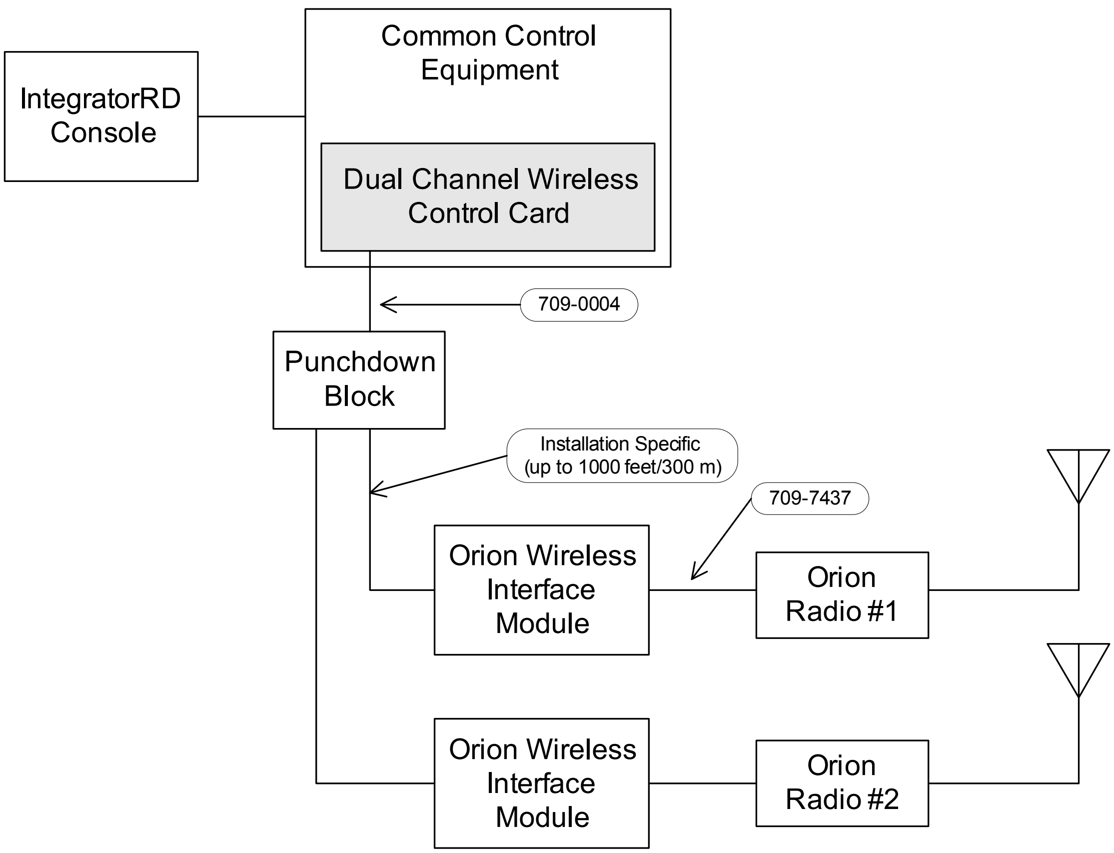
Harris M7100 Wireless Interface Option

Overview

The Zetron Series 4000 Harris Wireless Interface Option is designed to allow an IntegratorRD console to interface to a Harris M7100, Jaguar J725M, or an Orion radio.

The Harris Wireless Interface Option consists of a Dual Channel (Orion) Wireless Control Card (P/N 950-9867), which can interface with two radios. Each radio needs one Zetron Orion Wireless Interface Module (P/N 950-9868). The Dual Channel Card is installed in the Series 4000 Common Control Equipment (CCE) rack. The interface module and the radio should be located within 1000 feet (300 m) of the CCE rack. Each interface module is provided with a cable to connect the radios (P/N 709-7937). See Figure 31.

Figure 31: Series 4000 Harris Wireless Interface Option Components



The Harris Wireless Interface Option may be added to existing IntegratorRD console systems with the addition of the Dual Channel Wireless Control Card, the Zetron Harris Wireless Interface Module (WIM), and software upgrades to the Console Interface Card and the console itself. Adding the Harris capability to an existing system will have no effect on the existing channels. All other operation of the console is unaffected.

Both channels on the Harris Dual Channel Wireless Control Card must be Harris interface channels.

Recommendations

The following recommendations are made concerning overall system design:

Each of the radios should operate from its own 12VDC power supply.

For each radio in the system to achieve proper performance and stability, it is important that adequate separation be provided among all of the radio antennas for the system.

Warning! Harris M7100IP radios with certain firmware revisions may experience lock-up if the receive carrier detect signal changes state too frequently (an example of this is a field unit in motion in a fringe reception area). If this occurs with your radio, it may be necessary to cycle the radio power supply in order to restore normal radio operation. This potential problem also applies to Harris J725M (Jaguar) radios.

Orion Dual Channel Wireless Control Card Configuration

Switches

Note For firmware versions 1.26 and later, the DIP switches have no effect. Full Duplex is always on. BTI and OPT are always off.

For prior firmware versions, refer to the manual delivered with your hardware, or revision F of this manual (025-9533).

The Orion Dual Channel Wireless Control Card has several switches that, for earlier firmware versions, required configuration before the card is installed in the Series 4000 system. The card has four switches for each of the two channels (see Table 56); this table is provided as a reference only for earlier firmware versions.

Table 56: Channel options for earlier firmware versions (current version does not require setting)

Channel	Switch	Label	Type of Selection
B	1	BTI	Not used, set OFF
	2	OPT (upper)	TX blocking, set OFF
	3	OPT (lower)	Not used, set OFF
	4	FD	Full Duplex, set ON
A	5	BTI	Not used, set OFF
	6	OPT (upper)	TX blocking, set OFF
	7	OPT (lower)	Not used, set OFF
	8	FD	Full Duplex, set ON

Programming the Dual Channel Wireless Control Card

This programming section is for the Dual Channel Wireless Control Card (P/N 950-9867) only. The Dual Channel Wireless Control Card is used for systems with a Harris M7100, Jaguar 725M, or an Orion radio.

Note For programming Universal cards (P/N 950-9819) and Tone/Local cards (P/N 950-9820), see *Configuring Channel Cards* on page 48.

◆ To configure the Dual Channel Wireless Control Card

1. Use a terminal set for 19200, 8, N, 1 (with no flow control) to connect to the monitoring port on the front panel using the Zetron cable P/N 709-7452.
2. Once connected, press **Esc** to get the following menu (the version number may vary, and your options may vary based on your version):

```
Orion v1.24.01, 2013-MAR-24
---Press <ESC> anytime to return to this menu---
?,Config : ?
```

3. Menu choices are activated by pressing the appropriate capitalized letter. You can press **Esc** at any time to return to the main menu. Typing a question mark "?" gives you the current configuration that should look something like this sample:

```
DCC Serial_No:: 0000B4F6
--- 4048 ChA/B number = 3/4
Active ChA config. ________
 Ch Type = Orion
 Diag. Log Disabled
 Radio Volume=100%
 VOX Enabled
 VOX Threshold=-18dB
 VOX Decay Time=0.5sec
Active ChB config. ________
 Ch Type = Orion
 Diag. Log Disabled
 Radio Volume=100%
 VOX Enabled
 VOX Threshold=-18dB
 VOX Decay Time=0.5sec
AudioDRAM installed = None or Bad.

---Press <ESC> anytime to return to this menu---
```

```
?,Config : C
```

"Ch Type = Orion" indicates support for Orion, J725M, and M7100 radios.

4. Press "C" to configure a channel.

```
chA,chB,Flash,<BS> : A
```

5. You can then select which channel to configure by pressing "A" or "B". In this example we are configuring channel A.

6. Once you select a channel you have the option of reviewing or defining setting for the channel.

```
Define,Review,Store,Init,<BS> : D
```

7. Press "D" to define a channel. The options you can define are :

   - Log - Enable/Disable diagnostic logging. Displays event and state information that can be used to diagnose problems.
   - Volume - Set relative radio volume (20% to 100%).
   - voX enable - Determines if received audio controls incoming calls. Required to support PL calls on Orion radios. When enabled, incoming call state is determined by either VOX or the status of the "Busy" LED on the radio. When disabled, incoming call state is determined solely by the status of the "Busy" LED on the radio.

Tip The recommended setting for VOX depends upon your firmware version. These recommendations are only valid for Orion/M7100 firmware (P/N 601-0903).

- V1.00 to V1.16: VOX can be enabled with radios configured for conventional operation if desired, but will cause problems on trunked systems.
- V1.17 to V1.22: VOX can be enabled if desired.
- V1.24.01: VOX is recommended to be enabled.

   - vox Threshold - Received audio level that triggers call detection. Levels above the threshold will trigger a call indication. Selectable from -32 to -18 dbm.
   - vox Delay - Determines how long the audio must be below the vox Threshold before the call is cleared. Selectable from .5 to 4.0 seconds.

8. The logging options:

```
Log,Volume,voX enable,vox Threshold,vox Delay,<BS> : L
Disable,Enable,<BS> : #
```

Zetron recommends log disabled (**D**).

9. The volume options:

```
Log,Volume,voX enable,vox Threshold,vox Delay,<BS> : V
A:20%, B:40%, C:60%, D:80%, E:100%, <BS> : #
```

Zetron recommends 100% (**E**).

10. The Vox options (default is enabled):

```
Log,Volume,voX enable,vox Threshold,vox Delay,<BS> : X
Disable,Enable,<BS> : #
```

Zetron recommends VOX enabled (**E**) unless you have an older firmware version (see note above).

11. The Vox Threshold options:
```
Log,Volume,voX enable,vox Threshold,vox Delay,<BS> : T
A:-18dB, B:-20dB, C:-22, D:-24, E:-26, F:-28, G:-30, H:-32,<BS> : #
```
    Zetron recommends -18dB (**A**) for the initial setting. The setting can be adjusted later if needed, during audio level adjustment procedures.
12. The Vox Delay options (default is 0.5sec):
```
Log,Volume,voX enable,vox Threshold,vox Delay,<BS> : D
A:0.5sec, B:1.0sec, C:1.5, D:2.0, E:2.5, F:3.0, G:3.5, H:4.0,<BS> : #
```
    Zetron recommends 0.5sec (**A**).
13. When you are finished setting the options for a channel they are then stored. The card then does a reset and displays the current settings, which should look similar to this example:
```
Define,Review,Store,Init,<BS> : S  DCC is Resetting ...

Orion v1.20, 2009-MAR-24
---Press <ESC> anytime to return to this menu---
?,Config :

DCC Serial_No:: 0000B4F6
--- 4048/4020 ChA/B number = 1/2
Active ChA config. ________
 Ch Type = Orion
 Diag. Log Enabled
 Radio Volume=100%
 VOX Enabled
 VOX Threshold=-18dB
 VOX Decay Time=0.5sec
Active ChB config. ________
 Ch Type = Orion
 Diag. Log Disabled
 Radio Volume=100%
 VOX Enabled
 VOX Threshold=-32dB
 VOX Decay Time=4.0sec
AudioDRAM installed = None or Bad.
```

Installation Connections

Interconnects

Connection to each channel of the Orion Dual Channel Wireless Control Card in the common control equipment rack is made by way of the punchdown block (see Table 57 and Table 58).

Table 57: Punchdown Block (P/N 950-9351) Connections for Orion Dual Channel Card

Signal Name	Punchdown				WIM Connector P2
	1A	1B	2A	2B	
TX Data +	26	32	38	44	1
TX Data -	1	7	13	19	2
RX Data +	27	33	39	45	3
RX Data -	2	8	14	20	4
Busy Out +	28	34	40	46	5
Busy Out -	3	9	15	21	6
Busy In +	31	37	43	49	7
Busy In -	6	12	18	24	8
TX Audio +	4	10	16	22	9
TX Audio -	29	35	41	47	10
RX Audio +	5	11	17	23	11
RX Audio -	30	36	42	48	12

Table 58: Punchdown Block (P/N 950-9351) Connections

Chan 1A. TX Data +	---26	Chan 1A. TX Data +	1
Chan 1A. TX Data -	---01	Chan 1A. TX Data -	2
Chan 1A. RX Data +	---27	Chan 1A. RX Data +	3
Chan 1A. RX Data -	---02	Chan 1A. RX Data -	4
Chan 1A. Busy Out +	28---28	Chan 1A. Busy Out +	5
Chan 1A. Busy Out -	---03	Chan 1A. Busy Out -	6
Chan 1A. TX Audio -	---29	Chan 1A. TX Audio -	10
Chan 1A. TX Audio +	---04	Chan 1A. TX Audio +	9
Chan 1A. RX Audio -	---30	Chan 1A. RX Audio -	12
Chan 1A. RX Audio +	05---05	Chan 1A. RX Audio +	11
Chan 1A. Busy In +	---31	Chan 1A. Busy In +	7
Chan 1A. Busy In -	---06	Chan 1A. Busy In -	8
Chan 1B. TX Data +	---32	Chan 1B. TX Data +	1
Chan 1B. TX Data -	---07	Chan 1B. TX Data -	2
Chan 1B. RX Data +	33---33	Chan 1B. RX Data +	3
Chan 1B. RX Data -	---08	Chan 1B. RX Data -	4
Chan 1B. Busy Out +	---34	Chan 1B. Busy Out +	5
Chan 1B. Busy Out -	---09	Chan 1B. Busy Out -	6
Chan 1B. TX Audio -	---35	Chan 1B. TX Audio -	10
Chan 1B. TX Audio +	10---10	Chan 1B. TX Audio +	9
Chan 1B. RX Audio -	---36	Chan 1B. RX Audio -	12
Chan 1B. RX Audio +	---11	Chan 1B. RX Audio +	11
Chan 1B. Busy In +	---37	Chan 1B. Busy In +	7
Chan 1B. Busy In -	---12	Chan 1B. Busy In -	8
Chan 2A. TX Data +	38---38	Chan 2A. TX Data +	1
Chan 2A. TX Data -	---13	Chan 2A. TX Data -	2
Chan 2A. RX Data +	---39	Chan 2A. RX Data +	4
Chan 2A. RX Data -	---14	Chan 2A. RX Data -	3
Chan 2A. Busy Out +	---40	Chan 2A. Busy Out +	5
Chan 2A. Busy Out -	15---15	Chan 2A. Busy Out -	6
Chan 2A. TX Audio -	---41	Chan 2A. TX Audio -	10
Chan 2A. TX Audio +	---16	Chan 2A. TX Audio +	9
Chan 2A. RX Audio -	---42	Chan 2A. RX Audio -	12
Chan 2A. RX Audio +	---17	Chan 2A. RX Audio +	11
Chan 2A. Busy In +	43---43	Chan 2A. Busy In +	7
Chan 2A. Busy In -	---18	Chan 2A. Busy In -	8
Chan 2B. TX Data +	---44	Chan 2B. TX Data +	1
Chan 2B. TX Data -	---19	Chan 2B. TX Data -	2
Chan 2B. RX Data +	---45	Chan 2B. RX Data +	3
Chan 2B. RX Data -	20---20	Chan 2B. RX Data -	4
Chan 2B. Busy Out +	---46	Chan 2B. Busy Out +	5
Chan 2B. Busy Out -	---21	Chan 2B. Busy Out -	6
Chan 2B. TX Audio -	---47	Chan 2B. TX Audio -	10
Chan 2B. TX Audio +	---22	Chan 2B. TX Audio +	9
Chan 2B. RX Audio -	48---48	Chan 2B. RX Audio -	12
Chan 2B. RX Audio +	---23	Chan 2B. RX Audio +	11
Chan 2B. Busy In +	---49	Chan 2B. Busy In +	7
Chan 2B. Busy In -	---24	Chan 2B. Busy In -	8
Chassis	---50	Chassis	
Chassis	25---25	Chassis	

Harris Wireless Interface Module

The Harris Wireless Interface Module provides level conversion, power-on circuitry, and 4-wire audio from the Harris Dual Channel Wireless Control Card to the radio.

Connection from the interface module 10-pin connector to the radio 37-pin connector is made with the 20-foot cable supplied with the interface module (Zetron P/N 709-7437). The connections are listed in Table 59.

Table 59: Interface Module Connections

WIM Connector P1		DB-37 (Radio)	
Data +	1	4	BUS+
Data -	2	5	BUS-
Power-On	3	14	CTL-ON
No Connection	4	—	
RX Audio	5	13	RXA
TX Audio	6	11	TXA
Busy	7	17	BUSY
Digital Gnd	8	7	DGND
Audio Gnd	9	12	AGND
Power	10	25	PWR

Adjusting Levels

See *Audio Level Adjustments* on page 177.

Radio Programming

An Harris M7100, Orion, or Jaguar 725M radio personality must be programmed to support the interface to a Zetron IntegratorRD console.

To take advantage of the console ID alias capability, no LID information (or aliases) should be programmed into the radio (no individual call IDs should be programmed). The reason for this is that Integrator RD uses the radio's ID as a key to its alias database entries. This will ensure that the number on the radio's display is the radio's ID. Once this radio ID is obtained, RD will look through its alias database for a corresponding entry. If an alias is found, it shall be used by the console for purposes of identifying the radio. If a matching alias cannot be found, then RD shall simply display the original radio display text.

Radio Programming

Use the following procedure to program a radio for dual control head operation using ProGrammer or Radio Personality Manager (RPM). The following steps are based on a specific version of ProGrammer and may only be used approximately for other versions of ProGrammer or RPM.

RPM is used with JAGUAR J725M radios or M7100 radios using *J2R13* or newer firmware.

ProGrammer is used with JAGUAR J725M radios or M7100 radios containing *J2R12* or older firmware, or ORION radios.

♦ To program the radio

1. Connect a programming cable between the rear of the radio and a serial port on the programming PC.
2. Leave Zetron common control cable disconnected.
3. On the PC, start up the Harris ProGrammer software. Power up the radio control head to get into programming mode.
4. Read the contents of the radio. When prompted for the radio type, select: **Orion**, **M7100**, or **Jaguar 725M**.
5. All **External I/O** and **Scanning** should typically be disabled on fixed location radios. This is especially true of the **System Scanning – Wide Area** mode. This should never be enabled in a fixed location radio that shall be connected to a console system. To disable these items:
   a. In the **Options** tab, **Keypad Options** menu:
      Hookswitch Disable Scan (Parameter) = OFF (Unchecked)
      Ramp Wrap (Parameter) = ON (Checked)
   b. In the **Options** tab, **Scan Options** menu, **Conventional Scan Options** area:
      Scan With Channel Guard (Parameter) = OFF (Unchecked)
   c. In the **Options** tab, **Scan Options** menu, **Universal Scan Options** area:
      Scan List (Parameter) = FIXED
      P1 Programming (Parameter) = FIXED
      P2 Programming (Parameter) = FIXED

Note If the **Scan Add** and **Scan Delete** buttons are to be used at the IntegratorRD console, then the above parameters cannot be set to the **FIXED** parameter value (**Scan List**, **P1 Programming**, and **P2 Programming**). They must be configured according to the user's application desires instead.

   d. In the **System Scan Options** menu:

Scan Type (Parameter) = ProSound/ProScan (Option 2)

Note This option allows the radio to scan for its system (site) control channel to ensure that the site remains active. If **'Option 1 = Disabled'** is selected, then the system scanning of the radio is completely **disabled**. If **'Option 3 = Wide Area'** is selected, then the radio should not be used as a fixed location radio that gets connected to the console system. The **'Option 3 = Wide Area'** setting should only be used in radios that are capable of roaming from site to site such as those that are installed in vehicles would be used in this manner. The **'Option 3 = Wide Area'** setting is known to cause problems with the system if it's used in fixed location radios that are connecting to the system.

6. Under **Network Options**, enable **Dual Control**. Accept all the default selections under **Dual Control**.

Note If the radio currently connected to the Zetron CCE does not have a factory control head installed, it is not necessary to program the radios for dual control head operation.

7. Initiate programming of radio.
8. Select **Mobile Options**. Select **CUB** from the **Control Head ID** list. Press **OK** to close mobile options. Press **OK** to continue programming.
9. Upon completion of programming, power down the radio at the control head.
10. Connect the Zetron common control cable into the in-line programming cable. Leave the control head turned off; the control head display will be dark.
11. Initiate programming of radio.
12. Select **Mobile Options**. Under **Mobile Options** select **write system keypad file**. Select **CUA** from the **Control Head ID** list. Press **OK** to close mobile options. Then press **OK** to continue programming.
13. Upon completion of programming, remove programming cable and plug Zetron common control cable directly into radio.
14. Cycle power on the radio by removing and reattaching the power cable on the rear of the radio.
15. Turn the radio on at the control head.
16. The display should read ***DUAL***.

The radio is now configured for dual control head operation.

Note "Dual" control head programming has the following affect on the radios. When attempting to gain control of the radio from either the radio's attached control head with the "first mic" or from the IntegratorRD console position, PTT must be pressed twice before any audio is passed.

Other Versions of EDACS

Consult your radio programming manual on the procedure for programming dual control head operation. Also, see above instructions for basic flow of programming. The factory attached control head should be programmed as CUB (control unit B) while the Zetron equipment should be programmed into the radio as being CUA (control unit A). Upon programming completion the factory attached control head should read *DUAL*.

Operation

Programming the Console

IntegratorRDPS is used to program the IntegratorRD console position. See *IntegratorRDPS Programming* on page 259.

Channel Definition

To enable operation of an Orion channel it must be specified using the Edit, Channel Definitions menu. For each channel in the system, the type “E/ORION” must be specified for the Control Type field.

Control Buttons

There are several EDACS channel control buttons available for controlling an EDACS radio. These buttons may be programmed to operate on the video screen or the audio panel. The Edit, Screen Buttons and Edit, Keyboard Layout menus are used to program the button and panel layouts (see Table 60).

Table 60: Control Button Descriptions

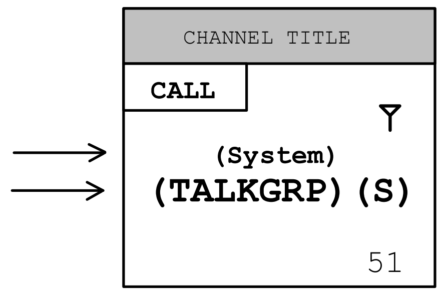
Button Function	Description
EDACS Clear	Used to clear menu-selected functions.
EDACS, I-Call, Next	Scrolls through radio-programmed individual call users. Not supported by IntegratorRD
EDACS, I-Call, Prev	Scrolls through radio-programmed individual call users. Not supported by IntegratorRD
EDACS, Emergency	When held for 2 seconds, causes the radio to transmit an emergency call on the current talkgroup.
EDACS, Emerg. Clear	Clears a receive or transmit emergency condition.
EDACS, Next Group (↑)	Scrolls through radio-programmed talkgroups.
EDACS, Prev. Group (↓)	Scrolls through radio-programmed talkgroups.
EDACS, Private	Enables/Disables radio encryption.
EDACS, System	Scrolls through radio-programmed systems.
EDACS, Scan	Enables/Disables radio scan.

Video Console Operation

Refer to *Series 4000 Communication Control System Operation* (P/N 025-9535) for general operation. The following describes the features of the Orion interface.

There are two display lines within each channel control module to indicate the mode and state of the attached Orion radio (see Figure 32).

Figure 32: Display of Orion Mode and State



These two lines basically mimic the display information of the two lines on the control head of an Orion radio.

The upper line displays the selected "system" when the radio is not transmitting or receiving. When a call is received, this display shows the individual ID (or alias) of the calling party.

The lower line displays the selected talkgroup and the scan mode. This line also indicates emergency status with *RXEMER* and *TXEMER* displayed in white letters on a red background, alternating with the talkgroup. When an individual call is in progress, the lower line will display *INDV*.

An antenna logo is displayed in the upper-right to indicate transmission on an Orion channel.

Console Error Displays

In the eight-character display on the console reserved for Orion radio information, errors may be displayed if communication between the Orion Dual Channel Wireless Control Card and the Orion radio are unsuccessful.

RCOM-ERR

This display indicates a communication error has occurred between the radio and the Orion Dual Channel Wireless Control Card. This error can be caused by improper setup, disconnection between the dual channel card and interface module or between the interface module and radio, or loss of power to the radio.

RRST ERR

Indicates that the radio is performing the power-up self-test. If this occurs during operation, it may indicate that the radio had lost power and is restarting.

Programming the Console

IntegratorRDPS is used to program the IntegratorRD video console workstation. See *IntegratorRDPS Programming* on page 259.

Harris M7300 Wireless Interface Option

Overview

This kit is used to connect Harris M7300 series radios to a Zetron Series 4000 system and also includes instructions on upgrading the S4000 Dual Channel card firmware

Assembly Level Part Numbers

- 950-1113 Wireless Dual Channel Card for Harris M7300 Radios
- 905-0366 Radio Interface Kit for Harris M7300, includes the following:
    - 950-1107 Wireless Interface Module (WIM) for Harris M7300
    - 950-1108 Radio Interface Controller for Harris M7300
    - 950-1109 CAN BUS to USB Adapter

Optional Mounting Kits

- 950-1110 Interface Controller Mounting Kit, 6-Channel, 19" Rack Mount
- 950-1111 Interface Controller Mounting Kit, 2-Channel, 19" Rack Mount
- 950-1112 WIM Mounting Kit, 6-Channel, 19" Rack Mount

Software Part Number

- 950-0503 Integrator RD
- 950-1155 Harris M-Series Dual Channel Card Firmware Upgrade

Required Tools

- Phillips screwdriver
- Small flat blade screwdriver
- Punchdown block tools

Versions

This kit was tested with the following combination of software and firmware versions:

- Zetron Integrator RD 5.1 and newer
- Harris RPM (Radio Personality Manager): R05C03
- Harris M7300 boot app version: R12A00
- Harris M7300 burn app version: R09J02
- Harris M7300 ECP (main control firmware): R14A18
- Harris M7300 DSP firmware: 12.13 (note: part of the ECP)
- Harris M7300 CH-721 Control Head: R05A02

Recommendations

- Each of the radios should operate from its own 12VDC power supply.
- For each radio in the system to achieve proper performance and stability, it is important that adequate separation be provided among all of the radio antennas for the system.

Radio Setup

A Harris radio personality must be programmed to support the interface to a Zetron IntegratorRD console.

To take advantage of the console ID alias capability, no LID information (or aliases) should be programmed into the radio (no individual call IDs should be programmed). The reason for this is that Integrator RD uses the radio's ID as a key to its alias database entries. This will ensure that the number on the radio's display is the radio's ID. Once this radio ID is obtained, RD will look through its alias database for a corresponding entry. If an alias is found, it shall be used by the console for purposes of identifying the radio. If a matching alias cannot be found, then RD shall simply display the original radio display text.

Radio Programming

Use the following procedure to program a radio for operation using Radio Personality Manager (RPM). The following steps are based on a specific version of RPM and may only be used approximately for other versions. The control head is required for programming the radio.

♦ To program the radio

1. Connect a programming cable between the rear of the radio and a serial port on the programming PC.
2. On the PC, start up RPM. Power up the radio control head to get into programming mode.
3. Read the contents of the radio. When prompted for the radio type, select: **M7300**.

4. All External I/O and Scanning should typically be disabled on fixed location radios. This is especially true of the System Scanning - Wide Area mode. This should never be enabled in a fixed location radio that shall be connected to a console system. To disable these items:
   a. In the **Options** tab, **Keypad Options** menu:
      Hookswitch Disable Scan (Parameter) = OFF (Unchecked)
      Ramp Wrap (Parameter) = ON (Checked)
   b. In the **Options** tab, **Scan Options** menu, **Conventional Scan Options** area:
      Scan With Channel Guard (Parameter) = OFF (Unchecked)
   c. In the **Options** tab, **Scan Options** menu, **Universal Scan Options** area:
      Scan List (Parameter) = FIXED
      P1 Programming (Parameter) = FIXED
      P2 Programming (Parameter) = FIXED

Note If the **Scan Add** and **Scan Delete** buttons are to be used at the IntegratorRD console, then the above parameters cannot be set to the **FIXED** parameter value (**Scan List**, **P1 Programming**, and **P2 Programming**). They must be configured according to the user's application desires instead.

---

   d. In the **System Scan Options** menu:
      Scan Type (Parameter) = ProSound/ProScan (Option 2)

Note This option allows the radio to scan for its system (site) control channel to ensure that the site remains active. If '**Option 1 = Disabled**' is selected, then the system scanning of the radio is completely **disabled**. If '**Option 3 = Wide Area**' is selected, then the radio should not be used as a fixed location radio that gets connected to the console system. The '**Option 3 = Wide Area**' setting should only be used in radios that are capable of roaming from site to site such as those that are installed in vehicles would be used in this manner. The '**Option 3 = Wide Area**' setting is known to cause problems with the system if it's used in fixed location radios that are connecting to the system.

---

   e. In the **Options** tab, **External Options** menu, **Auxiliary Input 1**:
      Keycode = Ext PTT
      Control Unit = A
5. Initiate programming of radio.
6. Upon completion of programming, power down the radio by removing power
7. Remove the programming cable and connect the radio to the Zetron control cables.

8. Turn the radio on by connecting power.

Wireless Dual Channel Card Configuration (P/N 950-1113)

DIP Switches

The Dual Channel Control Card has eight configuration switches on the front panel. However, firmware versions after v2.04 no longer require these to be set.

Programming

♦ To configure the Dual Channel Wireless Control Card

1. Use a terminal set for 19200, 8, N, 1 (with no flow control) to connect to the monitoring port on the front panel using the Zetron cable P/N 709-7452.
2. Once connected, press Esc to get the following menu (the version number may vary, and your options may vary based on your version):
```
Harris M-Series V2.03.01 2013-Mar-20
---Press <ESC> anytime to return to this menu---
?,Config : ?
```
3. Menu choices are activated by pressing the appropriate capitalized letter. You can press Esc at any time to return to the main menu. Typing a question mark "?" gives you the current configuration that should look something like this sample:
```
---Press <ESC> anytime to return to this menu---
?,Config : ?

DCC Serial_No:: 0000251E
--- 4048 ChA/B number = 5/6
Active ChA config. ________
 Ch Type = Harris-M
 Diag. Log Disabled
 Radio Volume = 100%
 VOX Enabled
 VOX Threshold = -18dB
 VOX Decay Time = 0.5sec
Active ChB config. ________
 Ch Type = Harris-M
 Diag. Log Disabled
 Radio Volume = 100%
 VOX Enabled
 VOX Threshold = -18dB
 VOX Decay Time = 0.5sec
AudioDRAM installed = 1 Mbyte

---Press <ESC> anytime to return to this menu---
?,Config : C
```
   "Ch Type = Harris-M" indicates support for M7300 radios.
4. Press "C" to configure a channel.
```
chA,chB,Flash,<BS> : A
```
5. You can then select which channel to configure by pressing "A" or "B". In this example we are configuring channel A.
6. Once you select a channel you have the option of reviewing or defining setting for the channel.

```
Define,Review,Store,Init,<BS> : D
```

7. Press "D" to define a channel. The options you can define are :
   - Log - Enable/Disable diagnostic logging. Displays event and state information that can be used to diagnose problems.
   - Volume - Set relative radio volume (20% to 100%).
   - voX enable - Determines if received audio controls incoming calls. Required to support PL calls on M Series radios. When enabled, incoming call state is determined by either VOX or the status of the "Busy" LED on the radio. When disabled, incoming call state is determined solely by the status of the "Busy" LED on the radio.

> **Tip** The recommended setting for VOX depends upon your firmware version. These recommendations are only valid for M7300 firmware (P/N 601-1540).
>
> - V2.00: VOX can be enabled if desired.
> - V2.03.01: VOX is recommended to be enabled.

   - vox Threshold - Received audio level that triggers call detection. Levels above the threshold will trigger a call indication. Selectable from -32 to -18 dbm.
   - vox Delay - Determines how long the audio must be below the vox Threshold before the call is cleared. Selectable from .5 to 4.0 seconds.

8. The logging options:
   ```
   Log,Volume,voX enable,vox Threshold,vox Delay,<BS> : L
   Disable,Enable,<BS> : #
   ```
   Zetron recommends log disabled (**D**).
9. The volume options:
   ```
   Log,Volume,voX enable,vox Threshold,vox Delay,<BS> : V
   A:20%, B:40%, C:60%, D:80%, E:100%, <BS> : #
   ```
   Zetron recommends 100% (**E**).
10. The Vox options (default is disabled):
    ```
    Log,Volume,voX enable,vox Threshold,vox Delay,<BS> : X
    Disable,Enable,<BS> : #
    ```
    Zetron recommends VOX enabled (**E**).
11. The Vox Threshold options:
    ```
    Log,Volume,voX enable,vox Threshold,vox Delay,<BS> : T
    A:-18dB,B:-20dB,C:-22,D:-24,E:-26,F:-28,G:-30,H:-32,<BS> : #
    ```
    Zetron recommends -18dB (**A**) for the initial setting. The setting can be adjusted later if needed, during audio level adjustment procedures.
12. The Vox Delay options (default is 0.5):
    ```
    Log,Volume,voX enable,vox Threshold,vox Delay,<BS> : D
    A:0.5sec,B:1.0sec,C:1.5,D:2.0,E:2.5,F:3.0,G:3.5,H:4.0,<BS> : #
    ```
    Zetron recommends 0.5sec (**A**).
13. When you are finished setting the options for a channel they are then stored. The card then does a reset and displays the current settings, which should look similar to this example:
    ```
    Define,Review,Store,Init,<BS> : S  DCC is Resetting ...
    ```

```
Harris M-Series v2.02.0006, 2012-AUG-31
---Press <ESC> anytime to return to this menu---
?,Config : ?


DCC Serial_No:: 0000251E
--- 4048 ChA/B number = 5/6
Active ChA config. ________
Ch Type = Harris-M
Diag. Log Disabled
Radio Volume = 100%
VOX Enabled
VOX Threshold = -18dB
VOX Decay Time = 0.5sec
Active ChB config. ________
Ch Type = Harris-M
Diag. Log Disabled
Radio Volume = 100%
VOX Enabled
VOX Threshold = -18dB
VOX Decay Time = 0.5sec
AudioDRAM installed = 1 Mbyte
```

(Shown with VOX Enabled, Not Default)

Console Setup

Programming the Console

IntegratorRDPS is used to program the IntegratorRD console position. See *IntegratorRDPS Programming* on page 259.

Channel Definition

To enable operation of a Harris radio channel, the channel must be specified using the **Edit**, **Channel Definitions** menu. For each channel in the system, the type "E/ORION" must be specified for the **Control Type** field.

Control Buttons

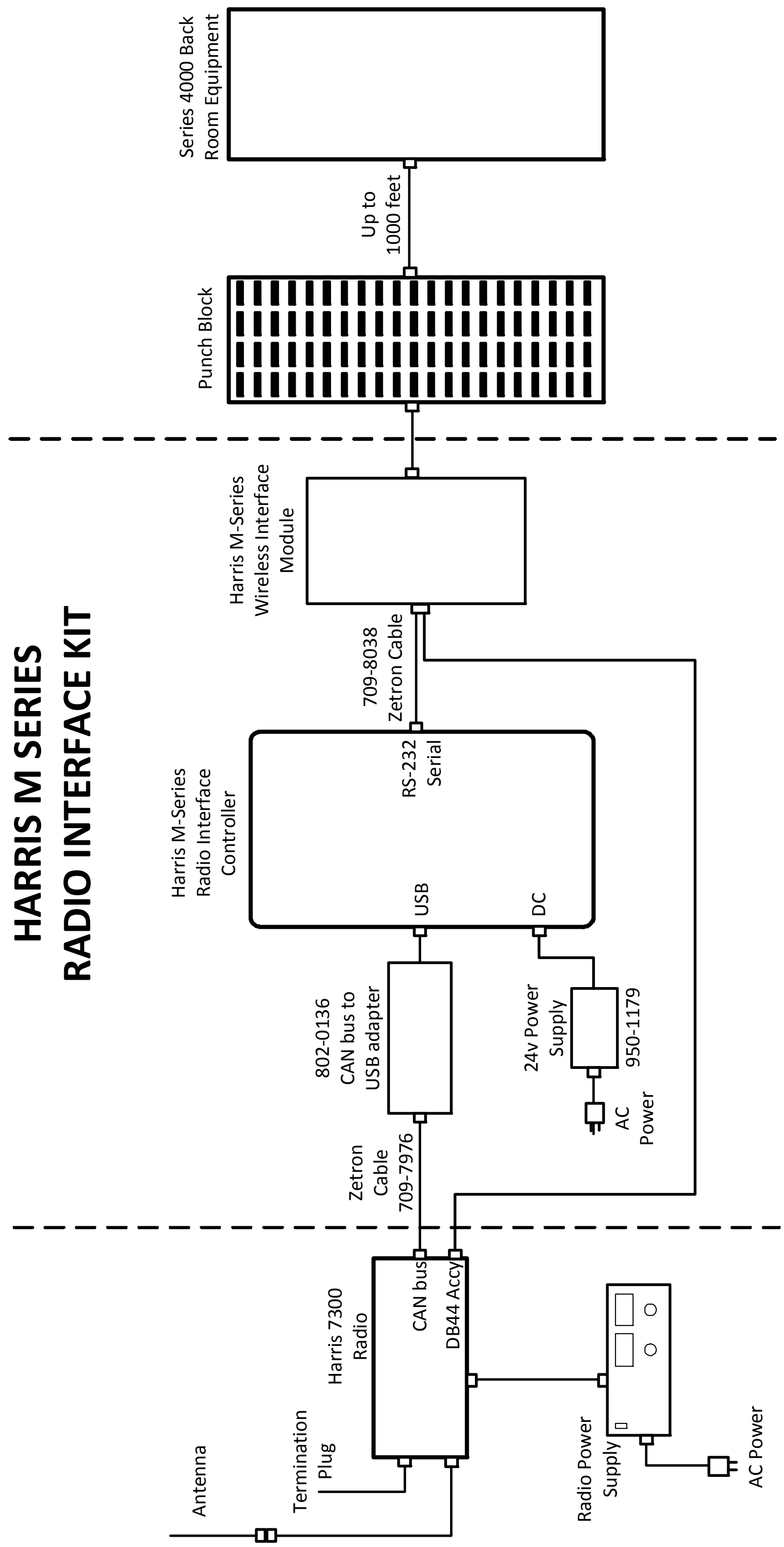
There are several EDACS channel control buttons available for controlling the radio. These buttons may be programmed to operate on the video screen or the audio panel. The **Edit**, **Screen Buttons** and **Edit**, **Keyboard Layout** menus are used to program the button and panel layouts (see Table 61). Some control buttons may be specific to the radio type. Harris M7300 radios operate on Zetron equipment in the same manner as Orion radios.

Table 61: Control Button Descriptions

Button Function	Description
EDACS Clear	Used to clear menu-selected functions.
EDACS, I-Call, Next	Scrolls through radio-programmed individual call users. Not supported by IntegratorRD.
EDACS, I-Call, Prev	Scrolls through radio-programmed individual call users. Not supported by IntegratorRD.
EDACS, Emergency	When held for 2 seconds, causes the radio to transmit an emergency call on the current talkgroup.
EDACS, Emerg. Clear	Clears a receive or transmit emergency condition.
EDACS, Menu	Selects the radio menu functions. (Not typically used with Orions.)
EDACS, Next Group (↑)	Scrolls through radio-programmed talkgroups.
EDACS, Prev. Group (↓)	Scrolls through radio-programmed talkgroups.
EDACS, Private	Enables/Disables radio encryption.
EDACS, System	Scrolls through radio-programmed systems.
EDACS, Scan	Enables/Disables radio scan.
EDACS, Scan Add	Adds and adjusts the priority of a talkgroup in the scan list.
EDACS, Scan Delete	Removes a talkgroup from the scan list.

Installation Connections

Figure 33: M7300 Radio Interface Kit connections.



⚠ **Caution!** Do not extend the length of the serial cables. These cables as supplied are already at their maximum length allowed in order to reliably support the baud rate of the data transmission.

Harris Wireless Interface Module

The Harris Wireless Interface Module provides level conversion, power-on circuitry, and 4-wire audio from the Harris Dual Channel Wireless Control Card to the radio.

Connection from the interface module 10-pin connector to the radio 44-pin connector is made with the cable supplied with the interface module (Zetron P/N 709-8038). The connections are listed in Table 62.

Table 62: Interface Module Connections

WIM Connector P1		DB-44 (Radio)	
PTT OUT	1	18	Aux IN1 PTT
CTS IN	2		
RXD IN	3		
TXD OUT	4		
RX Audio	5	14	Audio OUT
TX Audio	6	27	Audio IN
+5 OUT	7		
Audio GND	8	6	Audio GND
Digital GND	9	7	Chassis GND
+12 INPUT	10	28	SWA+

Set the jumpers inside the Wireless Interface Module as follows:

- JP 1, 2, 3, 6, 7 = A
- JP 4, 5 = B

Adjusting Levels

See *Audio Level Adjustments* on page 177.

Punchdown Block Connections

Connection to each channel of the Harris M-Series Dual Channel Wireless Control Card in the common control equipment rack is made by way of the punchdown block.

Table 63: Punchdown Block (P/N 950-9351) Connections for Harris M-Series Dual Channel Card

Signal Name	Punchdown				WIM Connector P2
	1A	1B	2A	2B	
TX Data +	26	32	38	44	1
TX Data -	1	7	13	19	2
RX Data +	27	33	39	45	3
RX Data -	2	8	14	20	4
Busy Out +	28	34	40	46	5
Busy Out -	3	9	15	21	6
Busy In +	31	37	43	49	7
Busy In -	6	12	18	24	8
TX Audio +	4	10	16	22	9
TX Audio -	29	35	41	47	10
RX Audio +	5	11	17	23	11
RX Audio -	30	36	42	48	12

Firmware Upgrade to the S4000 Dual Channel Card (950-1155) option

1. Use a terminal set for 19200, 8, N, 1 (with no flow control) to connect to the monitoring port on the front panel using the Zetron cable P/N 709-7452.
2. Once connected, press **Esc** to get the following menu (the version number may vary, and your options may vary based on your version):
```
Orion v2.00.0010, 2010-DEC-28
---Press <ESC> anytime to return to this menu---
?,Config : ?
```
3. Record the settings: See example below
```
DCC Serial_No:: 0000B4F6
    --- 4048 ChA/B number = 3/4
Active ChA config. ________
 Ch Type = Orion
 Diag. Log Enabled
 Radio Volume=100%
 VOX Enabled
 VOX Threshold=-18dB
 VOX Decay Time=0.5sec
Active ChB config. ________
 Ch Type = Orion
 Diag. Log Disabled
 Radio Volume=100%
 VOX Enabled
 VOX Threshold=-32dB
 VOX Decay Time=4.0sec
AudioDRAM installed = None or Bad.
```
4. Remove the Dual Channel card and replace U17 with the Flash Memory chip provided.

5. Re-Install the Dual Channel card and verify that the settings recorded in step 3 didn't change. If they did, reprogram as per instructions found in *To configure the Dual Channel Wireless Control Card* on page 147.

Console Installation

In this chapter:

Introduction

Several dispatch consoles can be integrated into the system and connected to a Model 4048 Common Control Equipment (CCE). Each operator position is made up of one dispatch console and up to three console expanders. The dispatch console provides the basic controls needed to operate the system. Console expanders provide additional functions that may be required in larger systems. The console encoder provides advanced tone encoding, including multiple format capability, “Instant Call” stacked single-button operation, and automatic channel steering. These advanced tone encoding functions are standard features in the Model 4018, Model 4118, as well as the Model 4217B and Model 4219 Audio Panels.

Three types of dispatch console are available: desktop, rack-mount, and video display. Diagrams of the consoles are located in *Identification of Console Models* on page 20.

Other accessories may be added to the dispatch positions including headset jackbox, handset, desk-microphone, gooseneck microphone, footswitch, and telephone radio headset interface. For information on these accessories, see *Accessory Installation* on page 219.

This chapter describes the physical placement, configuring, and wiring of the dispatch console and accessory control panels. This chapter covers the Desktop Console Model 4018, the Rackmount Console Model 4118 (with expansion panel 4115B), and the Model 4217B Audio Panel. For installation information for the video display console with IntegratorRD, please refer to *IntegratorRD Workstation Installation* on page 237.

Note In systems where there are both IntegratorRD video displays and button-based consoles, the video position must be installed with the first CIC.

Physical Placement, Desktop

When placing a Model 4018 desktop console, consider the amount of desktop space required not only for the desktop units, but also for a writing surface and the placement of accessory items (external speakers, microphones, foot switches, and headset jackboxes). Another consideration is the proximity of a power outlet and the CCE wiring jacks. Unless special provisions have been made, units should not be placed more than 2000 wiring feet from the CCE. Short Haul Modems (P/N 950-9222) are required beyond 2000 feet and up to 1 mile. The VoIP Console Gateway (P/N 905-0265) is required for distances longer than a mile.

Labelling

The buttons on the console usually come from the factory with key tops engraved to match the function programmed by Zetron. If key function changes, additional engraved and clear key tops are provided. To remove a key top, pull it directly away from the front panel. The white plastic plunger may stay with the key top or the switch housing.

Console Access

The connectors and option wiring for the Model 4018 console are located on the back panel of the console. The back panel also includes the status lights, which must be monitored during system checkout and troubleshooting. To gain access to make adjustments, open the top of the console in a “clam shell” fashion. This requires seventeen inches of vertical space. A service loop on the wiring may be necessary for ease of access.

Physical Placement, Rackmount

When placing the Model 4118 rackmount console or the Model 4217B Audio Panel, consider the amount of rack space required for the console and any console expanders. Each control panel is 5.25 by 19 inches (standard EIA size) and fits well into most rack control panel furniture. Additional space for the accessory items (such as external speakers, microphones, foot switches, and headset jackboxes) should also be considered. Another consideration is proximity to a power outlet and the CCE wiring jacks. The units should not be placed more than 2000 wiring feet from the CCE. Short Haul Modems (P/N 950-9222) are required beyond 2000 feet and up to 1 mile. The VoIP Console Gateway (P/N 905-0265) is required for distances longer than a mile.

Mounting

The rackmount console front panels come with four slotted mounting holes and #10 screws for securing the panels to the furniture rails.

Labelling

The buttons on the console usually come from the factory with key tops engraved to match the function programmed for them by Zetron. If the function of a key changes, additional engraved and clear key tops are provided. To remove a key top, pull it directly away from the front panel. The white plastic plunger may stay with the key top or the switch housing.

Console Access

The rackmount console connectors, option wiring, and audio adjustments are accessed from behind the console. Eight nuts must be removed and the rear panel removed to gain access to the option jumpers and fuse.

Power

Primary Power

A console requires an external 2.5-ampere, 12 V_{DC} regulated supply. The minimum input voltage for the console is 11.5 V_{DC} and the maximum is 15 V_{DC}. The Zetron Power Supply (Part # 802-0092) provides 13.5 ±0.5 V_{DC} and a DIN connector to mate with the input power connector. The module operates with an input of 95 to 240 VAC, 50 or 60 Hz, and is UL and CE approved.

A mating power connector is provided in the rack-mount panel's accessory bag for users who prefer to use their own power supply. The power pin connections are listed in Table 64.

Table 64: Primary Power Pin Connections

Signal	Pin
Power-	1
Open	2
Power+	3
Power-	4
Power+	5
Chassis ground	shell

A console is equipped with an internal fuse. This is labeled "F1" on the control board near the input power connect. The fuse is accessible by lifting the top cover of the unit. If replacement is required, replace only with 2.5-ampere, slow-blow, AGC-type fuse.

Model 4018 Auxiliary Power

A connection for auxiliary power for the Model 4018 is also provided in the unit. Screw terminal connector J16 is used to connect +12 V_{DC} and ground. The specifications for the auxiliary DC voltage are the same as for the main power supply. However, the voltage level must not exceed the main supply by more than 2.5 $V_{DC,}$ or drain on the auxiliary supply may occur. The auxiliary supply is automatically connected when the primary voltage falls more than 3.5 V_{DC} below the auxiliary supply.

Connection to the auxiliary is made through the wiring access hole in the back of the unit. The 3-position screw terminal strip J16 is used for connection and AWG #18 stranded wire is recommended. Strip the ends of the wire back ¼ inch, insert into J16, and screw down the terminal. The position nearest the first channel card slot (Pin 1) is positive, and the center terminal and terminal nearest the side of the console (Pins 2 and 3) are negative.

CIC Card Power Supply Test Points

The Console Interface Cards have three test points on the faceplate of the card related to power supplies on the CIC card. These test points are marked as +5 Vdc, GND, and -5 Vdc. In May of 2003, the voltage regulator for the minus supply was changed to -3 Vdc; however, the silkscreened label on the front panel remained -5. If your CIC card -5 Vdc test point reads -3 Vdc, there is no problem.

Model 4219 Power Connection Strain Relief

A strain relief has been provided in the parts bag for the Model 4219 to prevent the power cable from being accidentally being pulled out of the jack on the rear panel of the unit.

♦ Installing the power cable strain relief

See Figure 47 on page 244.

1. Locate the end of the power cable (709-7938) that threads onto the PWR jack on the rear of the Model 4219. Plug this connector into the PWR jack and secure the locking nut
2. Slip the white restraining clip from the Model 4219 parts bag over the wire of the power cord.
3. Insert the screw from the parts bag through the hole in the clip.
4. On the rear panel of the chassis, locate the screw hole between the 15-pin Auxiliary Audio connector and the 10-pin Spare Inputs connector. Secure the clip by inserting the screw into that hole and tightening it.

Be sure to leave enough slack in the cable between the clamp and the PWR jack so that the power cable can be disconnected without having to unscrew the clamp.

Programming Desktop and Rackmount Consoles

Button functions are defined by the Console Programming System (CPSW). The programmed functions are then uploaded to the console through an RS-232 port to the DATA IN and DATA OUT (Model 4018) or the LOOP IN and LOOP OUT (Model 4118) modular connectors. The data is stored in write-protected memory, and writing is enabled by the programming switch. To upload the program, the programming switch must be placed in the program position. For normal operation, the switch must be returned to the operating position.

Refer to *Console Programming System* on page 193 for CPSW instructions.

Configuring a Console

A console has several jumper-selectable configuration options that show the various options and the normal factory setting. Table 65 shows the options and the default factory setting.

Table 65: Model 4018 Jumper-Selectable Configuration Options

OPTION NAME	SETTING
Select Speaker/Headset & Handset audio	
Select audio to select speaker	JP6-A
Select audio switch under software control	JP6-B *
Select audio to handset/headset interface	JP6-C
Unselect Speaker/Headset & Handset audio	
Unselect audio always to unselect speaker	JP3-A *
Unselect audio switch under software control	JP3-B
Unselect audio to handset/headset interface	JP3-C
Headset/Handset Unselect Monitor	
Unselect audio open to handset/headset	JP4-A *
Unselect audio to handset/headset interface	JP4-B
Auxiliary Audio to Select audio	
Auxiliary Audio input open	JP2-A *
Auxiliary Audio input to Select audio	JP2-B
Auxiliary Audio input impedance	
Auxiliary Audio 600 ohm impedance	JP5-A *
Auxiliary Audio 10 kΩ impedance	JP5-B
Recorder Output & VU meter	
Unselect audio open	JP1-A *
Unselect audio to Recorder Output and VU	JP1-B
Operator Paging/Alert Audio	
Operator audio to Select speaker	JP10-A *
Operator audio to Unselect speaker	JP10-B
* Factory default. JP7, JP8, and JP9 are not used.	

Table 66: Model 4118, 4217B, and 4219 Jumper-Selectable Options

Option Name	Setting
Select Speaker/Headset & Handset audio	
Select audio to select speaker	JP10-A
Select audio switch under software control	JP10-B *
Select audio to handset/headset interface	JP10-C
Unselect Speaker/Headset & Handset audio	
Unselect audio always to unselect speaker	JP8-A *
Unselect audio switch under software control	JP8-B
Unselect audio to handset/headset interface	JP8-C
Headset/Handset Unselect Monitor	
Unselect audio open to handset/headset	JP7-A *
Unselect audio to handset/headset interface	JP7-B
Auxiliary Audio to Select audio	
Auxiliary Audio input open	JP2-A *
Auxiliary Audio input to Select audio	JP2-B
Auxiliary Audio input impedance	
Auxiliary Audio 600 ohm impedance	JP3-A *
Auxiliary Audio 10 kΩ impedance	JP3-B
Recorder Output & VU meter	
Unselect audio open	JP9-A *
Unselect audio to Recorder Output and VU	JP9-B
Operator Paging/Alert Audio	
Operator audio to Select speaker	JP11-A *
Operator audio to Unselect speaker	JP11-B
* Factory default. JP4, JP1, and JP5 are not used.	

Select/Unselect Audio Hookswitch Bypass

It may be desirable to leave the speaker audio enabled when the handset is lifted from its cradle, or when a headset is plugged into its jack. It may also be desirable to monitor the audio on the headset. The Select and Unselect jumpers may be used to choose different options.

Headset/Handset Unselect Monitor

It is sometimes desirable to monitor both Select and Unselect audio on the earpiece of the headset or handset. The jumper may be used to enable the Unselect audio monitoring.

Auxiliary Audio to Select Audio

The transmitted audio from the auxiliary audio input may be monitored at the position over the console speaker. This is useful when an external encoder is used, so that the operator can hear the encoder's tones as they are being transmitted.

Auxiliary Audio Input Impedance

The auxiliary audio input is often used for connection to external encoders. To properly match the output impedance of the encoder, the input impedance of the auxiliary audio input may be set high or low.

Recorder Output and VU Meter

The audio recorder output and the VU meter are a summation of the console microphone transmit audio and its select receive audio. Optionally, its unselect receive audio may be added.

Model 4018/4118 Option Code Explanation

The series 4000 consoles can be shipped with options that deviate from the standard operation. To determine what the option package is, refer to Table 67.

The Model 4018 has a programming switch located on the bottom of the console. The Model 4118 has a programming switch mounted on the back of the main unit. Position the programming switch in the "program" position for approximately one second and then return it to the normal run position while pressing the "#" key. As long as the "#" key is held down, the option code will be displayed on the LCD. The option code will be displayed in the upper left-hand corner on the first line of the display. The format is "OPT:xx". The "xx" are the options installed. Refer to Table 67 for a list of possible options. If no option is present, the display will show "OPT:-".

Table 67: S4000 Option Code Definition

Option Code	Option Description	Default Condition
L	With ANI Linkage enabled, any dispatcher can press ANI Review to clear ANI from all consoles.	ANI Linkage Disabled. Every dispatcher must press ANI Review to clear the ANI information on their own console.
B	The serial connection from the console to the CIC is 1200 baud	The serial connection from the console to the CIC is 9600 baud
D	D-PTT always selects the desk mic. This option is required when using both a desk mic and a gooseneck mic at the same time.	A contact closure on D-PTT selects the CPSW-defined dynamic input.
T	With ANI Transpond enabled, the console transmits a short, audible beep to indicate that it has received ANI.	ANI Transpond disabled.
X	Extended Paging enabled. This adds several paging formats: Rotary Dial/ 1500 Hz or 2805 Hz, Plectron, Quick-Call I (2+2), and 5/6 Tone Sequential.	Paging formats are limited to Motorola Two-Tone, GE Two-Tone, DTMF, and alert tones.
I	Instant Call Paging enabled. This allows frequently used pages or sequences of pages to be initiated and automatically steered to the correct channel with a single key press.	Instant Call Paging disabled. All pages are entered manually.
If an option code is not displayed, that option is set to the default condition.		

Some options require purchasing. To inquire about changing options to a Series 4000 console already in service, please contact Zetron's Customer Service.

Common Control Data Rate

The rate of the data between the console and the CCE is selectable between high (9600 Baud) and low (1200 Baud). Normally the high rate is used. However, for consoles that are remotely controlled from the CCE by way of modems, the low rate should be used. Be sure that the rate selected at the Console Interface Card inside the CCE matches that of the associated console.

Note The data rate for the Model 4018 Console, Model 4118 Console, and Model 4217B Audio Panel is set in the Option Code and must be configured in the EPROM before shipment.

Configuring Model 4115B Console Expander

Up to three console expanders may be included in the data loop of the console. Each console expander must have a unique “loop address”. Jumper JP1 may be placed in one of three positions to determine the expander loop address (see Table 68). The jumper is accessible at the opening at the panel rear.

Table 68: Model 4115 Loop Address Jumper JP1

Address	Position
1	A
2	B
3	C

Wiring the Dispatch Consoles

This section describes how to wire accessory items to the console. The descriptions here are for generic accessories. For detailed information about Zetron accessories, refer to *Accessory Installation* on page 219.

On the back of the dispatch console, there are connectors for connecting the console to the power, CCE, additional rackmount consoles, and various accessory items. These connectors are labeled as shown in the following table.

Table 69: Dispatch Console Connector Summary

Connector	Description
Voice	"VOICE" Jack to Common Control Equipment
Data	"DATA" Jack to Common Control Equipment
Data/Loop In	Loop Input Jack for Console Expander
Data/Loop Out	Loop Output Jack for Console Expander
Headset Jack	Hook-switch, Mic-switch, and Headset Signals
Aux Audio	Auxiliary Input, Desk-mic, and Recorder Signals
Comb Data/Program	CPSW Program Upload/Download Connector
Power	Power

For more detailed information concerning connections to the audio panels, see *Connecting the Model 4217B Audio Panel* on page 239 and *Connecting the Model 4219 Console Audio Interface* on page 242.

All configuration on the console audio interface units should be done before their final mounting. This is because access to the necessary potentiometers will mostly be prevented by the position the units get mounted in.

The mounting brackets provided with the Model 4219 can be attached in any orientation facilitate the mounting of the unit at a console position. It may also simply be set on the desk top.

Voice and Data Jacks

Two 6-conductor modular telephone-type jacks labeled “VOICE” and “DATA” provide connections to the CCE. The modular cords that plug into these jacks are typically connected from the console to a duplex wall jack (or directly to the punch-down block), which is, in turn, connected to the CCE.

Console Expander Connections

Console expanders communicate with the dispatch console via a serial data loop. A system can include as many as three expanders per operating position. Each panel has a “Loop In” and a “Loop Out” connector. Every “Loop Out” must be connected to the next panel’s “Loop In” with four-conductor modular telephone-type cable, in daisy chain fashion. If there is only a dispatch console at the position, the “Loop In” and “Loop Out” connectors must be connected.

Headset/Handset Jackbox Connections

The headset jack connector on the back of the console unit connects to Zetron headset and handset jackboxes or the Telephone Radio Headset Interface (TRHI). Refer to *Accessory Installation* on page 219 for a description of these functions.

Auxiliary Audio Connections

The console has additional audio signals available on the AUX AUDIO connector behind the console. Most of these signals are used when installing optional equipment. The mating screw terminal connector is supplied with the console. The connector pin-out is shown in Table 70.

Table 70: Auxiliary Audio Connector Pin-out

Signal	Pin
Busy Out	1
Select Audio Out	2
Aux Audio In	3
Aux Audio Common	4
Aux PTT In	5
PTT Common	6
D. mic Audio In+	7
D. mic Audio In-	8
D. mic PTT In	9
PTT Common	10
Monitor SW In	11
Mon Common	12
Foot Switch	13
FS Common	14
Comb Audio Out	15

Auxiliary Input Connections

Auxiliary audio, such as encoded tones from a paging encoder, may be transmitted over the selected channel using the Auxiliary Input connections. This input bypasses the AGC circuit for the other two microphone audio inputs. When connections 5 and 6 are shorted together, the audio present at connections 3 and 4 is transmitted over the selected channel (see Table 70).

Desk-Microphone Connections

A low-impedance, dynamic element, desk-microphone may be connected to the console at AUX audio connector Pins 7, 8, 9, and 10 as shown in Table 70. Pins 11 and 12 may connect to a microphone that includes an integrated "monitor" switch.

Footswitch Connections

A foot-operated PTT switch may be used, allowing operators free use of their hands. A foot-operated PTT switch for gooseneck microphone operation should be connected between connections 13 and 14. In addition, a dual position footswitch may also be used to operate the Monitor function. The contacts of the monitor footswitch should be connected between connections 11 and 12 (see Table 70).

Recorder Connections

The console supplies a 600-ohm, 0-dBm differential output for connection to a logging recorder. The output is a summation of the microphone transmit audio and the Select receive audio. The Select Audio Out connection for the recorder output is shown in Table 70.

Microphone Push-To-Talk Implementation

The console features two microphone ports. One port is for high-level electret element microphones, such as handsets or headsets. The other port accommodates low-level dynamic element microphones, such as desk mics or gooseneck mics.

The console automatically chooses the proper microphone port using several external signals. These signals are the PTT associated with the dynamic mic port, the PTT for the electret mic port, the Hookswitch signal and mic switch signal (previously know as "Spare Input #9").

Microphone Steering Note

There are three ways to cause the console to transmit: grounding the electret port PTT signal, grounding the dynamic port PTT signal, and pressing a "soft" (programmable) console transmit key. Soft transmit keys are keys programmed using the CPSW. These are keys such as "instant xmit", "site intercom", and "console intercom", which appear on the console or console expanders.

CPSW may be used to determine the microphone audio source when soft keys are used. Four options are available:

- Always use the dynamic mic port
- Always use the electret mic port
- Use the mic port indicated by the mic switch ("Spare Input #9") signal
- Use the port indicated by the "Hookswitch" signal

For the third option, shorting the mic switch to ground causes the soft transmit keys to use the electret port (handset or headset). Opening the mic switch from ground will cause the soft transmit keys to use the dynamic port (desk mic or gooseneck mic). This option is normally programmed at the factory for systems, which use the Telephone Radio Headset Interface (TRHI).

For the fourth option, shorting "Hookswitch +" to "Hookswitch –" (by lifting the handset from the cradle or plugging a headset into its jack) will force the soft transmit keys to use the electret port (handset or headset). Opening "Hookswitch +" from "Hookswitch –" (by placing handset on its cradle or removing the headset from its jack) will force the soft transmit keys to use the dynamic port (gooseneck or desk mic). The Hookswitch steered audio source is the normally supplied factory default when the TRHI is not attached.

The hookswitch signal always re-routes received audio between the console speaker and the headset/handset. This is in effect a "speaker switch" signal. When "Hookswitch +" is shorted to "Hookswitch -" (ground), the received audio is routed to the headset/handset earpiece. When "Hookswitch +" is opened from "Hookswitch -" the received audio is routed to the console speaker. Various routing options for receive audio may be achieved by the placement of jumpers inside the console (see Table 65).

The mic switch signal, when used in conjunction with the “electret PTT” signal, is used to re-route the microphone transmit audio between the electret mic port and the dynamic mic port. This is in effect a “mic switch” signal. When this signal is shorted to ground, the “electret PTT” signal is used for the electret mic port. When the mic switch signal is opened from ground, the “electret PTT” signal is used for the dynamic mic port.

When the fourth CPSW option is used, the “Hookswitch” signal is also used as a “mic switch” signal. This option is used if the standard headset jackbox is supplied instead of the TRHI. This option provides compatibility with older console installations that did not separate speaker and microphone switching.

Grounding the “dynamic port PTT” signal will always activate the dynamic microphone.

Table 71 summarizes the console signals involved in microphone steering.

Table 71: Microphone Steering Signals

Connection	Name	Description
Aux-7	Dynamic port mic +	(high)
Aux-8	Dynamic port mic -	(low)
Aux-9	Dynamic port PTT +	(always used for dynamic mic)
Aux-10	Dynamic port PTT -	(ground & mic shield)
HSJ-1	Ground	(ground)
HSJ-2	PTT Busy	(any PTT active)
HSJ-3	Aux Output 1	(optional off-hook signal)
HSJ-4	Electret port PTT +	(also steered PTT)
HSJ-5	Electret port mic +	(positive bias)
HSJ-8	Hookswitch +	(speaker switch)
HSJ-9	Mic Switch	(microphone switch)

Audio Source and Steering Note Summary

There are only three external audio sources:

- “D” Mic
- “E” Mic
- Aux In

There are four methods of turning on the audio:

- D PTT
- E PTT
- Aux PTT

- “Soft” Transmit Keys

There are four software-selectable audio steering options:

- Always D Mic
- Always E Mic
- Mic switch (“Spare input #9”) steered
- Hookswitch signal steered

The possible external Audio source selections are listed in Table 72.

Table 72: Possible External Audio Source Selections

PTT Input	CPSW Steering	MIC Switch	Hook Switch	Audio Source
D PTT	xxx	xxx	xxx	“D” Mic
AUX PTT	xxxx	xxxx	xxxx	Aux in
E PTT	xxxx	GND	xxx	“E” Mic
"	xxxx	Open	xxx	“D” Mic
"	Hook Sw	GND	On	“D” Mic
"	"	GND	Off	“E” Mic
"Soft PTT"	Always D	xxx	xxx	"D" Mic
"	Always E	xxx	xxx	"E" Mic
"	SP #9	GND	xxx	"E" Mic
"	"	Open	xxx	"D" Mic
"	Hook Sw	GND	On	"D" Mic
"	"	GND	Off	"E" Mic

Auxiliary Inputs

A console panel features eight spare inputs that can be programmed through CPSW. These inputs are TTL-compatible (0 to $5V_{DC}$ only) and accessible at the rear of the unit. All spare inputs are active low (≈0 V). The mating connector is provided with the unit.

Table 73: Console Spare Input Connector Pin-out

Signal	Pin	Signal	Pin
Input 1	1	Input 6	6
Input 2	2	Input 7	7
Input 3	3	Input 8	8
Input 4	4	Open	9
Input 5	5	Ground	10

Model 4018 uses connector P5, which is accessible through the wire access hole above the input power connector. The Model 4118 and the Model 4217B use connector P4.

Spare Outputs

A console has 8 spare outputs that can be programmed through CPSW. Outputs 1-4 are open collector drivers rated for 0-25V_{DC} 50 mA. Outputs 5-8 are relay outputs, which have the common (C) and normally open (NO) contacts brought out to the Aux Out connector. These contacts are rated for 1 ampere at 50 volts, non-inductive load. Wiring access is behind the console. The mating connector is provided with the unit. The connector pin-out is shown in Table 74.

Table 74: Auxiliary Output Connector Pin-out

Signal	Pin	Signal	Pin
Output 1	1	Output 6 - NO	8
Output 2	2	Output 7 - C	9
Output 3	3	Output 7 - NO	10
Output 4	4	Output 8 - C	11
Output 5 - C	5	Output 8 - NO	12
Output 5 - NO	6	Ground	13
Output 6 - C	7	Ground	14

Model 4018 uses connector P7, which is accessible through the wire access hole above the input power connector. The Model 4118 and the Model 4217B both use connector P1.

Output 1 can be used to generate an off-hook signal for the Headset Box option. JP5 (JP8 for Model 4018) must be jumpered to allow this option. CPSW can be used to program a panel button to activate spare output 1 and create the off-hook signal.

The spare outputs may be programmed as momentary or toggle functions. If spare outputs 7 and 8 are not programmed, they will function as follows for Reverse Selective Calling mode for both M4x18 button consoles and IntegratorRD workstations:

Spare Output 7	Turns on when an ANI is displayed on the console. Can be used to activate an external alert device.
Spare Output 8	Produces a 500-millisecond pulse whenever an ANI is decoded by the console.

For PTT ID mode for IntegratorRD workstations only:

Spare Output 7	Turns on when an emergency ANI is displayed on the console. Can be used to activate an external alert device.
Spare Output 8	Produces a 500-millisecond pulse whenever an emergency ANI is decoded by the console.

Additional spare outputs on the M4217:

Spare Output 5	Activates with call on Select Channel. Deactivates when call releases.
Spare Output 6	Activates with KeyUp. Deactivates with KeyDown.

The spare outputs are active low (≈0 V).

System Check

In this chapter:

This chapter identifies the typical steps to follow when initially bringing the system on-line. The following procedures will help identify any wiring or configuration problems that may have occurred. After the system has been completely wired and configured, it is time to turn on the power.

Bringing the System Online

♦ To bring the system online

(Items 1 through 5 apply to both button consoles and video consoles.)

1. Completely wire and configure the system before applying power. Be sure that all the circuit cards have been properly installed in the CCE. If you have a diagnostics printer, it should already be connected to the Modem and Service Port as described in *Common Control Equipment Installation* on page 29. Information in the printouts can assist greatly in identifying problems.
2. Turn on the power to the CCE by plugging it in.
3. After two seconds, observe the “CARD STATUS” LEDs (three in System Traffic Cards (STCs) and four on all other cards). For details on the status LEDs, see *On-Card Diagnostics* on page 174.
4. Ensure the following conditions are met:
   - The green “PASS” LED should be illuminated.
   - The green “POLL” LED should wink (mostly on), not pulse (mostly off). (The STCs do not have a “POLL” LED.)
   - The red “FAIL” LED must not be illuminated or blinking.

- The red “ERROR” LED may be illuminated but only on the Console Interface Cards (CICs).
- No other ERROR LEDs should be illuminated.

5. Turn on the power to the console(s). The time/message display on the console may say “SEE.LOG”, but when cleared it should display a time (which may be incorrect). If the console is equipped with a FAIL ACK button, pressing it will clear the diagnostics message. If not equipped with a FAIL ACK button, the display will clear either when the next button is pressed or after a few moments. If the display shows “dISCOn”, the dispatch console is not communicating with its associated CIC in the CCE. If the console is communicating, the “ERROR” LED of the associated CIC should turn off (if it was on). In addition, the printer output should show that the communication path has been restored.

   (Items 6 through 10 apply only to “button” consoles.)

6. If the console display remains blank when the power is turned on, check the power supply voltage and polarity. In addition, check fuse “F1” inside the dispatch console.
7. If the console display shows “ProG”, remove the access cover and switch the “Program Enable/Protect” switch (SW2) to the “Protect” position. The console then returns to normal operation.
8. If the console is not communicating, check the wiring between the associated CIC and the dispatch console. A common wiring mistake is to plug the “VOICE” and “DATA” cables into the wrong jack. Ensure that the data rate settings on the CIC and the console are the same.
9. If the auxiliary control panels are not operating, check for proper connection of the “Loop Cables” between them. The cables must form a loop connecting the “Loop Out” of every unit to the next unit’s “Loop In”. Ensure that the power fuse (F1) is not blown.
10. If the system is operating correctly, adjust audio levels as described in *Audio Level Adjustments* on page 177.

Note While making the adjustments, you will also be verifying the connections to the radio channels, as well as the dispatch console audio path. Problems in verifying proper levels may indicate problems in the wiring either to the channels or in the audio/voice signals to the console.

On-Card Diagnostics

Every circuit card in the CCE, except the STC card, is equipped with four status indicators, a fail-reset push-button, and a card-reset push-button. The STC card has three status indicators and the two reset push-buttons. Status indicators are located at the bottom of the legend plate of each card.

System Traffic Card

The STC LED indicators and take control switch are defined in Table 75.

Table 75: System Traffic Card Indicators

Indicator		Description
IN CONTROL (green)		This LED indicates the STC card is currently serving as the back plane traffic controller
TAKE CONTROL switch		Sets the card as traffic controller. This button only works if both STCs are working properly. If one STC has a fault, the remaining STC automatically becomes traffic controller and this button has no effect.
SYS LOGGER	To (red)	RS232C Data out to printer/system logger
	From (red)	RS232C Data in from printer/system logger
CLOCK	To (red)	RS232C Data out to system clock device (Netclock 2)
	From (red)	RS232C Data in from system clock device (Netclock 2)
MODEM	To (red)	RS232C Data out to modem
	From (red)	RS232C Data in from modem
RADIO MGNT	To (red)	RS232C Data out to Radio System Management logger
	From (red)	RS232C Data in from Radio System Management logger
COM A	TX (red)	This LED indicates data communication originating from CICs, STCs, and Patch Cards; and being sent to DCCs and IOCs located in odd numbered card slots.
	RX (red)	This LED indicates data originating from DCCs and IOCs located in odd numbered card slots; and being sent to CICs, STCs, and Patch Cards.
COM B	TX (red)	This LED indicates data originating from CICs, STCs, and Patch Cards; and being sent to DCCs and IOCs located in even numbered card slots.
	RX (red)	This LED indicates data originating from DCCs and IOCs located in even numbered card slots; and being sent to CICs, STCs, and Patch Cards.

Console Interface Card

Of the four indicators, two are green and two are red. When a card is functioning correctly, both green indicators are on, and both red indicators are off. When in any other condition, the indicators can be used to diagnose the problem (see Table 76). If the system is equipped with a diagnostics printer, the printed log will usually detail the problem. If a problem with a card arises, note the condition of the card indicators and the diagnostic log printout before contacting Zetron.

Table 76: On-Card Diagnostics

Indicator	Description
PASS (green)	Normally on. If this is off, the card has failed (or is failing) a diagnostic. Shorting the two pins of the “FAIL-RESET” jumper or pushing the “FAIL-RESET” push-button will turn this indicator back on. Depending on the detailed diagnostic on the system log, this card may or may not be in error.
FAIL (red)	Normally off. If this indicator is on or blinking, the card is continually failing a diagnostic. Press the “CARD-RESET” button and if the indicator continues to blink, the card must be repaired or replaced. The diagnostic log may not indicate the nature of this problem.
POLL (green)	Normally dimly winking (mostly on). If this indicator is pulsing (mostly off), it is not communicating with the rest of the system. Press the “CARD-RESET” button. If the indicator continues to pulse, rather than wink, the card will need service. The diagnostic log may not indicate the reason for this problem. This indicator is not applicable to the STC card.
ERROR (red)	Normally off. If this indicator is on, the card has detected an error that may not relate to the card itself. Check the system diagnostic log for details on the error. Pressing “CARD-RESET” should turn this indicator off.

Table 77 describes the CARD RST and FAIL RST switches. Table 78 describes CIC indicators.

Table 77: System Traffic Card Buttons

Switch	Description
CARD RST	Resets the STC microprocessor.
FAIL RST	Re-lights the PASS LED if it turned off because of watchdog failing, static discharge, or hardware failure.

Table 78: Console Interface Card Indicators

Indicator	Description
XMIT	(Transmit) This LED is on any time this CIC is commanding a channel to transmit.
CONS. LIVE	(Console Live) This LED shows proper connection to the console. If this LED is not lit, the console position is inoperable.
CONS. DATA	(Console Data) This LED will flash any time data is received from the console.
CIC DATA	(Console Interface Data) This LED flashes when the CIC sends data to the console.

Patch Card

The patch card features two indicators: XMIT and ACTIVE. The XMIT indicator shows that a transmission is active on patched channels. The ACTIVE indicator shows that a patch between channels is selected.

Audio Level Adjustments

In this chapter:

Overview

For optimum performance, the audio levels at each input and output must be adjusted. Adjustments are necessary at each DCC and each button-based console. Table 79 summarizes adjustments and location of the adjustments. Figure 34 shows the locations of test points and adjustments.

The audio levels have been factory adjusted for a transmit level of 0dBm and a minimum receive level of -15dBm.

Adjustments should only be made once the configuration, wiring, and preliminary system check have been completed. In addition, levels are best adjusted when the system is connected to the intended radio base stations.

Required Equipment

- Communication Service Monitor
- Zetron S4000 Channel Monitor RS-232 Cable, 709-7452
- Digital volt meter equivalent to or better than a Fluke 189 True RMS (Digital) Multimeter, or an Oscilloscope with sufficient accuracy for the small audio levels involved

Table 79: System Level Adjustment Summary

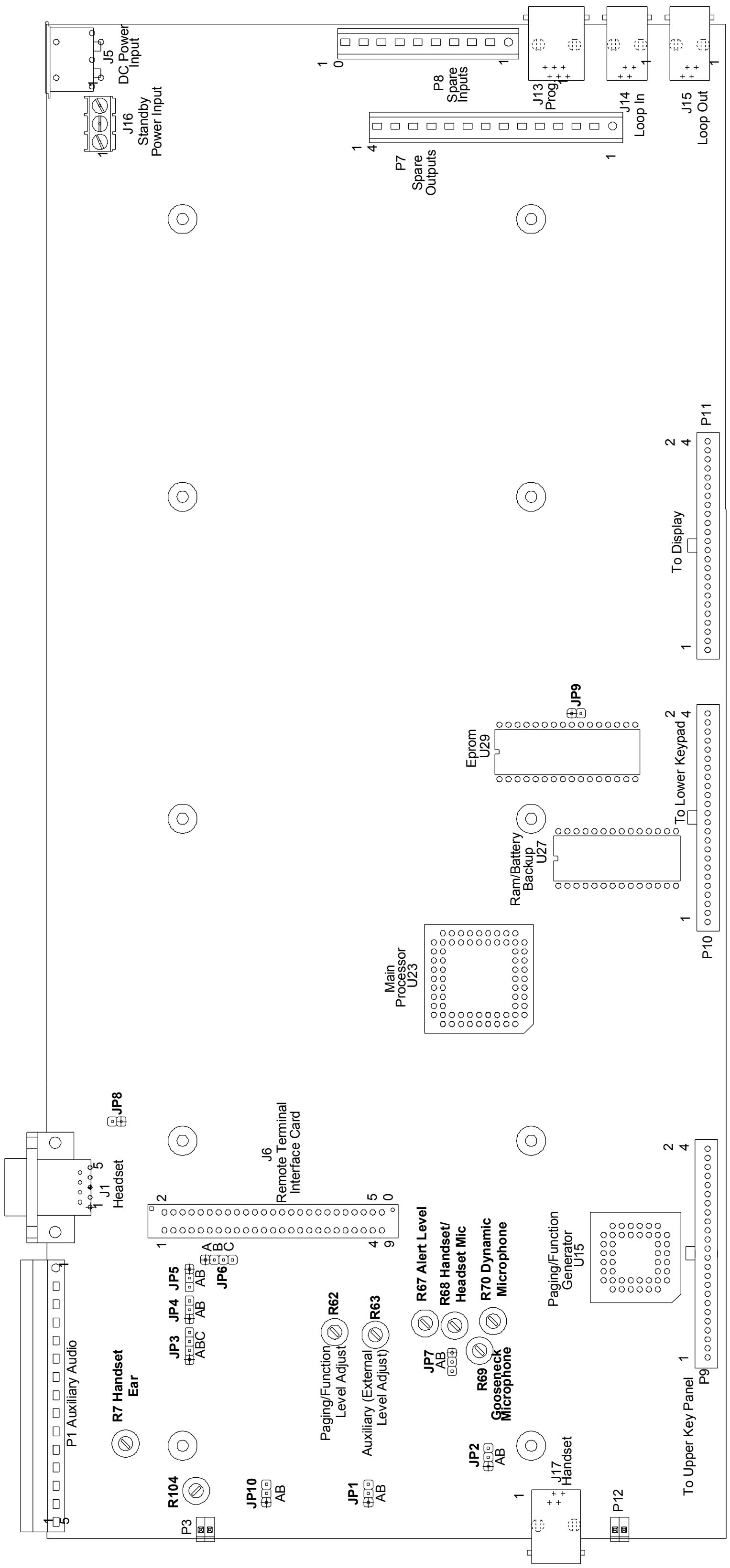
Adjustment	Location
Channel Receive Level	Dual Channel Card
Channel Transmit Level	Dual Channel Card
Channel Transmit Monitor Level	Dual Channel Card
Console Microphone Level (two)	Console
Console Auxiliary Input Level	Console
Console Line Loss Compensation	Console Interface Card

Figure 34: DCC Adjustments, Test Points, and Indicators

950/702-xxxx	Dual Channel Card Part Number
Channel B	**Channel B Test Points**
o TX	Transmit audio, before adjustment. 2.2Vpp max
o	Not used
o AGC	AGC’d Receive audio. 2.2 Vpp max
o RX	Pre-AGC Receive audio
o GND	Signal Ground
B	**Channel B Level Adjustments**
4W o RX	Four-Wire Receive Level
2w o RX	Two-Wire Receive Level/TX Monitor Level
o TX	Transmit Level
Channel A	**Channel A Test Points**
o TX	Transmit audio, before adjustment. 2.2Vpp max
o	Not used
o AGC	AGC’d Receive audio. 2.2 Vpp max
o RX	Pre-AGC Receive audio
o GND	Signal Ground
A	**Channel A Level Adjustments**
4W o RX	Four-Wire Receive Level
2w o RX	Two-Wire Receive Level/TX Monitor Level
o TX	Transmit Level
Channel B	**Channel B Status Indicators**
O CALL	Green CALL. On while VOX activity
O LOTL	Red Line-Operated-TX-Lamp. On while remote console Xmiting *
O BSYIN	Red BUSY-IN. On while local parallel console Xmiting
O XMIT	Red XMIT. On while this channel is transmitting
ZETRON	
Channel A	**Channel A Status Indicators**
O CALL	Green CALL. On while VOX activity
O LOTL	Red Line-Operated-TX-Lamp. On while remote console Xmiting *
O BSYIN	Red BUSY-IN. On while local parallel console Xmiting
O XMIT	Red XMIT. On while this channel is transmitting
o +5V	+5 volt (approximately) Audio Supply Test Point
o GND	Audio Supply Ground
o -5V	-5 volt (approximately) Audio Supply Test Point

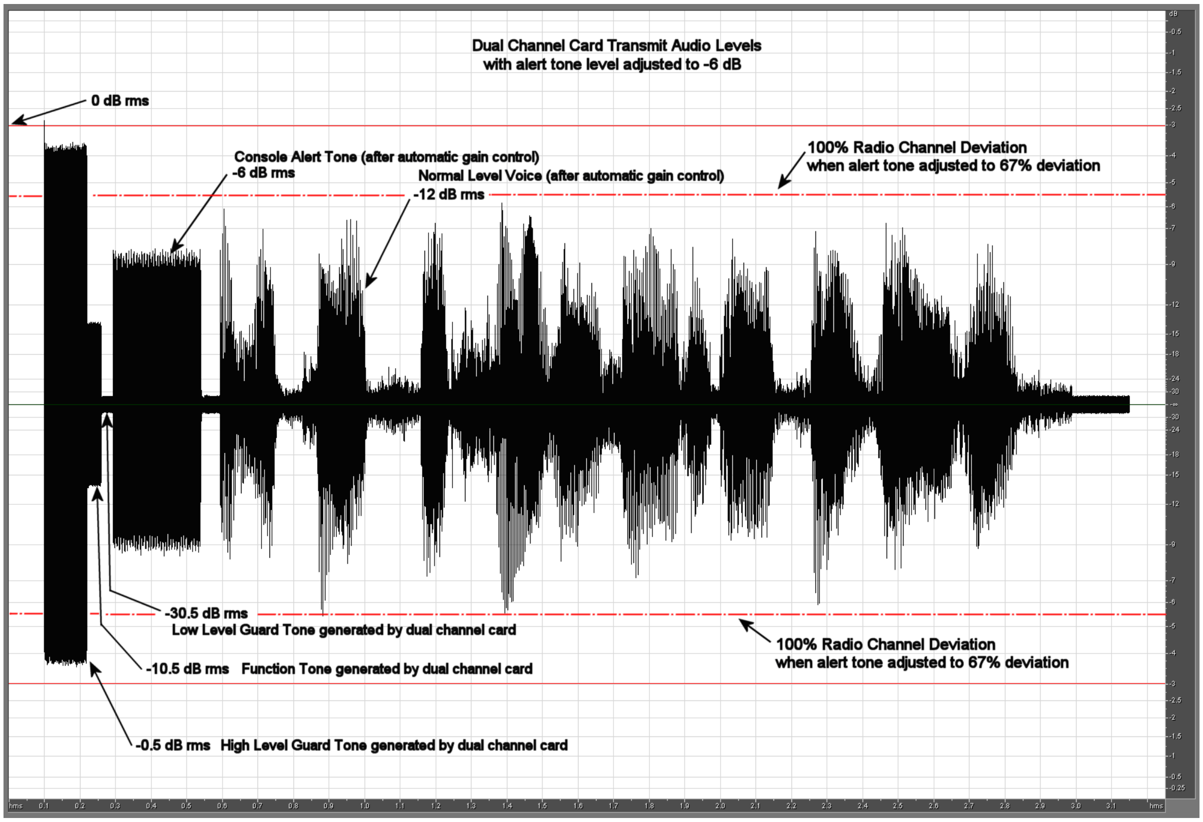
* FCN/GT test points are present only on Tone Control DCC. LOTL is present on Local Control DCC.

Figure 35: Model 4018 Control Board



Dual Channel Card Audio Levels

Theory of Operation



To adjust the audio levels it is necessary to understand the relationship between the levels of various types of audio signals used in the system. The voice signals will all pass though an automatic gain control (AGC). This normalizes the level of speech for a broad range of input levels. Sine waves such as alert tones that also pass through the AGC are normalized, but to a different rms level. If the sine wave level is at -6 dB rms then the speech level will be about -12 dB rms. If the channel being setup uses tone control there will also be some other transmit tone levels to consider. These are high level guard tone (HLGT), function tones, and low level guard tone (LLGT). The figure above shows the relationship between all these signal levels as they leave the dual channel card in a S4000 system. In the example figure it is assumed that the radio input level to cause 67% channel deviation is -6 dB and that the dual channel card Tx adjustment has been set so the alert tone level is -6 dB.

The transmit audio level output to the radio is adjustable over a broad range, for transmitting a sine wave this is from a maximum of +14 dBm and a minimum of silence. The high level guard tone is 5.5 dB louder than a console generated alert tone. Most voice peaks are less than 4 to 6 dB above the alert tone peaks. Function tones are 4.5 dB below the alert tone level. If the alert tone transmit level is set to 67% radio channel deviation the dashed lines in the example figure will represent the 100% radio deviation level.

Before Adjusting Levels

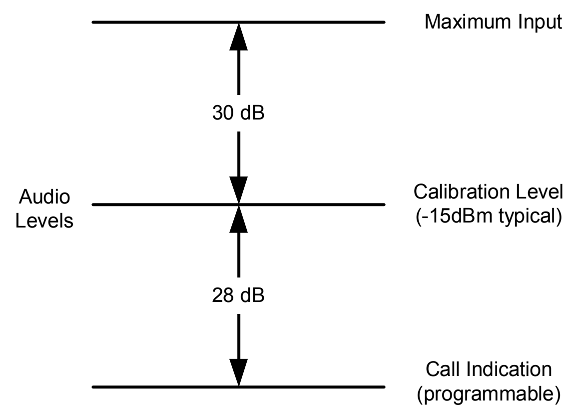
Before adjusting the levels on the dual channel card, it is important to set the gain settings in other parts of the S4000 system to the default. First, assure the console microphone level has already been adjusted to make up for any audio level loss between the console and the back room equipment. When this adjustment has been completed the front panel “MIC” test point on the console interface card will read -10 dBm (0.245 V rms = 0.69 Vpp) when the console is transmitting a single frequency alert tone, and the console LCD meter should be reading “0 dB” during alert tone transmit. Next set the software gain for the channel to be adjusted to the default “51” (00 to 99), this effects the level of the console logger output port and the console LCD meter reading when audio is being received.

Setting Rx Levels for Dual Channel Cards

Adjust the receive audio calibration level at the DCC to the minimum expected audio signal level. This should be the level of the audio output from the radio when receiving a 1 kHz sine wave signal at 40% radio channel deviation. The maximum signal level is 30 dB above this adjustment level and the “CALL” indication level is 28 dB (the default threshold) below this adjustment level. The CALL level is programmable from 14 dB to 28 dB below the AGC knee of compression. A typical sine wave receive calibration level (from the radio) is -15 dBm (390 mVpp).

Systems with a high ambient noise level should be calibrated at a higher signal level (approximately -8 dBm or 870 mVpp) to provide minimum gain of the background noise. The disadvantage of calibrating at the higher signal level is that for calls coming in significantly below the calibration level, the dispatcher may need to turn up the volume. Figure 36 shows the audio levels.

Figure 36: Receive Audio Levels



♦ To adjust receive audio levels for conventional radios

Warning! This adjustment procedure only works if VOX input is connected to the AGC output.

- **If your firmware version is prior to 2.70**, VOX is always connected to the AGC output. Use this procedure.
- **If your firmware version is 2.70**, VOX is always connected to the AGC input. In this case you must use a different procedure. See *Setting Rx Levels for Dual Channel Cards (VOX input connected to AGC input)* on page 190.
- **If your firmware version is 2.74 or later**, the VOX/AGC connection is user-configurable. The typical and default setting is for VOX input to be connected to the AGC output, in which case you can use this adjustment procedure. If you have changed this setting, you must use a different procedure instead. See *Setting Rx Levels for Dual Channel Cards (VOX input connected to AGC input)* on page 190.

To check the firmware version and to check or change how VOX is configured:

1. Connect a PC serial port to the dual channel card's front panel "MONITOR" jack using a Zetron cable part number 709-7452.
2. Using Hyper-Terminal (or equivalent) as a terminal emulator set the communications parameters to 19200-8-N-1-NONE.
3. Press <ESC>? To display the channel card's current configuration & version.

1. Ensure that gain settings throughout the Series 4000 system are configured for their default settings. See *Before Adjusting Levels* on page 182.
2. With the base station connected to the channel card use a communications service monitor to send a 1000 Hz sine wave at 40% radio channel deviation to the base station.

Note The receive audio adjustment process could also be performed if the user were to inject an audio signal at 0dBm or 2.2V (Peak to Peak) on the **RX- / RX+** pin pair at the punch down block with all equipment connected.

Tip When adjusting Wireless Dual Channel Control Cards such as the MAP27 Dual Channel Control Card, the installer can transmit the console's generated alert tone to the connected radio or a Model 427 channel that is being aligned, and use the alert tone as its receive audio.

3. Connect an AC voltmeter at the channel card “AGC” test point on the card edge.

4. On a four-wire channel, use the “4W-RX” adjustment. On a two-wire channel, use the “2W-RX” adjustment. Start with the adjustment fully counter-clockwise (10 turns) on both potentiometers and then turn the adjustment clockwise while observing the AC voltage measurement. Only adjust the potentiometer that is required to configure the desired channel.
5. Adjust for the knee of compression by stopping when the measurement begins to stop increasing, which will be at about 0.82 Vrms (2.3 Vpp or +0.5 dBm). Once the adjustment has been made the Rx test point should be reading about -30 dBm (25 mV rms or 70 mVpp) when the input sine wave level is at the knee of compression.

Setting Tx Levels for Dual Channel Cards

Prior to making the transmit adjustment, program a 1000 Hz alert tone to a button on the console. Confirm the console interface card MIC LVL and console alert tone level has been correctly setup by observing the console LCD meter while transmitting the alert tone. If the alert tone is programmed and adjusted correctly, the console LCD meter should be reading "0 dB" while transmitting. If this is not true, recheck the console alert tone level adjustment at the console and the MIC LVL adjustment at the console interface card. The CIC card transmit MIC test point level should be at -10 dBm during an alert tone transmit.

♦ To adjust transmit audio levels for conventional radios

1. Ensure that gain settings throughout the Series 4000 system are configured for their default settings. See *Before Adjusting Levels* on page 182.
2. Using a communications service monitor to monitor the channel deviation, key up the channel being adjusted with the 1000 Hz alert tone programmed to a console button.
3. While transmitting the alert tone, observe the communications service monitor received signal level and adjust the dual channel card Tx adjustment on the front of the dual channel card so that the service monitor shows a channel deviation of 67%. A clockwise adjustment rotation should increase the channel deviation (10-turn range).

   The alert tone is measurable on the channel's **TX- / TX+** pair of pins at the punch down block. The signal level at the punch down block should be close to 0dBm, which is equivalent to an oscilloscope reading of 2.2V(Peak to Peak).

Note This procedure sets the audio levels to the factory adjusted setting, which places the card in the general area that should work for most end-user's applications. Each end-user should also make their personal adjustments with their specific equipment needs and their personal preferences.

Microphone Adjustments

An automatic gain control (AGC) limits the maximum amount of audio that may pass through a console. If not properly adjusted, AGC circuits can amplify background noise when the operator is not speaking. Proper adjustment and microphone practices will eliminate background noise from transmitted audio.

♦ To adjust the microphone levels

1. For a Model 4018, open the case to access the potentiometers. See Model 4018 microphone adjustments in Figure 35. For Models 4116B, 4118, and 4217B, the adjustments are accessible at the rear of the console.
2. Use Table 80 to find the appropriate potentiometer for adjusting your microphone.

Table 80: Microphone Adjustments

Model	Level	Part	Label
4018	Handset/headset microphone	R68	E
	Desktop microphone	R70	D
	Gooseneck microphone	R69	GN
4116B, 4118, 4217B	Handset/headset microphone	–	H-MIC
	Gooseneck/desktop microphone	–	D-MIC

3. While transmitting, speak into the microphone at a normal voice level and distance from the microphone.
4. Turn the appropriate MIC potentiometer until the background noise is removed without reducing voice amplitude.
5. Verify audio quality by monitoring the transmitted signal or by observing the level meter under the time display. Optimum performance is achieved when the operator speaks at the level and distance for which the console was adjusted.
6. If the PTT handset with cradle option was installed, the ear audio level is adjusted by R7. This is set at the factory and probably needs no adjustment.

Note A desktop or gooseneck microphone connects to the D mic input of the AUX AUDIO connector.

♦ To perform precise microphone level adjustments

1. Begin transmitting a constant 1kHz alert tone from the console.
2. Adjust the console's Alert Tone potentiometer to ½ turn past knee of compression observable at the CIC mic test point.
3. Adjust the CIC mic for 0.25 Vrms (-10 dBm) at the mic test point.
4. Repeat steps 2 and 3 for each console.

5. Adjust the DCC "TX" adjustment for 0.77 Vrms (0 dBm) at TX Line output (into 600 ohm load or real line).
6. Adjust the associated Termination Panel/Radio Base Station for proper decoding and maximum modulation deviation according to manufacturer's procedure. For trunking radio interface, refer to the appropriate installation and operation manual.
7. Repeat steps 5 and 6 for each channel of every DCC.
8. Adjust each console microphone for optimum voice clarity and modulation deviation as observed on the RF channel of one of the radio base stations.

Console Line Loss Compensation

The CIC has one adjustment, labeled "MIC-LVL". This adjustment compensates for losses in audio from a console. This is normally factory-adjusted, but if the microphone level of the console is improper relative to other fixed audio levels (such as guard tone or function tone), use this adjustment to compensate. The adjusted level may be monitored on the card's mic test point on its legend plate. Factory adjusted level is -10 dBm (0.25 Vrms) when the associated console is generating a 1 kHz test tone.

Transmit Monitor Adjustment

On 4-wire simplex (half-duplex) channels, the audio level heard by other consoles in the system may be adjusted using the "2W-RX" adjustment on the DCC. On 2-wire channels, the monitor level is set by the receive audio adjustment. The 4-wire full duplex channels use a different monitor audio path at a fixed level.

♦ To adjust the 4-wire transmit monitor audio

1. Cause a console to generate a steady 1 kHz test tone on the channel.
2. Measure the voltage at the "AGC" test point of the channel. Turn the "2W-RX" adjustment fully clockwise and then turn the adjustment counter-clockwise while observing the voltage measurement.
3. Stop at the knee of compression where the level begins to decrease (about 0.70 Vrms).

Auxiliary Audio Input Adjustment

Auxiliary audio input is not run through an AGC circuit, but it is notch-filtered when transmitted over tone-controlled channels. The adjustment is best performed while monitoring the deviation on the channel over which the auxiliary audio is being transmitted. Fully compressed voice from the console will be at 0.75 Vrms (0 dBm, 2.2 Vpp).

Model 4018 input audio adjustment potentiometer is R63, labeled AUX. See Figure 35 for its location. Models 4118 and 4217B adjustment is labeled AUX IN and is located on the back of the console (see Figure 37).

Other Audio Adjustments

Speaker Minimum Audio Level

The minimum audio level is the level of audio produced when the front panel volume knobs are turned completely down.

To set the minimum audio level, adjust the potentiometers next to the associated speakers on the display board. The Model 4018 select speaker adjustment is R32 and unselect is R1. Models 4116B, 4118, and 4217B select speaker is R32 and unselect is R5. These are set at the factory for no audio output (completely counterclockwise) with the volume knobs completely off.

Other adjustments on the display board are set at the factory and should not require adjustment. If the display board is replaced or repaired, make the adjustments listed in Table 81.

Table 81: Replaced Display Board Adjustments

Model 4018	Model 4118 and 4217	Description
R21	R1	Display contrast, adjusted for best viewing
R34	R20	Select speaker DC bias, adjusted for minimum DC voltage across select speaker 0 ±30 mV
R7	R4	Unselect speaker DC bias, adjusted for minimum DC voltage across unselect speaker 0 ±30 mV

Tone Level Adjustments

The console generates alert and paging tones. The alert tones are adjusted with potentiometer R67, but the maximum output level is limited by the input audio AGC circuit.

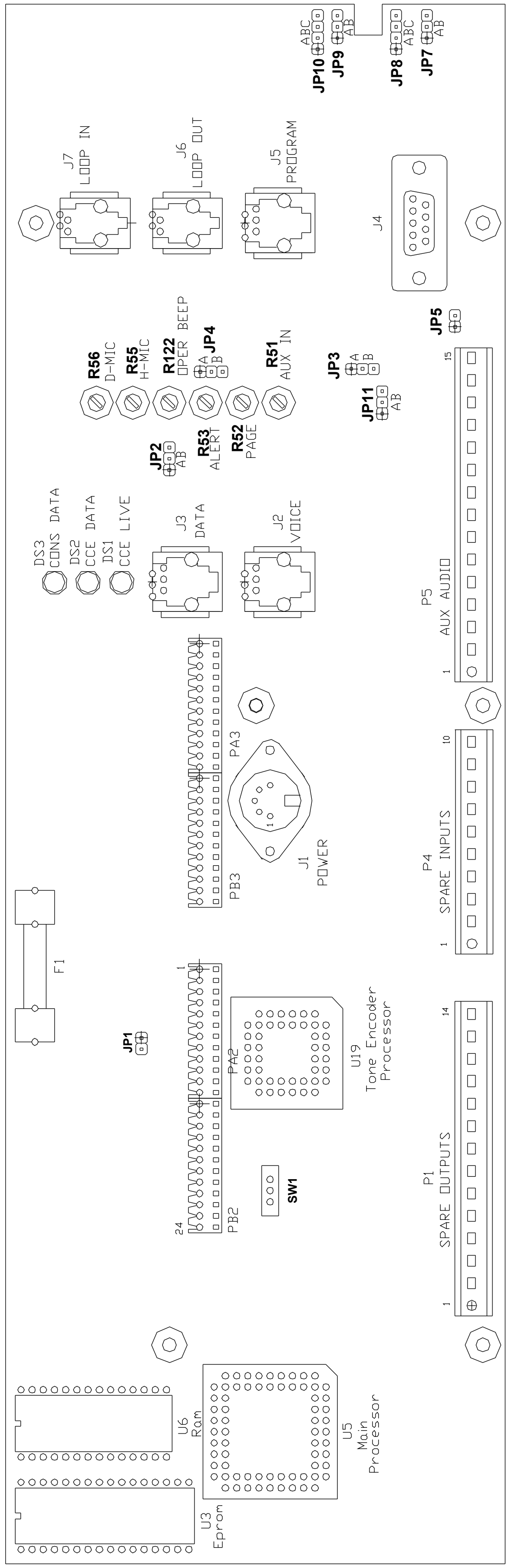
The paging audio level is adjusted with potentiometer R62 and does not go through the AGC circuit (see Table 82).

These paging and alert tones are also sent to the operator select/unselect speaker and are adjusted with a potentiometer.

Table 82: Alert Signal, Function Tone, and Paging Audio

Model 4018	Models 4118 and 4217B	Description
R67 Tone	R53 Alert	Adjust alert signal level
R62 Mute	R52 Page	Adjust paging tone levels
R104 Operator Tone	R122 Operator Tone	Adjust operator tone level

Figure 37: Models 4118 and 4217B Main Board



Setting Rx Levels for Dual Channel Cards (VOX input connected to AGC input)

Warning! This adjustment procedure only works if VOX input is connected to the AGC input.

- **If your firmware version is prior to 2.70**, VOX is always connected to the AGC output. Use this procedure instead: *Setting Rx Levels for Dual Channel Cards* on page 182.
- **If your firmware version is 2.70**, VOX is always connected to the AGC input. Use the procedure following this warning.
- **If your firmware version is 2.74 or later**, the VOX/AGC connection is user-configurable. The typical and default setting is for VOX input to be connected to the AGC output, in which case you must use this procedure instead: *Setting Rx Levels for Dual Channel Cards* on page 182. If you have changed this setting, and VOX input is connected to AGC input, use the procedure following this warning.

To check the firmware version and to check or change how VOX is configured:

1. Connect a PC serial port to the dual channel card's front panel "MONITOR" jack using a Zetron cable part number 709-7452.
2. Using Hyper-Terminal (or equivalent) as a terminal emulator set the communications parameters to 19200-8-N-1-NONE.
3. Press <ESC>? To display the channel card's current configuration & version.

Before the Rx audio level is set, ensure the VOX input, delay, and level are set correctly.

♦ To ensure the VOX level is set to -20dBm

1. Connect a PC serial port to the Dual Channel Card front panel "MONITOR" jack using a Zetron cable part number 709-7452.
2. Using Hyper-Terminal (or equivalent) as a terminal emulator set the communication parameters to 19200-8-N-1-NONE.
3. Press **<ESC> ?** to display the channel card's current configuration.
4. Confirm the channels being configured are set to VOX_input and to a VOX level of -20 dBm. (Look for "...VOX_input, -20 dBm".)
5. If necessary, change the call setting to VOX_input on the appropriate channels. The following substeps briefly describe setting both channels to VOX_input:
   a. Set channel A. From the main menu type: **<ESC> C A D C I <BACKSPACE> S**
   b. Set channel B. From the main menu type: **<ESC> C B D C I <BACKSPACE> S**

6. If necessary, change the VOX setting to -20 dBm on the appropriate channels. The following substeps briefly describe setting both channels with a delay of 2 seconds and set to -20 dBm:
   a. Set channel A. From the main menu type: **<ESC> C A D C D D C T B <BACKSPACE> S**
   b. Set channel B. From the main menu type: **<ESC> C B D C D D C T B <BACKSPACE> S**
   c. Press **<ESC> ?** to display the channel card's current configuration.
   d. Confirm the channels were configured correctly with a VOX level of -20 dBm. (Look for "...VOX_input, -20 dBm".)

   For help with navigating these menus, see *Navigation* on page 55. For more detailed instructions regarding the VOX setting, see *To define the channel's Call input source* on page 57.

♦ To adjust the Rx audio level

1. Turn both the 4W Rx and the 2W Rx pot all the way down (fully counter-clockwise, 25 turn pots).
2. Using a communications service monitor, generate a full-quieting 1 KHz test tone at 60% channel deviation on the base station receive frequency. The input audio level arriving at the Dual Channel Card must be between 0 dBm and -20 dBm. If a communications service monitor is not available then make an incoming voice call from a remote radio and do a "test count" at typical audio levels.
3. With the incoming test audio present, turn the appropriate Rx pot on the front of the Dual Channel Card (4W for four wire, or 2W for two wire) slowly clockwise until the green "CALL" LED for the channel being adjusted just comes on.
4. If desired, the input voltage being adjusted can be monitored with a digital voltmeter while doing the adjustment. To monitor the Rx voltage adjustment, connect the digital voltmeter to the dual channel card front panel test points GND and RX.

   The green call LED should come on at about -20dBm. Note there is some hysteresis in the adjustment, adjust such that the green call LED just comes on as the Rx level pot is turned up (clockwise).

Console Programming System

Introduction

This chapter describes how to use the Console Programming System for Windows (CPSW). CPSW provides technicians with the ability to field program any of the keys on a Model 4010, Model 4116B, Model 4018, or Model 4118. The keys may be defined to accommodate a new channel, a new layout, or a new remote function. The advanced menu-driven window interface makes the program intuitive and easy to use.

The CPSW executable can be run to support the Model 4010, or the Model 4116B and 4018/4118. This chapter provides instruction for CPSW for the Model 4116B, 4018, and 4118 only. The following table can help you identify the correct documentation for your model.

Model	Manual
M4010	Model 4010 Radio Dispatch Console Installation P/N 025-9227 (rev Q or newer)
M4116B M4018 M4118	Series 4000 Installation and Configuration Manual P/N 025-9533 (this manual)

Tip For online help, press F1 at any time in the CPSW application.

Versions and Compatibility

DOS and Windows

CPSW replaces CPS, an older program with similar functionality but created for use in MS-DOS. The older CPS application may be used within a command line window on a

Windows 95, 98, ME, or XP Professional PC as long as the serial port settings are set to: 9600, N, 8, 1, no flow control.

Tip This chapter is for CPSW only. CPS DOS users can obtain the CPS manual (025-9316 *Model 4018, 4116B, and 4118 Consoles Programming Manual*) by contacting Zetron or by directly downloading from the Zetron reseller website. See http://www.zetron.com.

Firmware Compatibility

Each version of CPS and CPSW is designed to work with a specific firmware version or range of firmware versions. It is best to use the version of CPSW that was delivered with your system or your last firmware upgrade. If you need a replacement copy of CPSW, contact Zetron technical support. They can assist you with acquiring the correct programming software for your specific firmware.

- CPS is supported for firmware versions up to 1.83 only.
- CPSW is supported for firmware versions 1.83 and newer.

Installation

Installation

To install CPSW, follow the instructions provided with it (*CPSW Installation Notes*, P/N 011-0795).

Uninstallation

♦ To uninstall CPSW

CPSW uses the standard Windows procedure for uninstallation.

1. From the Windows Control Panel, double-click **Add/Remove Programs**.
2. In the alphabetical list of installed programs, find and click **Zetron CPSW** to select it.
3. With **Zetron CPSW** selected, click **Remove** (located on the same highlighted line).
4. Proceed through the uninstallation wizard.

Note The Microsoft .NET Framework can also be uninstalled using the same method, but this is not recommended because other applications may rely on .NET.

CPSW Menu Structure

The following two figures provide a map for all menu items in CPSW. Figure 38 shows all menus items except key definitions. Figure 39 shows menu items related to key definitions.

Note When using CPSW, several menu items may be unavailable if they are incompatible or not relevant based on other configured settings. For example, keys cannot be defined for custom channel functions if there are no custom channels in the current system configuration.

Figure 38: CPSW Menu Structure

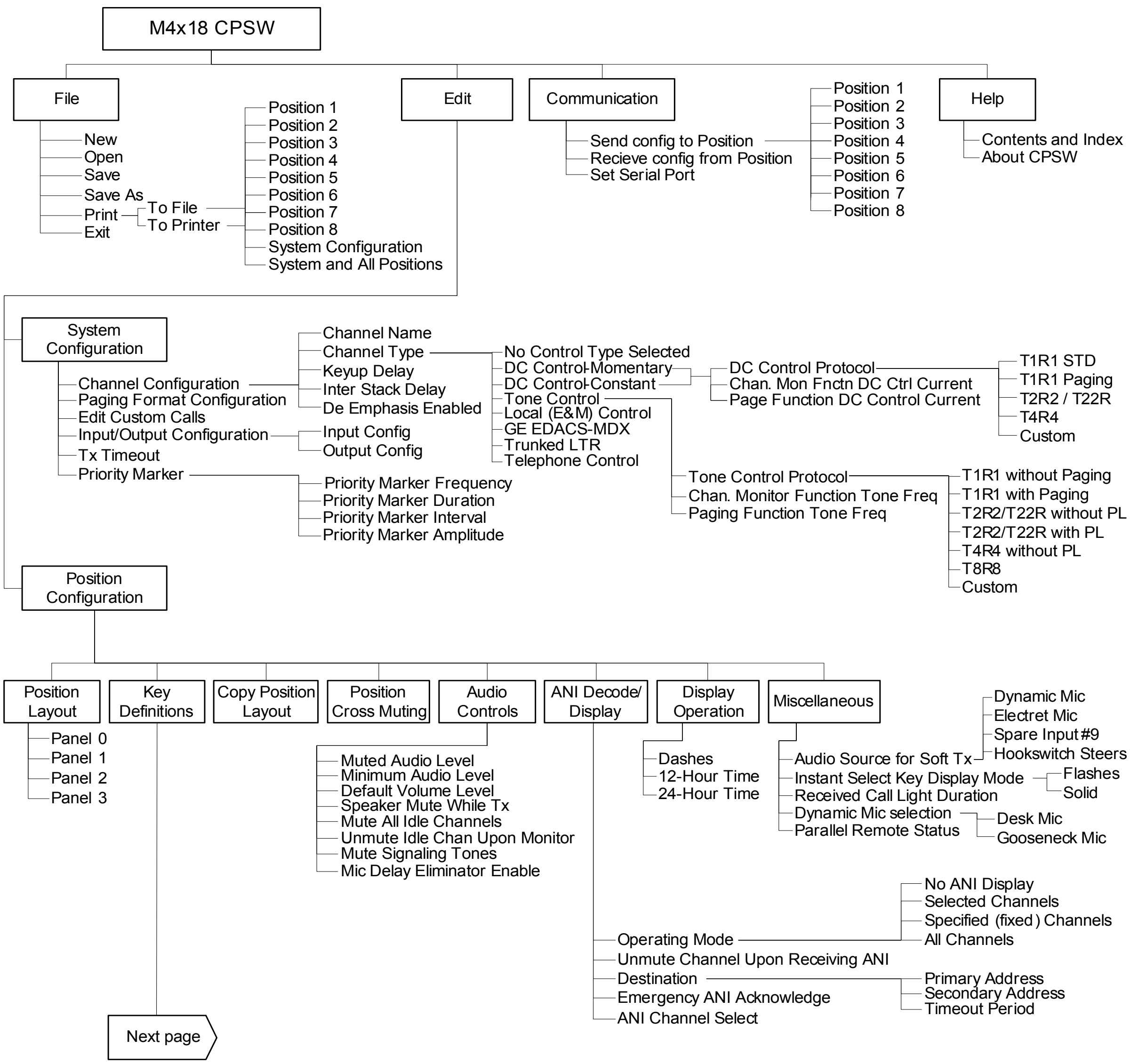
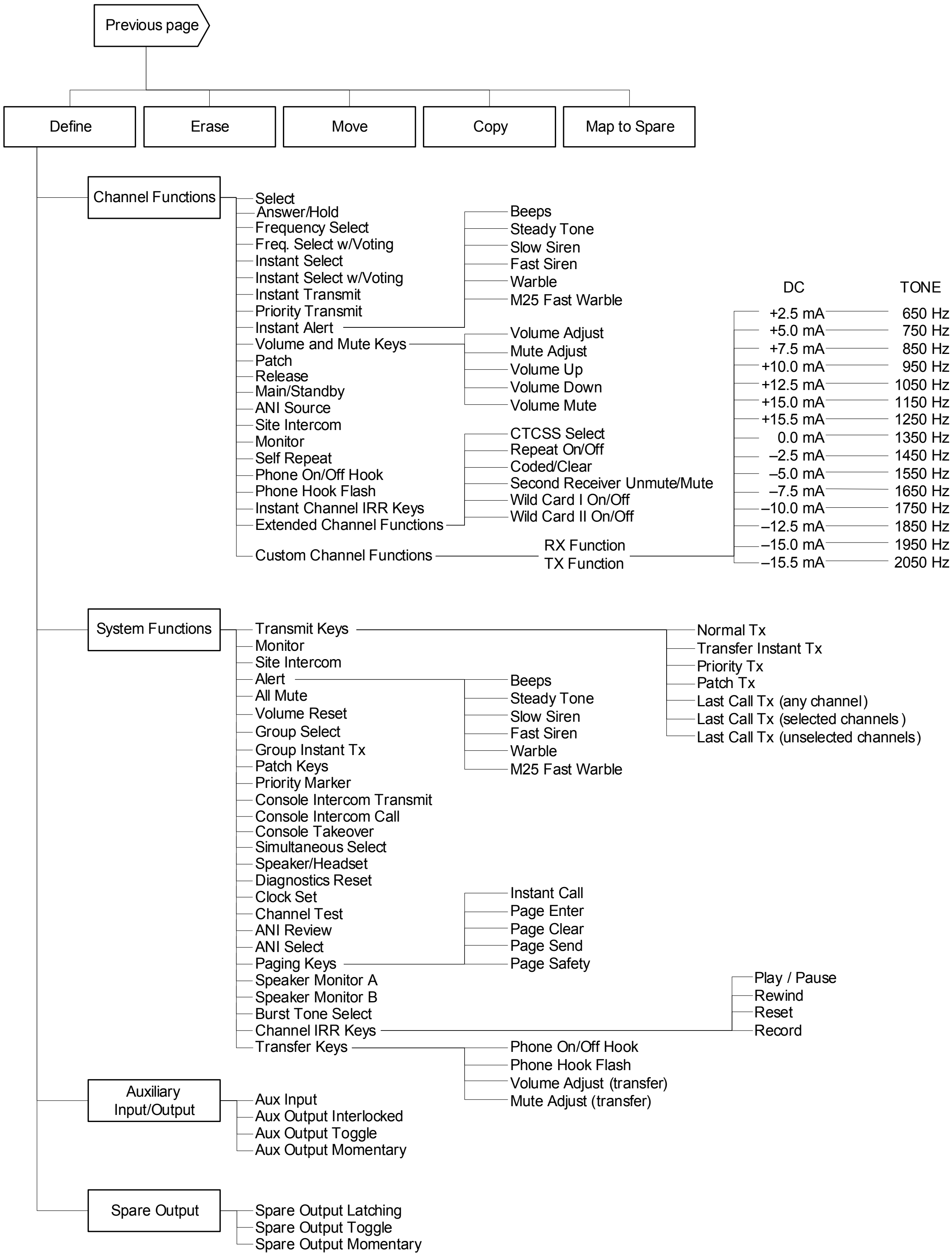


Figure 39: CPSW Menu Structure (continued)



Using CPSW

This chapter describes how to configure Models 4116B, 4018, and 4118 dispatch consoles. This is accomplished through three primary tasks:

1. Use one of the following methods to get configuration settings:
   a. download an existing configuration from a console
   (see *To receive the configuration from a console* on page 198)
   b. open an existing configuration file from a disk
   (see *To load a configuration from a file* on page 199)
   c. start a new configuration
   (see *To configure a position's panel layout* on page 209)
2. Edit the configuration settings as needed
(see *Editing a Configuration* on page 200)
3. Save the configuration file and send the configuration to one or more consoles
(see *Sending a Configuration to a Console* on page 216)

This section, Using CPSW, provides step-by-step procedures to cover everything you need to do in order to configure 4x18 consoles.

Starting CPSW

Start CPSW by double-clicking on its shortcut. Alternatively, the default location for the program itself is located here:

32-bit OS: `C:\Program Files\Zetron\CPSW (4x18)`

64-bit OS: `C:\Program Files (x86)\Zetron\CPSW (4x18)`

Configuring CPSW

The serial port setting is the only setting needed to configure the CPSW application. This setting is saved so you do not need to configure it every time the application is launched.

♦ To configure the serial port

1. Determine which serial port will be used to connect to consoles (typically COM1 or COM2).
2. Go to **Communication**, **Set Serial Port**.
3. Type in the serial port to use, using the following format:
   `COMx`
   Where `x` is the number of the serial port.
4. Click **Save New PC Com Port**.

Loading a Configuration

Zetron uses CPSW to preconfigure 4x18 consoles for customers. The resulting configuration file is supplied by email or disk to customers.

Normally the first operation performed after starting CPSW is loading a configuration from a console or a file on disk. Depending upon the source, different information is obtained:

- Receiving a configuration from a console number #1 includes position configuration for that position and system configuration. This system information is inherited by all other positions, even if they already have system configuration.
- Receiving a configuration from a console numbered #2-8:
  - Position information for the received position only.
  - If system configuration wasn't yet loaded, then system configuration is also received.
  - If system configuration was already loaded, then no system configuration is included.
- Loading a configuration file includes configuration information for all positions. System configuration is also included, and is inherited by all positions.

Tip It is a good idea to receive the configuration information from all console positions and then save this configuration to a file. That file acts as a backup, ensuring you can return to using the current working configuration. Receiving the configuration information from the consoles also ensures you are editing the current configuration.

♦ To receive the configuration from a console

- If you have a cable with one RJ connector (P/N 709-7266 or 709-7400), use it to connect the serial port of your computer to the COMB jack (combined data) on the console.
- If you have a cable with two RJ connectors (P/N 709-7084 or 709-7417), use it to connect the serial port of your computer to the DATA IN and DATA OUT jacks on the console (these jacks might also be named LOOP IN and LOOP OUT). The cable ends are labeled for specific ports (IN vs OUT) and must be connected correctly.

If there are existing cables already connected to any of these ports, you must temporarily remove them while programming. Before removing these existing cables, ensure they are labeled so they can be returned to the proper ports.

Note The USB-to-serial port adapter provided by Zetron (P/N 802-0516) is tested and the recommended adapter for this application. Many third party USB-to-serial port adapters are inconsistent with their serial port implementation and do not reliably communicate with Zetron equipment.

1. There is an unlabeled switch on the bottom of the Model 4010 used to switch the console between RUN and PROGRAM modes. Move the switch to the program position, which is towards the gooseneck MIC and away from the DATA IN, DATA OUT, and COMB jacks. (On the 4010R, this switch is on the back and the positions are labeled.)

   The console display shows “PROGRAM”.
2. Click **Communication, Receive config from Position**.
3. Click **OK** to begin receiving the configuration.

   The console display shows “UpLoading CPS” while it is sending data and shows “DONE” when all data is transferred.

   If you receive the error message “Console did not send any data”, check the following items and try again:
   - Check your cable for loose or incorrect connections
   - Ensure the RUN/PROGRAM switch is set to PROGRAM
   - Check your serial port settings (see *To configure the serial port* on page 197)
4. If you need configuration information from more than one position, repeat this procedure as needed.

Tip If position #1 is received, then the position's settings get stored into the current configuration and the system settings from that position will replace the current system settings for all positions in the configuration file. If position #2-8 are received, then the position's settings get stored into the current configuration, but that position inherits the current system settings from the configuration file.

Note When editing the configuration information for existing systems, it is good idea to receive configuration information from all positions before editing the configuration. This allows you to see each position’s configuration, to compare the settings, and, if applicable, to copy position layout from one position to another.

♦ To load a configuration from a file

Caution! CPSW can access configuration files at any location visible by the PC including mapped network drives. CPSW does not provide user locks or sharing arbitration, so file access must be coordinated amongst users. If multiple users edit a file at the same time, changes made by one user can overwrite changes made by another user.

1. Click **File, Open**.
2. Navigate to the location containing your configuration files. Configuration files have a file name extension of “.cfg”. The default location is **C:\CPSW Config**

Files. (For CPSW prior to version 2.0, the default location was **C:\CPSW 4x18 Config Files**.)

Note CPSW files ending in ".cf1" are used with the M4010 version of CPSW.

Tip Custom configuration files provided by Zetron are typically sent by email.

3. Double-click the appropriate .cfg file.

   Once loaded, the system name of this configuration appears in the window's title bar adjacent to "CPSW" and the CPSW version number. The system name is also the first seven letters of the filename.

Editing a Configuration

Warning! Prior to configuring the system, it is imperative that the programmer has a complete understanding of the radio system that is to be controlled by the Model 4x18 console.

There are two types of configuration settings: *position* and *system*. *Position* configuration refers to the settings specific to a single console position, such as the layout of that position or the preferences for that position. *System* configuration refers to system settings that affect all positions. Naturally, when you change a system setting, the new configuration must be uploaded to all positions or else some positions will have system settings that are incorrect or out of sync.

Tip It is best to configure system settings before position settings. Some position settings, such as specific key definitions, are not available until the system settings are configured correctly.

System Settings

System settings are those settings that affect all positions system-wide.

Channel Configuration

♦ **To configure channels**

1. Click **Edit, System Configuration, Channel Configuration**.
2. Select the channel number to configure using the up and down arrows next to **Channel Number**.
3. Enter a **Channel Name**. **Channel Name** is used for reference only, and can be left blank if desired.

4. Select the **Channel Type**.

Channel Type	Description
DC Control Momentary	Use this DC control option if the radio requires only a momentary DC current to perform the desired function.
DC Control Constant	Some radios require that the control current be maintained constant in order to perform the desired function. Use this option if your radio requires a constant current.
Tone Control	Radio is controlled by way of audible tones.
Local (E&M) Control	A local control radio has only PTT and audio connections; it does not have control functions.
GE EDACS MDX	Select this channel type for a GE EDACS MDX mobile trunked radio.
Trunked LTR	Trunked LTR radios are those that are identical to the E.F. Johnson 8600 series mobile radios. Refer to the EFJohnson radio manuals and the Zetron Series 4000 LTR Trunking Control Option Operating Procedures (P/N 025-9133).
Telephone Control	When the Telephone Control option is selected, the M4018/4118 console telephone interface will feature hands-free enhanced phone operation with automatic audio routing between the phone and radio channels. With this selection, the numeric keypad and the answer/hold mode operate differently than they would with a radio (for more detail, refer to the S4000 Operator Manual, P/N 025-9535).

Warning! The two channels used in a dual channel card must be configured for the same channel type. For example, if channel 1 and channel 2 are both on the same dual channel card, both channels must be configured as the same type. There are two exceptions to this rule. (1) For a Universal Dual Channel Card, each channel may be DC-Constant, DC-Momentary, Tone, or Local. (2) For a Tone/Local Dual Channel Control Card, each channel may be Tone or Local.

Note Different channel types have different settings to be configured. Depending on the channel type you have configured, some of the following settings may not be relevant and available for configuration.

5. If applicable, select the **Control Protocol**. Some channel types have control protocols and some do not. Also, the list of available control protocols will vary depending on channel type.

Control Protocol	Description
T1R1 Without Paging	Single frequency standard tone controlled radio without paging option. This is the option to use if the channel is to be used without an external paging terminal such as a Model 25 or 4014.
T1R1 With Paging	Single frequency standard tone controlled radio with external paging option. If your radio supports the paging option, use this type. The Auxiliary PTT input will cause a control tone different from the normal PTT to be generated.
T2R2/T22R Without PL	Two-frequency tone controlled remote radio without PL. Refer to *Appendix C: CPSW Reference Material* on page 363 for a list of the frequencies generated.
T2R2/T22R With PL	Two-frequency standard tone controlled radio with paging option. If your radio supports the paging option, use this type. The Auxiliary PTT input will cause a control tone different from the normal PTT to be generated.
T4R4 Without PL	Four-frequency tone controlled remote radio without PL. Refer to *Appendix C: CPSW Reference Material* on page 363 for a list of the frequencies generated.
T8R8	This is an eight-frequency tone controlled remote radio. Refer to *Appendix C: CPSW Reference Material* on page 363 for a list of the tones required to control this type of radio.

6. If applicable, select the **DC Control Current** or **Tone Frequency** used for channel monitor. See *Appendix C: CPSW Reference Material* on page 363 for a description of the control currents and tone frequencies.

   The options for channel monitor depend upon the channel type and some channel types may not support a monitor function at all.
7. If applicable, enter a value from 0.0 to 10.0 seconds for **Keyup Delay** to set the time delay between when the channel has finished keying up the transmitter and the start of the first page in a stack.
8. If applicable, enter a value from 0.0 to 10.0 seconds for **Inter-Stack Delay** to set the time delay between pages in a stack. This delay will only occur for manually entered page stacks (i.e., for two or more pages entered via Paging/DTMF keypad). Because each page can be sent out over different channels, Instant-Call (single button) paging stacks always use the Keyup Delay between pages even if the next page uses the same channel as the previous page.
9. If applicable, select the **DC Control Current** or **Tone Frequency** used for paging function. See *Appendix C: CPSW Reference Material* on page 363 for a description of the control currents and tone frequencies.

   The options for channel monitor depend upon the channel type and some channel types may not support a monitor function at all.
10. If applicable, enable or disable **De Emphasis** by marking or clearing its checkbox. De Emphasis should be enabled if the radios transmitting to the console are using

Pre Emphasis. If you are uncertain, leave De Emphasis disabled unless the reception of human voice sounds unnatural.

11. If you have additional channels to configure, click **Next** or **Previous** and repeat this procedure.
12. If you are finished configuring channels for now, click **Done**.

♦ To delete or clear a channel's configuration

There are two ways to delete a channel's configuration:

a. If you want to delete a channel's configuration but retain the channel name, change the **Channel Type** to **No Control Type Selected**.
b. If you want to delete a channel's configuration including the channel name, click **Delete** or change the **Channel Type** to **Undefined**.

Paging Format Configuration

Each paging format to be used in the Model 4018 and 4118 consoles must have certain parameters unique to that format defined and must have a leading digit assigned to it. There are 14 leading digits available to be assigned among the nine different paging formats the console is capable of generating (some of which are optional). This allows the console user to select which type of page to transmit by preceding each page with its assigned leading digit.

If only one paging format is programmed (only one leading digit has been assigned), the page is keyed in directly and no leading digit is necessary (or allowed). The console already knows what type of page it will be.

Multiple variations of the same paging format can be programmed into the console by assigning each one its own unique leading digit. For example, leading digits 3, 4, and 5 might each be assigned to the DTMF paging format but with different on/off timing defined for each of the three formats.

Note When programming Instant Call Key paging stack(s), a leading digit is always required.

♦ To assign and configure a paging format for a leading digit

1. Click **Edit, System Configuration, Paging Format Configuration**.
2. To select a leading digit to configure, click on the leading digit or click **Prev. Digit** / **Next Digit** until it is selected.
3. Select the **Paging Format**.

   A number of configurable settings are displayed based upon the paging format that was selected.
4. Configure the paging format settings. In general, you need to match your particular or desired radio setup.

   Notes for certain paging formats:

a. Most paging formats have a setting for Talk Time that should be configured. Talk Time is the predefined amount of time after a page is finished that the microphone and transmitter are keyed up. After that time expires, IntegratorRD releases PTT and terminates transmission.

   Operators can use the Transmit key or a PTT button to override the default Talk Time by extending or cancelling the transmission. Once the Transmit key or a PTT button is pressed, the default Talk Time is cancelled and the transmitter is keyed up until the key or button is released.

b. If you are using the paging format “1000 Call Two Tone” or “100 Call Two Tone”, the details for the code plans are listed in *Appendix C: CPSW Reference Material* on page 363.

c. If you are using the paging format “Custom (Plectron)” be sure to later configure custom calls (see *To configure Custom Calls* on page 205).

d. The paging format “Alerts” is used to add various alert tones to your pages. The following list shows the page character used by the operator to generate each Alert function:

   (0) Beep alert

   (D) Delay function

   (1) Slow siren alert

   (2) Fast siren alert

   (3) Hi/Lo warble alert

   (4) Fast warble alert

   For example, assuming the “Alerts” paging format has been assigned to leading digit “A”, keying **A4** on the Model 4018 or 4118 paging/DTMF keypad enters the Fast Warble alert on the paging stack.

   Beep Alert (0) and Delay (D) function are configurable:

   - Tone Frequency configures the tone for the Beep Alert.
   - ON Duration sets the length of each beep tone.
   - OFF Duration sets the delay between each beep tone.
   - Count / Delay Time sets the number of beeps for the Beep Alert or the delay in seconds for the Delay function.

   The tones for Alert (1) through (4) are predefined in the console; only their duration is configurable (by setting **Alert Duration**).

5. If you have additional Leading Digits to assign, repeat this procedure. If you are finished, click **Done**.

STOP **Warning!** When you have configured a Leading Digit and you select another Leading Digit, the configuration changes you made are automatically applied. Clicking **Cancel** only cancels configuration changes for the currently selected Leading Digit. Likewise, clicking **Revert** only reverts configuration changes for the currently selected Leading Digit.

Edit Custom Calls

Note The "Edit Custom Calls" menu item is only enabled when there is a leading digit in the "Paging Format Configuration" dialog that has been defined as "Custom (Plectron)". Otherwise, this menu item is disabled and cannot be accessed to configure any data in the area.

Custom Calls defines your own custom two-tone pages for the paging format "Custom (Plectron)". If you have assigned a leading digit to a custom paging format (see *To assign and configure a paging format for a leading digit* on page 203), then you must configure custom calls here.

♦ To configure Custom Calls

1. Click **Edit, System Configuration, Edit Custom Calls**.

   If the **Edit Custom Calls** menu item is disabled, you must first assign a leading digit to a custom paging format (see *To assign and configure a paging format for a leading digit* on page 203).

2. Type in a custom **Call Number** between 1 and 255 and press **Enter**. Alternatively, you can select a call number by using the **Up** and **Down** arrow controls, **Next** and **Prev** buttons, or **def** buttons.

   Choose a Call Number based on the number to key in. For example, if the "Custom Call" paging format has been assigned to leading digit "C" and you configure Call Number "11", then keying "C11" on the Model 4018 or 4118 paging/DTMF keypad would add the custom call to the paging stack.

Tip The **def** buttons jump to the next or previous defined call numbers only, thus skipping undefined call numbers.

3. If you are configuring a call number that wasn't previously defined, click **Define** to make the Tone Settings editable. (If the call number was previously defined, the Tone Settings are already editable.)

4. Enter the **Frequency** and **Duration** parameters for each tone, the **Tone Gap Duration** (duration between tones 1 and 2), and the **Talk Time**. For an explanation of Talk Time, see Step 4 on 203.

5. If you have additional Call Numbers to configure, repeat this procedure. If you are finished, click **OK**.

Tip The **Revert** button will restore the settings of the current call number only. The settings for other call numbers are not affected.

♦ To delete custom calls

1. To delete all custom calls, click **Delete All Custom Calls**.
2. To delete a specific custom call:

a. Select the **Call Number** to be deleted.

b. Click **Delete**.

Input / Output Configuration

The Series 4000 is equipped with eight spare inputs and outputs. Auxiliary inputs and outputs are added by adding Auxiliary I/O cards. There are important differences between spare I/O and Aux I/O, as described in the following list.

> **Tip** Spare I/O and Aux I/O serve different purposes. Therefore, you should read about and understand the differences provided in the following list before you start configuration procedures.

- **Auxiliary inputs** are limited to controlling the console LED indicators. These are typically used to monitor alarms or show voter status.
- **Spare inputs** are conceptually the same as pressing a key on a panel. For example, spare inputs can perform configurable functions, such as selecting a channel or transmitting.
- **Auxiliary outputs** can be interlocked with other auxiliary outputs and associated with auxiliary inputs. Auxiliary outputs have more choices than spare outputs when configuring the LED behavior. There are up to 38 auxiliary outputs available, so they can be labeled in CPSW for reference purposes.
- **Spare outputs** cannot be interlocked, associated with inputs, or labeled. Spare outputs have less choices for LED configuration. Spare outputs 7 and 8 can be used for a special purpose related to ANI. See *Outputs 7 and 8 in Reverse Selective Calling Mode* on page 386.
- The number of auxiliary inputs and outputs can be increased by adding Aux I/O Cards (see *Auxiliary I/O Card Installation (Optional)* on page 72). Each Aux I/O Card has 40 auxiliary inputs and 12 auxiliary outputs, and you can add up to 6 Aux I/O Cards. For more information about auxiliary inputs and outputs, see *Auxiliary Input/Output* on page 386.
- There is no method for adding spare inputs and outputs.

♦ To enable and name the auxiliary inputs and outputs

The names of the auxiliary inputs and outputs is used for reference within CPSW only. Although this is not required, providing identifiable names will ease configuration later when defining keys.

1. Click **Edit, System Configuration, Input/Output Configuration**.
2. Use **Next** and **Previous** to select the main board I/O or the appropriate I/O card to configure.
3. Enter the names for inputs and outputs that need to be configured.
4. Mark or clear the **Enable** checkbox to enable or disable inputs and outputs.

5. To configure inputs and outputs on other cards in the system, click **Previous** or **Next** and repeat this procedure. If you are finished, click **Done**.

Tip The **Revert** button will restore the settings of all inputs and outputs for the currently selected card only.

Note To define auxiliary inputs and outputs, see *To define a key* on page 211.

Transmit Timeout (TX Timeout)

The transmit timeout is the maximum amount of time (in minutes) that a channel can keyed before the channel is automatically released. The transmit timeout prevents an accidental keyup from tying up a channel for longer than the timeout duration.

♦ To configure TX Timeout

1. Click **Edit, System Configuration, TX Timeout**.
2. Use the slider or manually type in the number of minutes for the timeout.
3. Click **OK**.

Priority Marker

The priority marker is typically a short-duration beep that sounds every few seconds or so, in order to alert mobile radio users to stay off of a channel being used for emergency or other special conditions.

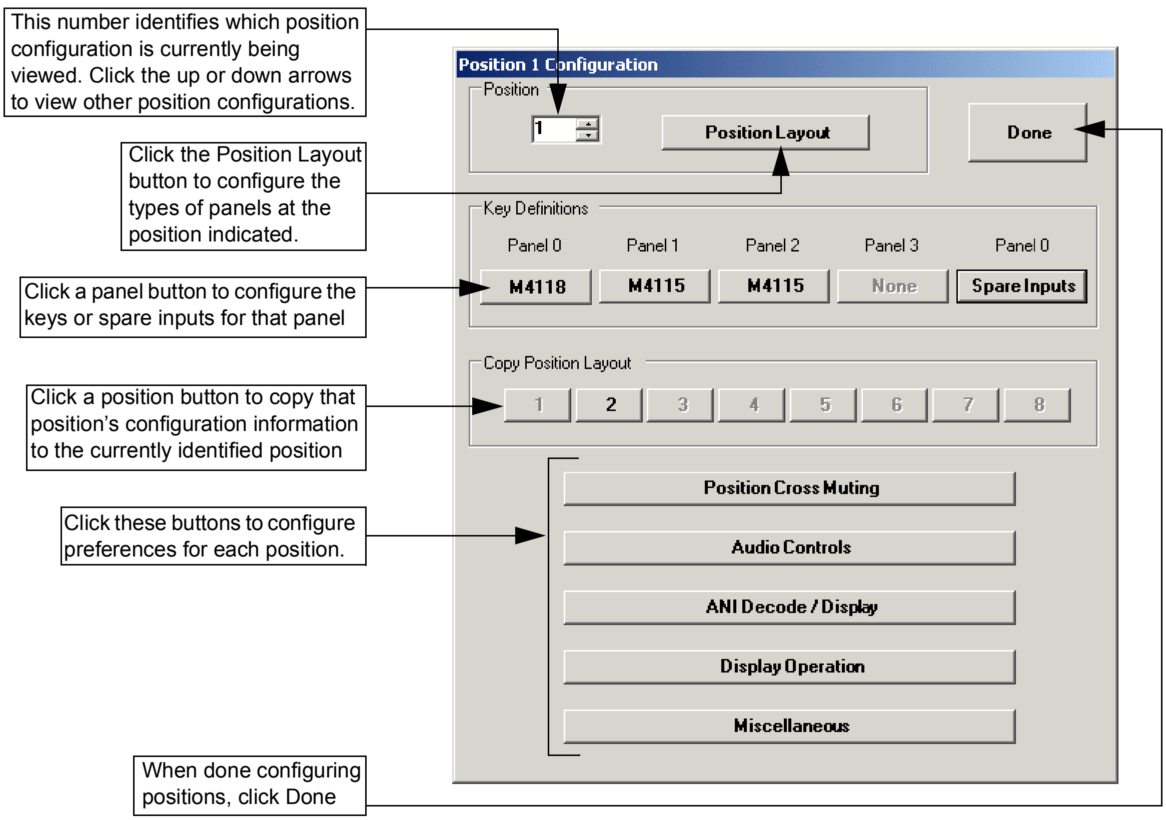
♦ To configure the priority marker

1. Click **Edit, System Configuration, Priority Marker**.
2. Set the **Priority Marker Frequency** (600 to 2000 Hz). This sets the tone frequency of the beep.
3. Set the **Priority Marker Duration** (50 to 1000 ms). This sets the duration of the beep.
4. Set the **Priority Marker Interval** (1 to 300 sec). This sets how often the beep will sound.
5. Set the **Priority Marker Amplitude** (1 to 100 percent). This sets the volume of the beep.
6. Click **OK**.

Position Settings

Tip Provides information to help users apply techniques or procedures. Suggests an alternative method for performing a task, or presents an advanced method or shortcut.

To configure position settings, click **Edit, Position Configuration**. A dialog box will appear, as shown in the following figure.



Tip It is best to configure system settings before position settings. Some position settings, such as specific key definitions, are not available until the system settings are configured correctly. See *System Settings* on page 200.

Position

This number identifies which position configuration is currently being viewed. Any changes you make to configuration information will only affect the identified position. To modify the configuration information for a different position, click the up or down arrows until you see the appropriate position number. The number can also be changed by typing the new number and pressing **Enter**.

Position Panel Layout

The layout of button panels can vary from position to position.

♦ To configure a position's panel layout

1. Click **Edit, Position Configuration**.
2. Use the up and down arrows next to the **Position** number to select the position to configure.
3. Click **Position Layout**.

   The Position Panel Layout dialog box opens.
4. Configure the panels according to the actual hardware in use at this position.

> **Tip** Choosing a panel affects the panel choices that follow, so configure panels in numerical order (Panel 0 through Panel 3).

> **Note** If you need to configure a Model 4116B, select **M4118**. The firmware and programming for these two models are identical.

5. When finished, click **Done**.

Key Definitions

Each panel that is configured in the position layout has a button that appears in the Key Definitions area. Panel 0 also has a button for configuring spare inputs.

♦ To choose a panel for configuring keys

1. Click **Edit, Position Configuration**.
2. Select a panel by clicking on its button.

   After selecting the appropriate panel, you will see a "key map" of the particular panel that you are configuring. The layout of the key map matches the physical layout of the keys on the actual panel.
3. Use the following procedures to define keys.

♦ To erase key definitions

1. Click on **Erase**.
2. Select all keys to erase by clicking on them. Deselect keys by clicking on them again. Selected keys are blue. Undefined keys cannot be selected for erasure because there is nothing to erase.
3. Click **Apply**.
4. Click **Yes** to confirm.

♦ To move or swap a key definition

1. Click **Move**.
2. Click a key to select its definition for moving. This is the “source” key. (If you are swapping key definitions, it does not matter which key you select first.)
3. Click a key to select it for receiving the definition. This is the “destination” key.

   If the destination key is undefined, CPSW will ask for confirmation to move the definition. Once confirmed, the destination key takes the source key’s definition and the source key becomes undefined.

   If the destination key already has a definition, CPSW will ask if you want to exchange the keys or not. If you click Yes, the key definitions are swapped. If you click No, the destination’s key is redefined with the source key’s definition and the source key becomes undefined.

♦ To copy a key definition

1. Click **Copy**.
2. Select keys for copying by clicking on them (these will be the source keys). Deselect keys by clicking on them again. Selected keys are blue. Undefined keys cannot be selected for copying because there is nothing to copy.

   Although several keys can be selected and copied at the same time, the layout of the source keys must match the layout of the destination keys. In other words, if you select a 3x4 group of keys to copy, the keys you copy them to must also be a 3x4 group of keys.
3. When done selecting keys, click **Next**.
4. Click the destination key (if several source keys are selected, click the destination key that is the upperleft-most key) and click **Next**.

   The destination key or keys will appear red so you can confirm that these keys will receive the copied definitions. If the destination keys do not appear red and you’ve selected more than one key to copy, then the destination area is not large enough to copy all of the source keys.
5. If the source keys are related to channels, CPSW prompts you to select a channel for the destination keys. If so, select a channel from the drop-down list in the lower right-hand corner of the window. All destination keys will be assigned to the chosen channel even if the source keys have multiple channels.
6. Click **Apply**.

♦ To map a key to a spare input

1. Click **Map to Spare**.
2. Click a key to map. The selected key will change to blue.
3. Select a spare input from the drop-down list in the lower right-hand corner of the window.
4. Click **Yes** to confirm the mapping or **No** to cancel the mapping.

♦ To define a key

1. Click on **Define**.
2. Click a key to define. A key definition dialog box opens.
3. There are approximately 130 functions that can be configured in this dialog box. All settings are grouped by the key's functional group.
    a. To assign a channel function to this key, select **Channel Functions** from **The Key's Functional Group**. The channel functions group includes all functions specifically related to a channel. For example: selecting a channel, monitoring a channel, and adjusting the volume for a channel.
    b. To assign a system function to this key, select **System Functions** from **The Key's Functional Group**. The system functions group includes all functions specifically related to the system (as opposed to a channel). For example: reviewing ANI, setting the clock, taking over a console, and the site intercom.
    c. To assign an auxiliary I/O function to this key, select **Auxiliary Input/Output** from **The Key's Functional Group**.
    d. To assign a spare output function to this key, select **Spare Output** from **The Key's Functional Group**.
4. Depending upon the functional group and key choice, some parameters may appear.

Tip A description of each key and its parameters are explained in *Description of Key Functions and Parameters* on page 372.

Tip If you are having trouble finding the correct setting to configure, refer to Figure 39 *on 196* for a map of all possible settings for key definitions.

Copy Position Layout

The Copy Position Layout function lets you copy a complete position configuration including key definitions and panel layout. Using this function, one operator position may be defined and then quickly copied to other positions.

♦ To copy a position's layout to another position

This feature requires at least one console position's layout to be configured.

1. Click **Edit, Position Configuration**.
2. Use the up and down arrows next to the **Position** number to select the position to you wish to copy the layout TO.
3. In the Copy Position Layout area, click the position number to copy the layout FROM.

    A dialog box appears, identifying which position layout it will copy from and to.
4. If the action in the dialog box is correct, click **Yes**.

5. If needed, repeat this procedure to copy the position layout to additional positions.

Position Cross Muting

The Position Cross Muting function lets you mute common channels between operator positions when transmission is occurring. Using cross muting eliminates feedback problems from physically close operator positions.

♦ To configure Position Cross Muting

This feature requires at least two configured positions.

1. Click **Edit, Position Configuration**.
2. Use the up and down arrows next to the **Position** number to select the position to enable cross-muting.
3. Click **Position Cross Muting**.

   A cross muting dialog box opens.
4. Mark the checkbox for any position you wish to cross-mute. Clear the checkbox for any position you wish to turn off cross-mute.
5. Click **Done** when you are finished.

Audio Controls

This function sets volume and speaker muting for each position.

♦ To configure Audio Controls

1. Click **Edit, Position Configuration**.
2. Use the up and down arrows next to the **Position** number to select the position to configure.
3. Click **Audio Controls**.

   The Audio Controls dialog window opens.
4. Configure the audio control settings as needed. The following table explains each setting:

Muted Audio Level *	This number (0 to 99) represents the percentage of total volume to be used as a muted audio level for all channels of the position.
Minimum Audio Level *	This number (0 to 99) represents the percentage of total volume to be used as a minimum adjustable audio level for all channels of the position.
Default Volume Level *	This number (0 to 99) represents the percentage of total volume to be used as a power-up default volume level for all channels of the position.
Speaker Mute while Transmitting	When enabled, both select and unselect speakers will mute when you are transmitting. Disable if you want speakers to remain unmuted.

Mute all Idle Channels	When enabled, audio from channels that do not have “call” activity are muted. This is useful for a position that has many channels, since quiescent line noise will accumulate on the unselected speaker audio. If not enabled, systems using Channel Check IRR will cause audio playback activated from one console position to be heard at all positions.
Unmute Idle Chan Upon Monitor	When enabled, channels unmute when the CTCSS monitor function is active.
Muting Signaling Tones	When enabled, tone remote signaling tones from the auxiliary audio input are muted at this position. Disable to hear the signaling tones.
Mic Delay Eliminator	The Mic Delay Eliminator puts a delay in the microphone voice signal so that the operator’s voice reaches the transmitting radio at the same time that the carrier is activated. Enable this to prevent the lost first syllables that can occur when transmitting over transmitter links or tone-remote control. This function is typically disabled by default. Enable this for use with the Tone Remote System Adapter with Audio Delay, as described in the adapter’s technical sheet (P/N 011-0347).
* The percentage entered will be rounded to the nearest multiple of three.	

5. Click **Done** when you are finished.

ANI Decode / Display

ANI (automatic number identification) is normally used for identification of mobile radios. ANI uses remote signaling tones that are either automatically or manually sent when the radio is keyed. One use for ANI is as a single-button-press on the radio to call for help.

On systems equipped with the ANI option, the ANI Decode / Display function will allow the ANI mode and the ANI address to be set for each position.

Note ANI decode is only possible from channels that have ANI enabled.

♦ To configure ANI Decode / Display

1. Click **Edit, Position Configuration**.
2. Use the up and down arrows next to the **Position** number to select the position to configure.
3. Click **ANI Decode / Display**.

   The ANI Configuration dialog window opens.

4. Configure the ANI decode settings as needed. The following table explains each setting:

Operating Mode	Select the desired operating mode: • No ANI Display - ANI is not displayed on this position. • Selected Channels - ANI is displayed at this position for select channels only. • Specified (Fixed) Channels - ANI is displayed at this position for configured channels only. Configuration is performed in this same dialog box, in the ANI Channel Select area. * • All Channels - ANI is displayed at this position for all channels.
Unmute Channel Upon Receiving ANI	Select **Yes** to enable channels to be automatically unmuted when an ANI is received. If channels are already unmuted, this has no effect.
Primary Address Secondary Address	Each console has two ANI addresses, a primary and a secondary. Normally the primary address is used to select an individual console while the secondary address is used to provide a group call to all consoles. For a group call, the secondary addresses should be set the same for all of the positions in the system. Enter the primary address by entering up to six digits in the **Primary Address** field. Enter the secondary address in the same manner. The following characters are valid digits “0123456789ABCD#*”.
Timeout Period	The timeout period is the time window between the detection of a valid address and the last ANI digit accepted. During operation, new ANIs will only be recognized after the time period has elapsed after the previous ANI. If the calling unit has automatic ANI calling, one or two seconds should be sufficient. If the calling unit uses a manual keypad to enter the ANI address, five seconds is the normal timeout. Enter a timeout period from 1 to 10 seconds.
Emergency ANI Acknowledge	This function makes the console automatically acknowledge the receipt of an ANI on any selected channel that has this function enabled. Mark the check boxes to select channels for emergency ANI acknowledgement.
ANI Channel Select	Mark the check boxes to enable ANI display on those channels. * The ANI Channel Select area is only visible and relevant if the Operating Mode is set to “Specified (fixed) Channels”.

5. Click **Done** when you are finished.

Display Operation

The display of each position is configurable to show time of day in 12-hour or 24-hour format. Alternatively, the display can show “- - - - -” (dashes) to prevent confusion with a master site clock.

♦ To configure Display Operation

1. Click **Edit, Position Configuration**.

2. Use the up and down arrows next to the **Position** number to select the position to configure.
3. Click **Display Operation**.

   The Display Operation dialog window opens.
4. Choose a display option.
5. Click **Done** when you are finished.

Miscellaneous

The **Miscellaneous** button opens a dialog window containing miscellaneous configuration settings.

♦ **To configure miscellaneous settings**

1. Click **Edit, Position Configuration**.
2. Use the up and down arrows next to the **Position** number to select the position to configure.
3. Click **Miscellaneous**.

   The Miscellaneous dialog window opens.
4. Configure the miscellaneous settings as needed. The following table explains each setting:

Audio Source for ‘Soft’ Transmit Keys	This option allows you to specify the transmit audio source (microphone) when a “soft” transmit key is activated. A “soft” transmit key is a programmable key which has been defined as a transmit key. Choose one of the following audio sources to assign it to ‘Soft’ transmit keys: • Dynamic Mic - Use a deskmic or gooseneck microphone connected to the D-Mic input on the console. • Electret Mic - Use a handset or headset. • Spare Input #9 steered - Use whichever audio source that Spare Input #9 is switched to. Spare Input #9 is the mic switch input on the headset box connector on the console back panel (J4-pin 9 on the Model 4118 and J1-pin 9 on the Model 4018). • Hookswitch steers... - Use whichever audio source that the hookswitch is switched to. Hookswitch is the ear switch input on the headset box connector on the console back panel (J4-pin 8 on the Model 4118 and J1-pin 8 on the Model 4018).
Instant Select Key Display Mode	This option allows you to set the green LED for the selected Channel/Frequency to either flash on/off or stay constantly lit. This option changes the display behavior only; there is no operational difference.
Received ‘CALL’ light duration	Enter the number of seconds (1-60) that the console “call” light indicator remains on after the channel call light has extinguished. Since the channel call light is typically on for three seconds (set by VOX hold time) after the end of a call, the time entered here is in addition to the three seconds. For example, if you enter 12 here, the console call light indicator would remain on for 15 seconds after the end of the incoming call.

Dynamic Mic selection	This setting is used to select either a Desk Mic or Gooseneck mic. The Model 4118 will default to whichever mic is connected to the D-Mic input on P5 (mainboard).
Parallel Remote Status	Enable this option to allow each console to display or follow the status of other console positions (for certain functions). For example, with Parallel Remote Status enabled, if console 1 has F1 selected for a particular channel and console 2 sets that channel to F2 for transmission, the indicator on console 1 will show F2 and the console 1 operator must re-select F1 in order to transmit on it. This option is typically enabled. By disabling Parallel Remote Status, each console will retain its own frequency selection.

5. Click **Done** when you are finished.

Saving a Configuration

Saving the configuration to disk is accomplished in the usual Windows manner (**File, Save** or **File, Save As**). The saved file contains all of the settings that have been configured, including system configuration and position configuration for all positions.

Caution! CPSW can access configuration files at any location visible by the PC including mapped network drives. CPSW does not provide user locks or sharing arbitration, so file access must be coordinated amongst users. If multiple users edit a file at the same time, changes made by one user can overwrite changes made by another user.

Sending a Configuration to a Console

Sending a configuration file from a console number includes position configuration (for that position only) and system configuration.

The system information should be the same for all positions, so every time you reconfigure system settings you should send the new configuration to all positions.

♦ To send configuration information to a console

- If you have a cable with one RJ connector (P/N 709-7266 or 709-7400), use it to connect the serial port of your computer to the COMB jack (combined data) on the console.
- If you have a cable with two RJ connectors (P/N 709-7084 or 709-7417), use it to connect the serial port of your computer to the DATA IN and DATA OUT jacks on the console (these jacks might also be named LOOP IN and LOOP OUT). The cable ends are labeled for specific ports (IN vs OUT) and must be connected correctly.

If there are existing cables already connected to any of these ports, you must temporarily remove them while programming. Before removing these existing cables, ensure they are labeled so they can be returned to the proper ports.

Note The USB-to-serial port adapter provided by Zetron (P/N 802-0516) is tested and the recommended adapter for this application. Many third party USB-to-serial port adapters are inconsistent with their serial port implementation and do not reliably communicate with Zetron equipment.

1. There is an unlabeled switch on the bottom of the Model 4010 used to switch the console between RUN and PROGRAM modes. Move the switch to the program position, which is towards the gooseneck MIC and away from the DATA IN, DATA OUT, and COMB jacks. (On the 4010R, this switch is on the back and the positions are labeled.)

   The console display shows “PROGRAM”.
2. Click **Communication, Send config to position, Send config to position x** (where x is the number of the position you are connected to).

   CPSW prevents sending a configuration to a position if there are no configuration settings for that position. If the position number you need is “greyed out”, you must first configure that position (see *Position Settings* on page 208).
3. Click **OK** to begin sending the configuration settings.

   The mouse cursor switches to an hourglass while CPSW is sending data. Although CPSW displays “Configuration data sent to position x” when all data is sent, CPSW is sending the data to the serial port blindly. In other words, the CPSW application is not aware if a console is actually connected or not or if the console successfully received the configuration information.
4. The download is successfully completed if the console displays “** DONE **”. If the console does not display “** DONE **”, then some troubleshooting is required:

   a. If the console display shows “PROGRAM” after CPSW is done sending, then there was a communication break between the PC and console, such as a serial cable not connected or a wrong COM port configured in CPSW.

   b. If the console continues to display “DnLoading CPS” long after CPSW is done sending, then the serial transfer was interrupted after it started. The cable may have been disconnected or the baud rate changed in the middle of the download (Windows XP will occasionally change the baud rate by itself). There is no timeout function on the console, so it will continue to display "DnLoading CPS" until reset or switched back to 'Run' mode.

c. If the console displays “THX 084”, a checksum error occurred, and the console ignored the rest of the download. This can be caused by a baud rate change or data corruption.

Warning! If the console displays “DnLoading CPS” or “THX 084”, the console's key-definition database has been corrupted and the console will not work until a good CPS database is successfully downloaded. Until the console is fixed, it will always display "CPSdataErr" when switched back to 'Run' mode and it will ignore all buttons.

Tip You can attempt to download again by toggling the console's mode switch to 'Run' and then back to 'Program'. The display will then show "PROGRAM" again and a new download from CPSW can start.

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5. Move the switch to the run position. The top line of the LCD should show the name of the configuration file. If the name of the file has fewer than eight characters, the LCD may display extra characters.
6. If you need to send configuration settings to more than one position, repeat this procedure as needed.

Accessory Installation

In this chapter:

Zetron Desktop Microphone

Zetron desktop microphones are wired directly to the consoles. Identify which microphone you have in Figure 40 and wire it to the console's Auxiliary Audio Connector pins as identified in Table 83. The Auxiliary Audio Connector is the 15-pin screw terminal at the rear of the console. If the supplied cable has two modular connectors, cut off one of the connectors to access the wire leads for use with the screw terminal.

Figure 40: Zetron Desktop Microphones

Rigid Style **Flexible Style**

Table 83: Desktop Microphone Wiring

Signal	Rigid Desktop Microphone	Flexible Desktop Microphone	Models 4018/4118/4217B/4219 15-pin Aux Audio Connector
Ground/Shield	—	Green	Pin 6
Audio +	Yellow	Blue	Pin 7
Audio –	Bare wire*	White/Blue	Pin 8
PTT +	Red	White/Brown	Pin 9
PTT –	Bare wire*	Brown	Pin 10
Mon +	Black	White/Orange	Pin 11
Mon –	—	Orange	Pin 12
* For the rigid desktop microphone, connect the bare wire to either pin 8 or 10 and use a jumper to connect pin 8 and 10.			

The console's built-in strain relief (except on Model 4018) can be used to secure wiring by using a tie-wrap.

To adjust microphone levels, see *Microphone Adjustments* on page 185.

Gooseneck Microphone

The gooseneck microphone (Part # 950-9459) is mounted to the front of the console at either edge, using the two bolts provided in the bag with the microphone. The microphone wires connect at the rear of the Series 4000 consoles. Wire the microphone cable to the Auxiliary Audio Connector as shown in Table 84. The Auxiliary Audio Connector is the 15-pin screw terminal at the rear of the console.

Table 84: Gooseneck Microphone Wiring

Wire	Signal	Models 4118/4217B 15-pin Aux Audio Connector
Clear	Mic +	Pin 7
Small black	Mic –	Pin 8
Large black	Shield	Pin 10

To adjust microphone levels, see *Microphone Adjustments* on page 185.

Headset Jackbox

The Headset Jackbox (Part # 950-9327) accommodates four-wire or six-wire headsets. This accessory may be wired to the desktop or rack-mount console. The volume knob on the jackbox adjusts the headset receive volume.

The Headset Jackbox is shipped configured for four-wire operation. There is a 4W/6W switch on the side for selecting the type of interface. For use with a six-wire headset, prior to revision "C" of the jackbox, open the unit and connect the yellow wire to Pin 3 of the headset socket.

For electrostatic discharge protection, the case of the jackbox must be connected to earth ground. Isolate the ground wire from the signal lines to prevent noise coupling.

Note Zetron does not support the use of amplified headsets with Series 4000 console equipment.

Footswitch

The footswitch (Part # 950-9102) allows foot control of headset or gooseneck microphone transmission, and/or the "P/L" monitor function. The footswitch may be used with either the desktop console or the rack-mount consoles. More than one footswitch may be attached to a console. For example, one may be used for transmit control and the other for monitor control. Table 85 shows the connections to the removable terminal block inside the console.

Table 85: Footswitch Wiring

Wire Color	Gooseneck PTT	Monitor PTT
Red	P5-9	P5-11
Black	P5-10	P5-12
White	P5-10	P5-12

Use the built-in strain relief on the console to ensure secure wiring.

Telephone Radio Headset Interface

Interface

The Series 4000 Telephone Radio Headset Interface (TRHI) (Part # 950-9439) is a headset interface used as a radio control console and as a telephone instrument. It should not be confused with the headset jackbox, which provides a jack for a console. The TRHI is low profile and is mounted under the writing surface of an operator's station. It is equipped with a dual-prong jack (accepting either 4-wire or 6-wire plugs) and two controls to adjust the volume of the radio and telephone separately. With the proper signals available from the telephone instrument, the following operation will occur:

Headset out of jack:

- Console Select audio heard on console speaker.

Headset in jack, telephone on hook (no line connected):

- Console Select audio heard on headset earpiece.
- May also be heard on console speaker if desired.
- Unselect audio may also be heard on headset if desired.

Headset in jack, telephone off hook (line connected):

- Console audio heard on console speakers.
- Telephone receiver audio heard on headset earpiece.
- Headset mouthpiece audio transmitted over telephone.

Headset in jack, radio console footswitch depressed:

- Headset mouthpiece audio transmitted over radio console, but not over telephone.
- Headset mouthpiece audio may also be transmitted to telephone if desired.

Considerations

To interface the TRHI to a telephone instrument, the telephone must already have an operational headset port or jack. If this is not available, the signal levels and impedance may not be compatible with the TRHI.

The telephone instrument must provide an off-hook signal to the TRHI to indicate that the telephone is connected to a line. Absence of this signal greatly reduces the usefulness of the TRHI and may cause undesirable audio levels at the headset earpiece. In any case, some source of off-hook signal must be provided to switch the headset earpiece between the telephone and the radio. If the signal is not available on the telephone, it can sometimes be generated by an accessory headset jack adapter (available from the headset supplier). It can also be generated by pressing a button on the radio console.

The preferred method of operation is pressing a telephone line connect button to generate the off hook signal. This provides a single action for answering the line and for switching the headset. Activating the “off hook” signal by other means usually requires one step to switch the headset and another step to answer the line.

Generally, it is easier to interface to standard 1A2 key telephones than to electronic telephones, especially Automatic Call Distributors (ACDs).

Zetron can supply headsets that are compatible with the TRHI.

Note Zetron does not support the use of amplified headsets with Series 4000 console equipment.

TRHI Installation

Installation requires mounting the interface, selecting the interface operation through the jumpers, wiring the interface to the telephone instrument, and wiring the interface to the radio console.

For installation instructions, refer to the *TRHI Product Manual* (P/N 025-9553).

Secondary Headset Jackbox

The Series 4000 Secondary Headset Jackbox (SHJB) (Part # 950-9208) allows multiple headsets to be connected to a console. The SHJB is low profile and is meant to be mounted under the writing surface of a dispatch station. It is equipped with a dual-prong jack (accepting either 4-wire or 6-wire plugs), and a volume control to adjust the earpiece volume.

Installation

Installation includes mounting the SHJB, configuring interface operation, setting mouthpiece muting, wiring the SHJB to a console, wiring the jackbox to parallel jackboxes, and wiring the jackbox to a footswitch (optional).

Mounting

The SHJB can be mounted anywhere, but it is usually installed under the writing surface of a dispatch station. Place it where it will avoid damage from chairs and spills, and where it will not inconvenience personnel.

♦ To mount the SHJB

1. Remove the top cover and secure it to the bottom of the writing surface using the supplied screws.
2. Attach the body of the interface to the top cover.
3. Connect the case to the central earth ground.
4. Isolate the earth ground wire from signal lines.

Configuration

The SHJB circuit board is equipped with two jumpers (see Table 86) to allow the operation of the jackbox to be tailored to the installation.

Normally, if a headset is plugged into any of the headset jackboxes, transmissions from the console will use the mouthpiece audio from all of the attached headsets. The person(s) wearing a headset may not know that a transmission is taking place.

If each SHJB can be provided with its own transmit switch (such as a foot-switch or 6-wire PTT headset), the jackboxes may be reconfigured to mute the mouthpieces of all headsets not being used. Set JP6 to “A” to enable muting.

PTT Override

If each SHJB is provided with its own transmit switch (such as a foot-switch or 6-wire PTT headset), PTT override operation may be used. When PTT override is enabled, pressing PTT on the primary jackbox mutes the secondary jackbox transmit audio and routes the primary jackbox audio to the transmitter allowing the primary jackbox user to preempt (override) the secondary jackbox user.

If PTT override operation is desired, only two jackboxes can be used on each console position, one primary and one secondary. Set JP1, JP3, and JP6 to position B to enable PTT override.

Table 86: SHJB Jumper Settings

JUMPER	OPERATION
JP1	A* = Normal B = PTT Override (JP3=B) (JP6=B)
JP2	Position 'A'/Hardwired
JP3	A* = Normal B = PTT Override (JP1=B) (JP6=B)
JP4	Position 'B'/Hardwired
JP5	A* = 6-Wire B =4-Wire
JP6	A* = Mute Enable B = Mute Disable
* Factory jumper settings.	

Caution! Do not install a four-wire plug into an SHJB configured for six-wire operation; the console may unexpectedly transmit on the selected channel.

Wiring to Console

The Secondary Headset Jackbox plugs easily into any of the consoles. The 9-pin, D-type connector, J2 (“Console”), at the rear of the jackbox provides the signals to the console. Use the supplied 9-pin cable to connect the jackbox to the console at the console headset connector.

Wiring to Additional Jackboxes

If more than one jackbox is to be installed for a single console, only one Secondary Headset Jackbox connects to the console. Additional jackboxes must connect in a daisy-chain fashion to the initial jackbox at connector J1 (“Expansion”), at the rear of the jackbox. If either the standard headset jackbox (Part # 950-9327) or the TRHI (Part # 950-9439) will be connected, it must be the last jackbox in the daisy chain. When multiple Secondary Headset Jackboxes are used, connect J2 of one box to J1 of the preceding box.

Wiring to Footswitch

Connector TB2 (“Footswitch”) is used to wire a footswitch to the headset jackbox. Wire the switch across the terminals labeled “GND” and “PTT”.

Console Programming

To assure proper routing of headset mouthpiece audio when the “soft” console transmit buttons (such as INSTANT XMIT and SITE ICOM) are used, the console must be programmed through CPSW. The following menu items must be selected: **Edit, Position #, Miscellaneous, Audio Source** for “soft” xmit keys, Spare Input #9 steered.

Zetron Desktop Speakers (Monitor A/B)

In addition to the typical Select/Unselect pair of speakers, the Series 4000 supports a second pair of speakers for Monitor A/B functionality. Monitor A and B speakers do not connect to the audio panels, they connect to the CIC card in the back room.

For wiring Zetron Desktop Speakers as a Select/Unselect speaker pair to a Model 4219, see *Connecting the Model 4219 Console Audio Interface* on page 242.

Monitor A/B Wiring from the CIC Card to the Console Position

To support Monitor A/B functionality, four additional wires must be run from the CIC card in the back room to a wall plate at the console.

Use UTP Cat 5 cable as shown in Table 87 or Table 88 to connect from the CIC card in the back room to the included wall plate (810-0026) near the console. Position the wall plate correctly as shown in Figure 41 (the jacks should have the connection pins at the top).

Caution! The pinout at the punch block varies depending on the location of the CIC card. Table 87 is for CIC cards in odd-numbered slots only. Table 88 is for CIC cards in even-numbered slots only. Be certain you are using the correct table.

Table 87: Monitor A/B wiring from the CIC to the console wall plate (CIC odd slot)

Signal	Punch Block Pins (CIC in Odd Slot)	In-House Wire Color	Wall Plate 810-0026		
			Jack Location	Wire Color	Pin #
MON A+	18		Top	Green	4
MON A–	43			Red	3
MON B+	42		Bottom	Green	4
MON B–	17			Red	3

Table 88: Monitor A/B wiring from the CIC to the console wall plate (CIC even slot)

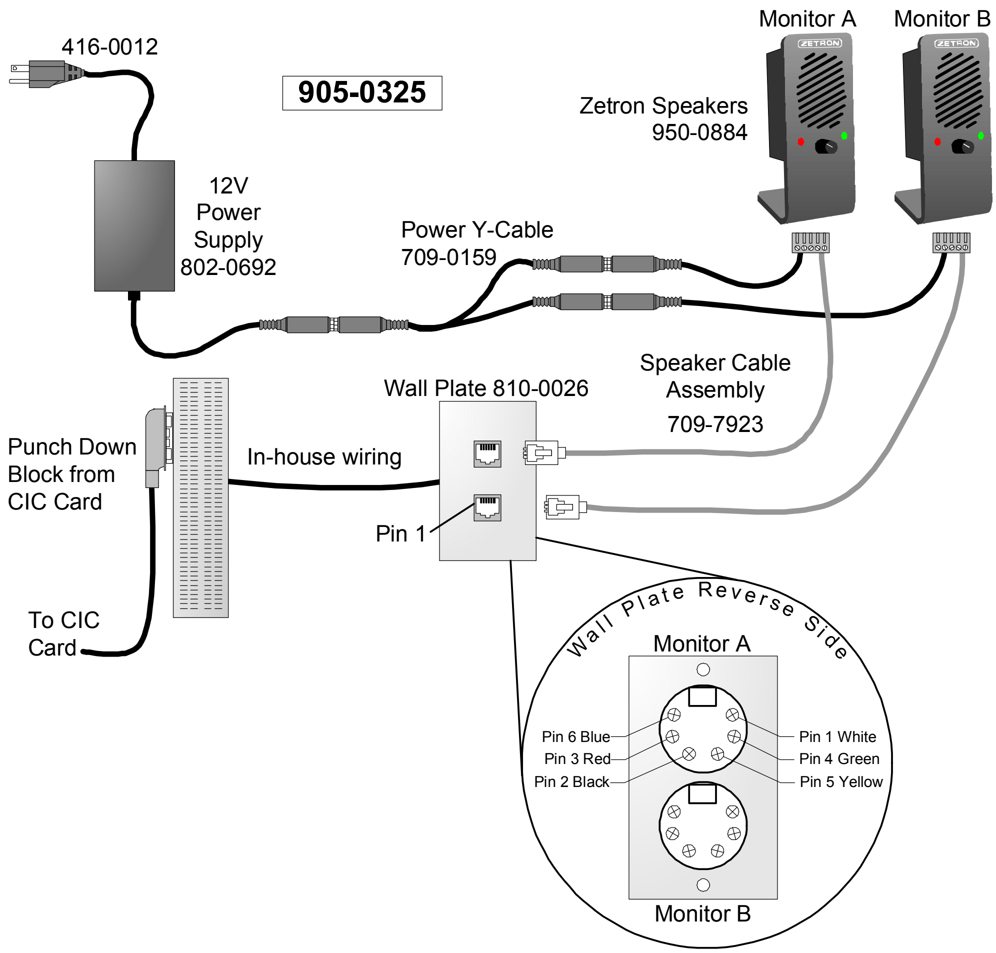
Signal	Punch Block Pins (CIC in Even Slot)	In-House Wire Color	Wall Plate 810-0026		
			Jack Location	Wire Color	Pin #
MON A+	6		Top	Green	4
MON A–	31			Red	3
MON B+	30		Bottom	Green	4
MON B–	5			Red	3

Tip The **In-House Wiring** columns in Table 87 and Table 88 are intentionally left blank. If you like, fill in the spaces with the actual wire colors used.

Monitor A/B Console Connections

The Zetron speaker bundle for Monitor A/B (P/N 905-0325) includes a pair of speakers, a power supply, a modular wall plate, and cables suitable for power and connection to the wall plate. Connect the cables as shown in the following diagram.

Figure 41: Connecting Monitor A/B Speakers to Series 4000



T2-2R Base Station Installation

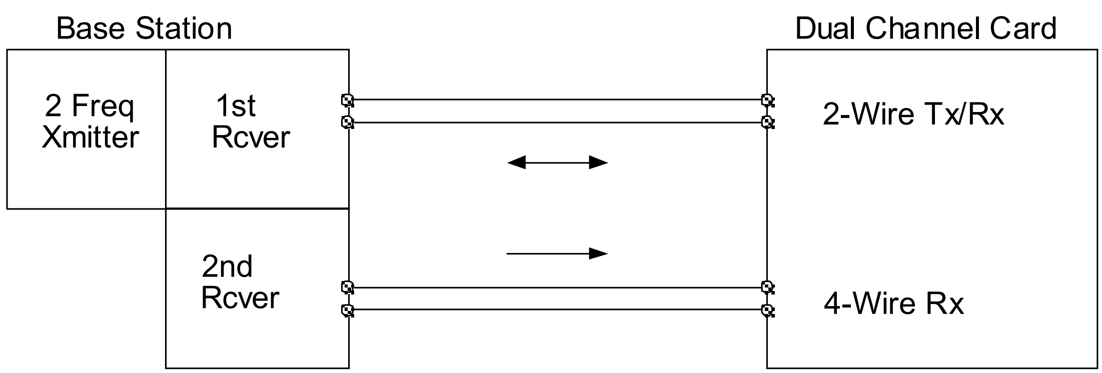
There are two methods of installing a T2-2R base station in a Model 4048/4020 system: single system channel and dual system channels.

Single System Channel

This method allocates one system channel to the T2-2R base station. The advantage of this method is that it uses only one system channel and is easy to install. The disadvantage is that both receivers are summed, giving only one mute button, one channel volume control, and one call indicator.

To program the channel as a T2R2 channel, include a channel select button, an F1/F2 button (sent at Xmit) for transmit frequency selection, and (optionally) an R2 On/Off button for second receiver muting at the base station. To enable Instant Select, use an F1-select and an F2-select button instead of the conventional select button.

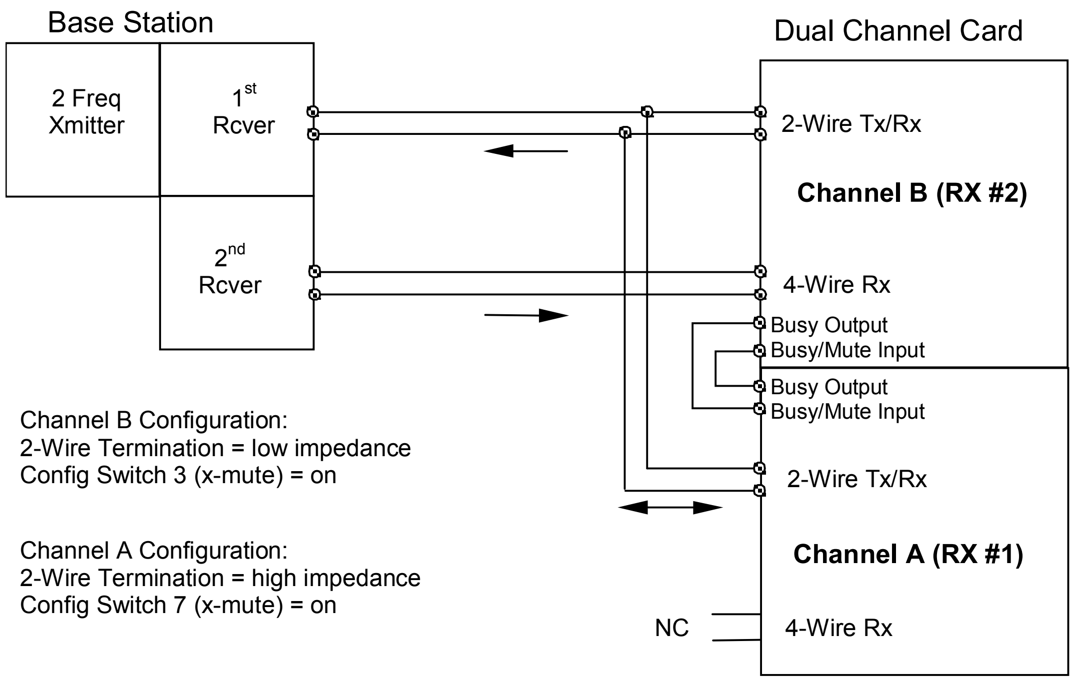
Figure 42: One System Channel



Dual System Channels

This method allocates two system channels to the T2-2R base station. The advantage of this method is that each receiver is given its own channel and thus individual mutes, channel volumes, and call indicators. The disadvantage is that it requires two system channels and is more complex to install.

Figure 43: Two System Channels



> **Note** In the above configuration the 2-wire Rx should be turned down (CCW), so that RX #1 is not heard.

Program Channels A and B as custom channels. When asked for the custom tone or current, specify the desired value. Generally, Channel A will have an “F1” tone (1950 Hz) or current (+5 mA), and Channel B will have an “F2” tone (1850 Hz) or current (+12.5 mA) upon transmit only.

Spectracom NETCLOCK Set Up

The Spectracom NETCLOCK may be used as an input to the Model 4048 and Model 4020 for the time-of-day clock. The NETCLOCK connects through the Clock Service Port. The Clock Service Port connections are described in *Wiring to the Service Ports* on page 102. The NETCLOCK supported baud rates are described in *Configuring the System Traffic Card (STC)* on page 41.

The NETCLOCK must be configured for Format 1 operation.

The Model 4048 and Model 4020 will automatically detect the NETCLOCK.

Console ANI Programming

In this chapter:

Signaling

When ANI signaling is used, the ANI is transmitted from a mobile or portable radio and received by the consoles. The more common signaling methods in use include the DTMF, 5/6 Tone, GE-STAR, and MDC-1200 formats. The ANI signaling is decoded by the DCC, forwarded to the CIC, and finally sent to the console. The output of the decoded information is different for DTMF than for the other methods. DTMF is decoded and sent to the console on a digit-by-digit basis. GE-STAR, 5/6 Tone, and MDC are decoded, stored, and only sent to the console if the decoded string matches certain decoding criteria (such as timing or check bits). For DTMF, no preceding digit is sent. Other types preceding the “F” character are sent to the console before the ANI string. In the case of emergency IDs, an “E” character precedes the ANI string, indicating an emergency condition. ANI decoding is performed by software selection for a Universal or Tone/Local DCC. Refer to *Tone/Local Software Configuration* on page 54 for a description of ANI configuration for the Universal and Tone/Local DCC.

DTMF ANI codes may be from 1 to 6 digits in length. 5/6 Tone ANI codes may be either five or six digits in length, plus one preceding character. MDC ANI codes are always four digits in length, plus one preceding character.

Modes

There are two general modes involving ANI: Reverse Selective Calling (RSC) and PTT ID ANI.

RSC is used to allow field radios to selectively call an individual console operator. Utility customers most often use this. In this mode, the signaling sent from the field radio starts with a destination address (console operator address) and ends with a source address (ANI). In actual operation, the console operator address attempts to match the destination address digits with its CPSW-programmed primary or secondary address. When a match occurs (within the CPSW-programmed time period), the console beeps its operator, unmutes the channel, and transfers the following ANI digits into the display buffer so that the operator may see who is calling. The console allows signaling to be received on all channels simultaneously and may queue up several decodes per channel. The ANI display buffer holds up to 24 ANIs (from all channels) with the oldest being displayed first. By pressing the ANI Review Key, the ANI being displayed is removed from the queue and the next oldest is displayed. When ANI information no longer appears in the display buffer, the time is returned to the display. For a detailed description of operation, refer to the appropriate operator's manual listed in Table 1.

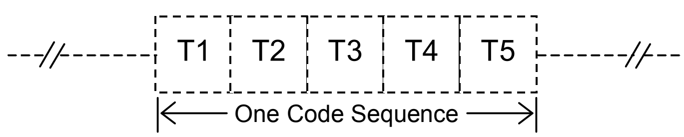
Programming

In addition to defining the ANI type on the DCC, the console requires programming with CPSW. Refer to *ANI Decode / Display* on page 213 for ANI programming directions.

5/6 Tone ANI Decoding

There are four versions of the Dual 5/6 Tone ANI, depending on the tone set that you wish to decode: ZVEI, CCIR, EEA, OR EIA. See Figure 44 and Table 89 for tone formats and timing requirements.

Figure 44: Five-Tone Sequence



Selection of Tone Set

Within the ZVEI Tone System, there are four possible tone sets.

The EEA, EIA, and CCIR tone systems have only one possible tone set. Only digits 0-9 are displayed. A minimum of five tones is required before the system will display. See Table 89 for a list of tone frequencies used for the various tone sets.

Table 89: Tone Set Frequencies

TONE	ZVEI1 Standard ZVEI	ZVEI2 French DDZVEI FZVEI MAB804 MDH768	DZVEI Modified DZVEI MZVEI MAB283 MDH736	PZVEI PZVEI	CCIR CCIR MCCIR MAB137/440 MDH712/737	EEA MAB441 MDH745	EIA EIA
1	1060	1060	970	1060	1124	1124 Hz	741
2	1160	1160	1060	1160	1197	1197	882
3	1270	1270	1160	1270	1275	1275	1023
4	1400	1400	1270	1400	1358	1358	1164
5	1530	1530	1400	1530	1446	1446	1305
6	1670	1670	1530	1670	1540	1540	1446
7	1830	1830	1670	1830	1640	1640	1587
8	2000	2000	1830	2000	1747	1747	1728
9	2200	2200	2000	2200	1860	1860	1869
0	2400	2400	2200	2400	1981	1981	600
Repeat	2600	970	2400	2600	2110	2110	459
Duration	70 ms	70 ms	70 ms	70 ms	70/100 ms*	40 ms	33 ms
Max Interdigit Pause	25 ms	25 ms	25 ms	25 ms	25 ms	15 ms	7 ms
Minimum Code Gap	140 ms	140 ms	140 ms	140 ms	290 ms	100 ms	66 ms

* CCIR70 is 70 ms and CCIR100 is 100 ms.

MDC-1200 ANI Decoding

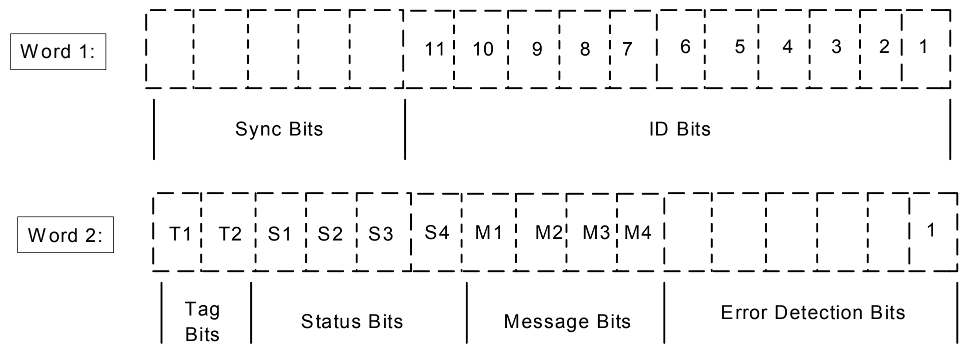
Operation of the MDC ANI display is the same as described in the *Series 4000 Communications Control System Operation* (Part # 025-9535). The ANI decoder supports extended PTT IDs (Characters A, B, C, D, E, and F), as well as the normal numeric-only IDs (0000-9999).

GE-Star ANI Decoding

The signaling method used in GE-STAR is phase-shift-keying (PSK). This method uses 400 bps data with a 1600 Hz subcarrier, resulting in 90-degree phase shifts that indicate a change in bit status (either 0 to 1 or 1 to 0).

The format of the data is shown in Figure 45.

Figure 45: GE-STAR Data Format



Typically, the GE-STAR information is transmitted in a short burst of three repeated messages of the above format, proceeded by a 16-bit preamble of alternating 1's and 0's. The repetitions and error detection on each message provide immunity to falsing and high decoding reliability.

Output Format

The GE-STAR ANI output will display on a console as a sequence of characters and numbers that represent the decoded GE-STAR ID. For non-emergency ANI numbers, the display shows the four-digit ID number (0000-9999), followed by a status or message character if present in the transmission. For emergency ANI numbers, the console sounds an alarm and displays the four digit number (0000-9999), followed by a status or message character if present in the transmission. The possible outputs are shown in the following tables:

11-Bit and Extended ID Decoding

Output	Description
xxxxS	Status Message (where S=0-7)
xxxxB	Request to Talk ID
xxxxC	Stuck mic ID
xxxx	PTT ID
*xxxx	Emergency ID
*xxxxD	Man Down ID
xxxx = decoded GE-STAR ID 0000-2047 w/11-bit decoding 0000-4095 w/12-bit decoding 0000-8191 w/13-bit decoding 0000-9999 w/14-bit decoding	

Mobile/Portable Decoding

Output	Description
xxxx*(S)	Mobile Decode (S = Status, if any)
xxxx#(S)	Portable Decode (S = Status, if any)

Multi-System Decoding

Output	Description
xxxx(S)	Decoded for system 0, 1, 2, or 3 only

(S = Status, if any)

Error Indications

If the GE-STAR ANI decoder receives and decodes an ANI that is out of the 0000-9999 range, it will display “####” on the console to indicate the error. If emergency or man-down status is included with the ID that is out of range, the decoder will send the emergency state to the console via a “*####” ID display.

IntegratorRD Workstation Installation

In this chapter:

Overview

The IntegratorRD Workstation utilizes the Integrator Radio Dispatch Software and provides a flexible graphical interface for integrating radio control, paging, alarm monitoring, and other functions into one easy-to-use console position.

The IntegratorRD Workstation supports up to 20 channels if used in conjunction with the Model 4020 Common Control Equipment (CCE), or 48 channels if used with the Model 4048 CCE.

The IntegratorRD Workstation provides a compact, uncluttered means of displaying and controlling system status and activity. Touch-screen, mouse (or trackball), and keyboard interfaces allow for maximum flexibility of operation. The display presents the status clearly and may be configured to display only the needed information.

Note In systems where there are both IntegratorRD video displays and button-based consoles, the video position must be installed with the first CIC.

Feature Summary (with Model 4020/4048 Common Controller)

- Supports up to 48 channels – combined radio and telephone (20 channels – M4020).
- Up to 16 operator positions – allows the combining of conventional button consoles (desktop or rack mounted) with IntegratorRD positions (6 positions, M4020).

- Intuitive display – provides compact, clear, and concise identification of control information.
- Large easy-to-use screen buttons – screen buttons “respond” to touch or mouse activation in 3-D fashion; the buttons appear to depress when touched. Color and the 3-D effects indicate function status.
- Screen organization allows control of up to 36 channels at all times, even when performing auxiliary I/O, paging, or setup functions. Menu functions do not restrict channel operation, such as transmit, select, frequency select, and mute.
- Supports touch-screen and/or mouse operation with panel keypad for encoder entry and special functions. In addition to the standard Audio Panel keypad, the optional Model 4115 Expansion Panels can be included for systems with substantial auxiliary I/O or Instant Call paging requirements.
- Compatible with standard, serial bus, touch-screen monitors.
- Flexible audio panel options allow for remote or rack mounted speakers, encoder and function keypad, speaker volume control, large 24-hour time clock, and VU meter.
- Advanced, one-touch, channel group operation for multiple selects, transmits, and patches. Group definition performed by operator.
- Patching capacity of up to 24 simultaneous, cross-channel patches.
- One-touch paging operation, using named buttons instead of pager codes. Hierarchical menu allows pages to be logically organized for quick access.
- ANI (with alias translation). Translates the caller’s ID into a configurable name and displays it on the receiving channel.
- Near “turn-key” operation. No complicated utilities requiring special skills. Simply define the common control setup using the included Radio Dispatch Programming Software.

Hardware Installation

This section provides instructions for the installation of the IntegratorRD workstation hardware, including cabling.

Connecting the Model 4217B Audio Panel

The following table lists physical and power requirements for the M4217B audio panel.

Audio Panel	Specification
Panel/Chassis	19 in W × 5.25 in H × 5 in D
Weight	10 lb.
Component	**Specification**
M4217B audio panel	Up to 80 watts
PC, Monitor and audio panel	600 watts (approximate)

STOP **Warning!** The PC is delivered configured for 120 V operation. If 220V operation is required, the voltage selection switch on the back of the PC must be changed and the appropriate AC power cable installed before applying power to the PC.

Table 90: Cable part numbers for Model 4217B

Name	Part Number
Data to Audio Panel Cable	709-7921 (newer) 709-7550 (older)
Data to CCE Cable	709-7920 (newer) 709-7551 (older)
Voice-to-CCE	709-7000

The most common dual RS-422 serial PCI card is part number 802-0322. This is the older card, not compatible with Windows 7, and it uses the older cables listed in Table 90. There are three serial interfaces that can be used including the dual RS-422 serial PCI card, part number 950-1011, the dual RS-422 serial PCI-E card, part number 950-1253, and the dual RS-422 Serial USB adapter, part number 950-1254 which are all Windows 7 compatible, and use the newer cables listed in Table 90.

Tip The newer cards have a label identifying which cables to use. The older card has no label.

♦ Connecting the Model 4217B

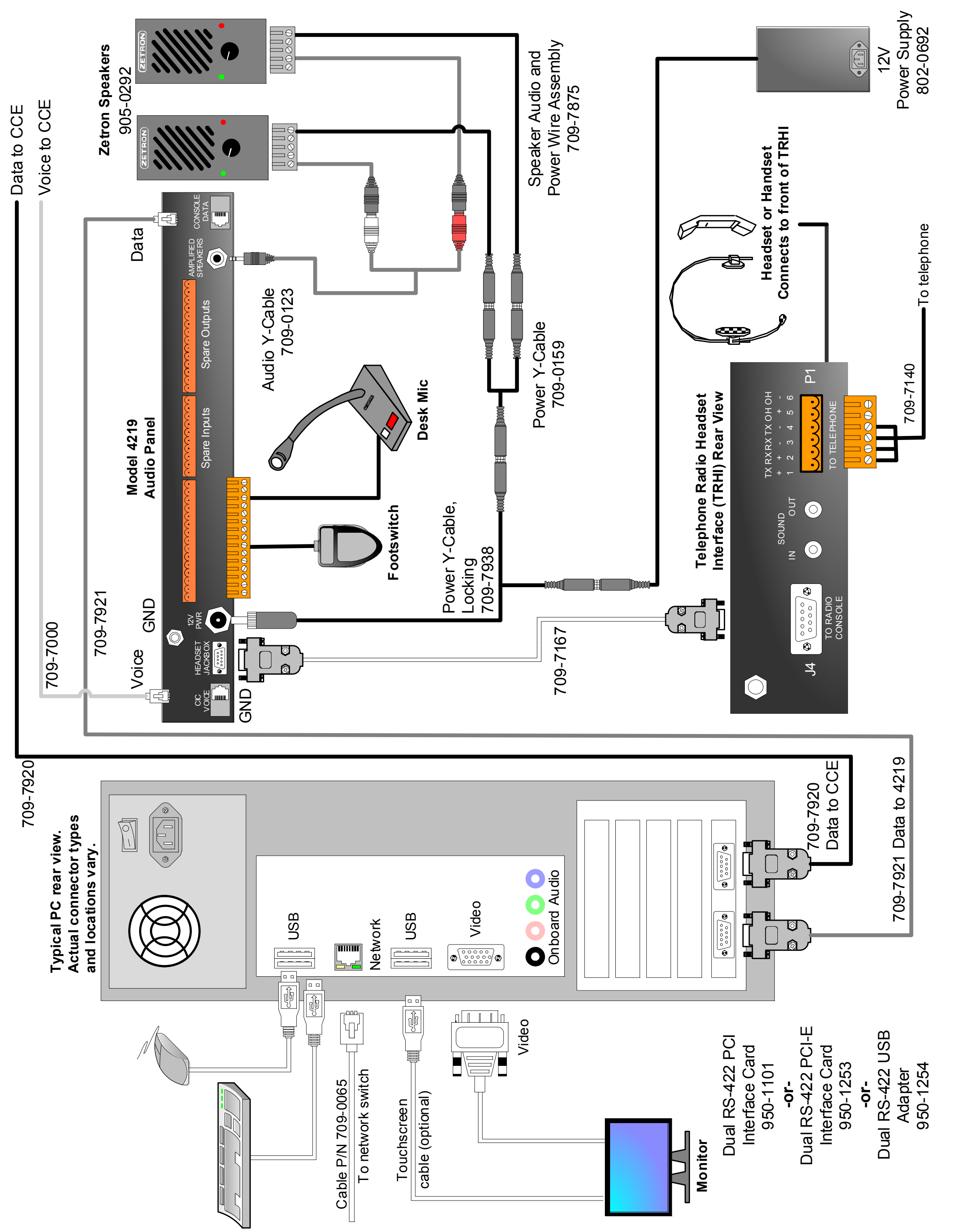
1. Connect the 6-conductor modular telephone connector of the Audio Panel cable to the jack marked DATA on the back of the Model 4217B Audio Panel. The 6-conductor modular telephone cable is plugged into the jack marked VOICE on the Model 4217B Audio Panel. This cable is then routed to the console VOICE connection in the Common Control cabinet.
2. Attach the 9-conductor end of the Model 4217B Audio Panel cable to the PC connector marked CON. See Figure 46.

3. Attach the 9-conductor end of the Model 4217B CCE cable to the PC connector marked CCE. The 6-conductor modular telephone connector on this cable is then routed to the console DATA connection in the Common Control cabinet.
4. (Touch-screen) If an installer-supplied touch screen monitor is used, connect the 9-connector touch screen cable marked To Touch screen to the touch screen monitor. Connect the opposite end, marked To Touch screen Controller to the COM1 or SERIAL1 connector on the back of the PC.
5. Connect the 15-pin CRT video cable to the video connector on the PC.
6. Connect the mouse or trackball cable to the PC.
7. Connect the PC keyboard to the PC.
8. Insert the AC power cables for the PC CPU, CRT, and Model 4217B Audio Panel.

Figure 46 shows the cabling for an IntegratorRD workstation. The port locations that are shown are for example only; they may not match your PC's configuration.

Note To add a Zetron Desktop Microphone, see *Zetron Desktop Microphone* on page 220

Figure 46: IntegratorRD Workstation Cabling



Connecting Model 4115 Expansion Panels (Optional)

Each Model 4115 Expansion Panel is supplied with two “loop” cables. Connect one cable from the LOOP OUT connection on the back of the Model 4217B Audio Panel to the LOOP IN connection on the back of the Model 4115. Repeat this for up to two more Model 4115 panels. The LOOP OUT connection on the last Model 4115 should be connected to the LOOP IN on the Model 4217B Audio Panel.

Each of the Model 4115 panels is addressed differently, using the jumpers accessible through the back cover.

Connecting the Model 4219 Console Audio Interface

This section covers the connections made to install a Model 4219 Console Audio Interface at an IntegratorRD console position. Figure 47 provides a wiring diagram for a typical console position that uses a Model 4219.

Table 91: Cable part numbers for the Model 4219

Name	Part Number
Data to Audio Panel Cable	709-7921 (newer) 709-7550 (older)
Data to CCE Cable	709-7920 (newer) 709-7551 (older)
Voice-to-CCE	709-7000
Power Y-cable, locking	709-7938
Power Y-cable	709-0159
Audio Y-cable	709-0123

The most common dual RS-422 serial PCI card is part number 802-0322. This is the older card, not compatible with Windows 7, and it uses the older cables listed in Table 91. There are three serial interfaces that can be used including the dual RS-422 serial PCI card, part number 950-1011, the dual RS-422 serial PCI-E card, part number 950-1253, and the dual RS-422 Serial USB adapter, part number 950-1254 which are all Windows 7 compatible, and use the newer cables listed in Table 91.

Tip The newer card has a label identifying which cables to use. The older card has no label.

♦ Connecting the Model 4219

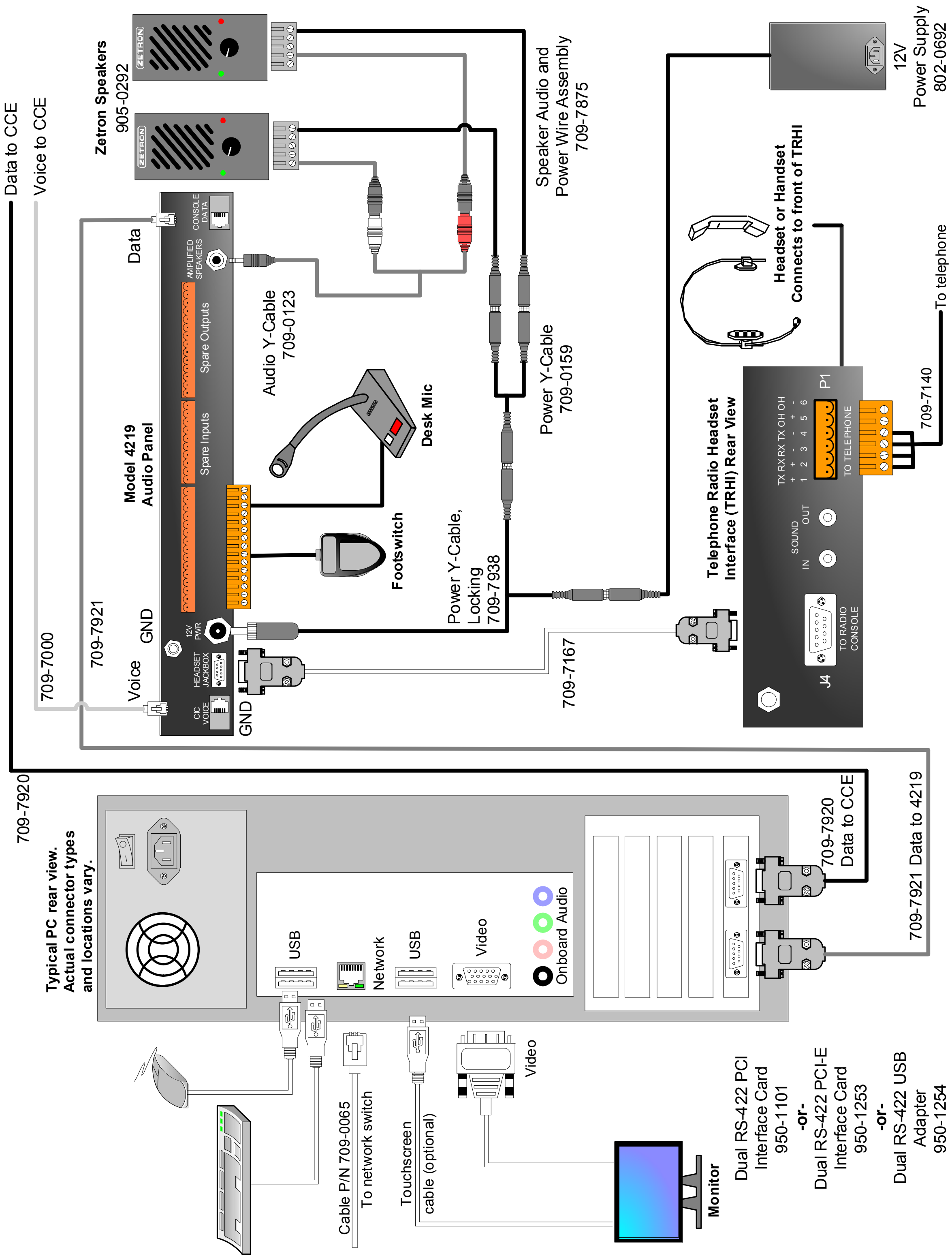
1. Locate the Data-to-Audio Panel cable. Connect the 6-pin modular plug end to the jack marked DATA on the rear panel of the Model 4219.
2. Connect the 9-pin D-connector on the other end of this cable to the socket marked CON on the dual RS-422 card in the console position PC.

3. Locate the Data-to-CCE cable. Connect the 9-pin D-connector end of the cable to the socket marked CCE on the dual RS-422 card in the console position PC.
4. Route the Data-to-CCE cable to the Common Control Equipment cabinet. Connect the 6-pin modular plug end of cable to the console DATA connection there.
5. Locate the Voice-to-CCE cable. Connect one end to the connector on the rear panel of the Model 4219 labeled VOICE. Route the other end to the Common Control Equipment cabinet and plug it into the console VOICE connection there.
6. Locate the Audio Y-cable (709-0123) and plug it into the jack on the rear of the Model 4219 marked AMPLIFIED SPEAKERS. Connect the other end to the left and right amplified speakers as appropriate.
7. Locate the two Power Y-cables (709-0159 and 709-7938). One of the plugs has a threaded locking ring. Insert that plug into the connector on the rear of the Model 4219 labeled 12V PWR and turn the locking ring tight.
8. Install the strain relief provided with the Model 4219 to prevent the cable from becoming disconnected. See *Model 4219 Power Connection Strain Relief* on page 158 for instructions on how to do this.
9. Plug the second Power Y-cable into either one of the sockets on the Y-cable connected to the Model 4219. Plug the 12V power supply that came with the Model 4219 into the remaining socket on that Y-cable.
10. Connect the two free sockets on the second Power Y-cable to the power leads going to the external amplified speakers.
11. (Touch-screen) If an installer-supplied touch screen monitor is used, connect the touch screen cable connector marked **To Touch screen** to the touch screen monitor. Connect the opposite end, marked **To Touch screen Controller** to one of the USB connectors on the back of the PC.
12. Connect the 15-pin CRT video cable to the video connector on the PC.
13. Connect the mouse or trackball cable to the PC.
14. Connect the PC keyboard to the PC.
15. Connect the AC power cords for the PC and the monitor.

Figure 47 shows the cabling for an IntegratorRD workstation. The PC port locations that are shown are for example only; they may not match your PC's configuration.

Note To add a Zetron Desktop Microphone, see *Zetron Desktop Microphone* on page 220

Figure 47: Desktop PC Console Position Wiring Diagram



Operator Position Installation

Overview

The IntegratorRD Workstation contains the following components:

- Model 4217B Audio Panel with power supply (one per operating position) — or — Model 4219 Console Audio Interface with power supply (one per operating position)
- One PC per operating position
- Dual RS-422 Serial I/O card for installation in PC (one per operating position)
- Integrator Radio Dispatch Software and associated license file (one per operating position)
- User/installer-supplied computer monitor (one per operating position)
- Cables to connect the PC, Audio Panel, and CCE

This section describes the installation of the operator position for the following scenarios:

1. *IntegratorRD Workstation purchased as a complete system* – The IntegratorRD Workstation (P/N 905-0178) is delivered fully configured with Integrator software and RS-422 Serial I/O card installed and tested. The on-site installation process is limited to connecting the various components of the IntegratorRD Workstation together, using the Zetron-provided cables. Refer to *Hardware Installation* on page 238 for the installation instructions.
2. *Model 4217B Audio Panel (or Model 4219 Console Audio Interface) and IntegratorRD software purchased separately* – For this situation, it is necessary to interface the M4217B Audio Panel (or Model 4219) to the user/installer-supplied PC and monitor by means of the Zetron-provided cables. The RS-422 Serial I/O card bundled with the M4217B Audio Panel (or Model 4219) must be installed in the PC and the Integrator software loaded. For the installation instructions, refer to *PC Configuration* on page 246, *Hardware Installation* on page 238, and *Software Installation* on page 251.
3. *IntegratorRD Software Upgrade to Existing DOS-based M4217 Video Console* – In this case, it is necessary to install IntegratorRD on a Windows PC that is already connected to the M4217B Audio Panel. See *Software Installation* on page 251

For scenarios II or III, the system integrator, installer, or end user must provide new or upgraded computers to host the IntegratorRD application. Zetron recommends that these computers meet or exceed the following specifications:

Table 92: Recommended Computer Specifications

Attribute	Requirement
CPU	Intel Pentium IV or equivalent x86-class CPU, 2 GHz Intel Dual Core or equivalent x86-class CPU, 1.7 GHz
Hard Disk	Windows XP and Windows 7: 80 GB Windows 10 PRO: 500 GB
Memory	Windows XP: 1 GB or more Windows 7: 3 GB or more Windows 10 PRO: 4 GB or more
Display	1024x768 resolution, 17” or 19”
Serial I/O	Two RS422 serial ports (other applications may require additional ports)
DVD-ROM	Required during installation
Mouse	Two- or three-button mouse, or touchscreen
Keyboard	Required
PC BIOS	Supports automatic restart of PC following AC power interruption
Operating System	Windows XP Pro SP3 (32-bit) or Windows 7 Professional SP1 (32-bit or 64-bit) Windows 10 PRO (64 bit) Version 1809 or later

PC Configuration

Systems delivered with the PC included are fully configured, IntegratorRD Software is installed, and the system has been tested. No further PC configuration is necessary for console operation.

If you have purchased a PC separately, the following PC configuration is required.

Dual Channel Serial Card Installation

The dual channel RS-422 serial interface card supplied with the Model 4217B Audio Panel must be installed and configured. In addition, the Windows Control Panel must be used to configure the PC communication port (COM3 and COM4, or COM5 and COM6). Finally, the port settings for the Integrator Radio Dispatch Software must be set to match the PC settings.

Refer to the Audio Panel instructions, (P/N 011-0411) for details on setting up and installing the dual channel serial interface card. Steps for configuring the PC communications ports and installing and setting up the IntegratorRD software, are described in *Software Installation* on page 251.

License File Installation

The license file “enables” the IntegratorRD software and must be installed for the software to operate. For more detailed information about software licenses, refer to *Obtaining a Zetron Software License* (P/N 011-0622). If you have additional questions, contact Zetron Technical Support for assistance.

Display Resolution Setting

The preferred video display resolution is 1024 x 768, although 800 x 600 is acceptable. However, at 800 x 600 the console window fills the entire monitor screen making it more difficult to access other applications. Additionally, the palette must be set to 65536 colors (“16-bit” color) or higher.

To set the display resolution, open the Windows Display control panel, and then click on the **Settings** tab. Adjust the slide control labeled **Desktop Area** to a resolution of 1024 x 768 pixels (or your desired resolution). Select **65536 colors** from the drop down list labeled **Color Palette**. When finished, click **OK**. Windows may suggest that you restart the computer.

Touch Screen Set Up

A touch screen monitor or flat panel compatible with Windows may be used with the Integrator Radio Dispatch software. When properly installed, touches on the monitor or panel are translated into mouse actions and received by the Radio Dispatch Software. In general, any touch-screen monitor that can be integrated with Windows to translate screen “touches” into mouse events is compatible with the Integrator Radio Dispatch software.

Network Set Up

Because networking is an inherent feature of Windows, it may be useful to configure the PCs used by the console positions into a private network. This can help considerably in the management of the console configurations. Connecting an IntegratorRD workstation to any public network is not recommended.

Windows XP Settings

Windows XP has some features that should be disabled for using IntegratorRD. The following steps assume you are using Windows XP Professional with Service Pack 3.

♦ To disable Fast User Switching

1. Click the **Windows Start Button**, **Control Panel**, **Performance Maintenance**, and **Administrative Tools**.
2. Double click **Services**, **Fast User Switching**. The **Properties** window opens.
3. At **Service Status** select **Stop**.
4. Set **Startup Type** to **Disabled**.
5. Click **Apply**, then **OK**.

6. Close out all windows (**Services** and **Administrative Tools**).

♦ **To disable security settings**

1. Start **Security Center** by double clicking on the shield icon in the lower right hand corner.
2. Click **Change the way Security Center alerts me**.
3. Disable all the **Alert Settings** and click **OK**.
4. Select **Automatic Updates** located at the bottom of the window.
5. Select **Turn off Automatic Updates** and click **OK**.
6. Select **Windows Firewall** at bottom of window.
7. Select the **OFF (not Recommended)** option.
8. Click **OK** to exit **Windows Firewall** option.
9. Exit **Security Center**.

Preparing the Console Computer

PC Configuration

PC's supplied by Zetron come pre-configured and pre-loaded with the system software. Customers providing their own PC are advised to follow these setup instructions before installing and operating the Zetron System software.

Windows 7 Settings

Windows 7 has several settings that should be adjusted before using IntegratorRD (or the optional Radio System Management program). The following steps assume you are using Windows 7 Professional.

WINDOWS 7 CONFIGURATION PROCEDURE:

♦ **Turn off UAC with Windows 7**

1. Click **Start, Control Panel, User Accounts, User Accounts**.
2. Click **Change User Account Control settings**.
3. Slide bar down to **Never Notify**.
4. Click **OK**. Windows must restart for settings to take effect.

♦ **Turn off the Windows 7 Firewall**

1. Click **Start, Control Panel, System and Security, Windows Firewall**.

1. In left hand column, select **Turn Windows Firewall on or off**.

2. Select **Turn off Windows Firewall (not recommended)** for each shown setting. (**Domain** if connected to domain, **Home or work** (Private), and **Public** network setting).
3. Incoming connections will still show as blocked.

♦ Allow Incoming Connections through Firewall

1. In left hand column, click **Advanced settings**.
2. Select **Windows Firewall Properties**.
3. Select **Domain** tab if connected to a domain (if not connected to a domain this tab will not show):
   a. Change **Firewall state** to **On.**
   b. Change **Inbound connections** to **Allow on the drop-down** and click **Apply.**
   c. Change **Firewall state** to **Off** and click **Apply.**
4. Select **Private Profile** tab:
   a. Change **Firewall state** to **On**
   b. Change **Inbound connections** to **Allow** on the drop-down and click **Apply**
   c. Change **Firewall state** to **Off** and click **Apply**
5. Select **Public Profile** tab:
   a. Change **Firewall state** to **On.**
   b. Change **Inbound connections** to **Allow** on the drop-down and click **Apply.**
   c. Change **Firewall state** to **Off** and click **Apply.**
6. Close **Windows Firewall with Advanced Security**.
7. Verify that the Firewall is off for all settings and **Incoming Connections** is set to **Allow all connections that do not have an exception to block the connection**.

♦ Turn off Aero Shake

1. Click **Start**.
2. In the Start menu's search field, type
3. `gpedit.msc` then press **Enter**.
4. In the **Group Policy Editor**, navigate to **User Configuration, Administrative Templates, Desktop**, and locate the option **Turn off Aero Shake windows minimizing mouse gesture**.
5. In that option, right-click on the entry, select **edit**, and double-click on the entry.
6. Select the **Disabled** option and click **Apply** to see the changes.

¨ Turn off Aero Snap

1. Click **Start, Control Panel, Ease of Access Center**.
2. Select **Change how your mouse works** or **Make the mouse easier to use option**.
3. Under **Make it easier to manage windows**, enable **Prevent Windows from being automatically arranged when moved to the edge of the screen with the mouse**.
4. Click **OK** or **Apply** to make the change effective.

♦ Disable Action Center Alerts

1. Click **Start, Control Panel, All Control Panel Items, Notification Area Icons, System Icons**.
2. Select **Turn system icons on or off**.
3. In the **Behaviors** pick list from **Action Center**, select **Off**.
4. Click **OK** for settings to take effect.

¨ Turn off System Protection

1. Click **Start, Control Panel, System and Security, System**.
2. Click **System Protection**.
3. Select **Hard drive to turn off System Protection**.
4. Press **Configure**.
5. Select option **Turn off system protection**.
6. Click **Apply**.
7. Windows will ask, "*Are you sure you want to turn off system protection on this drive?"*
   Click **Yes**.
8. Click **OK** to exit the Configure window.

♦ Turn off Windows Update

1. Click **Start, Control Panel, System and Security, Windows Update**.
2. Click **Change Settings** in the left hand column.
3. Under **Important updates**, select **Never check for updates (not recommended).**
4. Under **Recommended updates**, enable **Give me recommended updates the same way I receive important updates**.
5. Under **Who can install updates**, enable **Allow users to install updates on this computer**.
6. Click **OK** and close the Control Panel.

♦ Set Power Options

1. Click **Start, Control Panel, System and Security, Power Options**.
2. Select **Balanced** and click **Change Plan Settings**.
3. Set **Turn off the display** to **Never**.
4. Set **Put computer to sleep** to **Never then click Save Changes**.
5. Click **Change Plan Settings, Change advanced power settings**.
6. Set **Additional Settings, Require a password on wakeup** to **No**.
7. Set **Hard Disk, Turn off hard disk after** to **Never**.
8. Set **Wireless Adapter Setting, Power Saving Mode** to **Maximum Performance**.
9. Set **Sleep, Sleep after** to **Never**.
10. Set **Allow hybrid sleep** to **Off**.

11. Set **Hibernate after** to **Never**.
12. Set **USB settings, USB selective suspend setting** to **Disabled**.
13. Set **Power Button and lid, Power button action** to **Shut down**.
14. Set **Start menu power button** to **Shut down**.
15. Set **PCI Express, Link State Power Management** to **Off**.
16. Set **Processor power management, System cooling policy** to **Active**.
17. Set **Display, Turn off after** to **Never**.
18. Set **Multimedia settings, When sharing media to Prevent idling** to **sleep**.
19. Click **OK** and close the window.

♦ Setup Display Settings

1. Click **Start, Control Panel, Appearance and Personalization, Personalization.**
2. Select **Screen Saver** then **None** and **OK**.
3. Click **Start, Control Panel, Appearance and Personalization, Display.**
4. Select **Adjust Resolution**. For each display, Set **Resolution:** to **1024x768** for <19", **1280x1024** for >19", and **1600x900** for widescreen. Set **Colors:** to **Highest (32 bit)**.

Software Installation

Systems delivered with a PC, the Integrator Radio Dispatch Software, and the Integrator Radio Dispatch Programming Software (RDPS) are fully installed along with the console configuration file based on information supplied prior to delivery. No further installation is required. Installation discs are provided to allow the software to be reinstalled if necessary. Programming software for IntegratorRD versions prior to 5.2 can be installed on other PCs for off-line configuration purposes using the "Demo" format during installation. IntegratorRD 5.2 and later versions require a separate disc available by request from Zetron Sales.

If the system was purchased as individual components, the IntegratorRD disc will install the RD display and RDPS software on the PC for the dispatch console, and the IntegratorRD operational settings must be configured.

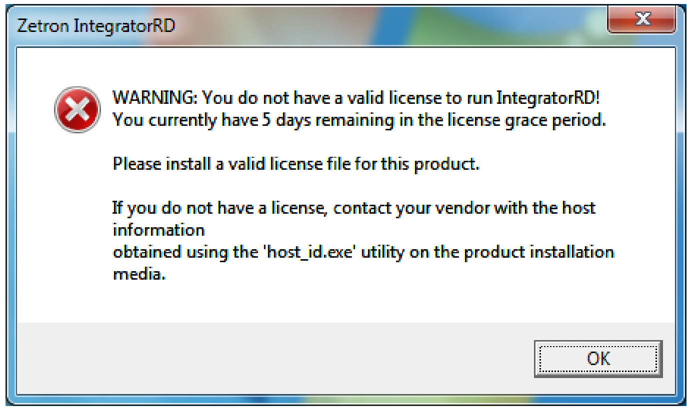
Installation Notes

Note There are significant changes to be aware of before installing Integrator 5.2 and later on a new customer supplied PC. The same applies when upgrading to 5.2 and later on an existing PC. Customers are strongly encouraged to discuss these changes with Sales or Technical Support before ordering.

- RD 5.2 and later requires a DVD drive due to the size of the application. It may be installed on Windows 7 Professional as a 32-bit or 64-bit application, and on Windows 10 as a 64-bit application. For PCs, using Windows 10, refer to *Windows 10 Setup* procedure (P/N 011-0955). There are extensive adjustments that the customer should arrange with the end-users IT personnel to adjust various Windows 7 parameters on PCs not supplied by Zetron.
- Existing PCs with WinXP Pro must have Service Pack 3 installed before upgrading.
- RD 5.2 and later requires .Net 3.5 which is included with Win7 and is available on the Installation DVD if required for an XP based upgrade.
- Regardless of Operating System, Administrator access is required for installation of IntegratorRD application.
- A “Demo” version of RD is available separately by contacting Sales. The Installation DVD does not have a demonstration function.
- Text Messaging is not available in RD 5.2 and later.
- The location of RD folders and files varies depending on the Operating system and whether it is a 32-bit or 64-bit application.
- Licensing parameters and registry data have changed as well. The Network Interface MAC Address will be used to generate original and replacement license files.
- Parameter files controlling the Integrator video display from versions prior to 5.0 are not usable with 5.2 and later and the screen arrangements must be recreated and the displays saved in 5.2 and later.
- Earlier versions of IntegratorRD must be uninstalled using Windows Uninstaller. IntegratorRD 5.2 and later will detect an older version and stop installing.
- Zetron does not support systems with mixed versions of IntegratorRD. All positions must run the same version. Upgrading to 5.2 and later may require audio panel and/or card firmware upgrades to operate efficiently and to obtain technical support.

Licensing

The application requires a valid software license file in order to run. Every time the application is started, it checks for the presence of a valid license information file. If it finds a valid license file, the application will continue with the start up and will run normally. If IntegratorRD does not find a valid license file in the correct directory, it displays a message similar to the following:



For more detailed information about software licenses, refer to *Obtaining a Zetron Software License* (P/N 011-0622) or contact Zetron Technical Support.

Installing Integrator Radio Dispatch Programming Software

The following general steps are for installing the Integrator software components when the Zetron system is delivered without a PC, or if it is necessary to reinstall the programs.

Note The following instructions require a Windows account with Administrator level access.

IntegratorRD is provided on a DVD labeled with Zetron P/N 395-0051. Both the Radio Dispatch and the applications are installed in this procedure.

♦ To install IntegratorRD

1. Close all running applications.
2. With Windows running and the Administrator user logged in, insert the IntegratorRD DVD into the DVD drive of the PC.
3. The setup program should start automatically and display the **Integrator Radio Dispatch** installer. If the setup program does not start automatically, go to the Windows **Start** menu and select **Run**. In the **Open** field, type **d:autorun**, where **d** is the letter designating your DVD drive.

Note The installation launcher requires Microsoft .NET Framework 3.5. If your computer does not have this version of .NET, the launcher will detect this and start the installation process for .NET.

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4. There is a selection of software available for installation, including applications and .NET Frameworks. Click an installation type (either “typical” or “full”) to see a list of software to be installed. Software is listed in the order it should be installed.

5. To install specific software, click the item to select it and click the blue installation button. Repeat as needed for each item you need to install.

Caution! For PCs using Windows 7 or earlier, IntegratorRD should either use the same version of UMS that is already installed with Integrator 9-1-1, or it should not use UMS at all (disable UMS for RD) for versions prior to 5.2.

If the version of UMS used by Integrator 9-1-1 is earlier than 5.6.2, then it cannot be used for RD as it did not support RD until version 5.6.2. In this case, UMS must be disabled for RD for versions prior to 5.2.

The option to enable UMS for IntegratorRD 5.2 and later appears while using the IntegratorRD installation wizard. UMS is disabled by default.

UMS is not supported with Windows 10.

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6. If you plan to complete an "Integrator RD Full Install" including UMS Client and/or UMS Server (for permission assignments and configuration file distribution over a local network), refer to the *User Management System Version 5.7 Product Manual* (P/N 025-9516) prior to starting the IntegratorRD Installation. There are a number of dependencies and naming conventions that must be considered before going on to load the RD application itself. This option is available only for PCs running Windows 7, or earlier.

Chinese/Arabic Language Support

IntegratorRD has the option to display its UI in Chinese or Arabic. For IntegratorRD to display correctly, you must install the language support for Windows XP or Windows 7.

♦ To install language support from the Windows XP installation Disc

1. Click the **Start** button and then, select **Control Panel**.
2. Select the **Regional and Language Options**.
3. Select the **Languages** tab.
4. Check mark **Install Files for East Asian Languages**.
5. Click **Apply**.
6. It will ask for Windows installation Disc. Follow the instructions.
7. When Windows is done with the language installation, it will ask to restart the computer. Click **Yes**. After the computer has been restarted, it is ready for Chinese or Arabic display.

♦ To install Chinese (Simplified) in Windows 7

1. Click **Start Orb, Control Panel, Appearance and Personalization, Fonts**.
2. Click **Font settings** and uncheck **Hide fonts based on language settings**.

3. Click **OK**.
4. Click on **Control Panel Home** on left hand column.
5. Click **Clock, Language, and Region** menu, **Region and Language**, **Keyboards and Languages** tab, **Change keyboards** button.
6. Click **Add** and select **Chinese (Simplified, PRC)**.
7. Click to expand the “plus” sign and show **Keyboard types**.
8. Enable **Chinese Simplified QuanPin (version 6.0)**.
9. Click **Apply**, then **OK**.
10. Click **Administrative tab**, **Change system locale...** button.
11. Change **Current System Locale** drop-down box to **Chinese (Simplified, PRC)**.
12. Click **OK**. Windows will ask you to restart for changes to take effect.

♦ To install Arabic in Windows 7

1. Click **Start Orb, Control Panel, Appearance and Personalization, Fonts**.
2. Click **Font settings** and uncheck **Hide fonts based on language settings**.
3. Click **OK**.
4. Click on **Control Panel Home** on left hand column.
5. Click **Clock, Language, and Region** menu, **Region and Language**, **Keyboards and Languages** tab, **Change keyboards** button.
6. Click **Add** and select any of the Arabic types.
7. Click to expand the “plus” sign and show **Keyboard types**.
8. Enable **Arabic (101)**.
9. Click **Apply**, then **OK**.
10. Click **Administrative tab**, **Change system locale...** button.
11. Change **Current System Locale** drop-down box to the desired Arabic language.
12. Click **OK**. Windows will ask you to restart for changes to take effect.

♦ To enable Chinese or Arabic keyboard in the PC

1. Select the Control Panel.
2. From the Control Panel, select **Regional and Language Options**.
3. Select the **Languages** tab.
4. Click the **Details** button.
5. Click the **Add** button.
6. For **Input Language**, select **Chinese (PRC)** or **Arabic**.
7. For **Keyboard Layout/IME**, select **Chinese (Simplified) - QuanPin** or **Arabic**.
8. After the installation at the right bottom corner of taskbar there is a Language bar displayed with **EN** as default.

♦ **To change the language keyboard selection**

1. Click on the **EN** icon at the right side of the taskbar and select **CH**.
2. There is a Chinese Language bar displayed at the left bottom corner of taskbar.
3. The keyboard is now ready for Chinese entry.

Serial Port Assignments

The dual RS-422 serial communications card delivered with the IntegratorRD Workstation (P/N 905-0178), is a "PCI" card. This card automatically assigns the port addresses and interrupt configurations using "Plug and Play." Typically Windows will assign the next available COM ports. If the computer has two on-board RS-232 ports assigned to COM1 and COM2, then the two RS-422 ports are assigned COM3 and COM4. These assignments will vary from computer to computer depending on the exact hardware.

To view the assigned ports in Windows XP, use the Device Manager (click **Start, Control Panel, System, Hardware, Device Manager**).

To view the assigned ports in Windows 7, use the Device Manager (click **Start, Control Panel, System and Security, System, Device Manager**).

Configuring Integrator Radio Dispatch Software Settings

If the system was purchased as individual components, the Integrator Radio Dispatch application settings must be configured. The basic configuration settings are assigned when the application is first started. When the application starts it will present the entry screen shown in Figure 48.

To reopen the settings later (any time the application is running), click the "Z" icon located on the Title Bar and select **Settings**. Alternatively, right-click anywhere in the Title Bar and select **Settings**.

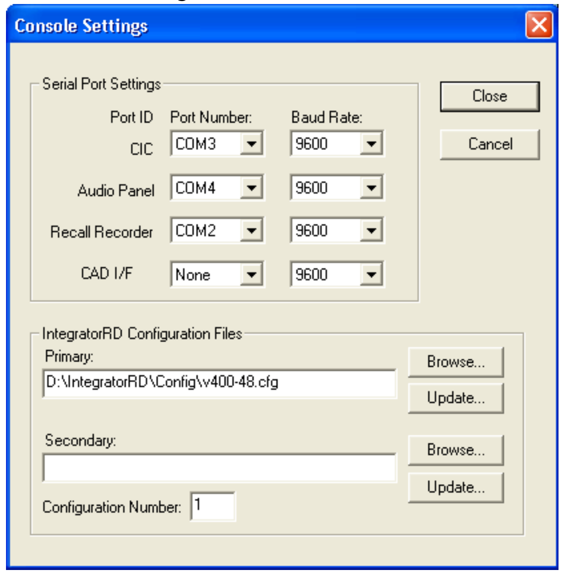
Serial Port Settings

Table 93 shows the default console serial port settings.

Table 93: Serial Port Settings

Port ID	Port	Baud Rate	Note
CIC	COM3	9600	1
Audio Panel	COM4	9600	1
Recall Recorder (Optional)	None	9600	2
CAD I/F (Optional)	None	9600	3

Figure 48: Integrator Console Settings



Note 1) COM3 and COM4 are shown as examples only. Your computer settings may be different, depending on how the PC assigns them.

2) If a Model 3022 Instant Recall Recorder is included with the system, and control is desired from the console, choose an unused port available on the PC (excluding the ports used for the Audio Panel and CIC connections).

3) The CAD I/F option is implemented for Computer Aided Dispatch (CAD) applications. Contact Zetron for details.

Integrator Radio Dispatch Configuration Files

The Radio Dispatch software can be set to load the configuration file from a primary disk location or a secondary location in the event the primary location is inaccessible. In a system in which the console PCs are networked, it is typical for the primary location to be a shared network file. If the network is unavailable when the console program starts, then the program will reload the configuration from the secondary location, which would be on the local PC hard disk.

If the console PCs are not networked, the primary location is a local hard disk file with the secondary location being left blank. If configuration information is provided to Zetron prior to delivery, the configuration file, which ends with the .CFG extension, is located in the Integrator Radio Dispatch application directory. By default, this is:

```
C:\Program Files\Zetron\IntegratorRD (32-bit OS)
C:\Program Files (x86)\Zetron\IntegratorRD (64-bit OS)
```

Use the associated Browse button to locate the configuration file.

The **Update** selection can be used to update the associated file with that stored in the alternate location. For example, if the administration of the configuration is performed on a network file directory it would be desirable to copy that centrally located file to the local PC hard disk to synchronize the configurations between the primary and secondary file locations. Conversely, if changes are made to the configuration stored locally on the PC, it may be necessary to update the network files.

Selecting **Update** for the *Primary file* copies the Secondary file to the Primary file location. Selecting **Update** for the *Secondary file* copies the Primary file to the Secondary file location.

The Configuration Number entry identifies the actual configuration within the configuration file for this position. Typically, this is set to "1" for all positions unless there are differences in the screen configuration (excluding the channel layout) from one position to the next.

When using with Zetron's User Management System, the logged-on user must have the UMS IntegratorRD change settings and configuration permission to store any changes.

Caution! Certain features, such as MDC-1200, Priority Transmit, and takeover functions, are managed system-wide by console 1. Therefore, in a new system, it is important to configure and start console 1 before testing the other consoles. Console 1 is not determined by physical location or any labelling made on-site. Console 1 is the console connected by serial cable to the first CIC card.

Upgrading the Configuration File

Caution! When upgrading an existing configuration, Zetron recommends that Console 1 is upgraded last. This helps to resolve problems prior to working on Console 1, which can impact normal operation of the entire system.

♦ **To upgrade the configuration file to be used in a newer version IntegratorRD**

1. Open the file with the new version RDPS.
2. Follow any instruction prompts there may be for upgrading your configuration.
3. Save the configuration file.
4. In IntegratorRD, reload the new configuration file by restarting the application or right-clicking in the title bar and selecting **Reload Configuration**.

IntegratorRDPS Programming

In this chapter:

Introduction

General Description

The Integrator Radio Dispatch Programming Software (RDPS) allows a system maintenance engineer to easily field program the system configuration of a Zetron IntegratorRD Workstation. This includes the addition or reconfiguration of radio channels, selection of paging and auxiliary I/O functions, and many other operating features of the IntegratorRD Workstation.

RDPS is a Windows-based application that uses an intuitive menu, a graphic-driven display interface, and incorporates context-sensitive help features. RDPS is designed to run on Windows XP Professional (32-bit) and Windows 7 Professional (32-bit or 64-bit) computers, including laptops. Netbooks may have insufficient screen size or resolution to support IntegratorRDPS.

If the editing of a configuration is not being done from a console PC, the configuration file will need to be copied to the console PC. This file has the extension ".CFG".

Note IntegratorRD 5.2 does not contain a Demo application. Please contact Zetron Sales or Technical Support to acquire a disc with a Demo application.

IntegratorRD 5.2 no longer supports Text Messaging.

IntegratorRD Concepts and Definitions

A Series 4000 Communications Control System supports from 1 to 16 IntegratorRD Workstations. Each workstation is connected to Model 4020 or 4048 CCE, which manages the communications functions for all console positions.

A *console position* is a single operator workstation comprised of a PC, display monitor, and an audio control panel. Each position may control a subset of the radio channel control and auxiliary I/O functions supplied by the system. Each position may have independent paging functions.

RDPS provides for up to 16 console configurations. A *console configuration* is a group of setup parameters that can be used on one or more console positions. Typically, only a single console configuration is necessary for all console positions in a system installation. This is because the operation of the system does not necessarily differ between operator positions. However, if there are variations in responsibilities based on console position, individual console configuration files can be created. Again, typically only one console configuration file is needed.

Getting Started

Requirements

RDPS requires the following equipment:

- PC or laptop compatible with Windows XP or Windows 7
  (Netbooks may have insufficient screen size or resolution to support RDPS)
- Monitor – Display settings configured to use “Small Fonts”
  (preferably operating in 800x600 resolution or greater)
- A physical method for storing and sharing configuration files, such as a floppy disk or USB drive (a shared or mapped network drive is not suitable)

Installation

RDPS is run either directly from the console that needs to be configured, or from another PC compatible computer. If you use a separate PC for editing, you will need to follow the instructions in *Software Installation* on page 251 to copy the configuration files from portable media to the console hard drive.

RDPS is included on the DVD with IntegratorRD workstation (601-1117). Refer to *IntegratorRD Workstation Installation* on page 237 for IntegratorRD installation instructions.

Starting RDPS

Double-click the **Zetron RDPS** shortcut on your desktop. If you do not have the shortcut, click **Start, All Programs, Zetron Integrator, Radio Dispatch Programming**.

If UMS is enabled, a user with permission to run this application must be logged on to run RDPS. Logon is controlled by the UMS Logon utility. See the *User Management System Product Manual* (P/N 025-9516) for details.

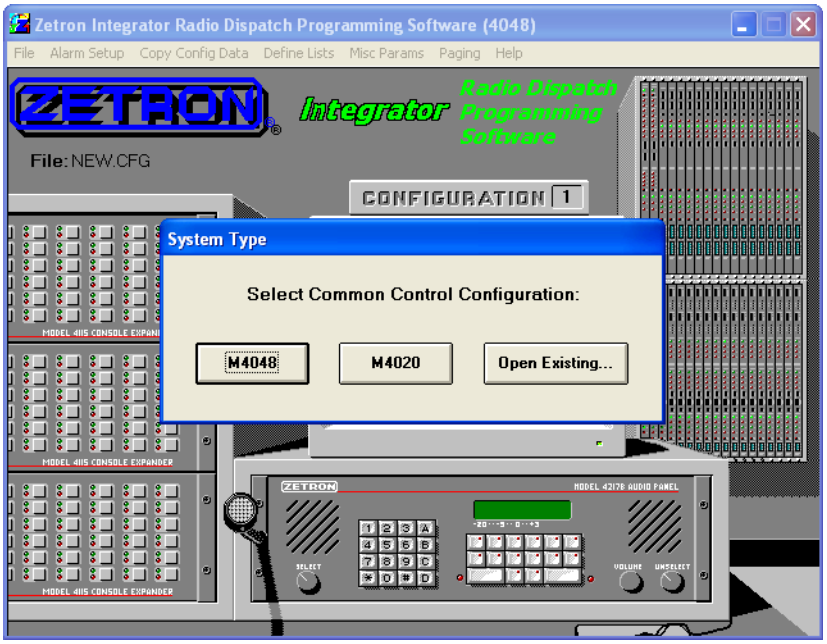
Logging off using the UMS Logon utility closes all of the open Integrator applications to which you were logged on. To close an individual application, exit directly from the application.

RDPS Main Display Window

When RDPS is started, it loads the last configuration file that was opened. If unable to do that, RDPS requests the CCE type and initializes a "NEW.CFG" configuration using default settings. See Figure 49.

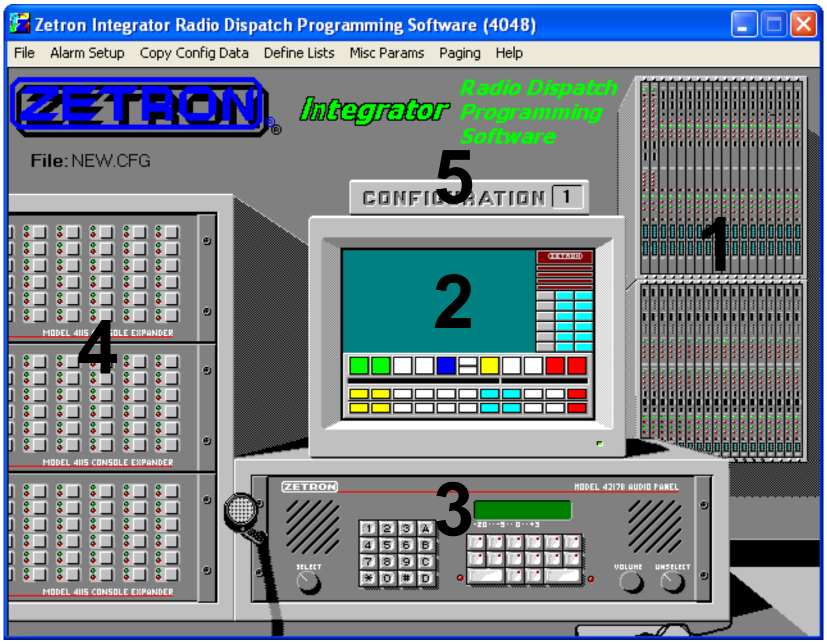
You can also open an existing configuration file by clicking **File**, **Open** and navigating to the .CFG file.

Figure 49: Main Display Window for RDPS



Using the Main Window Regions

Figure 50: RDPS Main window



Tip The name of the configuration file currently loaded into RDPS is located immediately below the Zetron logo.

The RDPS main screen provides regions which, when clicked with the mouse, present the configuration parameters of the essential components of the console. When the mouse is moved over any of these regions, the mouse pointer changes from the left-slanted arrow to a hand icon, indicating a selectable area. The configuration parameters of the essential components are described in the following subsections.

(1) Common Control Equipment

Use this selection to enter or modify radio channel definition, auxiliary input/output, position cross muting, and various system parameters.

(2) Dispatch Workstation Display

Enter the arrangement of the console screen configuration using this selection. This includes the channel control function buttons and menu buttons. In addition, from this screen, the Display Select button labels and Group menu button labels are entered.

(3) Audio Panel

Create the Audio Panel keyboard layout and spare input and output definitions using this selection.

(4) Optional Model 4115 Expansion Panels

If the console includes Model 4115 Expansion Panels for additional button controls, use this screen to define the function of the additional buttons on up to three expansion panels.

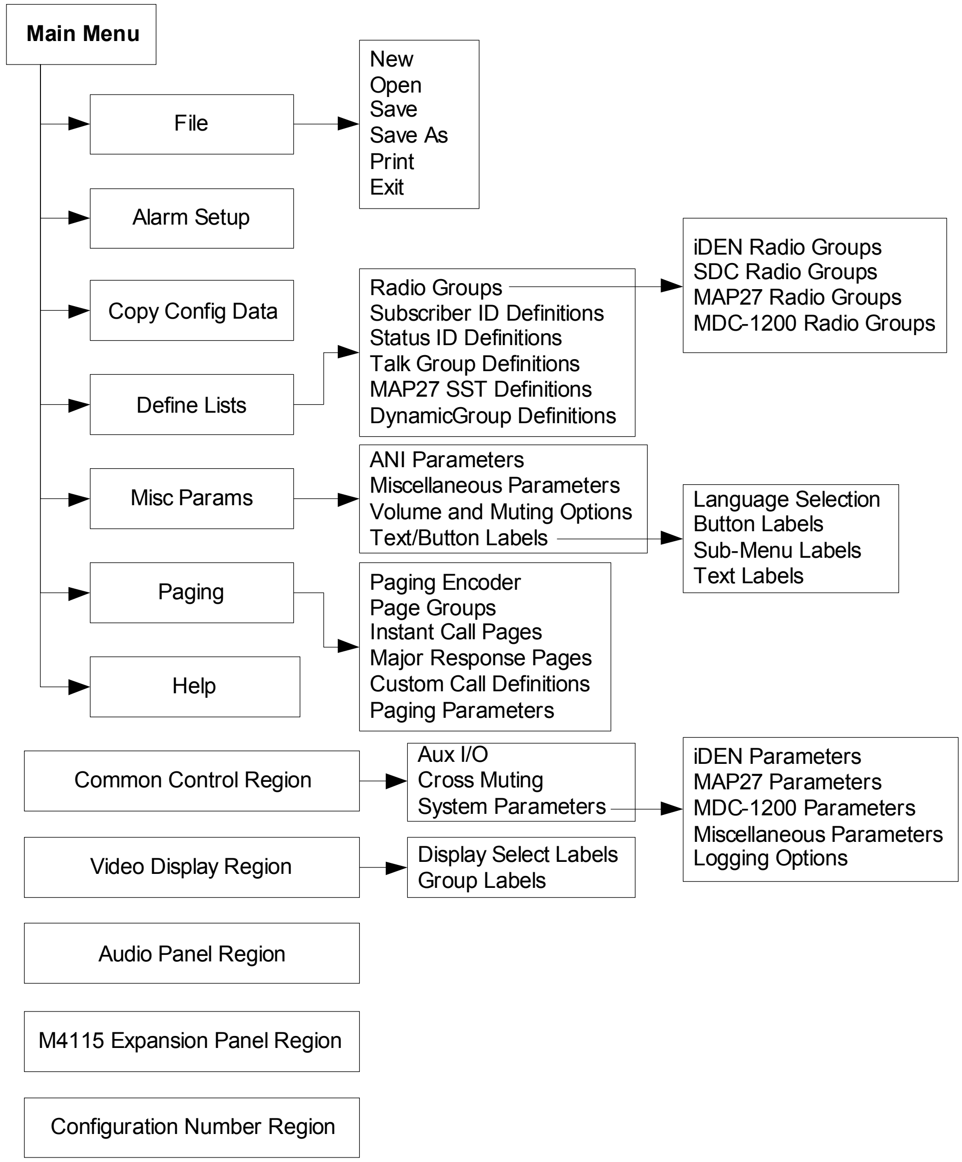
(5) Configuration Selection

This selection (located "on top of" the monitor graphic) presents the number of the configuration that is loaded for editing. There can be up to 16 different configurations for a console system. Typically, only one configuration is defined and used at all positions in a system. However, if there are differences in operation from one position (or one group of positions) to another, this selection allows you to switch between the configuration parameters for each set.

Using the Menus

Additional features of the console configuration are accessed through a series of drop-down menus selected from a main menu displayed on the second line of your display screen. These menus operate consistent with typical Windows applications – the mouse, keyboard, and arrow keys can be used to navigate the menus and associated entry forms. See Figure 51.

Figure 51: The RDPS Menu Tree



Getting Online Help

The F1 key can be used to get help on a particular configuration item at anytime when using RDPS. Pressing F1 (or selecting Help from the main menu) displays the main table of contents for all the help information as well as a description of using the main screen graphics for navigating to specific configuration items.

Saving the Information Entered

The **Save** menu selection allows you to edit or update the configuration file. To save the configuration files, return to the main screen and click **File, Save**.

⚠ **Caution!** Do not save the configuration file to a shared network location. Using a configuration file from a shared network location among multiple consoles can cause mismatched configuration problems.

To change the configuration file name and/or the directory where it is stored, click **File, Save As**. From the **Save As** screen, select the desired directory and file name. The console program requires the configuration name to have a ".CFG" extension.

Quitting RDPS

To quit the program from the main menu, click **File, Exit**. When the program closes, if any changes have been made, the program will ask if those changes should be saved. It is suggested that you answer "**Y**" to this query.

Creating a Console Configuration

For each IntegratorRD workstation, you will need to create a configuration consisting of several files. To create a configuration, perform the steps described in this section. This serves as a high-level guide to the proper order of initial configuration.

1. Name the configuration.
2. Define the radio channel specifications.
3. Enter the system-specific definitions, including:
   a. Auxiliary I/O
   b. Console positions enable
   c. Console position cross muting
4. Enter the position-dependent definitions, including:
   a. Position setup - Audio and display
   b. Paging Encoder Definition (optional)
   c. Instant Call Paging setup (optional)
   d. Alarm setup (optional)
   e. Miscellaneous Position Parameters
   f. Audio Panel and Expansion Panel Keyboard Layout
   g. Window Button Arrangement

h. Display Select Button and Group Button Labels (optional)
i. MAP27 Radio Groups (MAP27 installations only)
j. iDEN Radio Groups (iDEN installations only)
k. SDC Radio Groups (SDC installations only)
l. MDC-1200 Radio Groups (MDC-1200 installations only)
m. Subscriber ID Definitions (optional)
n. Status ID Definitions (optional)
o. Talk Group Definitions (optional)
p. Dynamic Group Definitions (MAP27 installations only)
q. MAP27 Short Status Text Definitions (MAP27 installation only)
r. Custom Call Definitions

5. Copy configuration data. (optional)
6. Save the configuration.

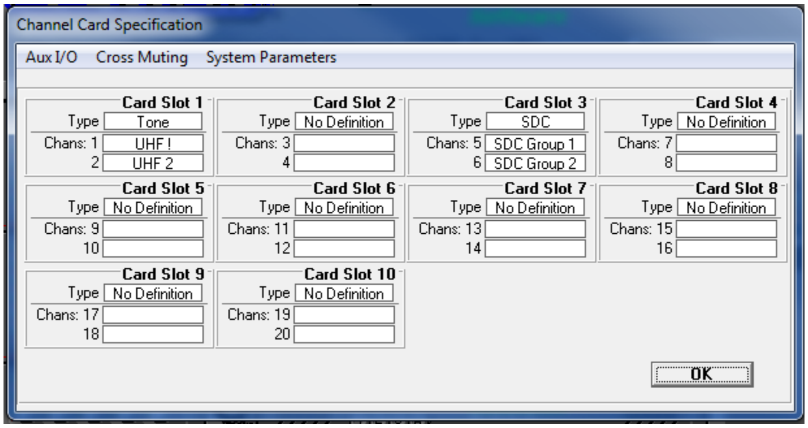
Tip If assistance is needed during configuration, press the F1 key to get online help.

Defining Radio Channels

The Series 4000 Common Control Equipment (CCE) controls up to 48 radio channels, 2 channels installed to a card, in up to 24 card slots. To define each card type and channel, click on the CCE rack image on the main screen. The Channel Card Specification window is shown in Figure 52.

Note The channel definitions are specified for the whole system, not just the console position. In other words, the channel definitions will be common to all console positions.

Figure 52: Channel Card Specification window



Defining the Card Type

Move the mouse cursor over the “Type” field for a specific card slot (the mouse cursor changes to vertical), and click. A list of buttons labeled with all the available Series 4000 Dual Channel card types is displayed.

Click the type appropriate for the card installed in the specific slot. To remove the assignment of a card slot, select the **No Definition** button.

Selecting the Channel to Edit

Move the cursor over the “Chans: 1 or 2” field and click. A screen of configuration parameters that are conditioned on the card type is displayed. See Figure 53.

Defining the Channel

Figure 53: Channel # Definition window

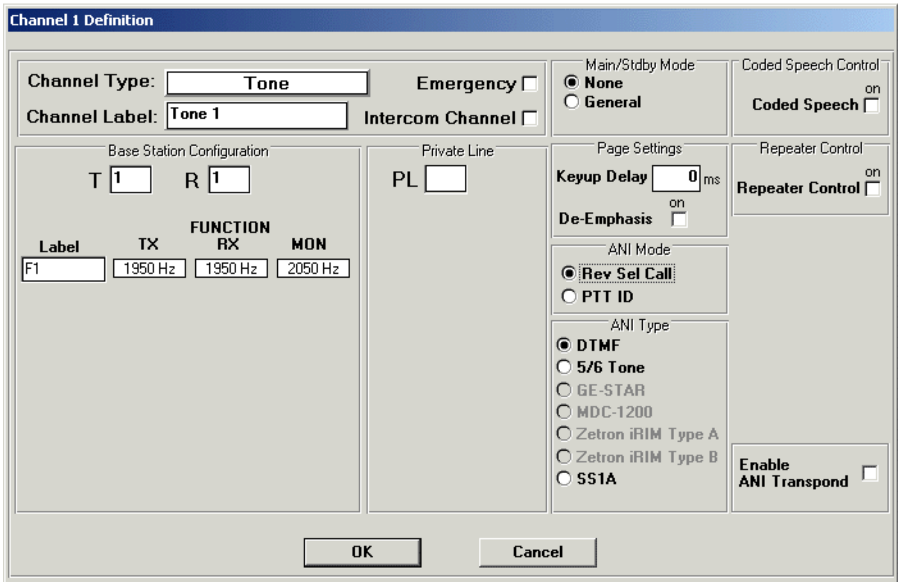


Table 94: Channel # Definition window

Parameter/Area	Purpose
Channel Type	The channel type is defined in the previous window and displayed here.
Channel Label	Each channel is labeled on the Console Display with an 11-character name. The Channel Label field accepts this label. Move the cursor to the Channel Label field and click; type in a descriptive label. The field accepts any printable character, including spaces, except commas.
Emergency	Enable **Emergency** to set IntegratorRD to perform an Emergency Alert for all receive activity on this channel. The purpose for this feature is to perform emergency alerts for simple radios without an emergency function of their own. This feature should only be used with radios that do not have a protocol for emergency calls.
Intercom Channel	Enable **Intercom Channel** if the channel is used in conjunction with the Series 4000 Intercom Interface for the audio interface to the intercoms.
Main/Stdby Mode	The main/standby output of each channel is enabled by selecting “None,” “General,” or “Phone” for the mode. General main/standby operation allows the MAIN/STBY key to toggle the output state. The state displays on the console as “MAIN” or “STBY”. Phone operation allows the Aux output channel to control a Zetron Model 4000 Phone Coupler from the console. The Aux output is used to control the state of the hook switch. The state displays on the console as “TEL” when the hook switch is off. The display goes blank when the hook switch is on. In some phone systems, it may be necessary to momentarily flash the hook switch to access certain phone features. The “Hook Flash” entry allows you to set the flash time when a Zetron Model 4000 Phone Coupler is not used.

Parameter/Area	Purpose
Coded Speech Control (Tone Cards Only)	To use Private Line (PL), disable **Coded Speech**. Private lines can then be configured. To use Digital Voice Privacy (DVP), enable **Coded Speech**. Tone remote channels can be configured to send tone remote functions to enable/disable encryption at the base station and to send either dual- or single-function tone sequences with a transmission.
Hook Flash (If **Phone** is selected)	Sets the duration of the Hook Flash generated when the Hook Flash button is pressed for this channel.
Base Station Configuration (DC or Tone cards only)	The Base Station Configuration field allows you to define the number of transmitter and receiver frequencies that your multi-frequency base station supports. This field is entered in the form of TxRy, where x is the number of transmitter frequencies and y is the number of receiver frequencies. Acceptable values for x and y are between 1 and 16. It is not necessary that x and y be the same. The following are examples of valid entries: T1R1 T2R1 T4R4 To configure frequencies and functions, see *Specifying the Frequency Control Functions* on page 271.
Private Line (Tone Cards Only)	To use Private Line (PL), disable **Coded Speech**. Private lines can then be configured. Tone-remote channels can be configured to support control of up to eight Private Line or Channel Guard modes. Valid numbers are 0 and 2 through 8. To configure PL control functions, see *Specifying the PL Control Functions* on page 271
DVP Coded/Clear (Tone cards only)	Allows the user to define the Digital Voice Privacy Coded and Clear remote functions and the transmit mode. See *Specifying the DVP Control Functions* on page 272.
Page Settings	During paging, a keyup delay can be specified that will delay the time from keyup to the start of the page. The keyup delay is entered in milliseconds. Valid range is 0 - 6000 ms. Paging tones sent on channels with De-Emphasis enabled will be de-emphasized unless they are being sent as a simulcast including at least one channel without De-Emphasis.
Repeater Control	Enable **Repeater Control** if this base station includes a repeater, otherwise clear the box. If repeater control is enabled, the labels to be displayed and the functions performed must be entered when the repeater ON/OFF keys are pressed. The first field is a 1-, 2-, or 3-character identifier that shows the repeater condition. The second field is the tone or current signal used when the console repeater ON/OFF keys are pressed.
ANI Mode **ANI Type**	There are several different formats of ANI that may be selected. The different formats change the response of the console to receiving an ANI. See *Selecting the ANI Mode* on page 272.
5/6 Tone Parameters (If **5/6 Tone** selected)	See *5/6 Tone Channel Parameters* on page 272.

Parameter/Area	Purpose
MDC-1200 Parameters (If **MDC-1200** selected)	See *MDC-1200 Channel Parameters* on page 273.
iRIM Parameters (If **Zetron iRIM** selected)	See *iRIM Channel Parameters* on page 275.
Enable ANI Transpond (If **Rev Sel Call** selected)	When enabled, this activates the channel transpond tone following the receipt of a valid ANI decode.

Specifying the Frequency Control Functions

Each frequency may be assigned a label and a frequency control function to select the transmitter, receiver, and monitor. The functions defined are used when the frequency select keys are pressed from the console.

The Frequency Label (Label) is a 1- to 10-character name, which displays on the console display when the frequency is selected. These labels are typically **F1**, **F2**, etc., but can be any characters you want. For single frequency channels, the label is not referenced.

The Transmit Function (TX) is a tone or current signal used when the console **Transmit** key is pressed. When the transmit key is released, the Receive Function is issued.

The Receive Function (RX) is a tone or current signal used to initialize the receiver frequency when the system is started and when the receiver frequency is selected from the console.

The Monitor Function (Mon.) is a tone or current signal used when the console **Monitor** key is pressed. When the monitor key is released, the Select Function is issued.

Move the mouse cursor over the TX, RX, or Mon. fields and click. A list of buttons labeled with the available tone frequencies or DC currents appears. Click the desired function.

Specifying the PL Control Functions

Similar to the frequency control functions, the PL (private line) control functions are used when the PL or CG (channel guard) keys are pressed.

The PL Label is a 1- to 7-character identifier displayed on the console when the PL is selected. These labels are typically **PL1**, **PL2**, etc., but can be any three characters you want. The PL Select Tone is a tone signal used when the console PL keys are pressed.

In the **PL** field, enter a value of **2** to **8** for the number of PL Select Tones desired. The PL labels and **Select Tone** fields will appear.

Move the mouse cursor over the **Select Tone** field and click. A list of buttons labeled with the available tone frequencies display. Click the desired function.

Specifying the DVP Control Functions

The Coded/Clear label is a 1- to 7-character identifier displayed on the console when the **Coded/Clear** button is pressed. The Coded/Clear function is a tone signal used when the console **Coded/Clear** key is pressed.

Click in the function field. A list of buttons labeled with the available tone frequencies displays. Click the desired frequency.

If **Positive Mode** is enabled, a dual function tone sequence, containing the coded/clear function and RF frequency selection tones, is sent. If positive mode is disabled, a single function tone sequence, containing only the RF frequency selection tone, is sent.

Selecting the ANI Mode

The method of ANI operation is selectable on a per-channel basis. The IntegratorRD workstation supports two modes of ANI decoding: Reverse Selective Calling (RSC) and PTT ID. For RSC mode, there are three types: DTMF, 5/6 Tone, and SS1A. For PTT ID mode, there are seven types: DTMF, 5/6 Tone, GE Star, MDC-1200, Zetron iRIM Type A, Zetron iRIM Type B, and SS1A. See Table 95.

Table 95: ANI Modes for IntegratorRD Workstation

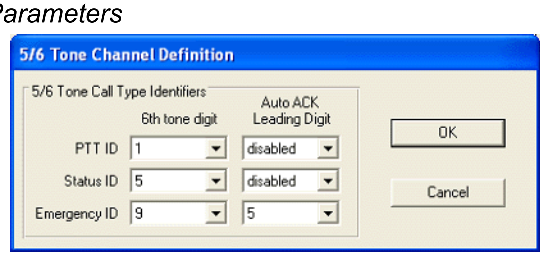
Mode	Call Format *	Description
RSC	CCCCAA...A	Standard Reverse Selective Calling
PTT ID	AA...A	Standard PTT ID
* CCCC is a fixed length console address specified by the Primary and Secondary address. AA...A is a variable length calling unit identifier. AAAA is a fixed length calling unit identifier. The length is selectable.		

In the RSC mode, the Primary and Secondary destination addresses are used to filter incoming sequences. Channels with ANI Transpond enabled will activate transpond tone following the receipt of a valid ANI decode.

For PTT ID ANI, the destination addresses are ignored and the most recent ANI displays. As subsequent ANIs are received, the older entries are "pushed" into the background buffer. Six ANIs are maintained in a revolving buffer. PTT ID ANI also provides detection of "emergency" ANI and related alerting functions.

5/6 Tone Channel Parameters

Figure 54: 5/6 Tone Parameters



6th Tone Digit

For 5/6 tone channels, the 6th character of a 6 Tone ANI for a 5/6 Tone channel may be configured to indicate three different call types: PTT ID, Status, and Emergency. Each of these indicators are independently optional.

Auto Acknowledge Leading Digit

The **Auto ACK** option causes the channel's radio to automatically respond to commands with an acknowledgement reply, parroting the received message back to the sender. Again, each of these indicators are independently optional. Each call type has a drop-down list of defined 5-Tone and 6-Tone paging formats (see *Defining the Paging Encoder Formats* on page 312).

MDC-1200 Channel Parameters

For the MDC-1200 type ANIs, see Figure 55 for the configurable channel parameters. If MDC-1200 system parameter, “Basic MDC-1200” option, is selected, only “Emergency Tone” and “Emergency Ack” parameters are configurable.

Figure 55: MDC-1200 Channel Parameters window

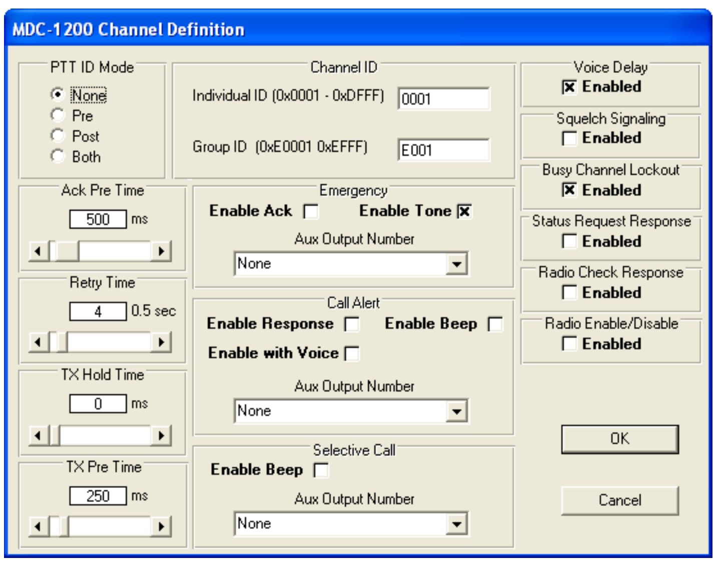


Table 96: MDC-1200 Channel Parameters window

Parameter/Area	Purpose
PTT ID Mode	The mode Pre, Post or Both determines if the PTT ID is sent before, after or both before and after a normal transmission.
Ack Pre Time	The delay after receiving an MDC1200 message before any programmed automatic acknowledgement or response is sent.

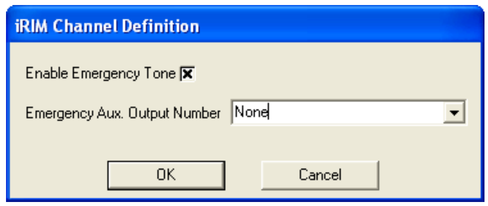
Parameter/Area	Purpose
Retry Time	The time between sending an MDC1200 message and re-sending the message if no acknowledgement or response is received. Retry Time can be programmed from 1 to 15.5 seconds in 0.5-second intervals. A random value between 0 and 1.8 seconds is always added to this value to prevent collisions.
TX Hold Time	The delay after the end of the MDC1200 data before the transmitter is unkeyed.
TX Pre Time	The delay after the transmitter has been keyed before the MDC1200 data is sent.
Channel ID	Regardless of the type of the call being transmitted, individual or group call, the individual ID is included as the source ID by the channel card when transmitting an MDC-1200 message. Do not configure the individual ID of the channel card to the same ID used by another field radio. The channel card will ignore incoming calls from its own ID. The Group ID is used for decoding incoming group calls.
Emergency	With **Emergency Ack** enabled, the channel card automatically sends an emergency acknowledge upon receiving an emergency alert. With **Emergency Tone** enabled, the workstation provides an audio feed back upon receiving an emergency alert. The **Aux Output Number** is the output activated upon receiving an emergency alert.
Call Alert	With **Call Alert Response** enabled, the channel card sends an automatic response upon receiving a call alert. With **Call Alert Beep** the workstation provides an audio feed back upon receiving a call alert. **Call Alert with Voice** enables/disables voice reception after receiving a call alert. The **Call Alert Aux Output Number** is the output activated upon receiving a call alert.
Selective Call	With **Selective Call Beep** enabled, the workstation provides an audio feed back upon receiving a selective call. The **Selective Call Auxiliary Output** is the output activated upon receiving a selective call.
Voice Delay	This selection enables/disables voice delay in the channel card.
Squelch Signaling	This selection enables/disables squelch signaling in the channel card.
Busy Channel Lockout	This selection enables/disables busy channel lockout in the channel card.
Status Request Response	When active the channel card sends an automatic response upon receiving a status request.
Radio Check Response	When active the channel card sends an automatic response upon receiving a radio check.
Radio Enable/Disable	When active this selection allows a user at another radio or console to enable or disable the console from accessing the radio attached to this channel card.

iRIM Channel Parameters

For the Zetron iRIM type ANIs, see Figure 56 for the configurable channel parameters.

Note 'iRIM Type B' supports 'Full FleetSync' ID decoding. 'iRIM Type A' is used to support 'Mapped FleetSync' and 'Mapped P25' IDs for decoding.

Figure 56: iRIM Channel Parameters window



With **Emergency Tone** enabled, an audio feed back is provided from the workstation upon receiving an emergency alert.

If an **Emergency Auxiliary Output** is selected, an auxiliary output is activated upon receiving an emergency alert and deactivated by turning off the auxiliary output or when operator transmits on the channel where the emergency call came in on.

System-Specific Definitions

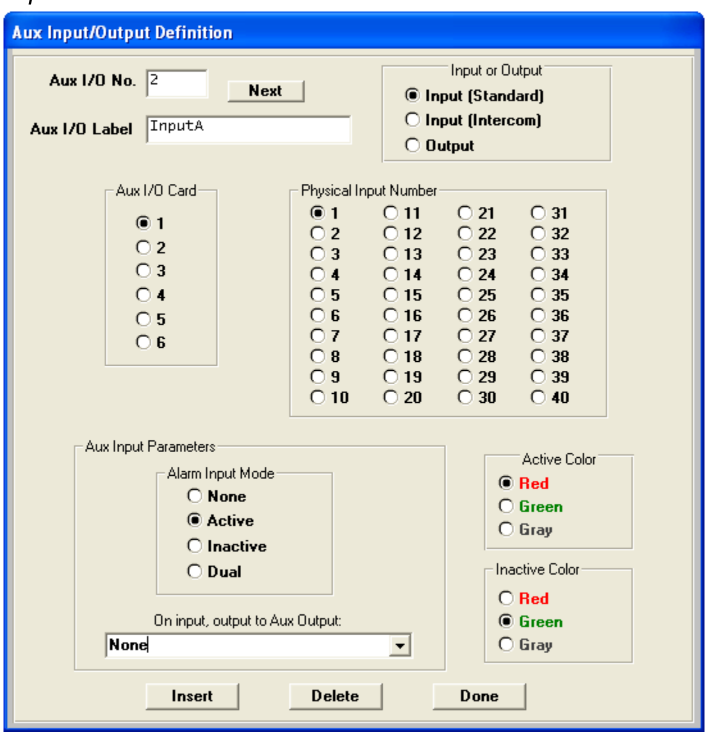
Setting Up the Auxiliary I/O and Alarm Functions

Tip Navigate to this area from the main window in RDPS by clicking on the **CCE cards** in the upper right, then **System Parameters, Aux I/O**.

The Aux I/O menu on the Channel Card Specification screen, and the Alarm Setup from the main menu, bring up entry forms for the purpose of defining the action of contact closure input and outputs. Inputs and outputs can be defined to actuate doors, sound alerts, indicate door status, indicate alarm conditions and many other things that use contact closure.

Selecting the Aux I/O menu on the Channel Card Specification screen presents a screen to add new Aux I/O records or edit existing records. The Series 4000 CCE supports up to 6 Auxiliary I/O cards in a system, each of which has 40 inputs and 12 outputs.

Figure 57: Aux Input Definitions window



Refer to Figure 57 for the following option descriptions.

Information Common to Standard and Intercom Inputs, or Outputs

Giving the Aux. Input, Intercom, or Output a Name

The Aux I/O Label field allows you to identify each I/O record with a label that is comprised of up to three words of seven characters each with a space separating each word. (This spacing ensures a readable display on the console program.) This label may contain any printable character (including spaces) except commas.

Note For Intercom inputs, to ensure the name is displayed correctly in Chinese or Arabic, the non-Unicode name can be no longer than 10 characters.

Setting the Aux. Input, Intercom, or Output Display Colors

The Active and Inactive Color entries are used to distinguish the ON/OFF states of the inputs and outputs while displayed on the console screen. Active and inactive colors can be selected from RED, GREEN, or GRAY.

Each record can be a standard input, an intercom input, or an output. For all three types, the screen includes an Aux I/O Number, Aux I/O Label, Previous, Next, Insert, Delete, and Done buttons. The Previous and Next buttons navigate through the existing records. The Insert button places a new blank record in the position *after* the current record. The Delete button deletes the currently displayed record. The Done button exits the Aux I/O screen, saving the current record if all fields are entered.

Input (Standard)

When the **Input (Standard)** option button is selected, the screen is configured as shown in Figure 57.

Associating the Aux. Input with a card and input number

The Aux I/O Card number and physical input number must be selected to complete a valid entry; these correspond to the physical wiring of the Aux I/O cards. If a selected Card number/physical input is already used, a warning message is displayed and a different input must be chosen.

Standard inputs are represented on the console screen as simply “ON/OFF” indicators.

Associating an Aux. Output with a Standard Aux. Input

The field labeled “On input, output to Aux Output” is used to activate an output when the input becomes active. Choose the desired output from the drop-down list of available outputs.

Note If the outputs have not yet been defined, you will have to come back to this point later to choose the output.

Enabling the Alarm Display (Standard and Intercom Inputs)

The Alarm Input Mode field allows you to select if and under what conditions an input displays an alarm message on the console screen. There are four alarm display options:

None	The input will not cause an alarm message display.
Active	The input will display an alarm message when the input transitions from inactive to active.
Inactive	The input will display an alarm message when the input transitions from active to inactive.
Dual	This special type of alarm input requires that two consecutive inputs (Input A and Input B) present the alarm status shown in Table 97.

Table 97: Dual Alarm States

State	Input A	Input B	Condition
1	Inactive	Active	No Alarm/No Fault
2	Active	Inactive	Alarm
3	Active	Active	Fault

Input A, which must be an odd-numbered input, should be labeled as the alarm condition input. Input B, which must be an even-numbered input, should be labeled as the Fault condition input.

For this type of alarm, the inactive and active colors should be set to GREEN and RED respectively. Then the display of the two inputs will be as shown in Table 98.

Table 98: Dual Alarm Displays

State	Input A	Input B	Condition
1	GREEN	GREEN	No Alarm/No Fault
2	RED	GREEN	Alarm
3	GREEN	RED	Fault

Input (Intercom)

When the **Input (Intercom)** option button is selected, the screen is configured as shown in Figure 58.

Setting the Intercom Channel Used with the Intercom Input

This entry identifies the audio channel used to route the intercom audio. Choose the desired entry from the drop-down list of available intercom channels.

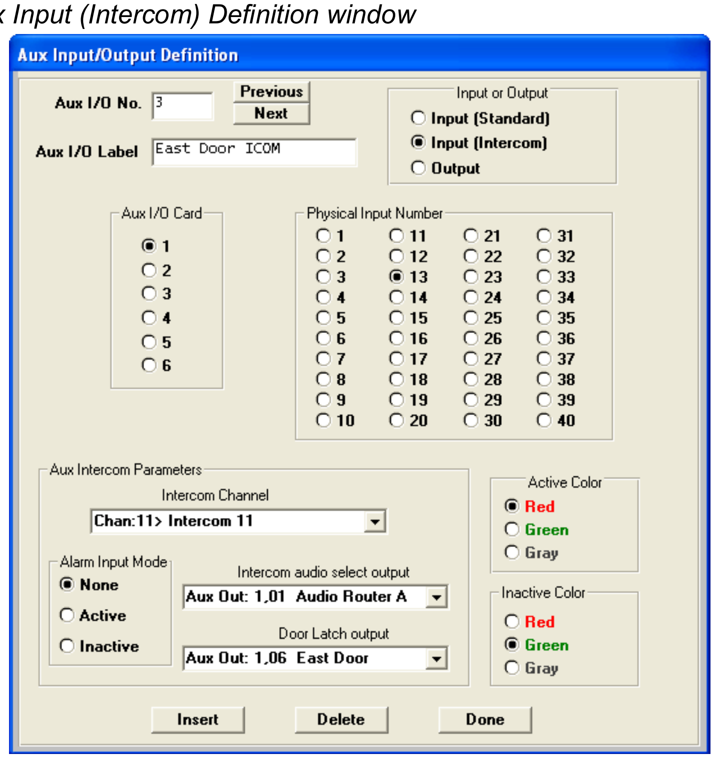
> **Note** If the intercom channels have not yet been defined, you will have to come back to this point later to make your selection.

Setting the Intercom Select Output

This selection specifies which auxiliary output is used to activate the intercom audio.

> **Note** If the outputs have not yet been defined, you will have to come back to this point later to make your selection.

Figure 58: Aux Input (Intercom) Definition window



Setting the Intercom Door Latch Output

This selection specifies an additional output for the intercom that is typically used to control a door latch associated with the intercom input.

Note If the outputs have not yet been defined, you will have to come back to this point later to make your selection.

Output

When the **Output** option button is selected, the screen is configured as shown in Figure 59.

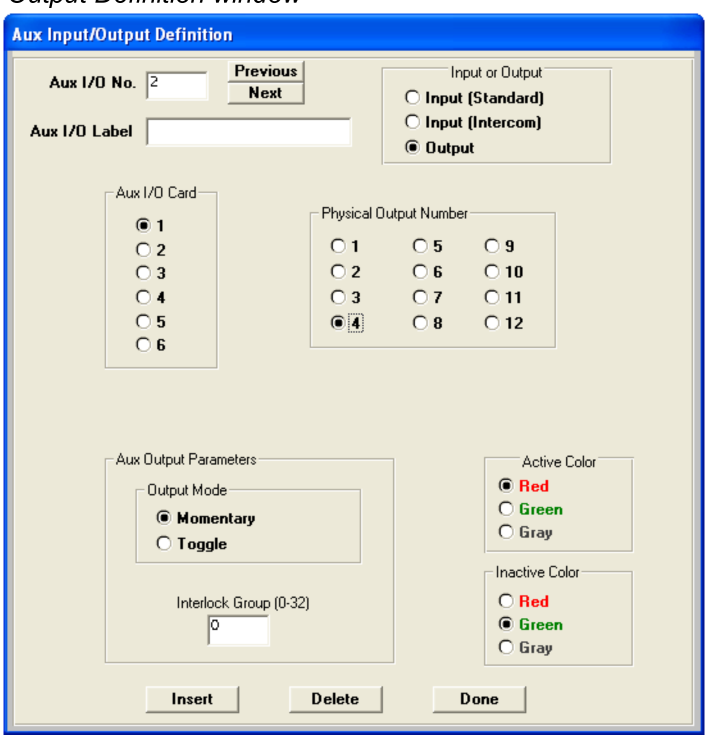
Selecting the Aux Output Mode

Outputs may be either Momentary or Toggle. Momentary means that when the console operator activates the output, it will only remain active while the operator holds down the key. Toggle outputs toggle from active to inactive or inactive to active each time the key is pressed.

Setting the Output Interlock Group

For toggle-type outputs, the interlock group is used to assign outputs to a group that will allow only one output to be active at a time. If the interlock group is set to "0", no interlock is applied. Up to 32 interlock groups may be assigned.

Figure 59: Aux Output Definition window

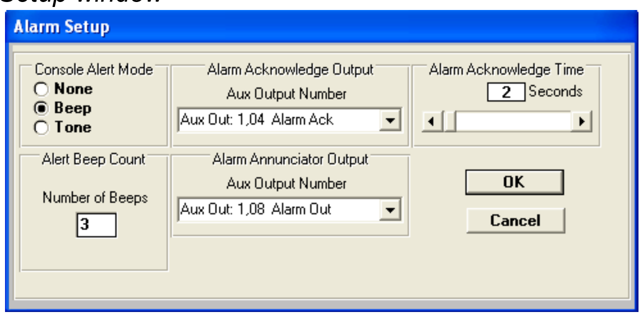


Setting the Alarm Acknowledge and Annunciation

Tip Navigate to this area from the main window in RDPS by clicking on **Alarm Setup**.

From the entry form presented within the main menu, the Alarm Setup menu selection allows you to specify several actions when alarm input is detected and when an alarm is acknowledged. See Figure 60.

Figure 60: Alarm Setup window



Alarm Setup

An Auxiliary output may be activated for a short time when the console Alarm Acknowledge key is pressed (**Alarm Acknowledge Output**). If no acknowledge output is needed, this field can be left blank. The **Alarm Acknowledge Time** can be set to limit the number of seconds (1-100) that the acknowledge output is activated.

In addition to the console display of an alarm message, you may specify an Aux Output to be activated when an alarm is detected (**Alarm Annunciator Output**). This could be used to energize a buzzer, horn, flashing lamp, etc. The annunciator output will stay active until the alarm is acknowledged.

You may specify an alert tone to be generated through the console speakers when an alarm is detected. This alert can be a series of beeps (select **Beep)** or one of a set of pre programmed alert tones (select **Tone**). If **Beep** is selected, then the **Alert Beep Count** may be specified. If **Tone** is selected, then you may select from one of six different tone types (**Alert Tone Type**).

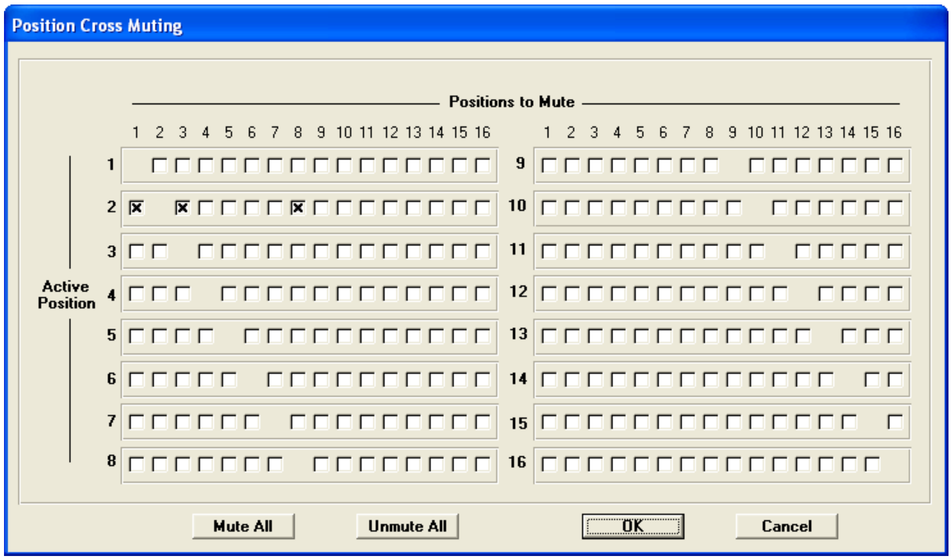
Cross Muting

Tip Navigate to this area from the main window in RDPS by clicking on the **CCE cards** in the upper right, then **Cross Muting**.

Channels common among operator positions can be muted when transmission is occurring. Cross muting eliminates feedback problems related to operator positions, which are physically too close.

The **Position Cross Muting** window (Figure 61) has a matrix of **Active Positions** and **Positions to Mute**.

Figure 61: The Position Cross Muting window



♦ To configure Position Cross Muting

1. To identify position numbers, start IntegratorRD and, in the upper right-hand corner of the application, see the number following the hyphen.
2. Identify the position number of the **Active Position**. The **Active Position** is the operator position whose speakers need to mute the transmissions of adjacent positions. For our example, the operator position is 2.

3. Identify the position numbers of the **Positions to Mute**. **Positions to Mute** are the adjacent positions whose transmissions shall be muted at the **Active Position**. For our example, the positions adjacent to position 2 are positions 1, 3, and 8.
4. Find the **Active Position** row (in our example, row 2 for position 2) and mark the check boxes for each adjacent position (in our example, 1, 3, and 8). See Figure 61.

   This mutes transmissions from position 1, 3, and 8 on position 2.
5. Configure additional position cross muting as needed.
6. Click **OK**.
7. Save the configuration and either restart IntegratorRD or reload its settings.

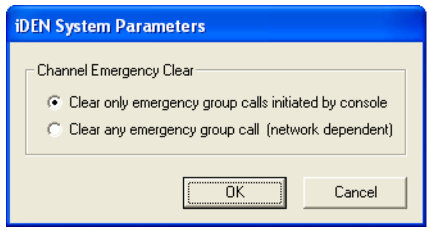
Tip Use **Mute All** to have all positions mute the transmit audio of all other positions. Use **Unmute All** to have all positions play the transmit audio of all other positions.

System Parameters

iDEN System Parameters

Tip Navigate to this area from the main window in RDPS by clicking on the **CCE cards** in the upper right, then **System Parameters**, **iDEN System Parameters**.

Figure 62: iDEN System Parameters window



If the iDEN EMERG button is held down in IntegratorRD for three seconds or more before release, the console acknowledges this as a request to clear the emergency group call. For cases where the console initiated the emergency group call, or Integrator RD is configured to 'Clear Any Emergency' (via RDPS), Integrator RD will send a request to the iDEN service network to abort the emergency group call. If this request is accepted by the iDEN service network, the emergency group call will be terminated.

There are two settings for Channel Emergency Clear:

- Clear only emergency group calls initiated by console
- Clear any emergency group call (network dependent)

Note Enabling the second mode (Clear any emergency group call) requires your iDEN service network to be configured to support the 'Abort Emergency Group Call' iDEN RALP command. It must be configured to “knock down” an emergency group call regardless of which radio initiated it.

MAP27 System Parameters

Tip Navigate to this area from the main window in RDPS by clicking on the **CCE cards** in the upper right, then **System Parameters, MAP27 System Parameters**.

Figure 63: MAP27 System Parameters window

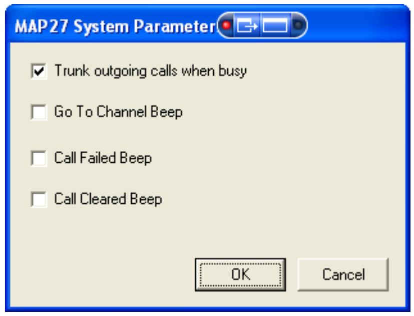


Table 99: MAP27 System Parameters window

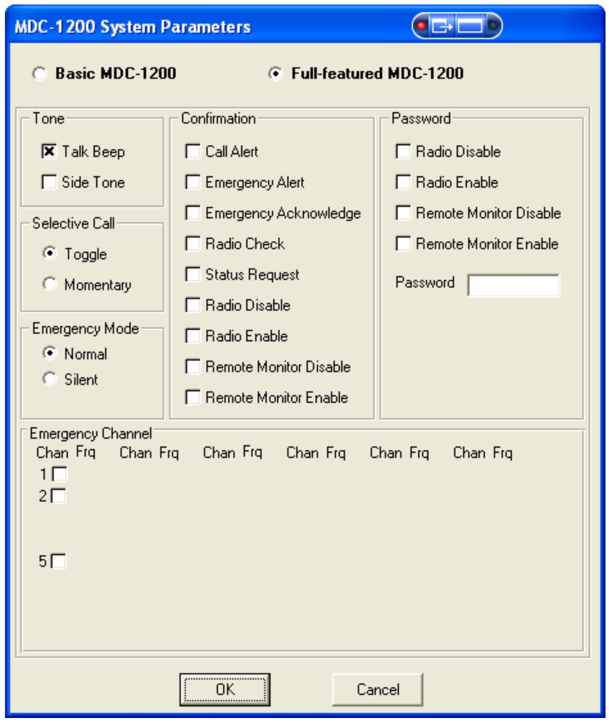
Parameter/Area	Purpose
Trunk outgoing calls when busy	With this option enabled, if an outgoing call is made on a busy channel, the call is trunked to the first available channel. With this option disabled, a busy indicator is displayed.
Go To Channel Beep	With this option enabled, when an operator transmits on a MAP27 channel, a beep is activated when the channel is ready for the operator to talk.
Call Failed Beep	With this option enabled, when an operator transmits on a MAP27 channel, a “call failed” beep is activated if the call failed because of a system busy, unit busy, or out of reach.
Call Cleared Beep	With this option enabled, when IntegratorRD receives a call cleared message on a MAP27 channel, a “call cleared” beep is activated.

Note In a typical S4000 system installation, radio equipment is generally installed in a back room, and is not within earshot of the console operator. For this reason, some of the tones that are normally heard through the MAP27 radio hardware are optionally provided through the console application.

MDC-1200 System Parameters

Tip Navigate to this area from the main window in RDPS by clicking on the **CCE cards** in the upper right, then **System Parameters, MDC-1200 System Parameters**.

Figure 64: MDC-1200 System Parameters window



The parameters listed here are not shown in RDPS unless the **Full-Featured MDC-1200** option is selected. Also, these features are not used by IntegratorRD consoles unless they have the appropriate optional license installed at every position.

If **Basic MDC-1200** is selected:

- No MDC-1200 encoding is supported
- MDC-1200 decoding supported are: emergency and non-emergency PTT ID
- Only Emergency Acknowledge and Emergency Tone channel parameters are configurable, but the Extended Paging option for the console is required in order to send the Ack as a message from the base station over the air

Caution! If a Zetron iRIM is in use, the Emerg Ack function is not transmitted to the radio network due to design limitations.

If **Full-featured MDC-1200** is selected:

- MDC-1200 license is required per position
- All MDC-1200 encoding and decoding are supported

Table 100: MDC-1200 System Parameters window

Parameter/Area	Purpose
Tone Setting	If **Side Tone** is enabled, the workstation sends a tone for the duration of MDC-1200 signaling. If **Talk Beep** is enabled, the workstation sends a go-ahead-to-talk beep when MDC-1200 signaling is completed and voice transmission may begin. Both tone settings are ignored if the transmitting channel has voice delay enabled.
Selective Call Mode	If set to toggle, after selective call is activated, it stays active until the selective call button is pressed again. If set to momentary, after the transmission is complete, the selective call function is automatically deactivated.
Emergency Mode	In normal mode, when an emergency alert is sent, the workstation provides visual feedback, whereas in silent mode, it does not. If an Emergency Channel and (optionally) Frequency are programmed any Emergency Alert will be sent on this Emergency Revert Channel and Frequency. If no Emergency Channel is programmed the currently selected channel is used.
Confirmation	The workstation system may be configured to require a confirmation before sending a Call Alert, Emergency Alert, Emergency Acknowledge (manual initiation only), Radio Check, Status Request, Radio Disable, Radio Enable, Radio Monitor Enable or Radio Monitor Disable. When required the confirmation is requested after the subscriber and function is selected. It summarizes these two selections. For a description of these commands, see *Confirmation (MDC-1200 Commands)* on page 287.
Password	If a password is defined, the dispatcher must enter the password to confirm certain commands such as enabling and/or disabling the Radio and Remote Monitor.
Emergency Channel	Select the channel where emergency calls should be routed to. Only MDC-1200 channels are displayed here.

Confirmation (MDC-1200 Commands)

Call Alert	Call alert is a no-voice transmission call to a particular radio ID.
Emergency Alert	Emergency alert is a radio channel declaring an emergency.
Emergency Acknowledge	This message is sent as a response to an emergency alert to the radio that sends the emergency.
Radio Check	Radio check is sent to a radio ID requesting its acknowledgement.
Status Request	Status request is sent to a radio ID requesting its current status.
Status Update	Status update is sent to an MDC-1200 channel to update its status.
Radio Disable*	This message is sent to a radio to disable itself.
Radio Enable*	This message is sent to a radio to re-enable itself.
Remote Monitor* Disable	This message is addressed to a radio to instruct it to close its microphone.
Remote Monitor* Enable	This message is addressed to a radio to instruct it to open its microphone.
* These commands can be selectively password-protected by enabling them in the **Password** section.	

Miscellaneous Parameters

Tip Navigate to this area from the main window in RDPS by clicking on the **CCE cards** in the upper right, then **System Parameters, Miscellaneous Parameters**.

Figure 65: (Miscellaneous) System Parameters window

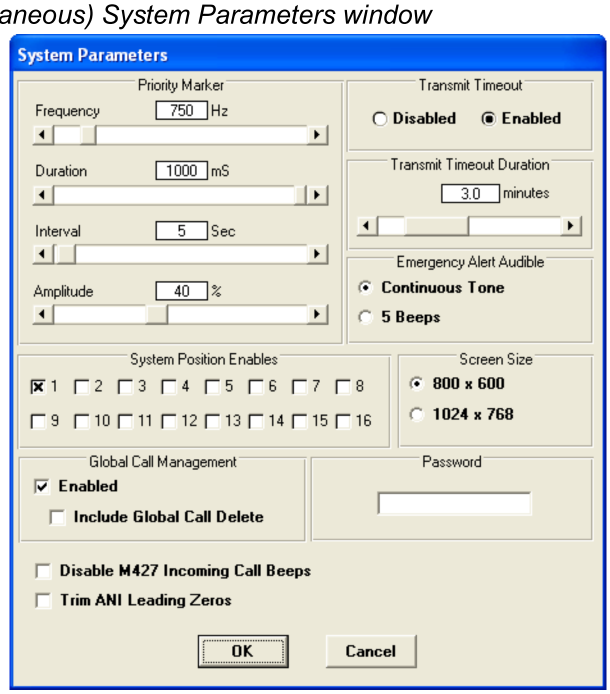


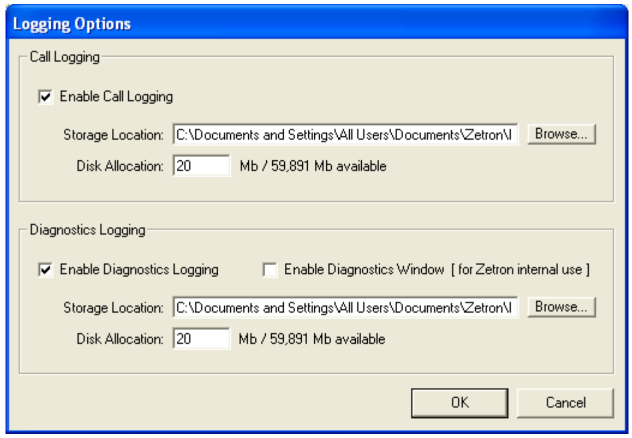
Table 101: (Miscellaneous) System Parameters window

Parameter/Area	Purpose
Priority Marker	A priority marker tone is issued when the Priority Marker key is pressed for a selected channel. The priority marker entry fields specify the frequency, duration, interval, and amplitude of the marker tone. Table 99 identifies the range limits on each entry. Frequency: 600 to 2000 Hz Duration: 50 to 1000 ms Interval: 1 to 300 seconds Amplitude: 1 to 100 percent
Transmit Timeout	The transmit timeout is the maximum amount of time a channel can be keyed before the channel is automatically released. The default timeout period is three minutes. You may select from "Disabled" or values between one minute and 10 minutes in one-minute intervals.
Emergency Alert Audible	This configures what type of alert audible activated by IntegratorRD on receiving an emergency call. If "Continuous Tone" is selected, to deactivate the alert, use the Alarm Ack or Review ANI key.
System Positions Enables	When enabling a console position, you designate which positions are available for position-to-position features, such as Console Intercom or Console Takeover. Positions should be enabled for any Zetron console in your system, including both IntegratorRD and button-based consoles.
Screen Size	IntegratorRD supports two screen sizes. If Chinese/Arabic language support is selected, the screen option will be disabled and forced to 1024 x 768.
Global Call Management	This option allows other positions to be informed when a call or alarm has been handled by a position. When "Global Call Management" is enabled, deactivating alarm with Alarm Ack key, reviewing an RSC mode ANI or an emergency PTT ID mode ANI, or replying to a call from one position will be updated to all other IntegratorRD positions. Other positions shall also be informed when a call entry is removed from Call History window using the Call Delete key by enabling "Include Global Call Delete" option.
Disable M427 Incoming Call Beeps	This option allows you to disable incoming call beeps on MAP27 channels connected to an M427. Mark **Yes** to disable the beeps.
Trim ANI Leading Zeros	When IntegratorRD receives PTT-IDs for which no alias is found, it displays the entire ID, including leading zeros. Enable this option to prevent leading zeros from being displayed.

Logging Options

Tip Navigate to this area from the main window in RDPS by clicking on the **CCE cards** in the upper right, then **System Parameters, Logging Options**.

This window is used to configure call data logging and diagnostic logging.



Enable Call Logging saves call data in daily log files. **Enable Diagnostic Logging** saves diagnostic data in hourly log files. This diagnostic data tracks communication between CIC and consoles and records critical errors and miscellaneous information. Diagnostic logging data is used by Zetron for troubleshooting.

The log files are saved to the folder specified in **Storage Location**. **Disk Allocation** sets the maximum amount of drive space to use for log files. When this limit is reached, the oldest log files are deleted as needed to make room for newer log files.

Default location for log files in Windows XP:
C:\Documents and Settings\All Users\Documents\Zetron\IntegratorRD\CallLogs
C:\Documents and Settings\All Users\Documents\Zetron\IntegratorRD\DiagnosticLogs

Default location for log files in Windows 7:
C:\Users\Public\Public Documents\Zetron\IntegratorRD\CallLogs
C:\Users\Public\Public Documents\Zetron\IntegratorRD\DiagnosticLogs

Note This is the default location for the current version of IntegratorRD. The default location for prior versions varies.

Defining Radio Groups

- *iDEN Radio Groups* on page 290
- *SDC Radio Groups* on page 290
- *Defining MAP27 Radio Groups* on page 291
- *Defining MDC-1200 Radio Groups* on page 292

iDEN Radio Groups

Tip Navigate to this area from the main window in RDPS by clicking **Define Lists, Radio Groups, iDEN Radio Groups**.

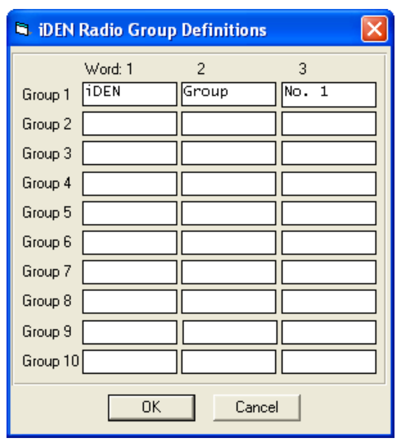
iDEN Radio groups associate similar iDEN radios into a group that the console operator can select. The Define Lists/Radio Groups/iDEN Radio Groups menu presents an entry form for assigning labels up to 10 radio groups.

If one or more radio groups are defined, selecting the iDEN Call menu button displays, to the console operator, labeled buttons for selection. When the operator clicks on one of the radio group buttons, all iDEN subscriber IDs that are associated to that group are displayed. If no radio group labels are defined, all iDEN subscriber IDs are displayed when the operator selects the console iDEN Call menu button.

Assigning a Radio Group Label

The Radio Group Label can be one, two, or three 6-character words that are shown on the console screen buttons for the radio group. See Figure 66.

Figure 66: iDEN Radio Group Definition Dialog Box



SDC Radio Groups

Tip Navigate to this area from the main window in RDPS by clicking **Define Lists**, **Radio Groups**, **SDC Radio Groups**.

SDC Radio groups associate similar SDC radios into a group that the console operator can select. The **Define Lists**/**Radio Groups**/**SDC Radio Groups** menu presents an entry form for assigning labels up to 10 radio groups.

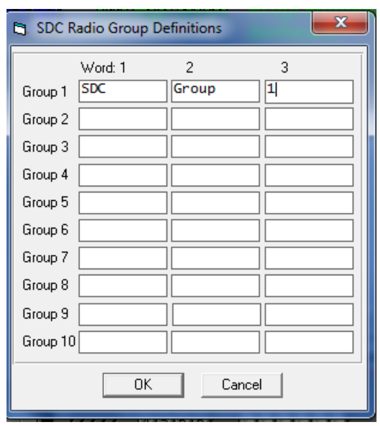
Note Due to current limitations for the SDC interface to the Series 4000 Dispatch console system, each SDC radio channel is limited to supporting a single subscriber ID, therefore, each SDC radio "group" will contain only a single subscriber ID.

If one or more radio groups are defined, selecting the SDC Call menu button displays, to the console operator, labeled buttons for selection. When the operator clicks on one of the radio group buttons, all SDC subscriber IDs that are associated to that group are displayed. If no radio group labels are defined, all SDC subscriber IDs are displayed when the operator selects the console iDEN Call menu button.

Assigning a Radio Group Label

The Radio Group Label can be one, two, or three 6-character words that are shown on the console screen buttons for the radio group. See Figure 67.

Figure 67: SDC Radio Group Definition Box



Defining MAP27 Radio Groups

Tip Navigate to this area from the main window in RDPS by clicking **Define Lists, Radio Groups, MAP27 Radio Groups**.

MAP27 Radio groups associate similar MAP27 radios into a group that the console operator can select. The Define Lists/Radio Groups/MAP27 Radio Groups menu displays an entry form for assigning labels up to 10 radio groups. If one or more radio groups are defined, selecting the Map27 Call menu button displays, to the console operator, labeled buttons for selection.

When the operator clicks on one of the radio group buttons, all the MAP27 subscriber IDs that are associated to that group are displayed. If no radio group labels are defined, all MAP27 subscriber IDs are displayed when the operator selects the console MAP27 Call menu button.

Assigning a Radio Group Label

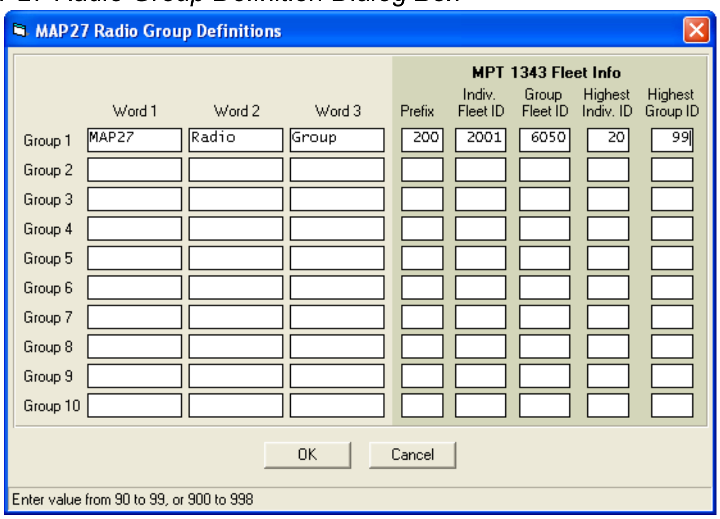
The Radio Group Label can be one, two, or three 6-character words that are shown on the console screen buttons for the radio group. See Figure 68.

Assigning MPT 1343 Fleet Info

Through RDPS, each MAP27 Radio Group (up to 10) can be programmed with its own MPT 1343 Fleet Info, which includes 'Prefix', 'Individual Fleet ID', 'Group Fleet ID', 'Highest Individual ID', 'Highest Group ID'.

With this information programmed, Integrator RD is able to determine which fleet a MAP27 radio belongs to, and display its corresponding Alias text (if defined).

Figure 68: MAP27 Radio Group Definition Dialog Box



Note In order for this lookup scheme to work, Integrator RD must make an assumption. This assumption puts specific radio configuration requirements on the installer, which is that all fleet numbering must begin at the respective minimum MPT 1343 ID (20, 90, 200, 900) and increment successively.

Defining MDC-1200 Radio Groups

Tip Navigate to this area from the main window in RDPS by clicking **Define Lists, Radio Groups, MDC-1200 Radio Groups**.

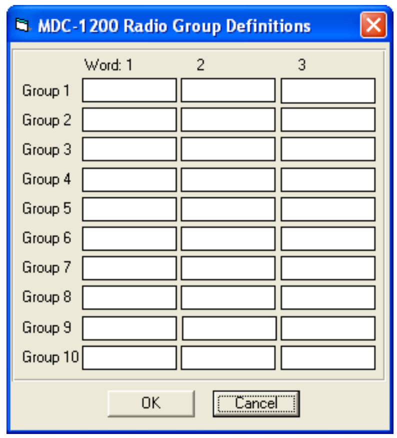
MDC-1200 Radio groups associate similar MDC-1200 radios into a group that the console operator can select. The Define Lists/Radio Groups/MDC-1200 Radio Groups menu presents an entry form for assigning labels to up to 10 radio groups.

If one or more radio groups are defined, selecting the MDC-1200 Call menu button displays labeled buttons for group selection. When the operator clicks on one of the radio group buttons, the MDC-1200 subscriber IDs that are associated with that group are displayed. If no radio group labels are defined, all MDC-1200 subscriber IDs are displayed when the operator selects the console MDC-1200 Call menu button.

Assigning a Radio Group Label

Radio Group Labels can be one, two, or three 6-character words that are shown on the console screen buttons for the radio group. See Figure 69.

Figure 69: MDC-1200 Radio Group Definition Dialog Box



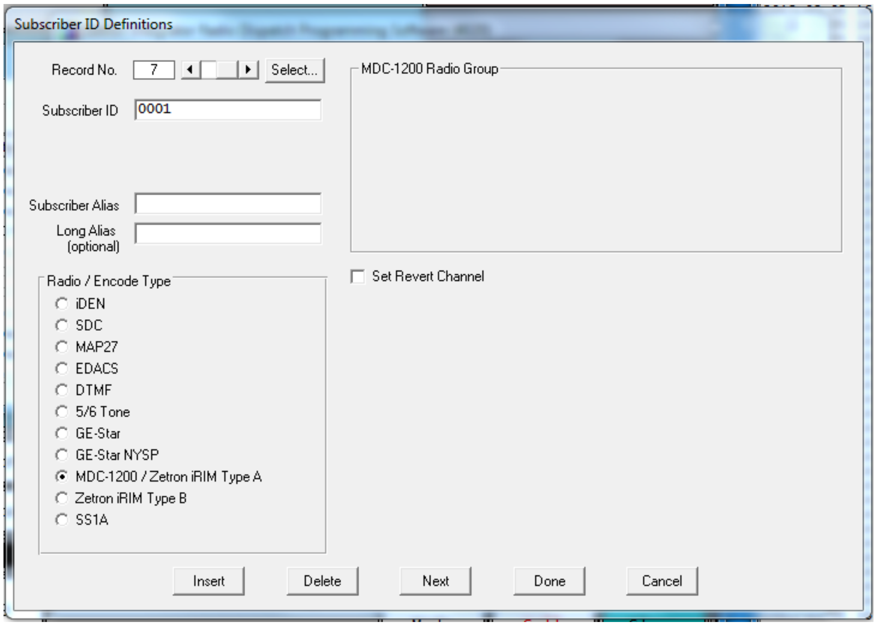
Entering Subscriber ID Definitions

Tip Navigate to this area from the main window in RDPS by clicking **Define Lists, Subscriber ID Definitions**.

The Define Lists/Subscriber ID Definitions main menu selection allows you to assign two aliases, or names, to a radio ID. You may enter from one to 10 characters for the subscriber alias and up to 20 characters for the long alias.

The subscriber alias will be displayed on the console channel display when a private call is received from that radio. The long alias will be displayed in the Call History window. If no long alias is programmed for a radio ID, then the short alias will be displayed in the Call History window. See Figure 70.

Figure 70: Configure Subscriber ID Aliases Dialog Box



For MDC-1200 only, each subscriber may have a revert channel and frequency. Any calls made to this subscriber are sent on this revert channel and frequency. See Figure 70.

Adding or Removing a Subscriber ID Alias

You may only associate one alias for an ID number. When RDPS is first started, only one (blank) alias per configuration is defined. As a blank is filled, pressing ENTER over the subscriber alias, or the NEXT button, creates another blank entry. Clicking DONE saves the entry and exits the screen. To delete an alias, click DELETE.

The following table provides the valid range of subscriber IDs for each supported radio type:

Table 102: Subscriber IDs

Radio Type	Valid Ranges for Subscriber IDs
5/6 Tone DTMF GE-Star SS1A	1 to 999999
iDEN	iDEN IDs must follow these specifications: • For standard iDEN IDs, the ID must be between 1 to 65535. • For Nationwide Direct Connect (NDC) iDEN IDs, use an asterisk to separate the fields for an ID with more than one field. • For IDs with two fields separated by an asterisk, the format is "fleet*member". The valid range for each field is 1 to 1048575 and the maximum length of the ID is 15 characters. • For IDs with three fields separated by asterisks, the format is "urban*fleet*member". The valid range for each field is 1 to 1048575 and the maximum length of the ID is 15 characters. • The binary value of the combined numeric value of all fields must not exceed 35 bits in length.
SDC	SDC IDs must follow these specifications: • For standard SDC IDs, the ID must be between 1 to 65535. • For Nationwide Direct Connect (NDC) SDC IDs, use an asterisk to separate the fields for an ID with more than one field. • For IDs with two fields separated by an asterisk, the format is "fleet*member". The valid range for each field is 1 to 1048575 and the maximum length of the ID is 15 characters. • For IDs with three fields separated by asterisks, the format is "urban*fleet*member". The valid range for each field is 1 to 1048575 and the maximum length of the ID is 15 characters. The binary value of the combined numeric value of all fields must not exceed 35 bits in length.
MAP27	If fleet information was previously configured for the MAP27 radio groups, the fleet information will display here when you select MAP27 as the Radio / Encode Type. Also, the subscriber ID will be validated against the fleet information. MAP27 IDs must be between 2 to 20 digits and use one of the following six formats: • 2-digit ID (for example, 25) • 3-digit ID (for example, 256) • 6-digit ID, base: 4 digits and ID: 2 digits (for example, 201025) • 7-digit ID, base: 4 digits and ID: 3 digits (for example, 2010256) • 9-digit ID, prefix: 3 digits and base: 4 digits and ID: 2 digits (for example, 260201025) • 10-digit ID, prefix: 3 digits and base: 4 digits and ID: 3 digits (for example, 2602010256)

Radio Type	Valid Ranges for Subscriber IDs
EDACS (Also used for P25)	For EDACS: 1 to 16383 For P25: 1 to 16777215 Because the valid range for P25 is longer than for EDACS, it is possible to enter an invalid EDACS ID.
GE-Star NYSP	This is a special format reserved for NYSP. Using this format requires a separate Zetron software license.
MDC-1200 or Zetron iRIM Type A	Hexadecimal value from 0001 to FFFF
Zetron iRIM Type B	For FleetSync: FFF-IIII where FFF is the fleet number (100 - 349) and IIII is the member ID number (1000 - 4999) For P25: DDDDDDDD where D is a digit 0 through 9 and the valid numerical range is 00000001 through 16777215.

Note Please reference Motorola's network and radio ID specifications for NDC to ensure that you are using the correct ID structures. Zetron does not currently support the use of Out Of Range (OOR) members in the IDs (transmit only). Received calls are still passed to the console.

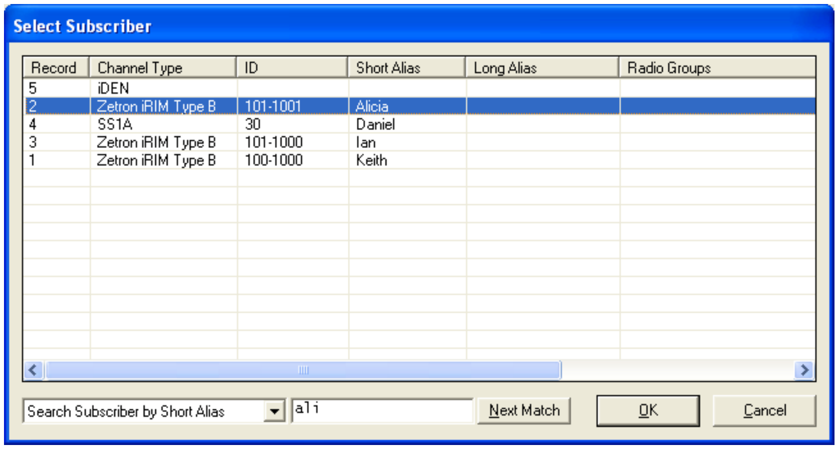
For iDEN, MAP27, and MDC-1200, a subscriber can be added to more than one radio group.

Finding and Selecting a Subscriber ID Alias

There are two ways to find and select a Subscriber ID. The simplest method is to use the scroll bars or arrows next to the **Record No.** field. Use these controls to quickly or individually browse through the list. Note that, when changing the alias number, the entry information shown is automatically saved and a warning popup tells you to check the number.

If the subscriber list is rather large or you need a more advanced method of finding a subscriber ID, click **Select**. This opens the **Select Subscriber** window. In this window you can click column headings to sort subscriber entries based on alphabetical or numerical ordering of any of their properties. You can also perform a text search by selecting which property you'd like to search and typing in the appropriate text in the search bar. When you have found the ID you were looking for, select it and click **OK** to return to the editing window.

Figure 71: Select Subscriber window

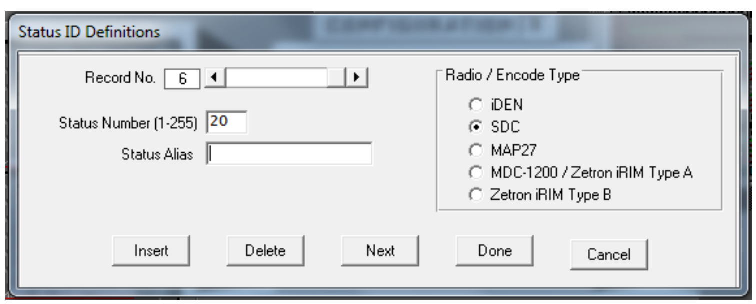


Entering Status ID Definitions

Tip Navigate to this area from the main window in RDPS by clicking **Define Lists, Status ID Definitions**.

The Define Lists/Status ID Definitions main menu selection allows you to assign a one to 10 character alias, or name, to a status ID (iDEN, SDC, MAP27, MDC-1200 / Zetron iRIM Type A, or Zetron iRIM Type B channels). This name is then displayed on the console display when a status call is received from a field radio. See Figure 72.

Figure 72: Configure Status ID Aliases Dialog Box



Adding or Removing a Status ID Alias

The following is the value range of the status ID for each supported radio type:

- iDEN: 1 to 255
- SDC: valid status IDs are 1 to 20 (Call Alerts are not supported at this time)
- MAP27: 1 to 31
- MDC-1200 or Zetron iRIM Type A: 1 to 255
- Zetron iRIM Type B: 10 - 99

Only one alias can be associated for each status number. When RDPS is first started, only one (blank) user per configuration is defined. As a blank is filled, pressing ENTER over the status alias field, or click NEXT to create another blink entry. Pressing the DONE button saves the entry and exits the screen. To delete an entry, select the entry and click DELETE.

Selecting a Status ID Alias

The record number field allows you to select the entry to be edited by using the associated scroll bar. Please note that, when changing you number, the entry information shown is automatically saved.

Entering Talk Group Definitions

Tip Navigate to this area from the main window in RDPS by clicking **Define Lists, Talk Group Definitions**.

The Define Lists/Talkgroup Definitions menu selection allows you to assign a one to 10 character alias, or name, to a talk group. This name is displayed on the console display when a talk group call is received from a talk group.

The channel selection boxes allow you to associate aliases with one or more channels. Using this feature, it is possible to associate one ID with several aliases unique to the specified channel(s). The talk group definitions also define the list of groups that an iDEN radio can scroll through using the talk group up and down buttons.

Adding or Removing a Talkgroup

When you start RDPS, only one alias per position is defined. As a blank is filled, pressing ENTER after the talk group name field, or clicking NEXT, creates another blank entry. Clicking the DONE button saves the entry and exits the scan. To delete a talk group, select that talk group and click DELETE.

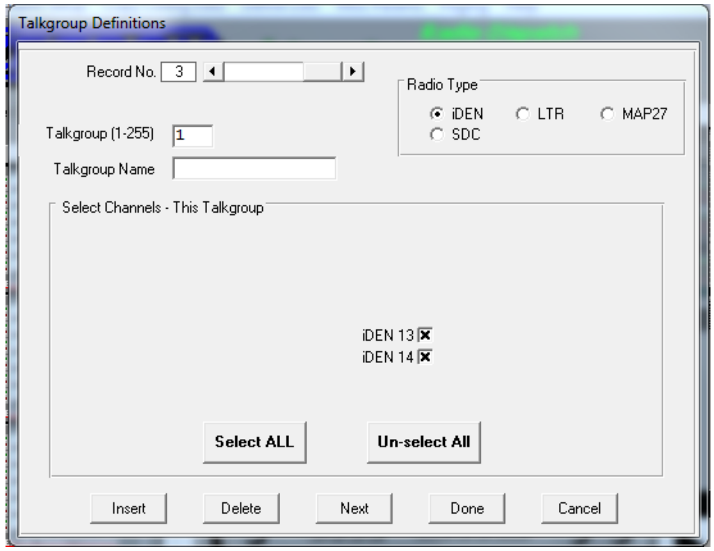
Selecting a Talkgroup Alias

The record number field allows the selection of a user for editing by using the associated scroll bar. Please note that, when the user number is changed, the entry information is automatically saved.

Entering the iDEN Talkgroup

You may associate up to 255 talk group numbers. Each group number may have several aliases but those aliases can not have the same channels assigned to each of them. Channels are not available (the Select Channels area is blank) if they have not yet been programmed. See Figure 73.

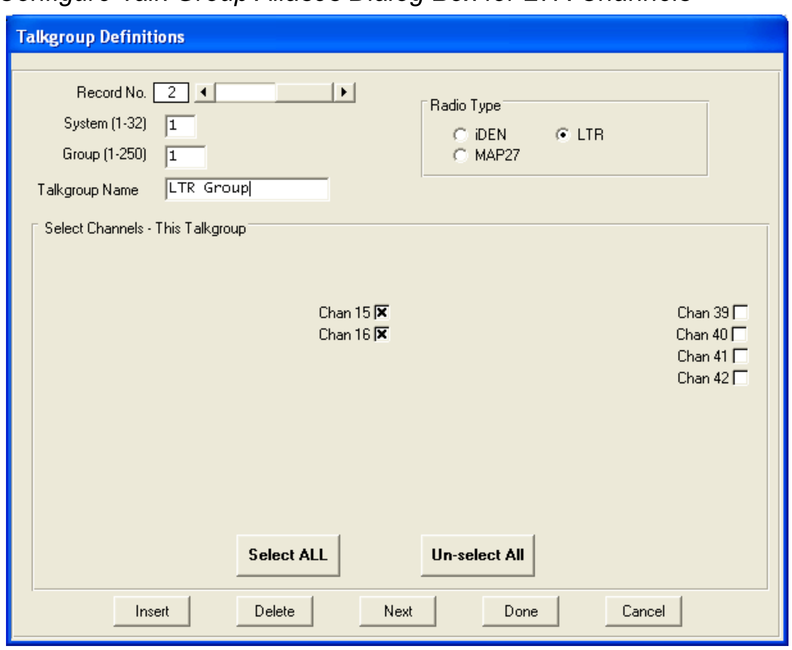
Figure 73: Configure Talkgroup Aliases Dialog Box for iDEN Channels



Entering the LTR System Talkgroup

For each group associated with an LTR channel, the LTR System and LTR Group must be selected. LTR Systems range from one to 32; Groups range from one to 250. Each system/group combination may have several aliases associated to it but may not have the same channels assigned to each of them. Channels are not available (the Select Channels area is blank) if they have not yet been programmed. See Figure 74.

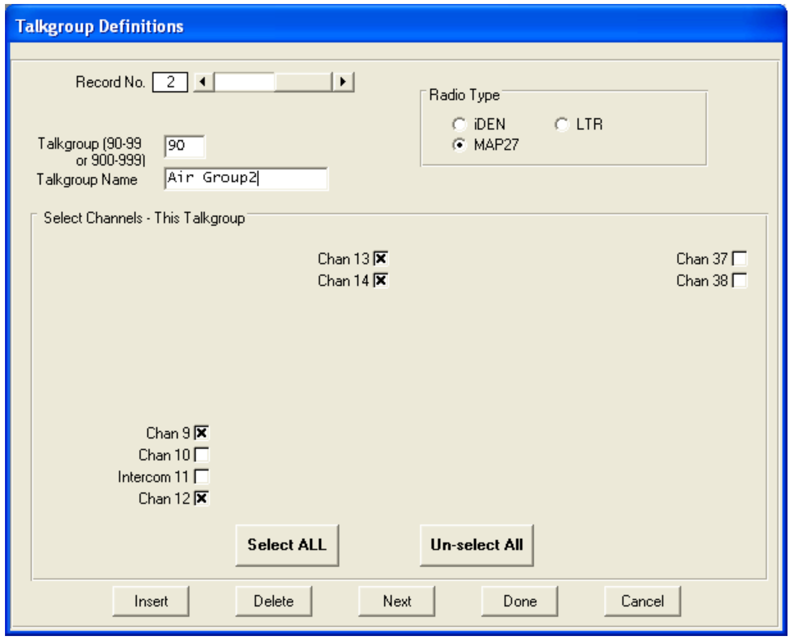
Figure 74: Configure Talk Group Aliases Dialog Box for LTR Channels



Entering the MAP27 Talkgroup

You may associate talk group numbers between 90 to 99, or 900 to 998. Each group number can have several aliases, but these aliases can not have the same channels assigned to each of them. Channels are not available (grayed) if they have not yet been programmed. See Figure 75.

Figure 75: Configure Talk Group Aliases Dialog Box for MAP27 Channels

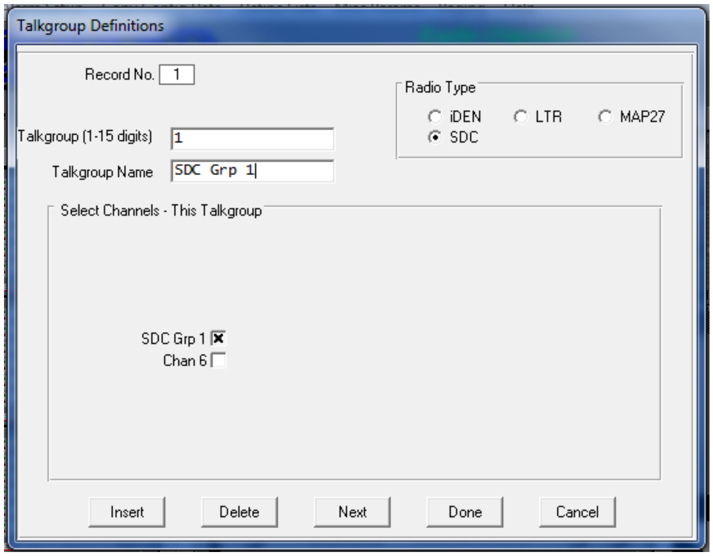


Entering the SDC Talkgroup

While the SDC format shares a great deal with the iDEN format, there are limitations in its implementation in the Series 4000 system that cause the Talkgroup Definitions window to change a bit when SDC is selected. The important limitations are:

- The Talkgroup ID number is any number from 1 to 15 digits in length
- SDC only allows a single channel to be selected per talkgroup
- SDC only supports a single talkgroup per channel, so already used channels will be visible but not available (grayed out)

Figure 76: Configure Talk Group Aliases for Dialog for SDC channels

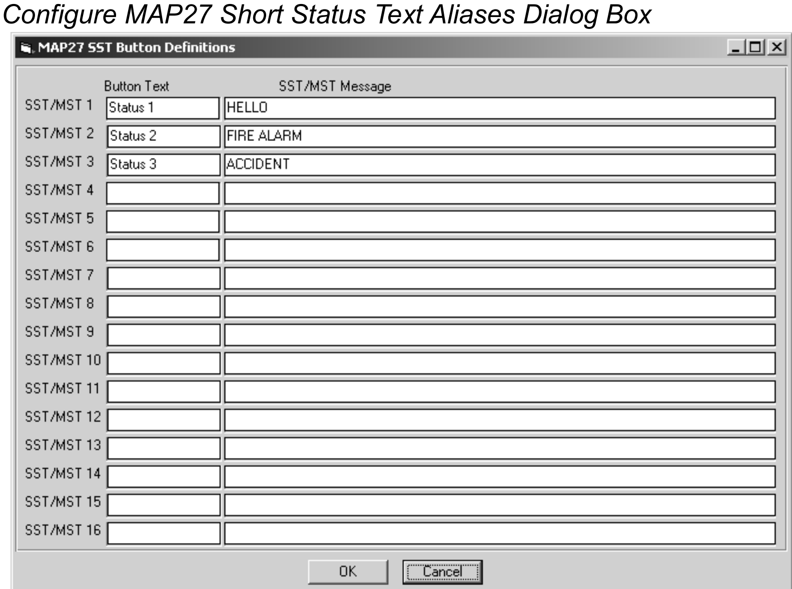


Entering MAP27 Short Status Text Definitions

Tip Navigate to this area from the main window in RDPS by clicking **Define Lists, MAP27 SST/MST Definitions**.

The Define Lists/MAP27 SST Definitions menu selection allows you to assign a one to 10 character alias, or name to a text message (up to 100 characters). This name is displayed on the console screen buttons for SST message. The short status message can be sent to any valid MAP27 ID. Up to 16 status text messages may be programmed. See Figure 77.

Figure 77: Configure MAP27 Short Status Text Aliases Dialog Box



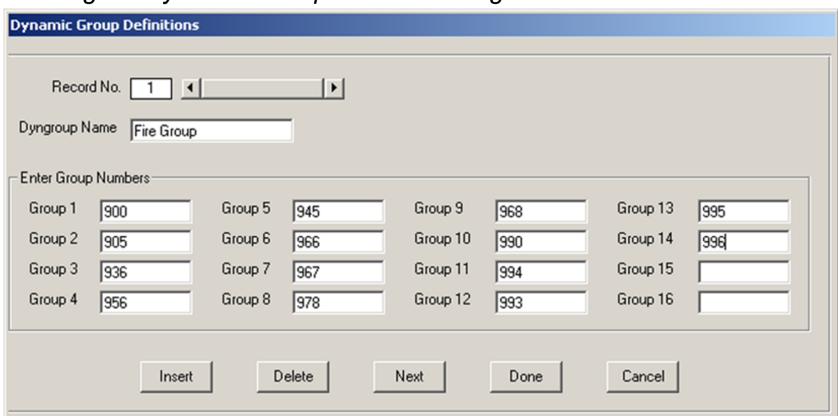
Entering Dynamic Group Definitions (MAP27 Channels)

Tip Navigate to this area from the main window in RDPS by clicking **Define Lists, DynamicGroup Definitions**.

The Define Lists/Dynamic Group Definitions menu selection allows you to assign a one to 10 character alias, or name, to a dynamic group alias. This name displays on the console screen buttons for dynamic group.

You may assign up to 16 groups to an alias. A dynamic group may be assigned to a radio ID so that the radio can listen to any activities on groups that are associated with that dynamic group. See Figure 78.

Figure 78: Configure Dynamic Group Aliases Dialog Box

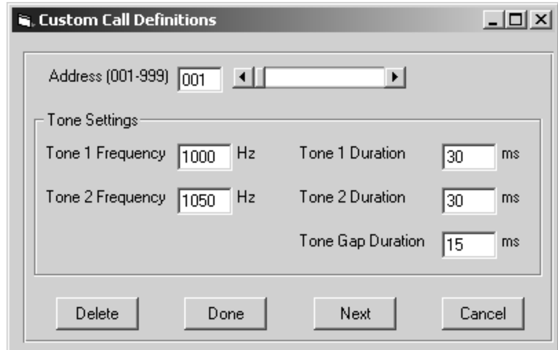


Entering Custom Call Definitions

Tip Navigate to this area from the main window in RDPS by clicking **Paging, Custom Call Definitions**.

The Define Lists/Custom Call Definitions menu selection allows you to assign a set of tone frequencies and duration to an address number. You may program an instant call page with a capcode consisting of a leading digit that is programmed as custom call paging format and a 3-digit address number defined in this custom call menu. Up to 999 custom call definitions are allowed. See Figure 79.

Figure 79: Configure Custom Call Definitions Dialog Box



Setting Up the Position Audio and Display Functions

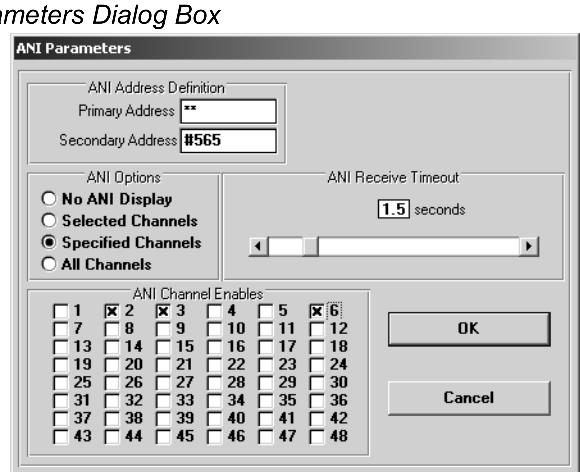
As described earlier, each system consists of up to 16 console configurations. Each configuration is independently enabled and various audio display control features can be specified. The Miscellaneous Parameters main menu provides selections for ANI, Miscellaneous, and Volume and Muting parameters.

Selecting the ANI Options

Tip Navigate to this area from the main window in RDPS by clicking **Misc Params, ANI Parameters**.

For systems with optional ANI decoding, the Dispatch Workstation can be set up to detect the ANI and display it with the associated channel. The following paragraphs describe the different ANI selections. See Figure 80.

Figure 80: ANI Parameters Dialog Box



ANI Options

ANI decoding is enabled for “Selected Channels” only, for a set of “Specified Channels”, or for “All Channels”. Choose “No ANI Display” to disable the ANI decoding option.

ANI Receive Timeout

Use the scroll bar to select the number of seconds the console should delay after receiving the last ANI digit before decoding and displaying the ANI identification. Typically, 1 or 2 seconds is sufficient for automatic ANI calling and 5 seconds for manual ANI calls.

Primary/Secondary ANI Addresses

Each console position can have an address assigned to it. These addresses are used to select only ANI calls with that address encoded in the ANI. Normally, the primary address is used to select an individual console, while the secondary address is used to provide a group call to all consoles. For a group call, the secondary address should be set the same for all of the positions in the system.

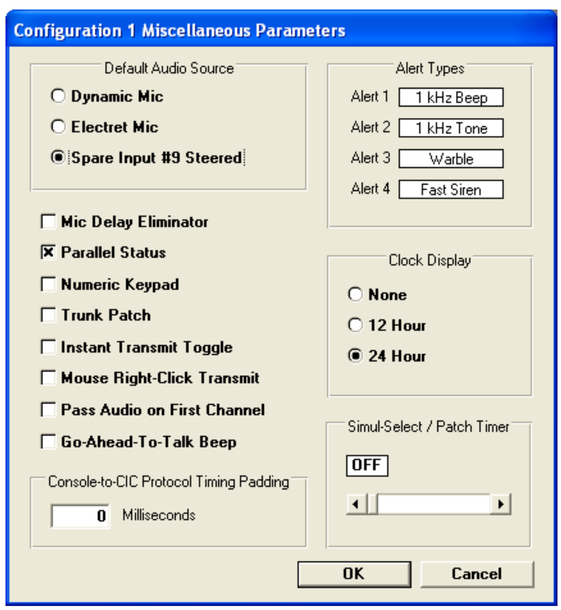
Specified Channels Enabled

When **Specified Channels** is selected for the **ANI Option**, a list of channels appears. Use the check boxes to specify which channels should respond to incoming ANI digits. Mark a box to enable a channel or clear the box to disable a channel. See Figure 80.

Miscellaneous Parameters

Tip Navigate to this area from the main window in RDPS by clicking **Misc Params, Miscellaneous Parameters**.

Figure 81: Configuration 1 Miscellaneous Parameters



Selecting the Default Audio Source

This selection defines which microphone and speaker are active according to the console configuration.

In all but unusual situations, the selection "Spare input #9 steered" should be chosen. This selection allows for console configurations with different combinations of gooseneck microphone, desk microphone, headset, and TRHI (Telephone/Radio Headset Interface) connections. The other selections, "Dynamic MIC" and "Electret MIC" are not applicable to the IntegratorRD workstation.

"Spare input #9" steering, detects the state of a headset jack and phone hook switch to direct microphone audio depending on the PTT selection. If the system does not have a headset or TRHI, the default states for these switches provide for normal operation of a standard gooseneck or desk microphone.

These abbreviations are used in the following look-up tables.

Transmit buttons:	D.PTT = Gooseneck/desk Mic PTT E.PTT = Footswitch or Headset PTT X.PTT = Screen or Keyboard XMIT
Microphones:	D.MIC = Goose/desk Mic E.MIC = Handset or Headset Mic
Audio Output:	SPKR = Console panel Speaker HDST = Headset speaker

Table 103 and Table 104 identify the different modes.

Table 103: Microphone Source Look-up Table

PTT SWITCH	HEADSET JACK	PHONE (TRHI)	MIC SOURCE
D.PTT	(do not care)	(do not care)	D.MIC
E.PTT	Plugged in	(do not care)	E.MIC
	Removed	(do not care)	D.MIC
X.PTT	Plugged in	(do not care)	E.MIC
	Removed	(do not care)	D.MIC

Table 104: Receive Audio Output Look-up Table

HEADSET JACK	PHONE (TRHI)	RX AUDIO	PHONE AUDIO
Plugged in	On-hook	HDST	(N/A)
Plugged in	Off-hook	SPKR	HDST *
Removed	(N/A)	SPKR	(N/A)
* When a headset is plugged in to the TRHI with the phone off-hook and no PTT is pressed, the headset mic will be open to the phone and phone audio will be heard through the headset.			

For systems that may include only a handset microphone, you may select "Hookswitch steering." See Table 105 and Table 106.

Table 105: Microphone Source Look-up Table (Hookswitch Controlled)

PTT SWITCH	HEADSET JACK	HANDSET	MIC SOURCE
D.PTT	(do not care)	(do not care)	D.MIC
E.PTT	Plugged in	On-hook	D.MIC
	Removed	Off-hook	E.MIC
X.PTT	Plugged in	On-hook	D.MIC
	Removed	Off-hook	E.MIC

Table 106: Receive Audio Output Look-up Table (Hookswitch Controlled)

HANDSET	RX AUDIO
On-hook	SPKR
Off-hook	HDST

Alert Types

For each console Alert button, you may specify one of six different tone options. The tone options are: 1 kHz Beep, 1 kHz Tone, Fast Siren, Slow Siren, Warble, and M25 Warble.

MIC Delay Eliminator

This selection enables the PTT delay after the transmit button is released. Select "Yes" or "No" to enable or disable the PTT delay.

Parallel Status

Enabling the Parallel Status option allows Tone and DC control remote status from other positions to be reflected at this position. For example, if position 1 sets the frequency on channel 2 to F3, then the remaining positions (parallel status enabled) display and set the frequency to F3.

Select "Yes" to enable parallel status reporting. Select "No" to disable parallel status reporting.

Numeric Keypad

This selection enables the 10-key keypad to be used for number entry. Select "Yes" or "No" to enable or disable the number entry. If the "Numeric Keypad" feature is "Enabled" in RDPS, then the "Home", "End", left-arrow (←), and right-arrow (→) functions are not available.

Trunk Patch

This selection allows the including of a trunking channel (such as LTR or EDACS) in a cross-channel patch.

Note Patching does not support MAP27 channels at this time.

Select “Yes” or “No” to enable or disable patching involving trunking channels.

Instant Transmit Toggle

If this feature is enabled, the Instant Transmit button in IntegratorRD will toggle. While this button is toggled ON, the channel windows are in instant transmit mode (touching/clicking on the channel windows will instantly transmit on that channel while the channel window/button is depressed). Likewise, transmission will end upon release of this channel window/button.

There are side effects when **Inst Xmit** is toggled on:

- Channel windows are in instant transmit mode (touching/clicking on the channel windows will instantly transmit on that channel while the channel window/button is depressed). Transmission will end upon release of this channel window/button.
- The only way to select a single channel is to double-click the channel button. As a side effect of the **Inst Xmit** toggled on, a brief instant transmit will occur during the double-click.
- There is no way to highlight or simul-select channels. To perform either of these tasks, first toggle **Inst Xmit** off.
- If Mouse Right-Click Transmit is also enabled, touching (or left-clicking on the mouse) anywhere in the unassigned channel area will initiate a transmit on currently selected channels. While this is by design, touch screen users may not realize the consequences of this feature, as it is easier to accidentally transmit if they rest their finger on the unassigned channel area.

Mouse Right-Click Transmit

Enable this feature to allow right-click transmit in the unassigned channel area. Right-click transmit mimics the instant transmit feature of right-clicking on an unselected channel, except the right-click occurs in the unoccupied region of the channel area. The transmission occurs on the currently selected channel(s).

Pass Audio on First Channel

This feature is disabled by default. When disabled, IntegratorRD requires all selected channels to be acquired prior to passing audio.

Enabling this feature causes in the following behavior. When a dispatcher initiates a transmit request for multiple selected channels (simul-selecting multiple channels and effectively pressing PTT), IntegratorRD allows audio for each channel as the channel is acquired.

This allows the dispatcher to begin conveying his message as early as the first channel being acquired. As subsequent channels are also acquired, the dispatcher is peripherally notified by the inherent "busy" indicator on the channel window and/or the go-ahead beep (depending on radio types). The dispatcher can then make a decision to repeat the message as necessary.

When the dispatcher completes transmission, this effectively releases PTT. Upon releasing PTT, all channels that were successfully acquired will be released. All channels that had not yet been acquired shall be deemed a transmit failure. These channels, along with all of the explicit transmit failures, shall be marked as transmit failures. Marking channel transmit failures shall take the form of displaying a textual indicator ("NoTx") in the channel status button's 'busy' field. The "NoTx" indicator persists until a subsequent transmit attempt is made (on any channel, our group of channels).

Go-Ahead-To-Talk-Beep

If a PTT request occurs during a paging transmission, IntegratorRD queues the PTT request and activates PTT when paging is complete. However, there is a time delay after the paging tones have finished and before the audio source is switched for voice transmission. The Go-Ahead-To-Talk (GATT) Beep, if enabled, provides an audio cue to the dispatcher that PTT is now active.

Console-to-CIC Protocol Timing Padding

If consoles are connected to CIC via an IP connection such as VoIP, additional time may be necessary to allow enough time for command responses. This is due to the nature of IP communication and potential network traffic issues. If there is insufficient time, commands may fail. The amount of time needed will vary from network to network, so some experimenting is required for determining optimal settings.

Start with 200 ms and adjust up or down as needed. If a command is failing, such as keying up a radio, increase the padding. The allowable range is 0 to 5000 ms. Use the default value of 0 ms for consoles that have a dedicated wiring connection to the CIC (direct, not using IP).

Clock Display

The clock time on the CRT display may be set to **None** (no time display), **12 Hour**, or **24 Hour**.

Simul-Select/Patch Timer

This selection sets the period for the Simul-select/Patch timer (range of 1 to 60 seconds). When the timer is set to zero seconds the box above the slider will say "OFF", otherwise it will show the number of seconds to which the timer is set. This timer will automatically return Simul-select or Patch buttons to their idle states if the operator does not select a resource for use in the simul-select or patch within the period for which the timer is currently set.

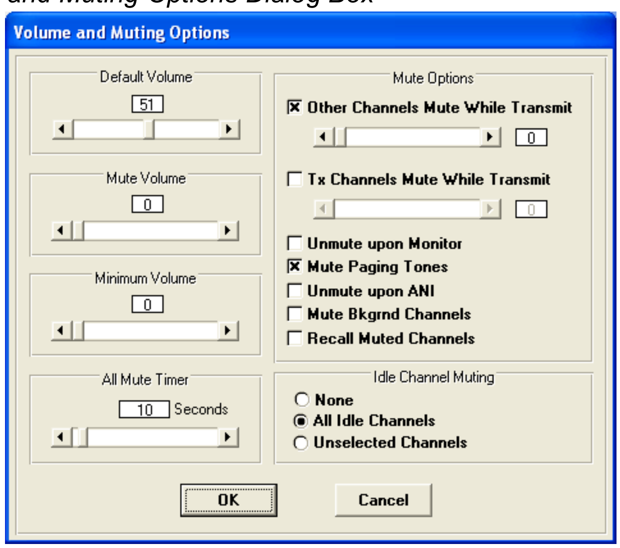
Also, if the operator presses the Simul-select or Patch button, makes the resource selection, but fails to press the Simul-select or Patch button again, the function button will still revert to its idle state when the timer reaches its timeout value.

If the timer is disabled (set to zero seconds = OFF), the operator must terminate Simul-select and patch operations manually.

Volume and Muting Options

Tip Navigate to this area from the main window in RDPS by clicking **Misc Params, Volume and Muting Options**.

Figure 82: Volume and Muting Options Dialog Box



Setting the Volume Control Levels and All-Mute Timer

The operator may set the speaker volume settings for each position including the Default volume, Muted volume, and Minimum volume settings. Each value may be set between zero and 99 representing the percentage of total volume. The percentage entered is rounded to the nearest multiple of three.

The first time configuration is reloaded with a new setting for the Default Volume, a “Save Display” needs to be done in order for that setting to be saved for the next reload or restart. For more information on saving a display, see *Series 4000 Communication Control System Operation* (P/N 025-9535), the subsection on “Saving the Channel Display Configuration.”

The **Default Volume** is used to set the default volume level of all channels for a position.

The **Mute Volume** is used when the channel mute or all-mute key is pressed. The Mute Volume may be set between 0 and 99 percent, which represents the percentage of total volume. The resolution is 3 percent.

The **Minimum Volume** sets the lowest level that the volume can be adjusted using the console volume up/down keys.

The **All-Mute Timer** specifies the number of seconds the All-Mute is in effect before automatically reverting to unmuted operation.

Setting the Mute Options

Other Channels Mute While Transmit	This option mutes all channels other than the Tx channels when the system is transmitting. When enabled, use the slider control to set the volume level when muted (default 0).
Tx Channels Mute While Transmit	This option mutes the receive audio of full-duplex Tx channels when the system is transmitting. Generally, this should be enabled to prevent microphone feedback. When enabled, use the slider control to set the volume level when muted (default 0). When disabled, the receive audio during transmissions on a full-duplex channel is set to the current user-selected volume level. This option does not affect half-duplex channels.
Unmute upon Monitor	This option allows the channels to unmute when the CTCSS monitor function is active.
Mute Paging Tones	Select “Yes” to have the paging encoder tones muted at this position. Select “No” to hear the paging tones.
Unmute Upon ANI	If enabled, a channel will unmute upon reception of a valid ANI. A channel if muted will unmute.
Mute Bkgrnd (Background) Channels	This option allows you to mute audio from channels that are not actively displayed and do not “pop up” on channel activity. This feature is useful for multi-position systems where each dispatch position is responsible for different channels. With this option set to “Yes,” activity on selected channels does not become a distraction.
Recall Muted Channels	When this option is enabled, the previously muted channels will be muted after an All-Mute. When disabled, all channels will be unmuted after an All-Mute.

Idle Channel Muting

Muting idle channels mutes the audio from channels that do not have “call” activity. This is useful for a position that has many channels, since quiescent line noise will accumulate on the unselected speaker audio. You have the option of selecting **None**, **All Idle Channels**, or just **Unselected Idle Channels** to be muted.

If you select **All Idle Channels** or **Unselected Channels**, then the **Unmute Upon Monitor** option should be enabled or disabled.

> **Note** If you select **None** or **Unselected Idle Channels** on systems with Channel Check IRR, audio playback activated from any console position is heard at all console positions.

Text/Button Labelling

The configurable labels are categorized into three groups: Language Selection, Button Labels, Sub-Menu Labels and Text Labels.

Language Selection

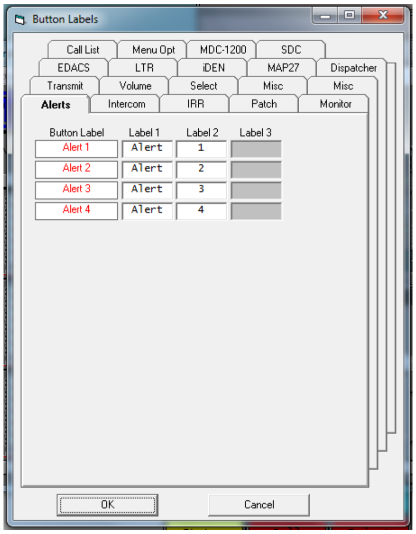
This dialog box allows you to select the language used for IntegratorRD programmable labels. If Chinese or Arabic is selected, a file will be requested for storing the Unicode translations. See Figure 83.

Figure 83: Text/Button Labels Dialog Box

Button Labels

To change the labels of a button, find the default labels for that button under “Button Label” and enter/modify the labels under “Label 1”, “Label 2” or “Label 3”. See Figure 84.

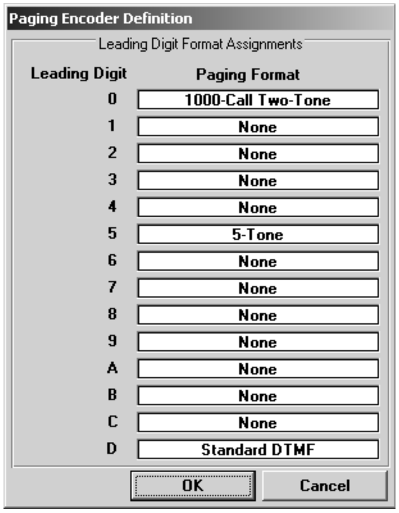
Figure 84: Button Labels Dialog



Defining the Paging Encoder Formats

All IntegratorRD workstations include standard two-tone and DTMF paging using the Model 4217B Audio Panel. If the enhanced paging option is included, then encoding for custom call, 5/6-tone, rotary dial, 2+2, and alerts is provided. From the main menu, the Paging Encoder menu allows you to define the formats and configuration for encoding in the system.

Figure 85: Paging Encoder Definition Dialog Box



Up to 14 “leading digits” can be programmed. The leading digit in the capcode entered for a page identifies the format. Any encoding format can be assigned to any leading digit. In addition, the same format is assigned to more than one leading digit. This can be useful if the system requires several different custom two-tone formats.

To assign a format to a leading digit, click the cursor over the line for the selected leading digit. A list of all available formats is displayed. Select the desired format and an entry form for the configuration of that format.

Note Changing the configuration of a leading digit, after defining one or more instant call pages that include that leading digit in their capcodes, invalidates the instant call.

100-Call Two-Tone

Table 107 provides a lookup table of the tone group frequencies. The Reach tone groups are available only through the 1000-call code plan. See Table 109.

Table 107: Tone Group Frequency Look-up Table

	Frequencies												
Group	0	1	2	3	4	5	6	7	8	9	A	B	Diag
Mot 1	0331	0349	0369	0389	0411	0434	0458	0484	0511	0539	0000	0000	0569
Mot 2	0569	0601	0635	0670	0707	0747	0789	0833	0879	0928	0000	0000	0980
Mot 3	1092	0289	0297	0305	0313	0954	0980	1007	1035	1063	0000	0000	0569
Mot 4	0322	0340	0359	0379	0400	0422	0446	0471	0497	0525	0000	0000	0569
Mot 5	0554	0585	0617	0652	0688	0727	0767	0810	0856	0903	0000	0000	0980
Mot 6	1123	1153	1185	1218	1251	1286	1321	1358	1395	1433	0000	0000	0980
Mot A	0359	0398	0442	0490	0543	0603	0668	0741	0822	0912	1012	1122	0980
Mot B	0372	0412	0457	0507	0562	0624	0692	0767	0851	0944	1047	1161	0980
Mot Z	0347	0385	0427	0473	0525	0582	0646	0716	0794	0881	0977	1084	0980
GE A’	0683	0593	0758	0803	0848	0893	0938	0548	0728	0638	0000	0000	0743
GE B’	0653	0608	0788	0833	0878	0923	0968	0518	0563	0698	0000	0000	0743
GE C’	0668	0713	0773	0818	0863	0908	0953	0533	0578	0623	0000	0000	0743
Mot 10	1473	1514	1555	1598	1642	1687	1734	1782	1831	1881	0000	0000	0000
Mot 11	1930	1989	2044	2095	2156	2212	2272	2335	2401	2468	0000	0000	0000
Reach1	1980	2704	2612	2523	2437	2354	2274	2196	2121	2049	0000	0000	0000
Reach2	1177	1608	1553	1500	1449	1400	1352	1306	1261	1219	0000	0000	0000
Reach3	1400	1912	1847	1784	1723	1664	1608	1553	1500	1449	0000	0000	0000
Reach4	0832	1137	1098	1061	1025	0990	0956	0923	0892	0862	0000	0000	0000
Reach5	0588	0804	0776	0750	0725	0700	0676	0653	0631	0609	0000	0000	0000

The two-tone timing table (100- and 1000-call) is given in Table 108.

Table 108: Two-Tone Timing Table (100- and 1000-call)

Label	Tone A Duration	Gap Duration	Tone B Duration	Group Call Duration
Mot/GE	1.00	0.00	3.00	8.00
Mot	0.40	0.00	0.80	8.00
NEC-B	1.00	0.00	3.00	6.00
NEC-A	1.00	0.00	3.00	6.00
NEC-C	1.00	0.00	1.00	4.00
NEC-M	0.40	0.00	0.80	4.00
NEC-L	0.50	0.00	0.50	3.00
NEC-D	0.40	0.00	0.40	3.00
Reach/F	0.13	0.00	0.13	1.40
Reach/S	2.00	0.00	0.70	4.50

1000-Call Two-Tone

Table 109 presents the tone group selections for each of the 1000-call code plans.

Table 109: 1000-Call Code Plan Look-up Table

	Tone Groups									
Code Plans	Block 0xx	Block 1xx	Block 2xx	Block 3xx	Block 4xx	Block 5xx	Block 6xx	Block 7xx	Block 8xx	Block 9xx
Mot B	2 + 4	1 + 1	2 + 2	3 + 3	1 + 2	1 + 3	2 + 1	3 + 1	2 + 3	3 + 2
Mot C	0 + 0	1 + 1	2 + 2	1 + 2	4 + 4	1 + 4	2 + 1	4 + 1	2 + 4	4 + 2
Mot D	0 + 0	1 + 1	2 + 2	1 + 2	1 + 5	5 + 5	2 + 1	5 + 1	2 + 5	5 + 2
Mot E	0 + 0	1 + 1	2 + 2	1 + 2	2 + 1	1 + 6	6 + 6	6 + 1	2 + 6	6 + 2
Mot F	0 + 0	1 + 1	1 + 3	3 + 3	4 + 4	3 + 1	1 + 4	4 + 1	3 + 4	4 + 3
Mot G	0 + 0	1 + 1	1 + 3	3 + 3	3 + 1	5 + 5	1 + 5	5 + 1	3 + 5	5 + 3
Mot H	0 + 0	1 + 1	1 + 3	3 + 3	3 + 1	1 + 6	6 + 6	6 + 1	3 + 6	6 + 3
Mot J	0 + 0	1 + 1	1 + 4	4 + 1	4 + 4	5 + 5	1 + 5	4 + 5	5 + 4	5 + 1
Mot K	0 + 0	1 + 1	1 + 4	4 + 1	4 + 4	1 + 6	6 + 6	6 + 1	4 + 6	6 + 4
Mot L	0 + 0	1 + 1	1 + 5	5 + 1	1 + 6	5 + 5	6 + 6	6 + 1	5 + 6	6 + 5
Mot M	4 + 2	2 + 3	2 + 2	3 + 3	4 + 4	3 + 2	2 + 4	4 + 2	3 + 4	4 + 3
Mot N	4 + 2	2 + 3	2 + 2	3 + 3	3 + 2	5 + 5	2 + 5	5 + 2	3 + 5	5 + 3
Mot P	4 + 2	2 + 3	2 + 2	3 + 3	3 + 2	2 + 6	6 + 6	6 + 2	3 + 6	6 + 3
Mot Q	4 + 2	2 + 4	2 + 2	4 + 2	4 + 4	5 + 5	2 + 5	4 + 5	5 + 4	5 + 2
Mot R	4 + 2	2 + 4	2 + 2	4 + 2	4 + 4	2 + 6	6 + 6	6 + 2	4 + 6	6 + 4
Mot S	4 + 2	2 + 5	2 + 2	5 + 2	2 + 6	5 + 5	6 + 6	6 + 2	5 + 6	6 + 5
Mot T	4 + 2	3 + 4	4 + 3	3 + 3	4 + 4	5 + 5	3 + 5	4 + 5	5 + 4	5 + 3
Mot U	4 + 2	3 + 4	4 + 3	3 + 3	4 + 4	3 + 6	6 + 6	6 + 3	4 + 6	6 + 4
Mot V	4 + 2	3 + 5	5 + 3	3 + 3	3 + 6	5 + 5	6 + 6	6 + 3	5 + 6	6 + 5
Mot W	4 + 2	4 + 6	6 + 4	5 + 6	4 + 4	5 + 5	6 + 6	4 + 5	5 + 4	6 + 5
Mot Y	0 + 0	7 + 7	8 + 8	9 + 9	7 + 8	7 + 9	8 + 7	9 + 7	8 + 9	9 + 8
Mot MT	4 + 2	1 + 1	2 + 2	1 + 2	4 + 4	5 + 5	2 + 1	4 + 5	5 + 4	2 + 4
GE X	A + A	B + A	B + B	A + B	C + C	C + A	C + B	A + C	B + C	0 + 0
GE Y	B + B	C + B	C + C	B + C	0 + 0	0 + 0	0 + 0	0 + 0	0 + 0	0 + 0
GE Z	A + A	C + A	C + C	A + C	0 + 0	0 + 0	0 + 0	0 + 0	0 + 0	0 + 0
Reach	5 + 3	1 + 2	2 + 1	3 + 4	4 + 3	1 + 4	4 + 1	1 + 5	5 + 1	3 + 5

Note For more information about REACH plans, see Table 124 and Table 125 on page 369, and Table 126 on page 370.

5/6 Tone

The 5/6 tone Group Type may be selected from the groups listed in Table 110. To enable the second address tone generation, select “Y.” Group call capability may be enabled and the group call tone specified. The digit “A” is the group call digit. See Table 110 for the 5/6-tone frequency lookup table. See Table 111 for the 5/6-tone timing table.

Table 110: Five/Six Tone Frequency Look-up Table

Tone Groups	EIA	CCIR-70	ZVEI	EEA	CCIR-100	ZVEI-2	DZVEI	DDZVEI
Digits ⇓	—	—	—	—	—	—	—	—
0	600	1981	2400	1981	1981	2400	2200	2400
1	741	1124	1060	1124	1124	1060	970	1060
2	882	1197	1160	1197	1197	1160	1060	1160
3	1023	1275	1270	1275	1275	1270	1160	1270
4	1164	1358	1400	1358	1358	1400	1270	1400
5	1305	1446	1530	1446	1446	1530	1400	1530
6	1446	1540	1670	1540	1540	1670	1530	1670
7	1587	1640	1830	1640	1640	1830	1670	1830
8	1728	1747	2000	1747	1747	2000	1830	2000
9	1869	1860	2200	1860	1860	2200	2000	2200
R	459	2110	2600	2110	2110	970	2400	2600
X	2010	2247	970	2400	2400	740	2800	2800
R: Repeat Tone X: Second Address Tone								

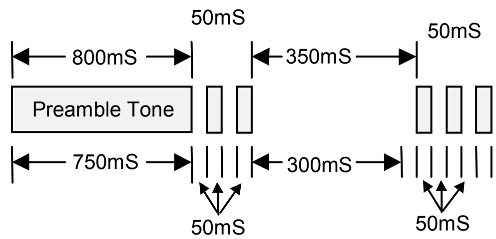
Table 111: Five/Six Tone Timing Table

Type	Tone	X-Tone
EIA	33	65
CCIR-70	70	70
ZVEI	70	70
EEA	40	40
CCIR-100	100	100
ZVEI-2	70	70
DZVEI	70	70
DDZVEI	70	70

Rotary Dial

Tone Type: 'H' (2805) 'L' (1500).

Rotary Dial Timing:



Standard/Knox DTMF

See Table 112 for the standard DTMF tone table.

Table 112: Standard DTMF Tone Table

DTMF Tones	1209	1336	1477	1633
697	1	2	3	A
770	4	5	6	B
852	7	8	9	C
941	*	0	#	D

Table 113: Knox Keypad Tone Table

KNOX Tones	1052	1162	1297	1430
606	1	2	3	A
672	4	5	6	B
743	7	8	9	C
820	*	0	#	D

Custom-Call

See *Entering Custom Call Definitions* on page 302.

2+2 (Quick-Call 1)

See Table 114 for the quick call frequency lookup table.

Table 114: Quick Call Frequency Look-up Table

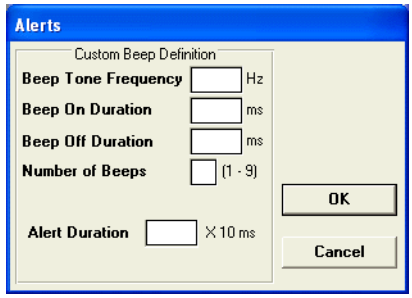
	0	1	2	3	4	5	6	7	8	9	A	B
A	359	398	442	490	543	603	668	741	822	912	1012	1122
B	372	412	457	507	562	624	692	767	851	944	1047	1161
Z	347	385	427	473	525	582	646	716	794	881	977	1084

Call ID

There are two types of Call ID: iDEN and MAP27.

Alerts

When you assign the **Alerts** format to a leading digit in RDPS, you then have to fill in the following **Custom Beep Definition** window with valid values.



When an Alert Page is used in IntegratorRD, the type of alert generated depends upon the second digit. If the second digit is 0, the alert from the **Custom Beep Definition** window is used. If the second digit is 1-9, IntegratorRD will only use the **Alert Duration** parameter from RDPS. The rest of the parameters from the **Custom Beep Definition** window are ignored, and IntegratorRD generates a pre-defined Alert for the configured duration. The following list identifies which alert is generated based on the second digit:

0 : Custom beep
1 : Slow siren
2 : Fast siren
3 : Hi/Lo warble
4-9 : Fast warble

Delay

There is no “delay” function. Although the beep definition can be manipulated to simulate a delay, IntegratorRD will not perform a PTT-Off to allow incoming audio during the simulated delay.

♦ **To simulate a delay**

1. Set the **Beep Tone Frequency** to **0** (silence).
2. Set the **Beep On Duration** to the desired delay duration in milliseconds.
3. Set the **Beep Off Duration** to **1**.
4. Set the **Number of Beeps** to **1**.
5. The **Alert Duration** is not applicable, but must be set to a value greater than **0**.

Tip “Delay” duration =
(Beep On Duration + Beep Off Duration) x Number of Beeps

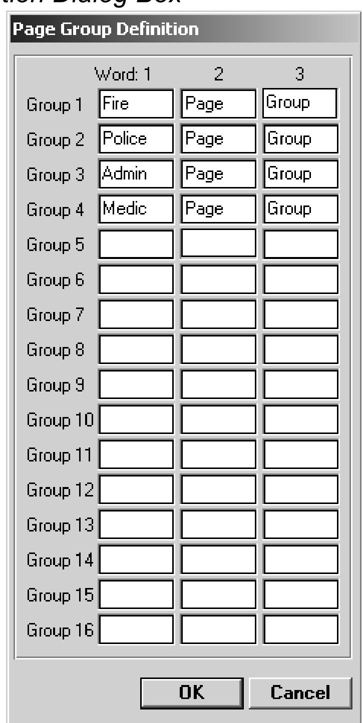
Defining Page Groups

Page groups associate similar pages into a group that the console operator can select. The console operator then can “filter” the Instant Call pages according to the type of event. The Define Lists/Page Groups menu provides an entry form for assigning labels up to 16 page groups. If one or more page groups have assigned labels, the console operator is presented with buttons with these labels for selecting the console paging screen. If no page group labels are defined, all Instant Call pages are grouped together for selection by the operator. The association of the Instant Call page with a page group is described in the next section.

Assigning a Page Group Label

The Page Group Label can be one, two, or three 6-character words that display on the console screen buttons for the page group. See Figure 86.

Figure 86: Page Group Definition Dialog Box



Defining Instant Call Pages

The **Instant Call Pages** dialog, found under the **Paging** menu, is an entry form for defining Instant Call Pages. Instant calls are independently entered for each position.

Configuration x Instant Call Page Definition

Each Instant Call Page is given a label, channel and page group association, paging codes (capcodes) and an option to include a voice message with the page. See Figure 87.

Adding or Removing Instant Calls

You may define up to 1000 instant calls. When RDPS is first started, only one instant call page per position is defined. When a blank is filled, another blank entry is automatically created when ENTER is pressed over the Capcode field or by clicking NEXT. Clicking DONE saves the entry and exits the screen. Delete users by clicking DELETE. Insert a new entry in the middle of the list by clicking INSERT. Please note that, the new entry is inserted *after* the currently displayed entry.

Selecting an Instant Call

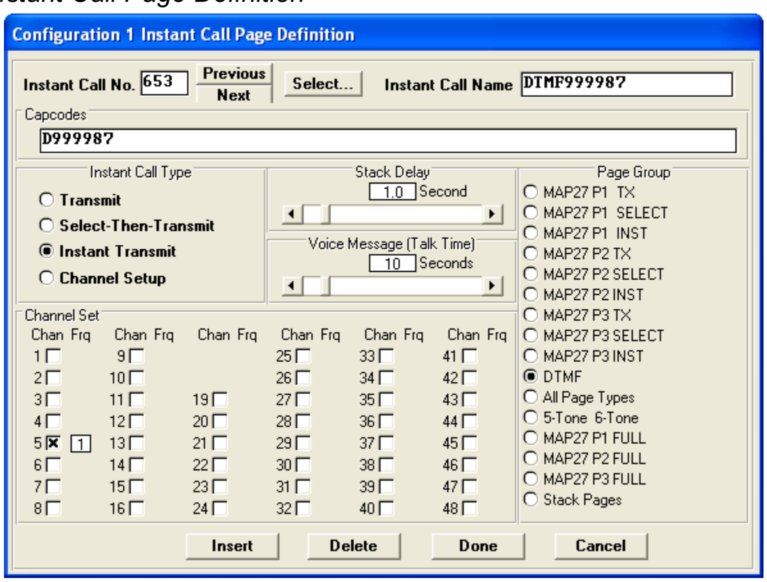
The “Instant Call No.” field allows you to select the instant call to be edited by using the Next and Previous buttons. To access a specific Instant call, type the number in the “Instant Call No.” field and press **Enter**.

Giving the Instant Call a Name

Each instant call is identified by a 1- to 20-character, alphanumeric **Instant Call Name**. This label may contain any printable character except commas.

Caution! Spaces are allowed in the name, but cannot be adjacent to each other. In other words, no double-spaces, triple-spaces, or more.

Figure 87: Instant Call Page Definition



Associating the Instant Call with a Page Group

You may associate an Instant Call with a Page Group (described in the previous section) by clicking the desired button in the Page Group column.

Selecting the Instant Call Type

You may specify how the call is directed and the channel action to be taken. The Instant Call Type field allows selection by one of the following methods:

Transmit: Transmits the page on the currently selected channel(s). The selected state for all channels is not changed.

Select-then-Transmit: Selects the channel(s) identified in the Channel Set field before the page is transmitted.

Instant Transmit: Transmits the page on the channel(s) identified in the Channel Set field. The selected state for all channels is not changed.

Channel Setup: This is a non-transmitting Instant Call Page type that is used for transmitter setup such as changing talk groups. iDEN and MAP26 channels cannot be selected for a Channel Setup because their channel setup requires a transmit.

Setting the Paging Capcodes

The Capcode(s) field allows you to specify the pages to be performed when this instant call is selected. More than one page may be “stacked” by listing several capcodes separated by commas. For example: 112, 114

The first digit of the capcode specifies the format of the page as defined by the encoder configuration (described above). If too few, too many, or incorrect digits are entered, the entry is rejected and a warning message displayed.

Setting MAP27 Call Capcodes

Instant call buttons can be used to setup calls, send status and SST messages, and change dynamic group settings for MAP27 radios (details below). The valid entries for MAP27 instant call pages are: (note: example use leading digit 7 and radio id 25)

Setup normal individual call:
<leading digit><radio id>#
For example: 725#

Setup emergency individual call:
<leading digit><radio id>#E
For example: 725#E

Setup priority individual call:
<leading digit><radio id>#P
For example: 725#P

Send status call:
<leading digit><radio id>S<status number>
Status number ranges from 1 to 32. For example: 725S9

Send short status message:
<leading digit><radio id>D<text message>
The maximum length for text message is 25 characters.
For example: 725DEXAMPLESST

Dynamic regroup message:
<leading digit><radio id>G<dynamic group list>
Dynamic group list is a list of map27 group up to 16 groups separated by '+'. For example: 725G90+94+96+99

Dynamic regroup clear message:
<leading digit><radio id>GCLEAR
For example: 725GCLEAR

Normal voice site-wide call:
<leading digit>B
For example: 7B

Emergency voice site-wide call:
<leading digit>BE
For example: 7BE

Priority voice site-wide call:
<leading digit>BP
For example: 7BP

Short status message site-wide call:
<leading digit>BD<text message>
The maximum length for text message is 25 characters. For example: 7BDEXAMPLESST

Setting MAP27 Broadcast Call Capcodes

Square-bracketed items are optional. If [MPT1343 Radio ID] is not supplied, a site-wide call is assumed.

Group broadcast call (standard):
<Leading Digit>[MPT1343 Radio ID]B

Group broadcast call (priority voice):
<Leading Digit>[MPT1343 Radio ID]BP

Group broadcast call (emergency voice):
<Leading Digit>[MPT1343 Radio ID]BE

Group broadcast call with site-wide short data message:
<Leading Digit>[MPT1343 Radio ID]BD[mm…m]
Where mm…m is the short data message supported by MAP27

Setting iDEN Call Capcodes

Instant call buttons may be used to setup calls and send statuses or call alerts to iDEN radios. (Details are shown below.)

Note Examples are leading digit 3.

The valid entries for iDEN instant call pages are:

Setup private call:
<leading digit><radio id>#
For example: 3543#

Setup target call:
<leading digit><radio id>#T
For example: 312#T

Setup group call:
<leading digit><radio id>#G
For example: 32#G

Send status call:
<leading digit><radio id>S<status number>
Status number ranges from 1 to 255. For example: 3123S244

Send call alert:
<leading digit><radio id>C
For example: 3123C

Setting the Paging Channels

For Select-then-Transmit and Instant Transmit page types, a list of channels is available to be checked for steering the page to the appropriate channel. For multiple-frequency channel types, you may also specify a frequency select number (in the range 1 to 8).

Setting the Inter-page Stack Delay

Under certain circumstances, it may be necessary to increase the amount of time delay between each page sent in a stacked page. Use the scroll bar to select the stack delay.

Enabling the Voice Message Prompt

By specifying a time for the Voice Message, the console holds the transmit active for the specified amount of time following the completion of the page.

In rare circumstances when using DC channels, a busy transmit failure can occur if the user keys up very soon after a page. Adding the appropriate amount of Voice Message time (2 seconds for example) prevents this failure.

Defining Major Response Pages

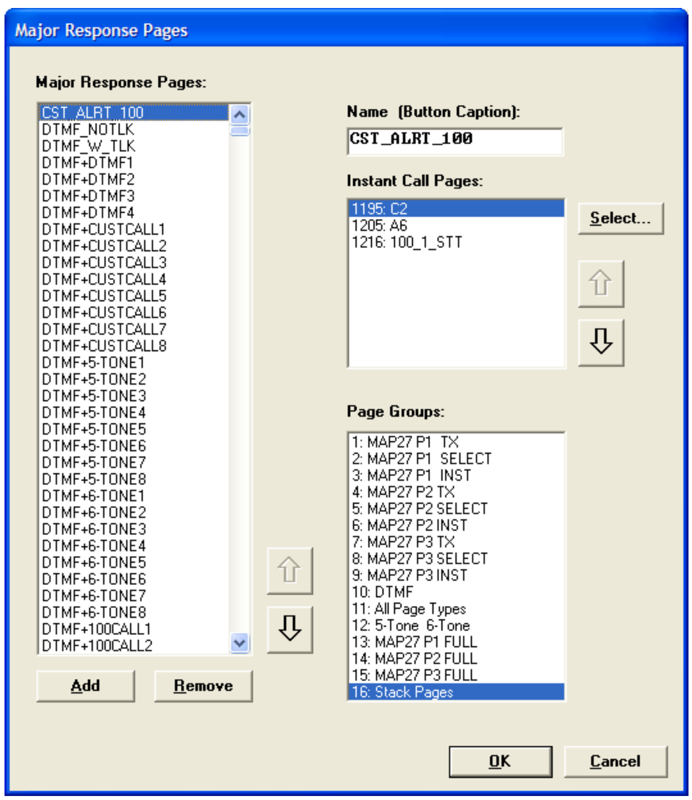
The Major Response Pages dialog is used to configure stacks of instant call pages. Each stack includes up to 32 instant call pages that are presented in IntegratorRD by a single Instant Call Page Button. Each instant call page in the stack may be sent to different channels and frequencies.

Note Major Response Pages is an optional, licensed feature. If you configure Major Response Pages and the dispatcher attempts to use the button on an unlicensed console, the console beeps and does not send the pages.

Tip Stacks are configured in part by selecting Instant Call Pages, so the individual pages must already be configured prior to creating stacks. To configure Instant Call Pages, see *Defining Instant Call Pages* on page 320.

♦ To configure Major Response Pages

1. Click **Paging**, **Major Response Pages**.



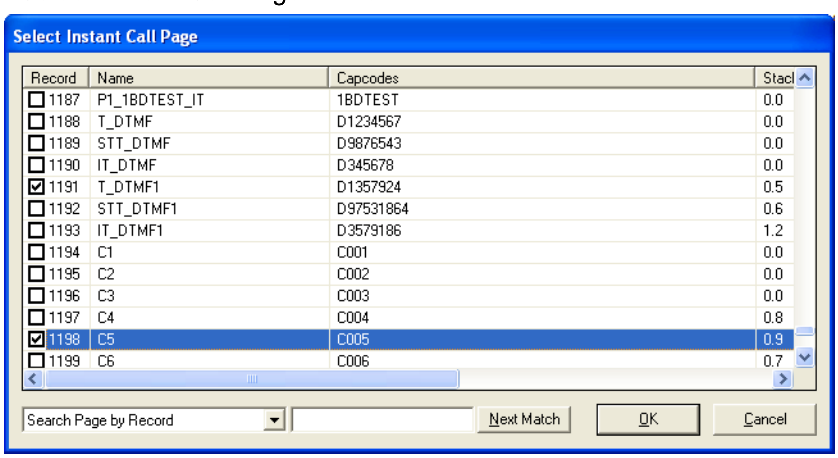
2. Click **Add** to create a new stack. The new stack is added to the end of the list of stacks. To reconfigure an existing stack, click its name in the **Major Response Pages** list.
3. Type the **Name** of the stack, which is used as the button label in IntegratorRD.

4. Click **Select** to select the Instant Call Pages to include in this stack. For help with that dialog, see *Finding and Selecting Instant Call Pages* on page 326.
5. When there are two or more Instant Call Pages in the stack, they can be arranged by selecting a page and using the arrow buttons adjacent to the list of pages. The order configured here is the order that the pages will be sent.
6. Select the **Page Group** for the Major Response Page. This is the page group where the button will appear in IntegratorRD.
7. Repeat the above steps as needed for additional Major Response Pages.
8. When there are two or more Major Response Pages, they can be arranged by selecting a stack and using the arrow buttons adjacent to the list of pages. The order configured here is the order that the stacks will appear in IntegratorRD.
9. To delete an existing stack, click its name in the **Major Response Pages** list and click **Remove**.
10. When you are done configuring Major Response Pages, click **OK**.

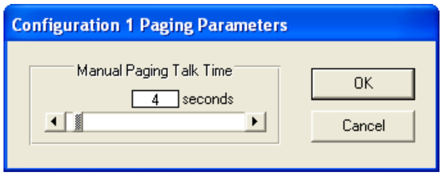
Finding and Selecting Instant Call Pages

Once you click **Select**, the **Select Instant Call Page** window opens. In this window, you can click column headings to sort pages based on the alphabetical or numerical ordering of any of their properties. You can also perform a text search by selecting which property you'd like to search and typing in the appropriate text in the search bar. When you find the pages you are looking for, use the check box to select them. When you have selected all of the pages you need, click **OK** to return to the stack configuration window.

Figure 88: Select Instant Call Page window



Configuring Paging Parameters



Manual Paging Talk Time is the predefined amount of time after a manual page (or page stack) is finished that the currently transmitting channels remain keyed up. After that time expires, IntegratorRD releases PTT and terminates transmission.

Operators can use the Transmit key or a PTT button to override the talk time by extending or cancelling the transmission. Once the Transmit key or a PTT button is pressed, the default talk time is cancelled and the transmitter is keyed up until the key or button is released.

Specifying the Keyboard and Expansion Panel Layout

From the main screen, the graphics of the Audio Panel and the Model 4115 Expansion Panels allows you to set up the configuration of the console keyboard. This includes the Model 4217B Audio Panel Spare Inputs and any optional Model 4115 Expansion Panels. See Figure 89.

The Keyboard Button Layout entry form presents the 16 function keys of the keyboard in the same arrangement as on the physical keyboard. Below the 16 function keys are selections for assigning functions to the eight “spare” inputs and outputs. The spare inputs can perform, from a remote contact closure, any of the same console functions available on the function buttons. The spare outputs are included in the set of all contact closure outputs.

Spare Outputs

If Spare Output 5, 6, 7, and 8 are not programmed for a specific function, they will function as follows:

Spare Output 5: Turns on when a call indication is received on selected channel.

Spare Output 6: Turns on when PTT is activated.

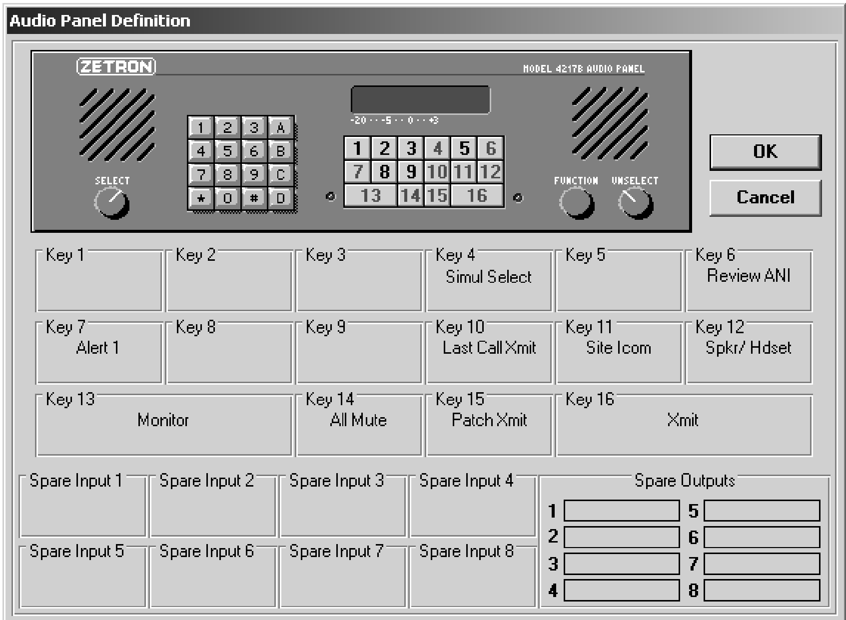
Spare Output 7: Turns on whenever an ANI for Reverse Selective Call Mode or an emergency ANI for PTT ID Mode is decoded by the console. It can be used to activate an external alert device.

Spare Output 8: Produces a 500 millisecond pulse whenever an ANI for Reverse Selective Call Mode or an emergency ANI for PTT ID Mode is decoded by the console.

Giving the Spare Output a Label

Each spare output is identified by a 1- to 15-character, alphanumeric label. This label may contain any printable character (including spaces) except commas.

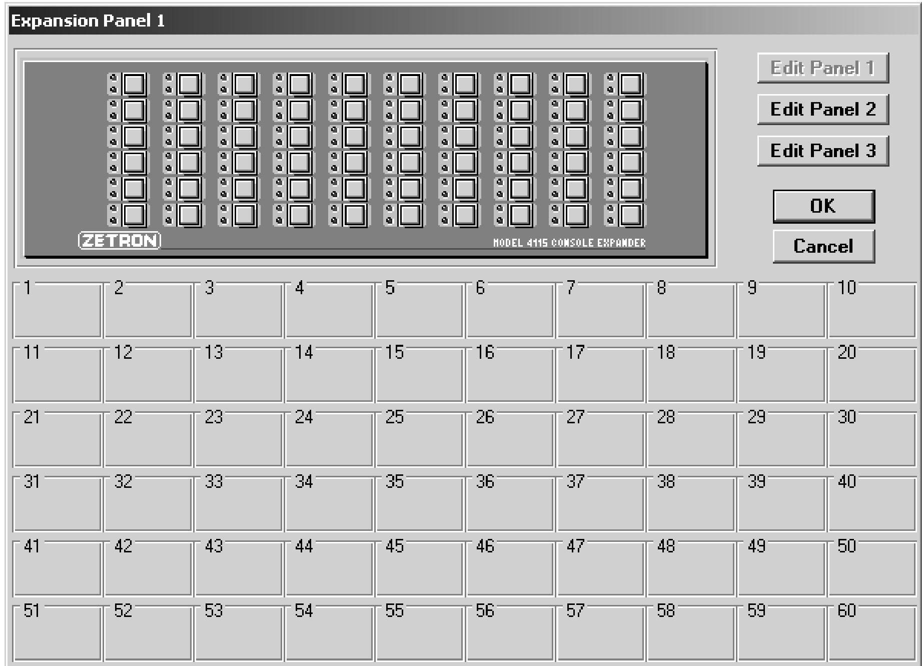
Figure 89: Audio Panel Definition



Expansion Panel

The Expansion Panel Button Layout entry form presents the 60 buttons of the expansion panel in the same arrangement as on the physical expansion panel. Select one of the three potential expansion panels by using **Edit Panel *n*** buttons on the right. See Figure 90.

Figure 90: Expansion Panel Dialog Box



Editing the Layout

To change the definition of a key, either click the panel graphic button or click the larger numbered button below the graphic. Make a selection from the list of displayed key types. The following types are available:

- Aux I/O - Assign Aux I/O and define LED functionality
- Functions - Assign functions for radio, CAD, instant recall, intercom, etc.
- Group Patch - Assign a patch group
- Group Select - Assign a group selection
- Group Transmit - Assign a group transmit
- Instant Call Pages - Assign an Instant Call
- Major Resp. Pages - Assign a Major Response Page
- Page Control - Assign Clear Page, Enter Page, Send Page, or Page Safety
- Clear Assignment - Remove the button assignment

Once you have assigned a key, its button label will update to show the assignment.

STOP **Warning!** If both the M4217B and M4115 are programmed with a transmit key, the transmit LED on the M4217B will not light up when using either transmit key.

Button Assignments

The main screen console displays the graphic when clicked with the mouse and presents a screen that allows you to set up the arrangement of buttons on the console screen.

The Screen Button entry form presents the buttons on the keyboard in the same arrangement as the console screen along with groups of button functions that can be "dragged" onto the desired button location. Simply position the mouse over the button function, for example "Select;" press and hold the left mouse button down and "drag" the mouse over the location that you want the button to appear. Release the left mouse button to complete the assignment.

Figure 91: Configuration 1 Button Assignments Dialog Box – Standard Functions

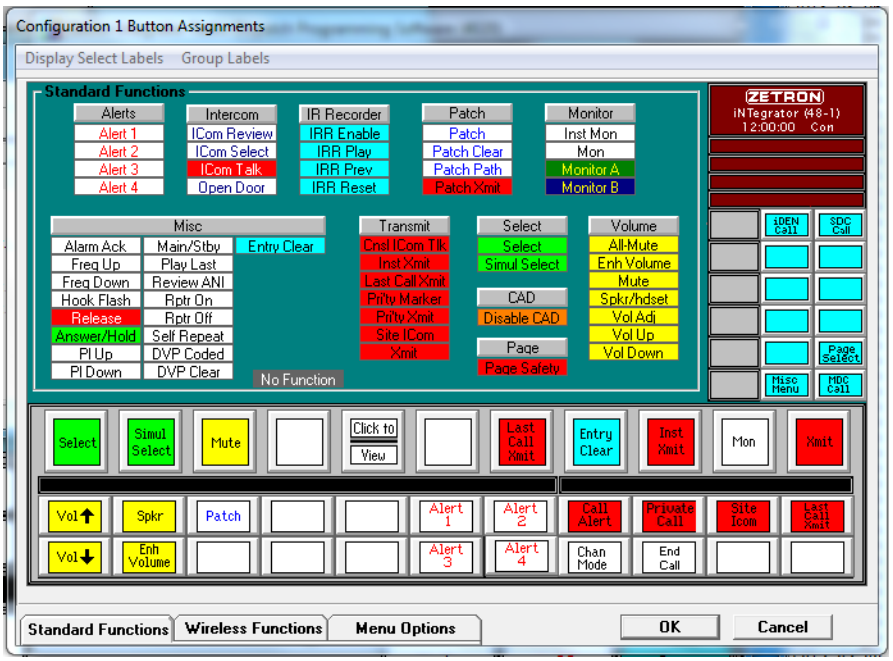


Figure 92: Configuration 1 Button Assignments Dialog Box – Wireless Functions

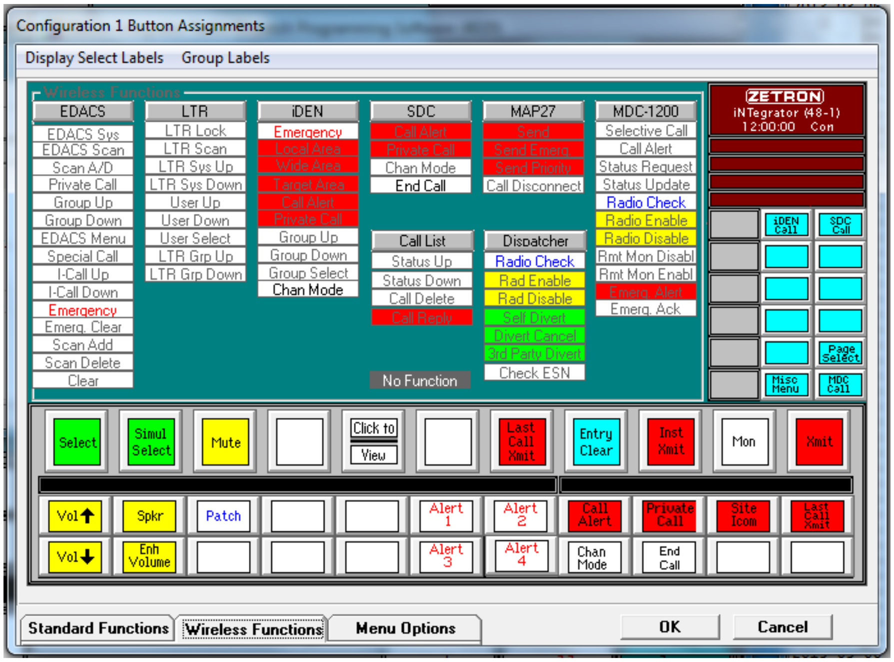
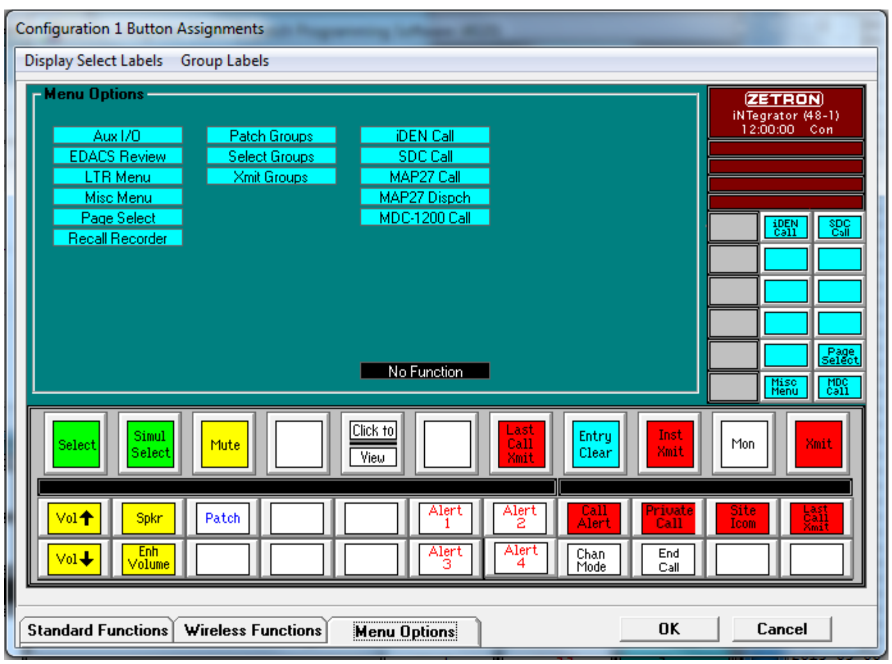


Figure 93: Configuration 1 Button Assignments Dialog Box – Menu Options



To see a list of the different types of buttons, select between the "Standard Functions," "Wireless Functions," and "Menu Options" tabs at the bottom of the screen to change the groups of displayed button types.

Standard and Wireless Functions can only be placed on the three rows of buttons along the bottom of the screen. The first of these three rows have taller buttons than the other two rows. These taller buttons can be assigned one function, or split and assigned two functions. To assign a second function to these larger buttons, simply drag a second function over the button. A popup will ask you to assign the second function to the top or bottom of the button.

Menu Options can only be placed on the two columns of buttons to the right of the screen.

To clear a button, drag **No Function** over the button.

For a description of each Function/Option button, see *Appendix F: IntegratorRD Buttons* on page 393.

Entering Display Setup Button Labels

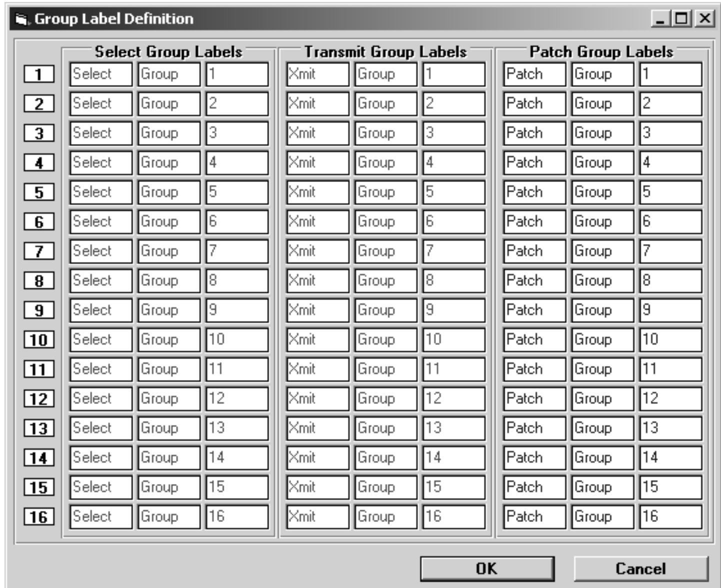
The Display Select Labels menu on the Button Assignments screen allows you to give a descriptive label to the Display Select buttons on the console. See Figure 94.

Figure 94: Display Select Button Labels Dialog Box

Entering Select, Xmit, and Group Patch Button Labels

The Group Labels menu on the Button Assignments screen allows you to enter the label for each of the Select, Transmit (Xmit), and Patch group buttons. Each button may have up to three lines of six characters each for a label. See Figure 95.

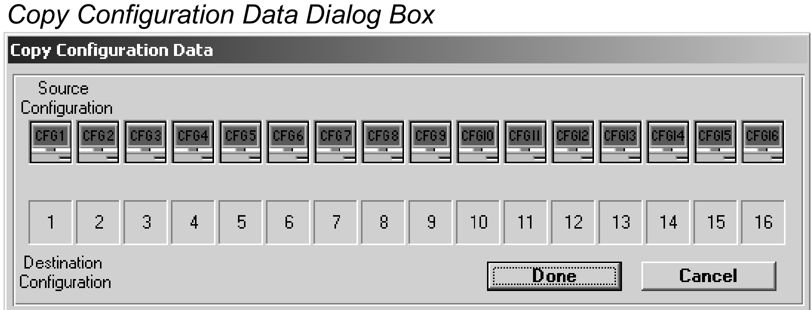
Figure 95: Group Label Definition Dialog Box



Copying Console Configuration Data

Generally, each console position in a console system will have similar if not identical operation. The main menu Copy Configuration Data selection is provided to speed up the process of duplicating data between positions. See Figure 96.

Figure 96: Copy Configuration Data Dialog Box



Up to 16 configurations can be created to copy data from one configuration to another. This can be accomplished by moving the mouse cursor over the source configuration (the one that has completed configuration information).

Press and hold the left mouse button, and "drag" the mouse over the desired destination configuration. Release the left mouse button. This operation copies all position-dependent information including: Position Configuration, Paging, Auxiliary I/O, Alarm Setup, Special Keys, Miscellaneous, Keyboard Layout, and Expansion Panel Layout.

Saving a Configuration

After entering the system configuration information, the file must be saved to create the configuration files for the console. See *Getting Started* on page 261 for details about saving and quitting RDPS.

Radio System Management Program

In this chapter:

The Radio System Management Program (RSMP) is optional software that allows the user to access the radio system management data generated by the Model 4048 and Model 4020 CCE. You can view the data and create 24-hour reports of current data either automatically or manually. The user interface has configurable display and report settings.

This chapter describes the Radio System Management Program. For information about the message format and content, see *Appendix A: Radio System Management Interface* on page 353.

Installing RSMP

System Requirements

The Zetron Radio System Management Program requires the following:

- Computer running Windows XP Professional (32-bit) or Windows 7 Professional (32-bit or 64-bit)
- DVD drive (during installation)
- One dedicated COM port (serial)
- Monitor (operating in 800x600 resolution or higher)
- Printer (optional)

Software Setup

The Zetron Radio System Management Program is provided on CD.

♦ To install the program

⚠ **Caution!** Windows 7 has settings that must be disabled before Radio System Management is installed. To disable these settings, refer to the procedure in *Windows 7 Settings* on page 248.

1. Insert the CD.
2. Navigate to the CD in Windows Explorer and double-click **setup.exe**.
3. Follow the on-screen instructions.
4. If the Setup program displays a message that some system files are out of date, click **Yes** or **Update** and follow the instructions (restart computer and re-run setup). If these system files are not updated, the Radio System Management program will not run.

   The setup program will request the name of the installation directory. The default directory is:

   ```
   C:\Program Files\RadioManager (32-bit OS)
   C:\Program Files (x86)\RadioManager (64-bit OS)
   ```

Hardware Setup

Hardware setup consists of connecting a cable and setting STC card switches. If two STC cards are used, set their switches identically.

1. Connect a standard serial cable (DB-9 to DB-9) from the **Radio Management** port on the back of the Model 4048/4020 Console Cardcage to a COM port on the computer.
2. On the STC card **Data Rate** switch, set switch **7 ON** and switch **8 OFF**. This sets the Radio Management port data rate to 9600 baud.
3. On the STC card Mode switch, set switches **C** and **D** to **ON**. This directs the STC's radio management data to the Radio Management port.

Starting the Radio System Management Program

The setup program creates an icon in the **Start** menu called **RadioManager**. Double-click the icon to start the program.

Uninstalling RSMP

♦ To uninstall the Radio System Management Program

1. Delete the RChan.mdb, RCons.mdb, and RAlias.mdb database files from the install directory of the RadioManager software. The default directory is:
   `C:\Program Files\RadioManager (32-bit OS)`
   `C:\Program Files (x86)\RadioManager (64-bit OS)`
2. Use “Add or Remove Programs” in the Windows Control Panel.
3. If Windows asks if you want to remove shared files, click Remove NONE.

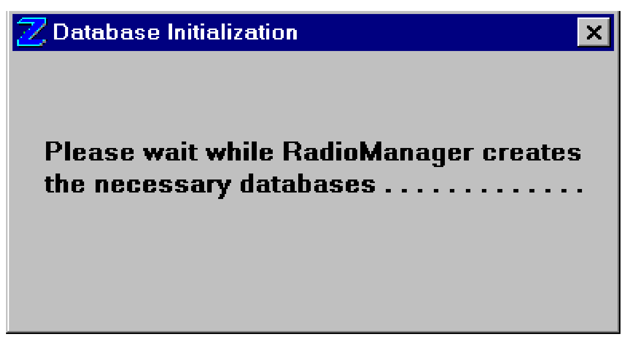
RSMP Operation

This appendix describes the Zetron Radio System Management Program. The program provides real-time data and allows the user to set report destinations, report run times, and channel names.

Initialization

The first time you run the Radio System Management Program, the program will create the database information it needs to store channel and console data.

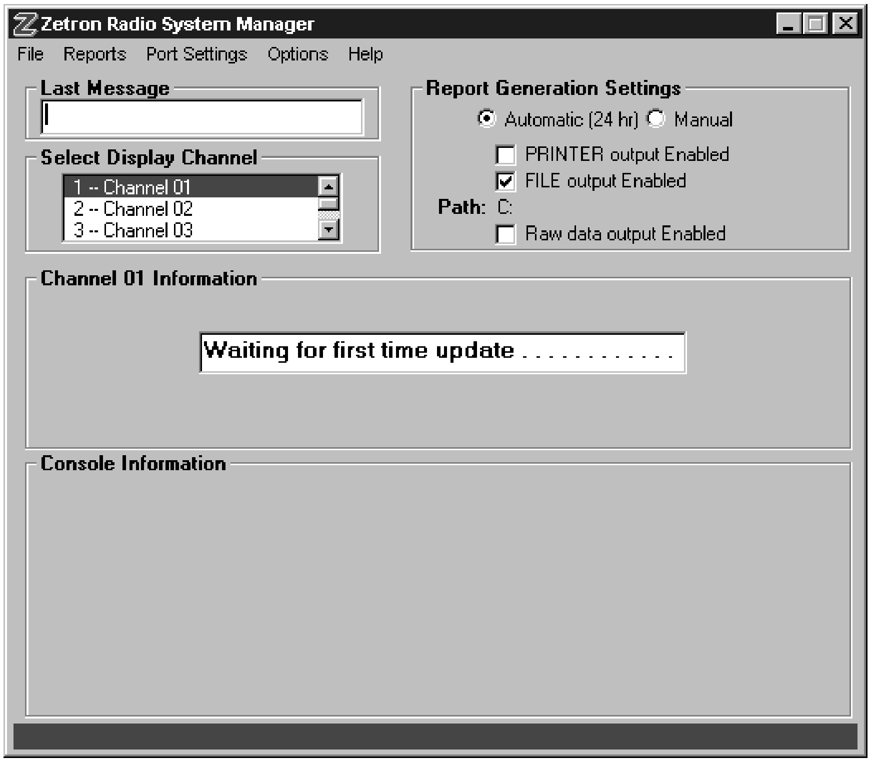
Figure 97: Database Initialization



When the database is created, the main screen is displayed.

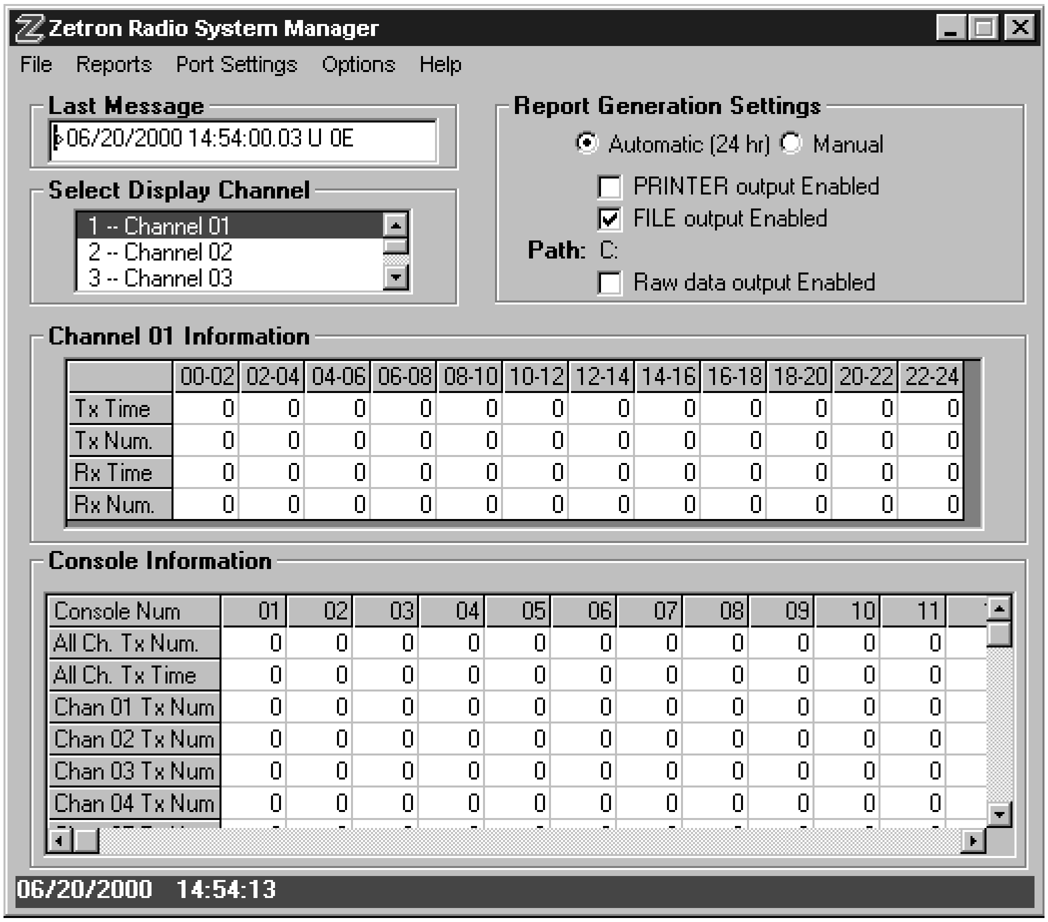
Upon starting, the program displays the main screen and waits for a time update from the CCE. The Model 4048/4020 sends time update messages over the Radio Management port. The message, “Waiting for first time update” is displayed until the first update is received (see Figure 98). Subsequent time updates (one per minute) are transparent to the user.

Figure 98: Main Screen - Waiting for Time Update



As soon as the time has been processed, the Channel Information and Console Information data areas will appear as shown in Figure 99.

Figure 99: Main Screen



Description of Screen Elements

This section describes the elements on the main screen.

Menu Bar

The menu bar contains menus and commands. Table 115 lists and describes them.

Table 115: Menu Bar

Menu	Command	Description
File	Exit	Exits the program. (Note that all current information is saved.)
Reports	Daily Summary	Outputs the current data to a file and/or printer, if they are enabled in the settings area. When selected, a file-naming windows dialog will appear so you can choose the filename for the report data.
Port Settings, COM Port		Selects the active serial port. You can choose COM1 through COM4.
Port Settings, Baud Rate		Selects the baud rate. You can choose 1200, 2400, 9600, or 19200. The baud rate must match the STC's baud rate setting.
Options, Active Channels	Set	Opens the screen that allows selection/deselection of active channels and channel name aliases.
Options, Data Collection Start Time		Defines when the 24-hour report is generated. You can choose any even-numbered hour in the day.
Options, Report Generation Destination	Setup Printer	Sets printer, paper size, and layout options.
Options, Report Generation Destination	Set Path	Sets path name for report files.
Help	About	Shows version number of program.

Incoming Message Display

Displays the last message received over the serial link.

Select Channel Area

Displays a list of active channels and their aliases. Highlighting a channel changes which channel's information is displayed in the Channel Information display area.

Settings Area

Displays, and allows changes to, report settings, including Automatic/Manual, File/Printer output enabled, and Raw data output enabled. Also displays the directory to which reports and raw data files are written.

Channel Information display area

Displays the Radio System Management information for the highlighted channel. The Tx and Rx Time are displayed in minutes. Data is collected for all channels, but displayed one channel at a time.

Console Information display area

Displays the console information currently being collected. The total Tx Time is displayed in minutes.

Time and Date display

Displays the current time and date. This time is for display only, and is not used in any calculations or reporting. The time display is updated once per minute but every radio message has its own exact timestamp so Rx and Tx times will be calculated accurately.

Note The time displayed at the bottom of the main screen is for display only. Depending on the amount of radio activity and the speed of the computer running the program, the seconds display may lose time occasionally. This has no effect on the accuracy of the time reporting function in the Radio Management program, and the time displayed will be updated to the actual time once per minute.

Setup

This section describes how to set up the program. Setup involves designating active channels, assigning aliases, setting the com port, configuring reports, and selecting a printer.

Activate Channels and Set Aliases

Activate the channels you want included in reports. You can click Cancel to exit without saving changes. To set active channels:

1. From the Options menu, click Channels and then Set. This will display the channel selection screen (see Figure 100).
2. To enable all forty-eight channels, click ENABLE All Channels.

Note There is no adverse effect to activating a channel that is not installed on the CCE (channels 21 through 48 on a Model 4020, for example).

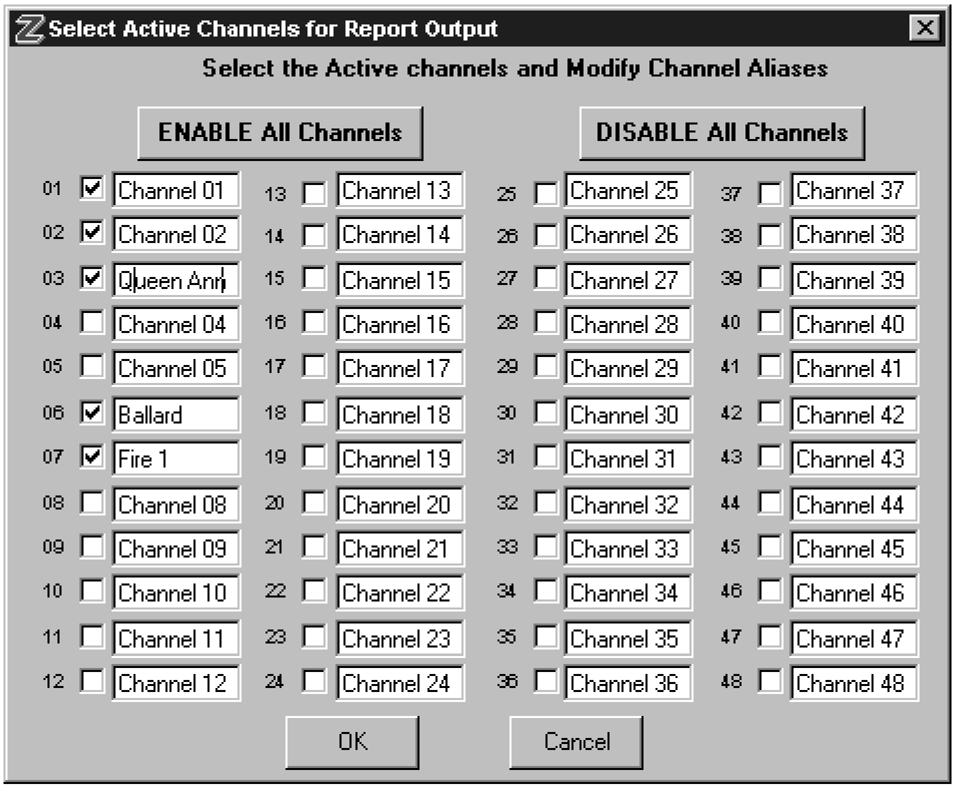
3. To disable all forty-eight channels, click DISABLE All Channels.
4. To enable or disable individual channels, check or uncheck the box next to the channel. For example, if your system has channels 1-32 installed, disable 33-48 since there will be no activity on those channels.

5. If you want to assign aliases, click in the channel name text box and change the text. Aliases are included in reports.

> **Note** All radio activity is recorded even if a channel is not enabled. Enabling channels determines which channels are printed in the report. These selections can be changed any time.

6. When you are done with channel selection and aliases, click OK to save changes.

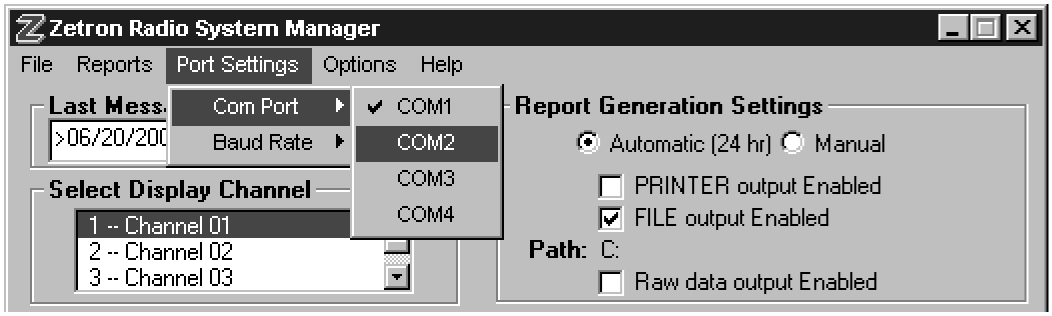
Figure 100: Select Active Channels



COM Port Settings

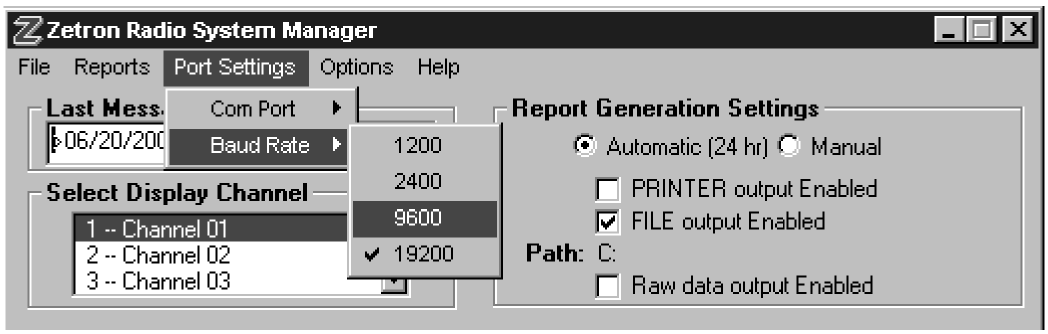
1. Choose the COM port for serial data (see Figure 101).
2. Click Options and COM Port and select the COM port to which the serial cable is connected.
3. If the COM port is busy or not available, the program will display a warning. Resolve the problem or choose a different COM port.

Figure 101: Select COM Port



4. Select Baud Rate and click the baud rate you set for the Radio Management port.

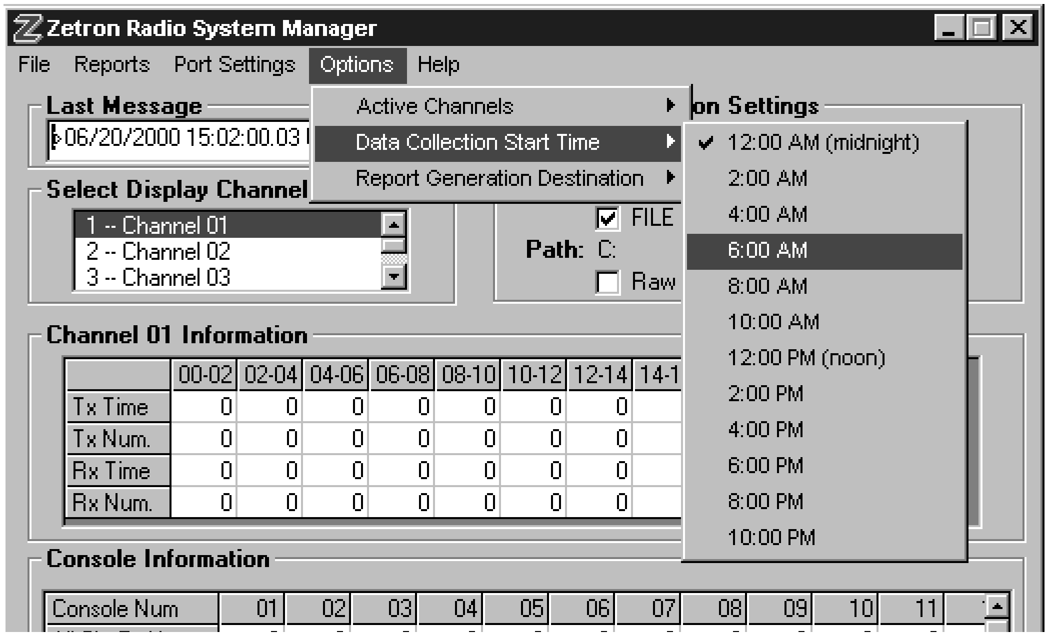
Figure 102: Select Baud Rate



Set Up Reports

1. From the menu bar, click 24-hour Reporting Time (see Figure 103).
2. Click Options and Data Collection Start Time. Select the hour you want the 24-hour report generated. When the report time is changed, the current data is reset. The program displays a warning and gives you the option to print the current data before it is reset.

Figure 103: Select 24-hour Report Time

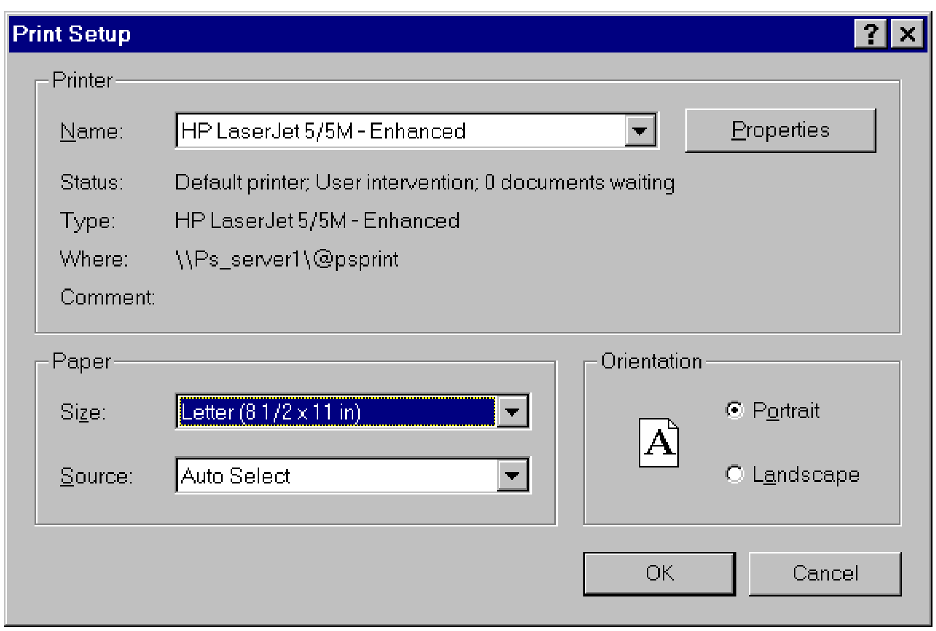


Set Up Printer

1. Click Options, Report Generation Destination, and Setup Printer (see Figure 104).

   This will bring up a printer selection screen. Select the printer, paper size, and paper orientation for the 24-hour reports.

Figure 104: Setup Printer

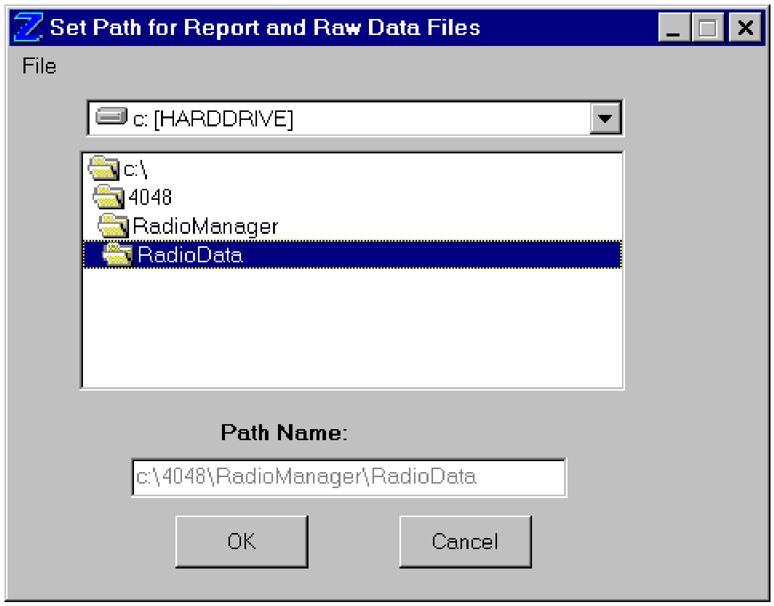


2. Click Options, Report Generation Destination, and Set Path.

This will bring up a directory selection screen (see Figure 105).

3. Select the destination path for the Radio System Management files. You can select an existing drive or directory, or create a new directory (click File and New Folder). The current path selection is shown in the text box.
4. To save changes and exit, click OK.
5. To exit without making changes, click Cancel.

Figure 105: Set Path

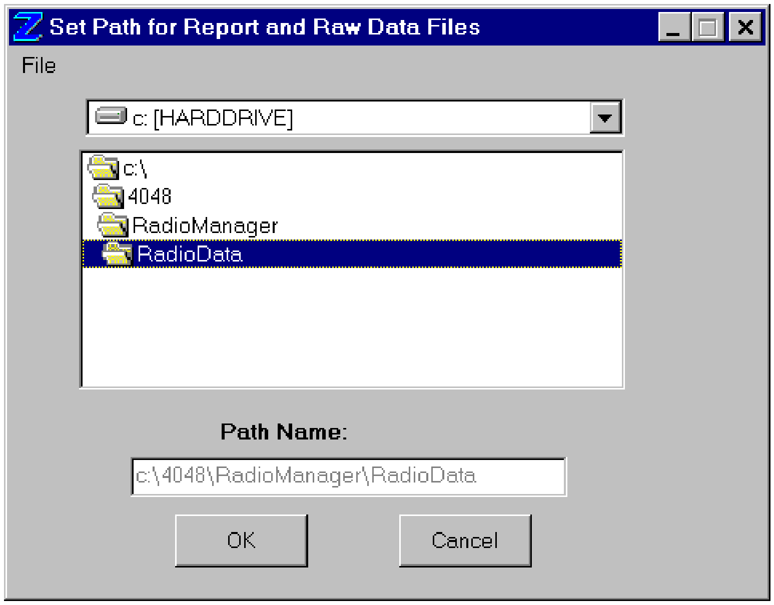


6. On the main screen in the Settings area, click either Automatic (24hr) or Manual. Automatic reporting generates a 24-hour report at the specified time each day. If Manual is selected, reports will be generated only when you click Reports and Daily Summary from the menu.
7. On the main screen in the Settings area, check the PRINTER output Enabled box to send reports to the printer, and check the FILE output Enabled box to send reports to a file. Both PRINTER output Enabled and FILE output Enabled can be checked.
8. If the FILE Output Enabled box is checked, and you want to output raw data to a file, check the Raw data output Enabled box.

Time Updates

If the Radio System Management program is stopped and restarted (for instance if the computer is rebooted) current data will be saved and operation will resume. The program will retain all settings, including report time. If the Model 4048\4020 time is changed and a previous 24-hour period has expired, the program resets its data (see Figure 106).

Figure 106: Time Jump Notification



Reports

24-Hour Reports

The 24-hour reports are written to files in the directory specified by the user. The filenames are formatted as "Radio_mmddyy.txt". For example, a file written on July 15, 2000 would be called "Radio_071500.txt".

If Automatic reporting is chosen, the filenames will be unique. If the report is generated manually, you must choose the filename carefully to avoid writing over an existing file.

The 24-hour report shows the date and time of the report and radio information for each active channel with radio activity. Channels that have had no radio activity will not be printed. Data displayed for each channel is shown in two-hour increments and also totaled or averaged for the entire 24-hour period. The categories shown are:

Tx Time	Total time, in minutes, the channel was transmitted to
Tx Num	Total number of transmits on this channel
Secs/Tx	Average duration of transmit, in seconds
Rx Time	Total time, in minutes, the channel was receiving calls
Rx Num	Total number of calls received on this channel
Secs/Rx	Average duration of call, in seconds

Note Patch activity will be reported as console 16.

When the data for all the active channels has been printed or written to a file, the console information will be displayed. Data displayed for each console will show each active channel's activity over the entire 24-hour period. The data shown for each console (1-16) includes:

Chan xx Tx Num	Number of transmits to this channel
All Ch. Tx Time	Total time, in minutes, this console was transmitting to any channel
All Ch. Tx Num	Total number of transmits made by this console
Avg. Secs/Tx	Average duration of transmit

An excerpt from a typical 24-hour report file is shown below. The printer output is identical.

```
ZETRON Daily Radio Management Summary for 06/09/1998 as of 15:02:03
Channel Summary:
Channel no. 12 (Fire North)

 Hour       0    2    4    6    8    10   12   14   16   18   20   22    Total
 Tx Time   028  029  028  018  003  ---  021  020  ---  ---  ---  ---  0147 min
 Tx Num.   545  525  559  368  058  ---  431  292  ---  ---  ---  ---  2778 qty
 Secs/Tx   003  003  003  002  003  ---  002  004  ---  ---  ---  ---  0003 sec
 Rx Time   ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  0000 min
 Rx Num.   ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  0000 qty
 Secs/Rx   ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  0000 sec

Channel no. 16 (Sheriff)

 Hour       0    2    4    6    8    10   12   14   16   18   20   22    Total
 Tx Time   028  032  027  019  004  ---  021  021  ---  ---  ---  ---  0152 min
 Tx Num.   556  547  542  363  058  ---  431  305  ---  ---  ---  ---  2802 qty
 Secs/Tx   003  003  003  002  003  ---  002  004  ---  ---  ---  ---  0003 sec
 Rx Time   ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  0000 min
 Rx Num.   ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  0000 qty
 Secs/Rx   ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  ---  0000 sec
```

```
ZETRON Daily Radio Management Summary for 06/09/1998 as of 15:02:05
Position Summary:
```

Position	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16
Chan 12 Tx Num	1427	1351	---	---	---	---	---	---	---	---	---	---	---	---	---	--- qty
Chan 16 Tx Num	1428	1374	---	---	---	---	---	---	---	---	---	---	---	---	---	--- qty
All Ch Tx Time	0515	0515	---	---	---	---	---	---	---	---	---	---	---	---	---	--- min
All Ch Tx Num	5575	5588	---	---	---	---	---	---	---	---	---	---	---	---	---	--- qty
Avg Seconds/Tx	005	005	---	---	---	---	---	---	---	---	---	---	---	---	---	--- sec

Raw Data Files

If Raw Data output is enabled, raw data files are written to the directory specified by the user (Set Path). Filenames follow the format "Raw_mmddyy.txt". For example, a file written on March 18, 1998 would be called "Raw_031898.txt". Raw data files contain a comma-delimited record of each radio event, similar to the messages displayed on the main screen. All radio event messages, excluding the once-per-minute time update, are written into the raw data files.

All messages are comma-delimited fields in the following format:

[Date],[Time],[Command],[Source],[Dest],[Rmt. Parm]

Element	Format	Description
Date	*mm/dd/yyyy*	Ranges are: month, 01-12; day, 01-31; and year, 0000-9999
Time	*HH:mm:ss.hh*	Ranges are: hour, 00-23; minute, 00-59; second, 00-59; and hundredth, 00-99
Command	one of five characters	S - Site intercom ON T - Transmit ON t - Transmit OFF, Site intercom OFF C - Call ON c - Call OFF
Source	a two-digit number	For commands S, T, and t - Console Number (01-16) For commands C or c - Channel Number (01-48)
Dest	a two-character string	For commands S, T, and t - Channel 01-48 or DD (all channels) For commands C or c - CC or CR (all consoles, all consoles/remotes)
Rmt. Parm	a two-character string	XX which means this message has no remote parameter OR A remote function parameter from/to a channel card as shown in Table 116.

Table 116: Remote Function Parameter

Tone Remote Function	Remote Parameter
650	T0
750	T1
850 (F8)	T2
950 (F7)	T3
1050 (F6)	T4
1150 (F5)	T5
1250 (F4)	T6
1350 (F3)	T7
1450	T8
1550	T9
1650	TA
1750	TB
1850 (F2)	TC
1950 (F1)	TD
2050	TE

DC Remote Function	Remote Parameter
+2.5	D0
+5.0 (F1)	D1
+7.5	D2
+10.0	D3
+12.5 (F2)	D4
+15.0	D5
+15.5	D6
0.0	D7
-2.5	D8
-5.0 (F3)	D9
-7.5	DA
-10.0	DB
-12.5 (F4)	DC
-15.0	DD
-15.5	DE

An excerpt from a typical raw data file and a translation of the message content is shown below:

```
09/21/1998,06:58:17.59,T,01,15,TC - (transmit on, cons. 1, chan. 15, rmt. func TC)
09/21/1998,06:58:17.95,t,01,15, X - (transmit off, cons. 1, chan. 15)
09/21/1998,06:58:19.77,T,01,16,TC - (transmit on, cons. 1, chan. 16, rmt. func TC)
09/21/1998,06:58:20.08,t,01,16, X - (transmit off, cons. 1, chan. 16)
09/21/1998,06:58:30.65,C,15,CR,TD - (call on, chan. 15, rmt. func TD)
09/21/1998,06:58:33.36,c,15,CR,TD - (call off, chan. 15, rmt. func TD)
09/21/1998,06:58:40.72,S,01,15, X - (Site Icom on, cons. 1, chan. 15)
09/21/1998,06:58:42.20,t,01,15, X - (Site Icom off, cons. 1, chan. 15)
```

Installation Verification

Overview

This chapter provides a procedure to follow that verifies a Series 4000 installation will operate properly. If you haven't already done so, first see *System Check* on page 173 and perform the procedures there. The procedures in that chapter check base-level functionality required by the procedure in this chapter.

Procedure

Tip If you do not understand how to perform any of these steps, see *Series 4000 Communication Control System Operation* (P/N 025-9535).

◆ **To perform installation verification on a Series 4000**

1. Select a channel and transmit with the main transmit button on the audio panel. (4118 or 4217b). Repeat the key up using the foot pedal, the handset button, or any other PTT buttons. Ensure the selected radio keyed up with all transmit methods.
2. Select each channel in turn and key it up using your preferred transmit button. Ensure each channel keys up properly.
3. With the headset/handset unplugged, ensure receive audio on the selected channel is coming from the select speaker (typically the left speaker). All other audio should be coming from the unselect speaker (typically the right speaker.)
4. With the headset/handset plugged in, ensure the selected channel audio is heard in the headset, and all other audio is still in the unselected speaker.
5. [For multi-channel radios only] At the console, select a channel, then change the frequency (F2...F3...F4 and so on). Ensure the radio is changing frequencies as the frequency is selected. Repeat for each multi-channel radio.

6. Send out a test page. Check to see that the correct page was transmitted and that it transmitted on the correct channel and frequency as programmed.
7. Set up a patch between two separate channels. Make sure that the two channels are able to talk to each other without dispatcher intervention.

Appendix A: Radio System Management Interface

In this appendix:

The Model 4048/4020 provides a dedicated message stream for the output of receive and transmit events on individual channels and consoles. These messages can be used to record statistics related to console and channel-specific call and transmit activity. Available statistics include the sum of the duration of all calls on specific channels, the transmit activity and a per-console basis, and the average call and/or transmit duration per channel. The recording device is usually a computer application communicating through the Radio System Management port on the Model 4048/4020 CCE. Zetron offers an optional Radio System Management Program (P/N 950-0078) for Windows (see *Radio System Management Program* on page 335).

Message Format

All messages are line-oriented with ASCII-encoded fixed-width fields in the format:

```
>[Date][Time][Command][Source][Dest][Rmt. Param][Checksum]CRLF
```

Table 117 explains the fields. “>” is the start of record identifier; “CRLF” is the record terminator, a carriage return (0x0D) followed by a line feed (0x0A). All items contained in brackets are space-separated.

Table 117: Message Field Descriptions

Field	Description
Date	Consists of 10 ASCII characters. `[Month1][Month2]/[Day1][Day2]/[Year1][Year2][Year3][Year4]` Ranges are: Month 01-12 Day 01-31 Year 0000-9999 Example: 02/19/1998
Time	Consists of 11 ASCII characters. `[Hour1][Hour2]:[Min1][Min2]:[Sec1][Sec2].[Hun1][Hun2]` Ranges are: Hour 00-23 Min 00-59 Sec 00-59 Hun 00-99 (hundredths of a second) Example: 13:40:45.56
Source	Consists of two ASCII characters. `[S1][S2]` The range of source values is described in message descriptions that follow.
Dest	Consists of two ASCII characters. `[D1][D2]` The range of destination values is described in message descriptions that follow.
Rmt. Param	Consists of two ASCII characters - either a remote function parameter from/to a channel card, or “XX” which means this message has no remote parameter.
Checksum	Consists of two ASCII characters representing a 1-byte checksum. `[Chk1][Chk2]` The checksum represents the sum of all data bytes, modulo 256. The range is 00 to FF. The checksum adds the hex value of each ASCII byte (for example, ‘C’ is 43 and ‘3’ is 33), including spaces (0x20) and the separator characters > `:` `.` `/`, excluding the CRLF. Example: 5D

Message Content: Messages From Channels

For All Channel Messages:

[Source] [S1][S2] is the source channel number
Range 01-48

[Dest] [D1][D2] is the destination console number
01-16 - specific console number
CC or CR– all consoles

[Parameters] = [P1][P2] – The message descriptions are identified in the Remote Function Parameters table, Table 118.

Channel Call On

[Command] = 'C'
[Rmt. Param] = 'XX' for none, or according to Table 118.

Example: >02/19/1998 13:40:42.19 C 02 CR XX 0F
(From Channel 2 to all consoles)

Example: >02/19/1998 13:40:42.19 C 02 CR TD 1E
(From Channel 2 to all consoles, Tone freq. F1)

ANI Log

Note ANI logging may be enabled or disabled through the Modem/ Service port (see *ANI Display Option* on page 108).

[Command] = 'a'
[Rmt. Param] = 'nn…nn' up to 24 ANI digits.

The System Traffic Card (STC) starts collecting ANI digits at the start of the call, when the Dual Channel Card (UDCC) sends the **Call On** message to the consoles. ANIs can be one of many tone formats, some with unknown ID lengths. One example of an ANI is a string of DTMF digits. When the STC detects the **Call Off** from the UDCC, it reports the collected ANI digits to the RSM port using the **ANI Log** message.

MDC-1200, Zetron iRIM "Type A", and Zetron iRIM "Type B" ANI all have similar formats. MDC-1200 and "Type A" ANI have five hex digits. The first digit will be the received status from the radio, if there is one, and will be a value from 0x00 to 0x0F. The next four digits are numbers of 0x00 to 0x0F containing the four sets of four bits of the ANI, for a total of 16 bits. "Type B" ANI are similar except the bits are binary coded decimal with a special purpose value (the value 0x0A indicates a hyphen in the ID). Also the first digit of the first half of the ANI has its leading bit set to indicate it is the first half of the ANI.

Generic example from channel 2 to all consoles:
`>10/19/2001 11:34:01.41 a 02 CR nn … nn 0F`

DTMF example from channel 2 to all consoles, ANI E0609:
`>02/18/2001 11:34:01.41 a 02 CR 0E 00 06 00 09 D8`

MDC-1200 or Zetron “Type A” example, ANI 2345:
`>10/22/2009 15:35:22.41 a 02 CR 0F 02 03 04 05 FF`
`0F` is the status, and the ID appears as `02 03 04 05`.

Zetron “Type B” example, ANI 207-1550 (FleetSync ID):
`>10/22/2009 15:37:23.45 a 02 CR 0F 0A 00 07 0A 0F 01 05 05 00 C1`
Starting at the first `0F` of the example:

`0F` - status of 15 (normal ID), `0E` would be an emergency ID

`0A` - 2 plus the first digit of first half of the ID (02 + 08 = 0A)

`00` - 0

`07` - 7

`0A` - hyphen

`0F` - status of 15, repeated for second half

`01` - 1

`05` - 5

`05` - 5

`00` - 0

`C1` - the checksum

Channel Call Off

[Command] = ‘c’
[Rmt. Param] = ‘XX’ for none, or according to Table 118.

Example: >02/19/1998 13:40:45.54 c 02 CR XX 31
(From Channel 2 to all consoles)

Example: >02/19/1998 13:40:45.54 c 02 CR D4 A5
(From Channel 2 to all consoles, DC freq. F2)

Message Content: Messages From Consoles

For All CIC Card Messages:

[Source] [S1][S2] is the source console number
Range 01-16
[Dest] [D1][D2] is the destination channel number
01-48 - specific channel number
DD – all channels

Channel Transmit On (Local)

[Command] = 'T'
[Rmt. Param] = 'XX' for none.

Example: >02/19/1998 13:40:30.47 T 04 12 XX 06
(Console 4 to Channel 12, Transmit on)

Channel Transmit On With Remote Function

[Command] = 'T' *(this is intentionally the same command as Local Transmit)*
[Rmt. Param] = [P1] – The remote parameters are identified in the Remote Function Parameters table, Table 118.

Example: >02/19/1998 13:40:21.37 T 01 46 TD 63
(Console 1 to Channel 46, TX w/tone frequency F1)

Channel Transmit On With Dual Remote Function

[Command] = 'D'
[Rmt. Param] = [P1] [P1] – The remote parameters are identified in the Remote Function Parameters table, Table 118.

Example: >03/05/2002 04:05:34.62 D 02 07 TD TC 5F
(Console 2 to Channel 7, TX w/tone frequency F2)

Channel Site Intercom

[Command] = 'S'
[Rmt. Param] = XX for none.

Example: >02/19/1998 13:40:30.47 S 01 17 XX 2B
(Console 1 to Channel 17, Site TX)

Channel Transmit Off

[Command] = 't'
[Rmt. Param] = XX for none.

Example: >02/19/1998 13:40:37.38 t 01 01 XX 10
(From Console 1 to Channel 1, TX Off)

Parameters used in messages from the channels and consoles are identified in Table 118.

Table 118: Remote Function Parameters

Tone Remote Function	[P1][P2]	DC Remote Function	[P1][P2]
650	T0	+2.5	D0
750	T1	+5.0 (F1)	D1
850 (F8)	T2	+7.5	D2
950 (F7)	T3	+10.0	D3
1050 (F6)	T4	+12.5 (F2)	D4
1150 (F5)	T5	+15.0	D5
1250 (F4)	T6	+15.5	D6
1350 (F3)	T7	0.0	D7
1450	T8	-2.5	D8
1550	T9	-5.0 (F3)	D9
1650	TA	-7.5	DA
1750	TB	-10.0	DB
1850 (F2)	TC	-12.5 (F4)	DC
1950 (F1)	TD	-15.0	DD
2050	TE	-15.5	DE

Appendix B: Troubleshooting

"Disconnect" or "Comm Fail" message in console LCD display

Affects M4217B, M4118, M4018. Check the following:

- Check the rear of panel's CCE LIVE LED and CIC cards CONS LIVE LED. If one or both are not illuminated it's likely a data wiring problem.
- DATA wiring of CI and IC pairs. Check both the CCE position punch-block end and the DATA port of the RJ-11 duplex wall jack.
- The data is RS-422 protocol and is polarity sensitive. Verify correct pins and polarity.

No audio out of either speaker on console

Check the following:

- Check if affecting specific channel or any channel. If single channel, try another channel to isolate if channel card or console issue.
- VU meter deflection (SEL only). If there is meter movement on receive, it means audio is present at the console itself.
- Verify no jackbox/TRHI with headset/handset in jack. Check that HEADSET button isn't active (red LED illuminated if active).

- If no VU meter movement on SEL, check SEL audio present at position's CIC card test pins (SEL), CCE position punch down block, duplex wall jack AUDIO, and RJ-11 connection to console panel.
- Check UNSEL audio the same way, but on UNSEL test points. Note: LCD VU meter does not monitor UNSEL audio by default.

CPS upload or download problems

Check the following:

- Verify cable type. If two ends marked "loop in / loop out" then plug directly to loop in / loop out ports, not reversed.
- If using the single 6-conductor "combined" cable, verify nothing is connected to the loop in/out ports on console, because they share same data bus.
- Verify the baud rate and serial port assignment in CPS/CPSW. In CPS, this is set under **UPLOAD, Communications Parameters**. In CPSW,
- If CPS or CPSW are used in Windows 2000 or XP, there may be a "serial timeout error" and/or the console LCD may not show "done" after the download attempt. In this case, run the **cps4x18.bat** or **cps4010.bat** batch file. These batch files use the MODE command to fix the serial port baud rate at 9600 and prevent timeout errors.

Siren coming from 4217 on power up

When installing the IntegratorRD system or replacing the PC, you may hear the Model 4217 giving a siren tone out the speaker. This tone indicates that the RS-422 data that the 4217 is seeing was meant for the CCE. There are two different ways to resolve this:

- Swap the CON and CCE data RS-422 cables on the back of the PC, or
- Go into IntegratorRD Console Settings and change the CIC and Audio Panel Comm Port Settings.

Changes in IntegratorRDPS not showing up on the IntegratorRD display

There are several reasons that changing settings in RDPS does not affect the IntegratorRD display:

1. After saving the changes in IntegratorRD, The user did not reload the configuration or relaunching IntegratorRD.
2. More then one configuration file exists and the file that was changed was not the file selected in IntegratorRD Console Settings.
3. The incorrect configuration number (console number) was selected in RDPS or in the IntegratorRD console settings.
4. You may have made a change in RDPS that requires an optional software license. To determine if a valid license is present on the computer, see *Obtaining a Zetron Software License* (P/N 011-0622).

Some features (MDC-1200, Priority Transmit, Takeover) do not work

Certain IntegratorRD features, such as MDC-1200, Priority Transmit, and takeover functions, are managed system-wide by console 1. Therefore, if the Console 1 PC or the CIC card in slot 1 fails, these features may be lost system-wide.

Console 1 is not determined by physical location or any labelling made on-site. Console numbering is determined by which Console is connected to which CIC card by way of RS-422 serial cables. In this case, Console 1 refers to the console connected by serial cable to the first CIC card.

If the CIC card in slot 1 fails, it can be replaced by a spare CIC card or even one of the other in-use CIC cards. CIC cards are hot-swappable.

If the Console 1 PC fails, it will need to be replaced or repaired. As a workaround in the mean time, you can connect a different Console position's PC to CIC card 1 and that PC will become Console 1 after you close and restart IntegratorRD.

Fault LED is lit on 4048 Power Supply

If the +5VDC Fault LED is lit on a single power supply in a dual supply setup and the measured voltage is inside the normal range, this indicates there is imbalanced sharing. Increase the voltage on the supply with the lit LED.

Note The adjustment direction of the +5VDC potentiometer varies, and may even be different on two power supplies in the same system.

Additional Uninstall

During normal uninstall of IntegratorRD, several files remain on the hard drive. This is normal, so when the application is reinstalled there is no need to configure it from scratch. However, there may be times when it is appropriate to manually remove these additional files. For example, if the configuration files have become corrupt or an upgrade is being performed where the old configuration files are incompatible with the new software. To remove the files left behind by the uninstall process, delete the following folders:

```
Windows XP:
C:\Program Files\Zetron\IntegratorRD
C:\Documents and Settings\All Users\Documents\Zetron\IntegratorRD

Windows 7 32-bit:
C:\Program Files\Zetron\IntegratorRD
C:\Users\Public\Public Documents\Zetron\IntegratorRD

Windows 7 64-bit:
C:\Program Files (x86)\Zetron\IntegratorRD
C:\Users\Public\Public Documents\Zetron\IntegratorRD
```

Appendix C: CPSW Reference Material

This appendix contains reference material used for programming with CPS (Console Programming System, DOS version) and CPSW (Console Programming System for Windows). See *Console Programming System* on page 193.

Main topics in this appendix:

DC and Tone Remote Function Definitions

Table 119: DC Remote Function Definition

Current	T1R1 STD	T1R1 PAGING	T2R2	T4R4
0.0 mA	RX	RX	RX	RX
+2.5 mA	—	—	—	—
+5.0 mA	F1	—	F1	F1
+7.5 mA	—	—	—	—
+10.0 mA	—	—	—	—
+12.5 mA	RPTR ON	F1 W PL	F2	F2
+15.0 mA	—	—	—	—
+15.5 mA	—	—	—	—
-2.5 mA	PL MON	PL MON	PL MON	PL MON
-5.0 mA	RPTR OFF	—	R2 OFF	F3
-7.5 mA	—	—	—	—
-10.0 mA	—	—	—	—
-12.5 mA	—	F1 W/O PL	—	F4
-15.0 mA	—	—	—	—
-15.5 mA	—	—	—	—

Table 120: Tone Remote Function Definition

Tone Freq	T1R1	T2R2	T4R4	T8R8
650Hz	—	—	—	—
750Hz	—	—	—	—
850Hz	—	—	—	F8
950Hz	—	—	—	F7
1050Hz	PL4/WC 2 OFF	PL4/WC 2 OFF	WC 2 OFF	F6
1150Hz	PL3/WC 2 ON	PL3/WC 2 ON	WC 2 ON	F5
1250Hz	PL2/WC 1 OFF	PL2/WC 1 OFF	F4	F4
1350Hz	PL1/WC 1 ON	PL1/WC 1 ON	F3	F3
1450Hz	RPTR ON	RPTR ON	RPTR ON	RPTR ON
1550Hz	RPTR OFF	RPTR OFF	RPTR OFF	RPTR OFF
1650Hz	R2 ON	R2 ON	R2 ON	R2 ON
1750Hz	R2 OFF	R2 OFF	R2 OFF	R2 OFF
1850Hz	F1 W/O PL	F2	F2	F2
1950Hz	F1	F1	F1	F1
2050Hz	PL MON	PL MON	PL MON	PL MON

Achieving Motorola/GE DC Control Currents

On Dual Channel DC Remote Control cards, P/N 702-9095, Revision E or later, with software version V4.01 or later, standard Motorola and General Electric DC Remote Control currents may be achieved.

Normally, the available positive and negative currents which are based on 2.5 mA increments will achieve proper control of DC Remote Controlled base stations. However, a feature on the late DC Dual Channel Cards allow the exact Motorola and GE currents to be achieved. This is done using the Console Programming System for Windows (CPSW) custom DC programming in the System Configuration menu, and switches on the legend plate of the DC Dual Channel Card.

If the “A” channel of a Dual Channel Card needs Motorola/GE standard currents, close option switch 6 of the card's configuration switch. If the “B” channel of the Dual Channel Card needs Motorola/GE standard currents, close option switch 2 of the card's configuration switch.

Then using the CPSW, locate the **System Configuration** menu and program all channels that require the standard Motorola/GE currents with a Channel Type of **DC Control...** and a DC Control Protocol of **Custom** (see *Channel Configuration* on page 200). Then using the conversion table below, locate the desired current and find the CPSW current to use for **DC Control Current**.

Desired Current	CPSW Current
0.0 mA	+0.0mA
+2.5 mA	+2.5 mA
+5.5 mA	+5.0 mA
+6.0 mA	+7.5 mA
+11.0 mA	+10.0 mA
+12.5 mA	+12.5 mA
+15.0 mA	+15.0 mA
+15.5 mA	+15.5 mA
-2.5 mA	-2.5 mA
-5.5 mA	-5.0 mA
-6.0 mA	-7.5 mA
-11.0 mA	-10.0 mA
-12.5 mA	-12.5 mA
-15.0 mA	-15.0 mA
-15.5 mA	-15.5 mA

Paging Format Specifications

Table 121: Motorola and GE Tone Group Frequencies

Tone	Tone Groups						
Number	**Mot 1**	**Mot 2**	**Mot 3**	**Mot 4**	**Mot 5**	**Mot 6**	**Mot A**
0	330.5	569.1	1092.4	321.7	553.9	1122.5	358.9
1	349.0	600.9	288.5	339.6	584.8	1153.4	398.1
2	368.5	634.5	296.5	358.6	617.4	1185.2	441.6
3	389.0	669.9	304.7	378.6	651.9	1217.8	489.8
4	410.8	707.3	313.0	399.8	688.3	1251.4	543.3
5	433.7	746.8	953.7	422.1	726.8	1285.8	602.6
6	457.9	788.5	979.9	445.7	767.4	1321.2	668.3
7	483.5	832.5	1006.9	470.5	810.2	1357.6	741.3
8	510.5	879.0	1034.7	496.8	855.5	1395.0	822.2
9	539.0	928.1	1063.2	524.6	903.2	1433.4	912.0
A	none	none	none	none	none	none	1011.6
B	none	none	none	none	none	none	1122.1
Diagonal Tone	569.1	979.9	569.1	569.1	979.9	979.9	979.9

Tone	Tone Groups						
Number	**Mot B**	**Mot Z**	**GE A'**	**GE B'**	**GE C'**	**Mot 10**	**Mot 11**
0	371.5	346.0	682.5	652.5	667.5	1472.9	1930.2
1	412.1	384.6	592.5	607.5	712.5	1513.5	1989.0
2	457.1	426.6	757.5	787.5	772.5	1555.2	2043.8
3	507.0	473.2	802.5	832.5	817.5	1598.0	2094.5
4	562.3	524.8	847.5	877.5	862.5	1642.0	2155.6
5	623.7	582.1	892.5	922.5	907.5	1687.2	2212.2
6	691.8	645.7	937.5	967.5	952.5	1733.7	2271.7
7	767.4	716.1	547.5	517.5	532.5	1781.5	2334.6
8	851.1	794.3	727.5	562.5	577.5	1830.5	2401.0
9	944.1	881.0	637.5	697.5	622.5	1881.0	2468.2
A	1047.1	977.2	none	none	none	none	none
B	1161.4	1084.0	none	none	none	none	none
Diagonal Tone	979.9	979.9	742.5	742.5	742.5	none	none

Table 122: Motorola and GE Code Plans

Pager	Code Plans								
Cap-code	Mot B Groups	Mot C Groups	Mot D Groups	Mot E Groups	Mot F Groups	Mot G Groups	Mot H Groups	Mot J Groups	Mot K Groups
0xx	2+4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
1xx	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1	1+1
2xx	2+2	2+2	2+2	2+2	1+3	1+3	1+3	1+4	1+4
3xx	3+3	1+2	1+2	1+2	3+3	3+3	3+3	4+1	4+1
4xx	1+2	4+4	1+5	2+1	4+4	3+1	3+1	4+4	4+4
5xx	1+3	1+4	5+5	1+6	3+1	5+5	1+6	5+5	1+6
6xx	2+1	2+1	2+1	6+6	1+4	1+5	6+6	1+5	6+6
7xx	3+1	4+1	5+1	6+1	4+1	5+1	6+1	4+5	6+1
8xx	2+3	2+4	2+5	2+6	3+4	3+5	3+6	5+4	4+6
9xx	3+2	4+2	5+2	6+2	4+3	5+3	6+3	5+1	6+4
Groups	1-2-3-4	1-2-4	1-2-5	1-2-6	1-3-4	1-3-5	1-3-6	1-4-5	1-4-6

	Mot L Groups	Mot M Groups	Mot N Groups	Mot P Groups	Mot Q Groups	Mot R Groups	Mot S Groups	Mot T Groups	Mot U Groups
0xx	N/A	4+2	4+2	4+2	4+2	4+2	4+2	4+2	4+2
1xx	1+1	2+3	2+3	2+3	2+4	2+4	2+5	3+4	3+4
2xx	1+5	2+2	2+2	2+2	2+2	2+2	2+2	4+3	4+3
3xx	5+1	3+3	3+3	3+3	4+2	4+2	5+2	3+3	3+3
4xx	1+6	4+4	3+2	3+2	4+4	4+4	2+6	4+4	4+4
5xx	5+5	3+2	5+5	2+6	5+5	2+6	5+5	5+5	3+6
6xx	6+6	2+4	2+5	6+6	2+5	6+6	6+6	3+5	6+6
7xx	6+1	4+2	5+2	6+2	4+5	6+2	6+2	4+5	6+3
8xx	5+6	3+4	3+5	3+6	5+4	4+6	5+6	5+4	4+6
9xx	6+5	4+3	5+3	6+3	5+2	6+4	6+5	5+3	6+4
Groups	1-5-6	2-3-4	2-3-4-5	2-3-4-6	2-4-5	2-4-6	2-5-6	2-3-4-5	2-3-4-6

	Mot V Groups	Mot W Groups	Mot Y Groups	Mot MT Groups	GE X Groups	GE Y Groups	GE Z[1] Groups	SPL EXT Groups
0xx	4+2	4+2	N/A	4+2	A'+A'	B'+B'	A'+A'	10+10
1xx	3+5	4+6	A+A	1+1	B'+A'	C'+B'	C'+A'	11+11
2xx	5+3	6+4	B+B	2+2	B'+B'	C'+C'	C'+C'	10+11
3xx	3+3	5+6	Z+Z	1+2	A'+B'	B'+C'	A'+C'	11+10
4xx	3+6	4+4	A+B	4+4	C'+C'	N/A	N/A	3+10
5xx	5+5	5+5	A+Z	5+5	C'+A'	N/A	N/A	6+10
6xx	6+6	6+6	B+A	2+1	C'+B'	N/A	N/A	3+11
7xx	6+3	4+5	Z+A	4+5	A'+C'	N/A	N/A	6+11
8xx	5+6	5+4	B+Z	5+4	B'+C'	N/A	N/A	10+6
9xx	6+5	6+5	Z+B	2+4	N/A	N/A	N/A	11+6
Groups	2-3-4-5-6	2-4-5-6	A-B-Z	1-2-4-5	A'-B'-C'	B'-C'	A'-C'	3-6-10-11

1. GE 100-call plan Z is tone groups C'+C'; use (100-Call format). For capcodes ending in double-digits using tone group twice, (example: 122 in code plan C), use diagonal as one of the tones.

Table 123: General Encoding Plans

Pager	General Plan		Modified Gen. Plan		General Alternate Plan	
Cap-code	Tone Groups	Diagonal Tone	Tone Groups	Diagonal Tone	Pager Capcode[1]	Tone Groups
0xx	4+2	N/A	N/A	N/A	0xx	N/A
1xx	1+1	569.1	1+1	569.1	1xx	953.7 + Mot 1
2xx	2+2	979.9	2+2	979.9	2xx	953.7 + Mot 2
3xx	1+2	N/A	3+3	569.1	3xx	979.9 + Mot 2
4xx	4+4	569.1	4+4	569.1	4xx	953.7 + Mot 4
5xx	5+5	979.9	5+5	979.9	5xx	953.7 + Mot 5
6xx	2+1	N/A	6+6	979.9	6xx	979.9 + Mot 1
7xx	4+5	N/A	N/A	N/A	7xx	979.9 + Mot 5
8xx	5+4	N/A	N/A	N/A	8xx	979.9 + Mot 4
9xx	2+4	N/A	N/A	N/A		
Axx[2]	3+3	569.1	N/A	N/A		

1. For General Alternate Code Plan, the last two digits of the capcode are the same.
2. The General Plan has an eleventh pager block (with Capcodes Axx), which is not coded on the console.

Tone Groups	
General Plan	1, 2, 3, 4, 5
Modified Gen. Plan	1, 2, 3, 4, 5, 6

Note On General and Modified General plans, there are different diagonal tones for different pager blocks.

Table 124: Reach Encoding Plan

Tone Number	Frequency (Hz)	Tone Number	Frequency (Hz)	Tone Number	Frequency (Hz)	Tone Number	Frequency (Hz)
0	3960.0	16	2274.0	32	1306.0	48	750.0
1	3824.0	17	2196.0	33	1261.0	49	725.0
2	3694.0	18	2121.0	34	1219.0	50	700.0
3	3568.0	19	2049.0	35	1177.0	51	676.0
4	3446.0	20	1980.0	36	1137.0	52	653.0
5	3329.0	21	1912.0	37	1098.0	53	631.0
6	3215.0	22	1847.0	38	1061.0	54	609.0
7	3106.0	23	1784.0	39	1025.0	55	588.0
8	3000.0	24	1723.0	40	990.0	56	568.0
9	2898.0	25	1664.0	41	956.0	57	549.0
10	2799.0	26	1608.0	42	923.0	58	530.0
11	2704.0	27	1553.0	43	892.0	59	512.0
12	2612.0	28	1500.0	44	862.0	60	495.0
13	2523.0	29	1449.0	45	832.0		
14	2437.0	30	1400.0	46	804.0		
15	2354.0	31	1352.0	47	776.0		

Table 125: Zetron Tone Groups for Reach Encoding

Tone	Tone Groups				
Number	Z1	Z2	Z3	Z4	Z5
0	1980.0	1177.0	1400.0	832.0	588.0
1	2704.0	1608.0	1912.0	1137.0	804.0
2	2612.0	1553.0	1847.0	1098.0	776.0
3	2523.0	1500.0	1784.0	1061.0	750.0
4	2437.0	1449.0	1723.0	1025.0	725.0
5	2354.0	1400.0	1664.0	990.0	700.0
6	2274.0	1352.0	1608.0	956.0	676.0
7	2196.0	1306.0	1553.0	923.0	653.0
8	2121.0	1261.0	1500.0	892.0	631.0
9	2049.0	1219.0	1449.0	862.0	609.0

Table 126: Reach Code Plan

Pager Capcode	Individual Call Tone Groups (x+y)
0yx	Z5+Z3
1xy	Z1+Z2
2yx	Z2+Z1
3xy	Z3+Z4
4yx	Z4+Z3
5xy	Z1+Z4
6yx	Z4+Z1
7xy	Z1+Z5
8yx	Z5+Z1
9xy	Z3+Z5

Note The ones/tens digit encoding, shown by “x” and “y,” reverses position for each 100 pager block. In Motorola/GE plans, the first tone is always the tens digit and the second tone is the ones digit.

For REACH group call, 0xx group is not present. Instead, ten group calls are accessible using pager numbers 000, 011, 022...099. These pager numbers generate the ten group call tones from tone group Z1. The group calls activate the first tone Z1 pagers (capcodes 1xx, 5xx, and 7xx).

Table 127: Zetron Standard Tone Sets

Tone Set[1]	CCIR	EEA	EIA	ZVEI	DDZVEI	DZVEI	PZVEI
Tone No. 0	1981	1981	600	2400	2400	2200	2400
Tone No. 1	1124	1124	741	1060	1060	970	1060
Tone No. 2	1197	1197	882	1160	1160	1060	1160
Tone No. 3	1275	1275	1023	1270	1270	1160	1270
Tone No. 4	1358	1358	1164	1400	1400	1200	1400
Tone No. 5	1446	1446	1305	1530	1530	1400	1530
Tone No. 6	1540	1540	1446	1670	1670	1530	1670
Tone No. 7	1640	1640	1587	1830	1830	1670	1830
Tone No. 8	1747	1747	1728	2000	2000	1830	2000
Tone No. 9	1860	1860	1869	2200	2200	2000	2200
A Group	2400	1055	2151	2800	885	825	970
C X-Tone	2247	2400	2010	970	740	2800	2800
E Repeat	2110	2110	459	2600	970	2400	2600
Timing[2]	**CCIR**	**EEA**	**EIA**	**ZVEI**	**DDZVEI**	**DZVEI**	**PZVEI**
Preamble	673	673	673	673	673	673	673
Gap	65	65	65	65	65	65	65
Tone	100	40	33	70	70	70	70
X-Tone	100	40	65	70	70	70	70

1. Frequencies are shown in hertz.
2. Timing is shown in milliseconds

Table 128: DTMF Tone Pair Frequencies and Timing

	Column 1	Column 2	Column 3	Column 4
First Row[1]	**1** 697 1209	**2** 697 1336	**3** 697 1477	**A** 697 1633
Second Row	**4** 770 1209	**5** 770 1336	**6** 770 1477	**B** 770 1633
Third Row	**7** 852 1209	**8** 852 1336	**9** 852 1477	**C** 852 1633
Fourth Row	***** 941 1209	**0** 941 1336	**#** 941 1477	**D** 941 1633

1. Frequencies are shown in hertz.

Key from 16-button keypad.
Timing: Variable. Typical is 150ms of tone, 50ms of silence.
Digits: 1 through 14, including A, B, C, D, *, and #.

Table 129: Quick Call One (Two-Plus-Two) Frequencies and Timing

Tone	A Series		B Series		Z Series	
No.	Freq.[1]	Code	Freq.	Code	Freq.	Code
0	358.9	CA	371.5	CB	346.7	CZ
1	398.1	DA	412.1	DB	384.6	DZ
2	441.6	EA	457.1	EB	426.6	EZ
3	489.8	FA	507.0	FB	473.2	FZ
4	543.3	GA	562.3	GB	524.8	GZ
5	602.6	HA	623.7	HB	582.1	HZ
6	668.3	JA	691.8	JB	645.7	JZ
7	741.3	KA	767.4	KB	716.1	KZ
8	822.2	LA	851.1	LB	794.3	LZ
9	912.0	MA	944.1	MB	881.0	MZ
A	1011.6	NA	1047.1	NB	977.2	NZ
B	1122.1	PA	1161.4	PB	1084.0	PZ

1. Frequencies are shown in hertz.

Timing: Variable.

Typical Timing:
First tone pair: 1250ms
Gap: 0ms
Second tone pair: 1000ms
Group call: 5000ms (if 1st and 2nd tone pairs are same)

Description of Key Functions and Parameters

This section describes key functions and their definable parameters. Use this section as a reference when defining key functions (see *To define a key* on page 211).

Channel Functions

To define a channel function, you must first select the channel number. The channel must have been previously defined in System Configuration.

Select

This function will “Select” the appropriate channel for transmission when a transmit key is pressed. The received audio from the selected channel will be heard on the “Select” speaker. All other received audio will be routed to the “Unselect” speaker. All channels must have one and only one “Select” key assigned.

Answer/Hold

This key requires telephone control. The key is used to answer a telephone call. Once a call is answered (telephone is off-hook), this key toggles the hold function.

Frequency Select

This key is only applicable with a tone or DC controlled radio with multiple frequency capability. By selecting this key, the desired frequency command will be sent. The current or tone will be sent to the radio in order to select the desired frequency.

Please note that “no current” is different from 0.0 ma. Selecting “0.0 ma” will cause zero milliamperes of DC control current to be sent when this command is executed. Selecting “No current” will cause the previous control current for that function to be maintained; that is no current change.

After selecting the receive current/tone, you must also specify a current or tone to activate the transmitter for the desired frequency.

Frequency Select with Voting

This key is identical to the frequency select function with the added feature of selecting an auxiliary input. This allows the output of a voter to indicate which frequency was voted. The red LED will be illuminated for the frequency that voted.

The input must have been previously defined before using this key.

Instant Select

Instant Select differs from the normal Select function in that after the Select is performed, a DC or Tone control function is sent. This is normally used on a multi-frequency base station to select a channel at a desired frequency. Several Instant Select keys may be assigned to a single channel even though only one can be active at a time.

Instant Select with Voting

If you chose instant select with voting, you must also pick the Auxiliary input that will receive the voter result. This input indicator will be illuminated whenever the voter picks this particular input. The input must have been previously defined using the System

Configuration menu. After selecting the input number, the name of the input will be shown.

Note This is an indication of the voter result only. The channel is NOT selected by the voter input.

Instant Transmit

The Instant Transmit function will cause the transmitter on the assigned channel to activate even though the channel is not selected. The selected channel will not be affected.

Note If the key being defined is a spare input key and the channel is multi-frequency tone or DC control, you will be asked to supply a function to be used when this key is activated.

Priority Transmit

This key will allow the transmission on a "Busy" channel. This must be used cautiously to prevent interfering with other console positions. This is normally a supervisory position function.

Instant Alert

This function will transmit the desired alert tone on the assigned channel. The alert tone will be sent as long as the key is held down.

Beeps

This key causes a continuous beeping sound to be transmitted on the "selected" channel as long as the key is activated.

Steady Tone

This key causes a continuous 1-kilohertz tone to be transmitted on the "selected" channel. This tone can be used for calibrating the console equipment or as an indication on the channel.

Slow Siren

This key causes a slow siren-like sound to be transmitted on the "selected" channel.

Fast Siren

This key causes a fast siren-like sound to be transmitted on the "selected" channel.

Warble

This key causes a warble-like sound to be transmitted on the “selected” channel.

M25 Fast Warble

This key generates a fast warble sound to the “selected” channel. This warble is consistent with the same function on the Model 25.

Volume and Mute Keys

Volume Adjust (Knob)

The volume adjust key allows the volume of a specific channel to be set or changed at the console. Pressing the key will cause the current volume level (in percentage) to be displayed. Turning the “channel volume” knob while holding the key down will cause the volume level to be changed with the new value displayed on the console display.

Mute Adjust

This is a dual function key and is more correctly called the “mute/volume adjust”. Pressing and releasing the key causes the channel's received audio to be muted. The red light by the key will remain on while the channel is muted. Pressing again will unmute the channel. Pressing and holding this key will allow the channel volume to be set as described in the preceding paragraph, “Volume Adjust”.

Volume Up (Key)

This key is assigned to a specific channel to allow “one hand” volume adjusting. Pressing this key will cause the current volume setting to be displayed. Holding the key will cause the volume to be adjusted upwards. Releasing the key will cause the volume to be set to the displayed level. The red key indicator will illuminate while the key is pressed.

Volume Down (Key)

This key is assigned to a specific channel to allow “one hand” volume adjusting. Pressing this key will cause the current volume setting to be displayed. Releasing the key will cause the volume to be set to the displayed level. Holding the key will cause the volume to be adjusted downwards. The red key indicator will illuminate while the key is pressed.

Volume Mute

The Volume Mute key will cause the specific channel's volume to be “muted” to the mute pre-set value. The red LED associated with the key will illuminate showing that the channel is muted. If the channel volume option is not present, the mute level will be set to zero.

Patch

The patch key, when activated, will connect the channel with other patched channels. When audio is received on one of the patched channels, the other transmitter(s) will be activated as long as the audio is active. The patch keys on at least two channels must be activated in order to have any effect.

Release

This key requires telephone control. The key is used to end a telephone call by releasing the line.

Main/Standby

This key activates the channel's Auxiliary output line. It is normally used to select a standby transmitter but can be used for other functions if desired. Each channel has one auxiliary output line.

ANI Source

This function is assigned to the switch's lights only. The ANI option must be installed for this function to have meaning. Whenever a valid ANI is displayed, the ANI source light for the channel that received the ANI will illuminate. This light will be illuminated (flashing) until the ANI review key is activated.

Site Intercom

The site intercom key allows the console operator to communicate with the radio site by using the audio lines as an intercom path. When this key is pressed, only the audio is sent to the channel; the transmitter is not keyed.

Monitor

This key will send the correct command (current or tone) to disable the private line or channel guard feature of the radio allowing the received audio to be heard at the console. The indicator LED will remain on until the channel's transmitter is keyed.

Self Repeat

Self repeat allows the channel to act as a repeater; that is, any received audio on the channel will be retransmitted or “repeated” on the transmitter. The channel must be configured for full duplex.

Phone On/Off Hook

This key will activate the auxiliary output line of the designated channel. It is intended to be used as an “off hook” signal to answer an incoming phone line when the optional telephone coupler is installed. Each channel has one auxiliary output line.

Phone Hook Flash

The phone Hook Flash key will cause the On/Off Hook line to be deactivated for 500 ms thereby putting the phone on “hold”. Hit the key again to enable the phone conversation.

Scan

This EDACS-only function performs the same action as the SCN button on the radio. The key's green LED reflects the state of the radio's scan mode.

Emerg. Clear

This EDACS-only function performs the same action as pressing the HOME and CLR buttons on the radio. The key's red LED blinks when an emergency condition exists and the display shows the originator's ID.

Private

This EDACS-only function enables/disables the radio's optional Aegis/Encryption hardware. It is equivalent to pressing the A1 button on the radio and requires appropriate radio personality programming. The key's green LED reflects the state of the radio's “private” mode. This function is mutually exclusive with the Scan-Add-Delete function on a given channel.

Instant Channel IRR Keys

These keys can only be used with the Universal Dual Channel Card (950-9819 or 950-9820) and act on the specified channel. A complete description of the Channel Instant Recall Recorder functions can be found in the *Series 4000 Communications Control System Operation Manual* (P/N 025-9535).

Note If **Mute All Idle Channels** is not enabled, systems using Channel Check IRR will cause audio playback activated from one console position to be heard at all positions. See *Mute all Idle Channels* on page 213.

Play/Pause

This key starts IRR playback at the current playback message pointer if the IRR is stopped or paused. It stops IRR playback and enters the pause mode if the IRR is playing. When the IRR is playing, it is automatically set to the pause mode when a call is received or any transmit occurs on the channel.

Rewind

If the IRR is not playing, it enters the pause mode and the IRR playback pointer is moved back one message each time the key is pressed until the oldest message has been reached. If the IRR is playing, it enters the pause mode and the playback pointer is moved to the beginning of the message that was playing (such that pressing the PLAY key will then replay that message).

Reset

This key cancels IRR playback or pause, and resets the playback message pointer to the beginning of the most recently recorded message. This function has no effect on the record mode.

Record

This toggle key enables the IRR to record all transmit and receive audio on the channel if currently disabled. It disables IRR recording if currently enabled. This function is recommended for supervisory consoles only.

Extended Channel Functions

These are additional channel functions that can be assigned to Standard Tone and/or DC controlled channels.

CTCSS Select

This command activates CTCSS (constant tone coded squelch signal) over-ride. This key will cause the PL (private line) feature to be disabled thereby allowing all radio channel activity to be monitored by the console operator. Refer to *DC and Tone Remote Function Definitions* on page 364 for the actual tone or DC current transmitted.

Repeat On/Off

This key will toggle the radio repeater on/off function on the appropriate channel. Refer to *DC and Tone Remote Function Definitions* on page 364 for the actual tone or DC current transmitted.

Coded/Clear

This key will toggle the coded/clear function on the appropriate channel. Refer to *DC and Tone Remote Function Definitions* on page 364 for the actual tone or DC current transmitted.

Second Receiver Unmute/Mute

This key will toggle the radio Mute on/off function on the appropriate Tone controlled channel. Refer to *DC and Tone Remote Function Definitions* on page 364 for the actual tone transmitted.

Wild Card I On/Off

Toggle the Wild Card I function on the appropriate tone controlled radio channel. Refer to *DC and Tone Remote Function Definitions* on page 364 for the function actually transmitted.

Wild Card II On/Off

Toggle the Wild Card II function on the appropriate tone controlled radio channel. Refer to *DC and Tone Remote Function Definitions* on page 364 for the function actually transmitted.

Custom Channel Functions

The Custom Channel Functions are used to customize the channel card to the radio. Each key must have the desired transmit and receive tones or DC currents assigned.

DC

If the channel is defined as a DC controlled channel, choose the desired current for receive and transmit.

Tone

If the channel has been defined as a tone controlled channel, you will be asked to select the desired transmit and receive tone. The receive tone selected will be sent whenever the key is pressed. The transmit function will be sent on transmit.

System Functions

System functions are assigned to individual keys, but may affect more than a single channel.

Transmit Keys

The following transmit functions may be assigned to a specific key.

Normal Tx

This key will cause the selected channel(s) to transmit. This is functionally the same as the optional foot-operated PTT switch. Normally only one TX key is assigned per position.

Transfer Instant Transmit

This key, when pressed, will cause the next channel “Select” key pressed to become an “instant transmit” key for the channel. The selected channel will not change. This key is used to eliminate the need for individual Instant transmit keys on each channel.

Priority Transmit

This key operates like the Normal TX key but will allow the supervisory console to override any other console transmitting on the selected channel. This key only functions on a supervisory console (Position one).

Patch Transmit

This button allows the operator to transmit on all the channels that are currently patched on the local console. This key only functions when there is no “call” activity on any of the patched channels.

Last Call Transmit Any Channel

This key will cause the last channel that received audio (“Call” activity) to transmit. The channel will not be selected.

Last Call Transmit Selected Channels

This key will cause the last “Selected” channel that received audio (“Call” activity) to transmit. The channel will not be selected.

Last Call Transmit Unselected Channels

This key will cause the last “Unselected” channel that received audio (“Call” activity) to transmit. The channel will not be selected.

Monitor

This key causes the programmed PL monitor current or tone to be sent to the “Selected” channel, thereby disabling the “private line” feature on the radio.

Site Intercom

The site intercom key allows the console operator to communicate with the “Selected” radio site by using the audio lines as an intercom path. When this key is pressed, only the audio is sent to the channel; the transmitter is not keyed.

Alert

Select a key to generate the desired alert tone to be transmitted to the “Selected” channel. The desired alert will be sent as long as the key is held down.

All Mute

This “All Mute” function key will cause the audio from all “Unselected” channels to be muted. The “selected” channel will be unaffected. If a muted channel is “selected”, it will be unmuted as long as it is selected. If it becomes “unselected”, it may become muted again if the “all mute” function has not been toggled.

Volume Reset

This key will cause the received audio level of the selected channel to be set to its default level, usually 51%. This function only has meaning if the Console Volume Card option is installed.

Group Select

The group select key allows a set of preselected radio channels to be selected with a single key. Mark check boxes to add or delete a channel from this group key. Several group keys may be defined on a single position. A channel may be a member of several different groups. If a channel card is not installed in the system, its channels will not show in the table.

If the channel chosen is tone or DC and is defined as a multi-frequency channel, you will be asked to select the desired function (tone or I) to be used when this key is activated.

Group Instant Tx

The group instant transmit key will cause all members of the group to be keyed with a single key. Mark check boxes to select channels for this key. A channel may be a member of several different groups. If a channel card is not installed in the system, its channels will not show in the table.

If the channel chosen is tone or DC and is defined as a multi-frequency channel, you will be asked to select the desired function (tone or I) to be used when this key is activated.

Patch Keys

The system patch keys are only valid if an optional Patch Card is installed. A normal patch key must be assigned to each channel to be patched. Pressing the desired Patch A-H key and the channel patch keys will cause those channels to be patched.

Up to two Patch Cards may be installed in a system giving the capability for multiple simultaneous patches. Never use the patch A-H keys if a patch card is not installed.

If the Patch keys (A-H) are defined, the normal patch function will not operate. The Patch card must be installed if these keys are defined.

Priority Marker

To cause the priority marker to be sent when this key is pressed, click the channel number for a specific channel or click “Select” or “Transfer”. Clicking “Select” will cause the marker to be sent on the “Selected” channel. Clicking “T” will cause the marker to be sent to channel of the next “select” key pressed.

Console I'com Transmit

This key will cause the microphone audio to be transmitted to the console(s) which have been “called” by the console I'com call key.

Console Intercom Call

This key will cause the selected console(s) to be "called". The called console(s) will be alerted with an audible alarm and the calling position will be displayed on the console display. Select the console(s) to be called from the list. The console currently being defined will not appear.

Console Takeover

This is a supervisory function and can only be assigned on console position 1. It allows the supervisory console to "Takeover" all functions of the target console. All keys on the console taken over will be disabled until released by the supervisor. The console taken over will display "TakeOver" on the display until released by the supervisor pressing this key again. Select and Unselect Audio will not be affected. Select the console(s) to be taken over from the list.

Simultaneous Select

Holding this key and pressing channel "Select" keys will cause multiple channels to be "Selected". All the channels thus selected will transmit when the transmit key is pressed and all their received audio will be routed to the "Select" speaker.

Speaker/Headset

This key will cause the speaker audio to be toggled between the speakers and headset. The Green LED will indicate that the audio is routed to the speaker; the red LED will indicate the headset is receiving the audio.

Note Jumpers are available on the console controller board to allow "Selected" or "Unselected" audio to be "locked" to the speakers or headset thus negating the function of this key.

Diagnostics Reset

By programming this key, any diagnostic messages displayed on the console will be held until the key is pressed. If this key is not assigned, the diagnostic will be removed after approximately three seconds or when the next key is pressed.

Clock Set

This key should only be assigned to the supervisory position. By programming this key, clock setting can be initiated by pressing the "CLOCK SET" key on the key panel.

The first time the "CLOCK SET" key is pressed, the seconds-unit on the time display will be highlighted with an underscore. The seconds-unit may be adjusted up or down using the "CHANNEL VOLUME" knob. When the desired number of seconds have been set, press the "CLOCK SET" key again.

In a similar manner, each time you press the "CLOCK SET" key, another time unit will be highlighted in the display, until the entire time and date have been set. The units are adjusted starting with seconds, then minutes, hours, month, day, and finally year. The display will automatically show the date once the three units of the time of day have been set. You may distinguish a time display from a date display by the colon (:) units separator used for time versus the slash (/) units separator used for date.

Channel Test

This key is for diagnostic use only. Pressing this key will cause all indicator LEDs to light for any channel which is currently inoperable.

ANI Review

Because ANIs are received from various radios, they will be decoded and stored in a "stack" in memory. The ANIs are reviewed and removed from the stack by repeatedly pressing this key. The LED associated with this key will blink as long as an ANI remains in the stack.

Note ANI Review only functions if the optional ANI software is installed in the console.

ANI Select

Pressing the ANI Select key will cause the channel that received the ANI showing in the display to be "Selected".

Note ANI Select only functions if the optional ANI software is installed in the console.

Paging Keys

Note The "Instant Call" and "Page Safety" functions represent optional features. They can always be programmed, but will generate an error message in the console if the Instant Call Paging option has not been installed.

Instant Call

An Instant Call key can have multiple pages (called a page stack) assigned to it. Each page in the stack can be a different format (e.g., DTMF, Two-Tone, Alert) and be steered to different channel(s).

Page Enter

This paging function is used during manual page entry (via the console DTMF/paging keypad) to terminate the entry and add the page to the stack. The use of this key is only required for variable-length paging formats (i.e., DTMF). Fixed-length paging formats (i.e., Two-Tone and Alerts) are self-terminating.

Page Clear

If manual page entry (via the console DTMF/paging keypad) is in progress, this function will abort the current key entry sequence and clear the paging display without altering the existing page stack. If a page entry is not in progress, pressing this key will delete all console page stacks. If a page transmission is in progress, it will also immediately abort the page transmission. This function should always be programmed if the console is to be used for paging.

Page Send

This paging function will terminate any manual page entry in progress (as if a PAGE ENTER key had been pressed), and begin transmitting the manual page stack on the currently selected channel(s) in the order the pages were stacked (entered). The page stack is retained and can be transmitted again (on different channel(s), for example) by pressing this key again.

Page Safety

If this function is programmed, instant-call pages will not be transmitted until this key is pressed, allowing the operator to review the selected instant-call pages before sending them. If this key has not been programmed, pressing an instant-call page key will begin the page transmission immediately.

Speaker Monitor Keys

This key will allow the unselect audio to be routed to two additional speakers besides the console's own “unselect” speaker. This function is most commonly used with Zetron Model 4117 Console Monitor.

The first time a Monitor A/B selection is made, the “Channel Select” key's green LED will flash, indicating its association with the pressed Monitor key. The next time a Monitor A/B selection is made, the green LED will stop flashing, indicating that channel's unselected audio will now be sent to the Unselected Speaker (i.e. it acts as a toggle function between the Unselect Speaker and the Monitor A/B Speaker).

Burst Tone Select

A 1-second tone burst can be enabled by selecting a frequency from the list. This tone burst is generated for each transmit function after the transmitter is keyed-up and before the console audio is switched on. Several keys can be programmed with different frequencies. The tone burst can be disabled by selecting a key programmed with the “No

Tone" choice. This feature is always disabled if no Burst Tone Select keys have been programmed.

Channel IRR Keys

These keys can only be used with the Universal Dual Channel Card (950-9819 or 950-9820) and act on the currently selected channel. If more than one channel is selected, the key is ignored. A complete description of the Channel Instant Recall Recorder functions can be found in the *Series 4000 Communications Control System Operation Manual* (P/N 025-9535).

Note If **Mute All Idle Channels** is not enabled, systems using Channel Check IRR will cause audio playback activated from one console position to be heard at all positions. See *Mute all Idle Channels* on page 213.

Play/Pause

This key starts IRR playback at the current playback message pointer if the IRR is stopped or paused. It stops IRR playback and enters the pause mode if the IRR is playing. When the IRR is playing, it is automatically set to the pause mode when a call is received or any transmit occurs on the channel.

Rewind

If the IRR is not playing, it enters the pause mode and the IRR playback pointer is moved back one message each time the key is pressed until the oldest message has been reached. If the IRR is playing, it enters the pause mode and the playback pointer is moved to the beginning of the message that was playing (such that pressing the PLAY key will then re-play that message).

Reset

This key cancels IRR playback or pause, and resets the playback message pointer to the beginning of the most recently recorded message. This function has no effect on the record mode.

Record

This toggle key enables the IRR to record all transmit and receive audio on the channel if currently disabled. It disables IRR recording if currently enabled. This function is recommended for supervisory consoles only.

Transfer Keys

These keys are used only if the optional Telephone Line Interface (950-9112) is connected to the desired channel. The transfer keys are used to "Transfer" the desired function temporarily to another key in order to save key space.

Phone On/Off Hook (Transfer)

This key will activate the auxiliary output line of the next channel “Selected”. It is intended for use as an “off hook” signal to answer an incoming phone line when the optional telephone coupler is installed. Each channel has one auxiliary output line.

Phone Hook Flash (Transfer)

The phone Hook Flash key will cause the On/Off Hook line of the next channel selected to be deactivated for 500 ms thereby putting the phone on “hold”. Hit the key again to enable the phone conversation.

Volume Adjust (Transfer)

Pressing this key will cause the next “select” key pressed to become a “Volume adjust” key. This eliminates the need for a separate Volume adjusts key for each channel.

Mute Adjust (Transfer)

Pressing this key will cause the next “select” key pressed to become a “Mute/Volume adjust” key. This eliminates the need for a separate Mute Adjust key for each channel.

Auxiliary Input/Output

Auxiliary Input / Output ports have a variety of uses. Input ports can monitor alarms or show voter status. Output ports can control gates, gas pumps, video monitors, room lights and doors, even control the lawn sprinkler system.

The Auxiliary Inputs and Outputs require that an Auxiliary I/O card (702-9105) be installed in the system. The eight spare outputs are located on each console controller card.

For each Auxiliary Output you will be prompted to select the desired LED configuration.

Note For more information about spare and auxiliary inputs and outputs, see *Input / Output Configuration* on page 206.

Selecting Auxiliary Input / Output Functions will display the AUXILIARY INPUT / OUTPUT menu. From the menu you may assign an auxiliary input, one of three different types of auxiliary outputs, or spare outputs.

Outputs 7 and 8 in Reverse Selective Calling Mode

If either a primary or secondary ANI address is programmed (see *ANI Decode / Display* on page 213), the console operates in Reverse Selective Calling (RSC) mode. Radios must support one of the following signaling modes in order to support RSC: DTMF, 5/6 Tone, or SS1A.

If a primary or secondary ANI address is programmed, and your radios support RSC, and Spare Outputs 7 and 8 are not programmed, then Spare Outputs 7 and 8 will function as follows:

- Spare Output 7: ON when ANI is displayed on the console display, OFF otherwise
- Spare Output 8: Produces a 500 ms pulse when an ANI is decoded by the console

Auxiliary Input

By assigning an input to this key, the associated LEDs will reflect the state of the input. Pick the desired inputs by entering the input numbers. The input must have been previously defined using the System Configuration menu. Then select the desired LED behavior.

Auxiliary Output Interlocked

Several outputs may be “interlocked” such that only one output can be active at any given moment. That is, when one output goes active, all others will be inactive. Up to 32 interlock groups may be defined with any number of outputs per group.

Enter the desired output number up to 240. The output number will be accepted if it has been previously defined using the System Configuration menu.

Type an interlock group number 1 - 32. If the interlock group has been already used, this input will be added to it. If not, a new interlock group will be created.

Auxiliary Output Toggle

The chosen output will toggle with this key. That is, press the key once and the output will be activated; press again and the output will deactivate.

Auxiliary Output Momentary

As long as this key is pressed, the output will be active; when released, the output will be inactive.

Spare Output

Spare Output Latching

The eight spare outputs are located on pin block P1 of the Models 4118 and 4116B and on P7 of the Model 4018 console. When an output is ON, its voltage is greater than +3.5 volts DC relative to ground. When the output is OFF, its state is less than +0.5 volts.

If Spare outputs 7 and 8 are not reprogrammed, Spare Output 7 will be ON whenever an ANI is displayed on the console and Spare Output 8 will produce a 500 ms pulse every time an ANI is decoded by the console.

The assigned spare output will toggle on and off with each press of the spare output latching key. The red LED will toggle to show the state of the output.

Spare Output Toggle

The assigned spare output will toggle on and off with each press of this key. The red and green LEDs will toggle to show the state of the output.

Spare Output Momentary

The assigned spare output will be activated only as long as the key is depressed. The green LED will blink as long as the key is held down.

For each spare output assigned, select the desired output number (1-8).

Appendix D: Power Supply Worksheet

This power supply worksheet should be used before adding equipment to an existing Series 4000 system. The worksheet helps you determine your current power supply capacity and your current or planned power draw.

Use Table 130 to determine your current power supply capacity and use Table 131 to determine your current or planned power draw.

Tip Make copies of the worksheets and work from the copies.

Note The provided "supply" and "load" values are represented in milliamps.

Table 130: Worksheet for Power Supply

Item Name	12V Supply	Fill in Qty	12V x Qty	5V Supply	Fill in Qty	5V x Qty
M4048 Power Supply 950-9693	17,000	x _____	=	10,000	x _____	=
Modular Power Supply M4020 950-0167	4500	x _____	=	8000	x _____	=
M4020 Dual Power Supply 950-0265	7000	x _____	=	5000	x _____	=
		Total 12V supply:			Total 5V supply:	

Warning! The Modular Power Supply for the M4020 (P/N 950-0167) does not typically provide enough power for any additional equipment. Virtually all Series 4000 systems using that power supply must upgrade to the M4020 Dual Power Supply (950-0265) or the M4048 Power Supply (950-9693) to support adding new hardware.

Table 131: Worksheet for Power Load

Item Name	12V Load	Fill in Qty	12V x Qty	5V Load	Fill in Qty	5V x Qty
Dual Channel Universal T/R Control Card 950-9819 (with **0** DC remote channels)	400	x _____	=	220	x _____	=
Dual Channel Universal T/R Control Card 950-9819 (with **1** DC remote channel)	665	x _____	=	220	x _____	=
Dual Channel Universal T/R Control Card 950-9819 (with **2** DC remote channels)	930	x _____	=	220	x _____	=
Dual Channel Tone/Local T/R Control Card 950-9820	230	x _____	=	220	x _____	=
Dual Channel T/R Control Card (Orion) 950-9867	230	x _____	=	270	x _____	=
Dual Channel T/R Control Card (MAP27) 950-0015	230	x _____	=	270	x _____	=
Dual Channel T/R Control Card (iDEN®) 950-9862	230	x _____	=	270	x _____	=
Dual Channel T/R Control Card (MDX®) 950-9617	230	x _____	=	270	x _____	=
S4000 LTR® Wireless Dual Channel T/R Control Card 950-0172	230	x _____	=	270	x _____	=
Auxiliary Input/Output Interface Card 950-0293	410	x _____	=	40	x _____	=
System Traffic Card 950-9692	60	x _____	=	135	x _____	=
Console Interface Card 950-9695	70	x _____	=	100	x _____	=
Model 4020/4048 8 Patch Card 905-0229	95	x _____	=	80	x _____	=
Model 4020/4048 16 Patch Card 905-0230	95	x _____	=	80	x _____	=
Model 4020/4048 24 Patch Card 905-0231	95	x _____	=	80	x _____	=
M4000 Phone Coupler 901-9384	200	x _____	=	0	N/A	0
Telephone Interface Card 950-9538	200	x _____	=	0	N/A	0
		Total 12V load:			Total 5V load:	

Appendix E: List of Audio Delays

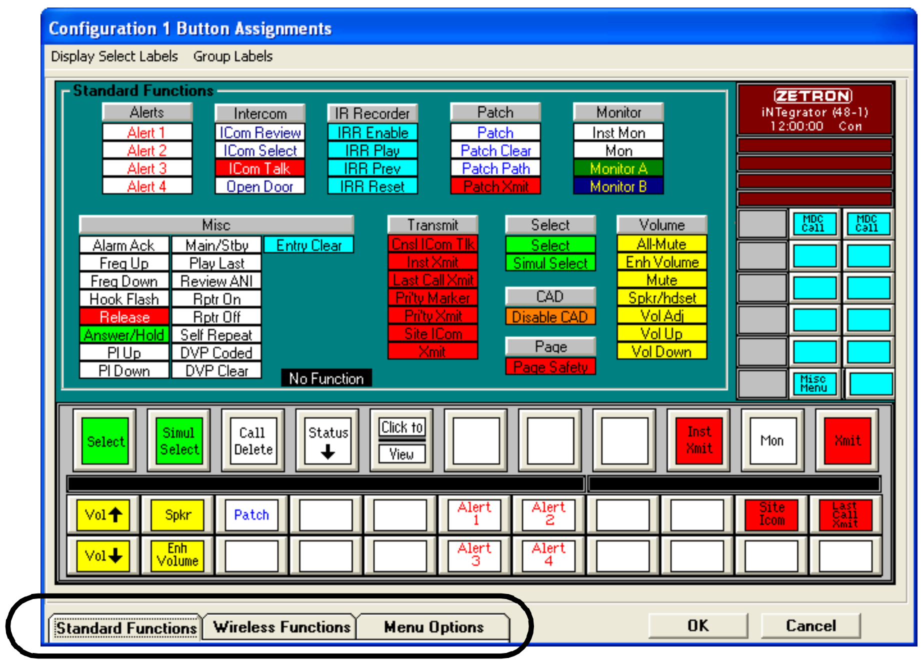
Table 132: List of Audio Delays

Name	Description
Channel Transmit Delay	Transmit delay is a fixed audio delay that may be programmed for each channel. It is programmable in 0.25-second increments from none to 3.75 seconds. Transmit audio is buffered for the programmed interval then sent to the channel. This allows the operator to begin speaking immediately upon keyup without regard of any delays imposed by the radio network. To configure this delay, see *Channel Configuration* on page 56 and *Transmit Delay* on page 60.
Guard Tone Delay	See *Type* on page 56. To prevent an echo effect, the guard tone delay should be disabled when the IRR option is used. To configure this delay, see *Options Configuration* on page 61.
Inter-Page Delay	The time delay between pages in the same manual page stack. This delay only occurs for manually entered page stacks (i.e., for two or more pages entered via Paging/DTMF keypad). Because each page can be sent out over different channels, Instant-Call (single button) paging stacks always use the Keyup Delay between pages even if the next page uses the same channel as the previous page. To configure this delay on button-based consoles, see *Channel Configuration* on page 200. This delay is not applicable for IntegratorRD consoles. See Stack Delay instead.
Inter-Stack Delay	See Inter-Page Delay.
Keyup Delay	This is the delay between when a channel has finished keying up the transmitter and the start of the first page in a stack. To configure this delay for button-based consoles, see *Channel Configuration* on page 200. For IntegratorRD consoles, see *Page Settings* on page 270.
Manual Paging Talk Time	Manual Paging Talk Time is a single value, programmed per position via RDPS, that is automatically applied to manual page stacks. See also Talk Time.

Name	Description
MIC Delay Eliminator	The Mic Delay Eliminator puts a delay in the microphone voice signal so that the operator's voice reaches the transmitting radio at the same time that the carrier is activated. This prevents the loss of first syllables that can occur when transmitting over transmitter links or tone-remote control. To configure this delay, see *Audio Controls* on page 212.
Remote Voice Delay	See Guard Tone Delay.
RX Delay	Receiver delay. For Harris Orion Dual Channel Cards, see *Programming the Dual Channel Wireless Control Card* on page 134.
Stack Delay	Associated per Major Response Page; inserts a delay at the end of an Major Response Page, forcing the next Major Response Page to wait until this delay time has expired before sending out its pages. This delay is not applicable for button-based consoles. Instead, see Inter-Page Delay for manual pages or Keyup Delay for Instant Call pages.
Talk Time	Talk Time is the predefined amount of time after a page is finished that the currently transmitting channels remain keyed up. After that time expires, IntegratorRD releases PTT and terminates transmission. Talk Time should be configured for most paging formats. Operators can use the Transmit key or a PTT button to override the default Talk Time by extending or cancelling the transmission. Once the Transmit key or a PTT button is pressed, the default Talk Time is cancelled and the transmitter is keyed up until the key or button is released. If a Major Response Page has mixed talk times: • Button-based consoles use the longest programmed Talk Time (associated with each Leading Digit) at the end of the page stacks. With the exception of the last page, channels are keyed down between pages on different channels. At end of page stacks, keys up all channels from page stacks (and their associated frequencies) where a page was transmitted, and also had a programmed talk time; keydowns are kept to a minimum as it recognizes which channels are already keyed up and keeps them keyed up, only keying up channels which are not already keyed up. • IntegratorRD consoles use the programmed Talk Time (associated with each Major Response Page) of the last Instant Call page. At the end of page stacks, leaves last keyed up paging channels open for voice message talk time; does not key down nor key up any new channels.
Transmit Delay	See Channel Transmit Delay.
Voice Delay	Enable Voice Delay to hear the go-ahead-beep on an MDC Sel Call. See *Voice Delay* on page 274.
VOX Delay	Determines how long the audio must be below the vox Threshold before the call is cleared. See *Call* on page 57.

Appendix F: IntegratorRD Buttons

In IntegratorRDPS, buttons to be assigned are grouped as shown in the following figure:



To find a description of these buttons, see the appropriate matching section:

- *Standard Functions* on page 394
- *Wireless Functions* on page 402
- *Menu Options* on page 408

Standard Functions

In IntegratorRDPS, standard functions are grouped by purpose. To find a description of a button, see the appropriate group:

- *Alerts* on page 394
- *Intercom* on page 394
- *IR Recorder* on page 395
- *Patch* on page 396
- *Monitor* on page 396
- *Misc* on page 397
- *Transmit* on page 398
- *Select* on page 400
- *CAD* on page 400
- *Page Control* on page 400
- *Volume* on page 401

Alerts

Alert 1, 2, 3 and 4

When one of the Alert keys is pressed, an alert or test tone will be transmitted over all selected channels. When the Alert key is released the tone transmission will stop.

Each of the four Alert keys may have one of the 6 different tone options assigned to it. The tone options are:

1. kHz Beep
2. kHz Tone
3. Fast Siren
4. Slow Siren
5. Warble
6. M25 Warble

Intercom

Icom Review

Reviews the intercom calls that have been received on the intercom channel. If more than one intercom channel has been defined then the calls received on the highlighted intercom channel are reviewed.

Icom Select

Cycles through the defined intercoms (for the highlighted intercom channel if more than one intercom channel is defined) connecting the audio from the console to the intercom remote position.

Icom Talk

Opens the audio path for the operator to talk through the intercom to the remote speaker.

Open Door

Activates the second aux output assigned to current intercom. This aux output is usually used for opening a door.

IR Recorder

Note If **Idle Channel Muting** is set to **None** or **Unselected Channels**, systems using Channel Check IRR will cause audio playback activated from one console position to be heard at all positions. See *Idle Channel Muting* on page 310.

IRR Enable

The IRR Enable key is used to enable and disable the Instant Recall Recorder for the selected channel. Note that this function is only available with the DSP Dual Channel Card. This function controls the Channel Check IRR only; it does not control the M3022 IRR or IntegratorIRR. This function is recommended for supervisory consoles only.

IRR Play

The IRR Play key is used to start playback of the current message stored in the Instant Recall Recorder of the selected channel. Note that this function is only available with the DSP Dual Channel Card. This function controls the Channel Check IRR only; it does not control the M3022 IRR or IntegratorIRR.

IRR Prev

Pressing the IRR Previous key makes the next older message in the Instant Recall Recorder of the selected channel the current message. Note that this function is available only with the DSP Dual Channel Card. This function controls the Channel Check IRR only; it does not control the M3022 IRR or IntegratorIRR.

IRR Reset

Pressing the IRR Reset key makes the most recent recorded message in the Instant Recall Recorder of the selected channel the current message. Note that this function is available only with the DSP Dual Channel Card. This function controls the Channel Check IRR only; it does not control the M3022 IRR or IntegratorIRR.

Patch

Patch

This button toggles the state (On/Off) of the patch path displayed on the Patch Path button for the currently highlighted channel.

Patch Clear

This button clears the cross-channel patch on the path currently displayed on the Patch Path button, if this console owns the patch.

Patch Path

This button allows the user to cycle through the available patch paths. The number of paths available is dependant on the patching hardware installed (4048 - Enhanced Patch Card with 8, 16, or 24 available paths, 4020 – Enhanced Patch Card with 8 or 16 available paths (10 maximum usable)). If another console has activated a patch path, that path number will be skipped on your console's Patch Path button until it is released.

Patch Transmit

Following the selection of a cross-channel patch the user may wish to key up only those channels included in the patch. The Patch Xmit key serves this purpose.

Monitor

Instant Monitor

Pressing the Inst Mon key will disable the coded squelch (PL) decoding for the highlighted channel.

Monitor

Pressing the Mon key will disable the coded squelch (PL) decoding for the selected channel(s).

Monitor A

Pressing the Monitor A key connects the highlighted channel's unselect audio to the Monitor A speaker.

Monitor B

Pressing the Monitor B key connects the highlighted channel's unselect audio to the Monitor B speaker.

Misc

Alarm Acknowledge

The Alarm Ack function may be assigned to a key on the main screen or to a key on the audio panel or one of the expansion panels.

When an alarm input is activated, a single-line message will be displayed on the screen, just below the system logo. The message will be displayed in blinking red letters on a white background. If multiple alarms are received, they will be queued in the order received. Only one message will be displayed at a time.

The Alarm Ack key is used to acknowledge the alarm currently displayed. Pressing the Alarm Ack key will remove the current alarm message and, if there are additional alarm messages, display the next alarm in the queue. When all alarms have been acknowledged, the alarm message display will be blanked.

Frequency Up and Down

To change the frequency of a multiple frequency base station, highlight the channel module and use the Frequency Up and Frequency Down keys to change the frequency selection.

Hook Flash

The Hook Flash key is used to send a hook flash to the telephone system. This key only operates when the phone channel is off-hook.

Phone Release

The Phone Release key is used to disconnect the phone line for a telephone line channel.

Answer/Hold

The Answer/Hold key is used to connect to a telephone line channel, and toggles the phone into the hold mode after it’s connected.

PL Up and Down

The PL Up and Down keys may be used to select the Private Line function of a tone channel.

Main - Standby

For channels that have been configured for general main/standby operation, the Main/Stby key allows the user to toggle the state of the main/standby output for a channel. The state of the output will be shown in the channel module display.

Play Last

The Play Last key is used only when a Model 3022 Instant Recall Recorded is being remotely controlled by the console. Pressing the Play Last key causes the last recording on the 3022 to be played.

Review ANI

When the console is called from a field unit using ANI (automatic number identification), the unit number (or alias) will be shown in a field of the channel module display. To clear identification, highlight the channel and press the Review ANI key. If more than one ANI has been received the ANI identification will have a flashing “bullet” appended to the ID. The Review ANI key will remove the displayed ID and display the next ID.

Repeater On and Off

The Rptr On and Rptr Off keys are used to enable and disable a base station repeater.

Self Repeat

Enabling Self Repeat on a channel will cause calls received on this channel to be automatically retransmitted on the same channel. Self Repeat functionality requires a 4-wire channel with full duplex enabled.

DVP Coded and Clear

The Digital Voice Privacy Coded and Clear keys are used to enable and disable a base station encryption using tone remote sequence.

Entry Clear

This key is used to clear the entry area.

Transmit

Console Icom Talk

In a system with multiple dispatch positions, it is possible for the dispatchers to talk with one another using the console intercom. This is done by first establishing the audio path from the Console Icom menu and then pressing the Console Icom Talk key to talk.

Instant Transmit

The Inst Xmit key may be used to transmit on the currently highlighted channel module. This will not change the channel selection.

Last Call Transmit

The Last Call Xmit key may be used to transmit on the channel, which last received a call.

Priority Marker Key

Pressing this key enables the priority marker for the currently highlighted channel. This function will emit a brief tone over the radio channel every few seconds while radio traffic is idle. While the priority marker is enabled the channel status module will show “PrM” in the “busy” field.

Priority Marker

A priority marker tone may be issued when the Priority Marker key is pressed for a selected channel. The priority marker entry fields specify the frequency, duration, interval and amplitude of the marker tone. The following identifies the range limits on each entry.

- Frequency: 600 to 2000 Hz
- Duration: 50 to 1000 mS
- Interval: 1 to 300 seconds
- Amplitude: 1 to 100 percent

Priority Transmit

The Pri’ty Xmit (priority transmit) key will allow the supervisor console position (position 1) to override any other console transmitting on a specific channel.

The priority transmit key only works on the supervisory console position.

Site Icom

Pressing and holding the Site Icom key provides an audio connection (via the microphone) to a remote base station site without transmitting over the radio channel. This acts like an intercom between the console and service personnel at the base station site.

Transmit

Pressing the Transmit (Xmit) key keys the transmitter for each channel that is selected.

Select

Select

After the desired channel module is highlighted, the channel may be selected by pressing the Select key. All other channels will be unselected. The channel name will be displayed with a green background to indicate the channel is selected.

Simul Select

To select more than one channel at a time, press the Simul Select key. Then highlight the desired channels. When complete, press the Simul Select key again. While Simul Select is active, highlighting an already selected channel will unselect the channel.

CAD

Disable CAD

This button is only needed when the console has a CAD (Computer Aided Device) interface connected to it through a serial port. This button disables the CAD control over the console while allowing console activity messages to be sent to CAD. When this button is activated, a countdown timer is started and displayed in the system message area. The timer indicates the amount of time before the CAD-disable condition will be automatically removed. Pressing the Disable CAD key while CAD-disable is active will cause the disable to cancel, allowing CAD control over the console.

Note The button, 'Disable CAD' is only needed when the console has a CAD interface connected to it through a serial port. This button disables the CAD control over the console while allowing console activity messages to be sent to CAD. CAD stays disabled for 256 seconds, or, to re-enable it, press the button again.

Page Control

Page Safety

If a Page Safety key has been defined, any instant call page key that is pressed just selects the page for sending. As many pages as desired may be selected for sending. The pages are not sent until the Page Safety key is pressed. Once this key is pressed, IntegratorRD will send pages in the same order in which they were selected, pushing each subsequent selection to the end of the selection list. During the selection process, if a page is unselected from the list, it is removed. If the same page is subsequently added again, it is pushed to the back of the list. When Page Safety is pressed, pages are sent in the order of their final selection.

Volume

All-Mute

Pressing the All-Mute key causes all unselected channels to mute (be reduced in level). When the mute is activated, all channel volume displays will be changed to yellow with no volume level value. At the same time, a countdown timer is started and displayed in the system message area. The timer indicates the amount of time before the all-mute condition will be automatically removed. Pressing the All-Mute key while all-mute is active will cause the mute to cancel, returning all channels to their previous audio levels.

Enhanced Volume

Pressing the Enhanced Volume key toggles the channel volume of the highlighted channel between the standard volume level and another defined volume setting. When enhanced volume is active, the volume indicator for the channel will blink.

Mute

Pressing the Mute key reduces the channel audio volume for the highlighted channel to the value defined as the Mute Volume. Press the Mute key again to return the volume to its original level.

Speaker/Headset

If the console includes an auxiliary headset (and associated jack-box), the user may select where console audio is directed using the Spkr/Hdset key. When the headset is plugged in, the key will indicate Hdset in the color black. At this time audio will be directed to the headset. If the user would like to redirect audio to the console speakers without removing the headset, press the Hdset key. The key will then indicate Spkr in the color yellow.

Volume Adjust

The Volume Adjust key allows the user to adjust channel volume using the FUNCTION knob on the audio panel. Pressing the Volume Adjust key toggles it on or off. When the Volume Adjust key is on (depressed) turning the FUNCTION knob will adjust the currently highlighted channels volume.

Volume Up and Down

The volume of a channel, relative to the other channels, may be adjusted by using the Volume Up and Volume Down keys. The percentage volume level is displayed in the channel module. Each press of the Volume Up key increases the channel volume by 3% and each press of the Volume Down key decreases the channel volume by 3%.

Wireless Functions

In IntegratorRDPS, standard functions are grouped by purpose. To find a description of a button, see the appropriate group:

- *EDACS* on page 402
- *LTR* on page 404
- *iDEN* on page 404
- *SDC (Sprint Direct Connect)* on page 405
- *Call List* on page 406
- *MAP27* on page 406
- *Dispatcher* on page 407
- *MDC-1200* on page 407

EDACS

EDACS Sys

Pressing this key initially causes the current system setting to be displayed. Subsequent presses (before a 1-second timeout period) increment the system setting to the next system on the radio's internally programmed system list. Pressing this key is functionally equivalent to pressing the SYS key on the radio.

EDACS Scan

Pressing this key causes the radio to enable/disable scan mode. The key reflects the state of the scan mode setting, key depressed indicates that scanning is on; key not depressed indicates that scanning is off. Pressing this key is functionally equivalent to pressing the SCN key on the radio.

Scan A/D

Pressing this key causes the radio to enable/disable the current group setting from the scan list. The key reflects the state of the scan list setting, key depressed indicates that the current group is included in the scan list; key not depressed indicates the current group is not included in the scan list. Pressing this key is functionally equivalent to pressing the A1 key on the radio.

EDACS PVT / Private Call

This key enables/disables the optional Aegis/Encryption hardware that can be added to the radio. The key state reflects the state of the private setting, key depressed indicates that the Aegis/Encryption option is enabled; key not depressed indicates the option is disabled. Pressing this key is functionally equivalent to pressing the A1 key on the radio. This key can not simultaneously exist with the Scan Add/Delete key.

EDACS Group Up and Down

Pressing one of these keys causes the current group setting of the radio connected to the selected channel to change to the next or previous group on the radio's internally programmed group list. Pressing one of these keys is functionally equivalent to pressing the Group-Up or Group-Down Ramp Switch on the radio. These keys are also used to change settings once in the MENU, SPCL CALL, STATUS or MESSAGE selection displays.

EDACS Menu

Pressing this key gives the operator access to the radio's programmed menu items. Examples of items accessible are the Special Call Menu (SPC CALL), Scan Add/Delete menu (SCAN A/D), Status menu (STATUS), and Message menu (MESSAGE). Each press of the Menu option changes the displayed menu. Pressing this key is functionally equivalent to pressing the MENU key on the radio.

EDACS Special Call

Pressing this key gives the operator access to the radio's Special Call Menu (SPC CALL). Pressing this key is functionally equivalent to pressing the A2 key on the radio. The Group-Up and Group-Down keys are used to select the radio to which the special call will be made.

I-Call Up/Down

Cycles up or down through the individual calls programmed into the radio (speed dials)

EDACS Emergency

Pressing and holding this key for longer than 1 second causes an emergency declaration. Pressing this key is functionally equivalent to pressing the HOME button on the radio.

Emergency Clear EDACS

Pressing this key causes the radio to clear a currently existing emergency condition. The green LED of this key (if there is one) will blink to indicate when an emergency condition exists, and the display will indicate the ID of the originator of the emergency. Pressing this key is functionally equivalent to pressing the HOME key then the CLR key on the radio.

Scan Add/Delete

When using the Group Up/Down buttons to select the current group, the Scan Add/Delete buttons add or delete the currently active radio group into the radio's scan list.

EDACS Clear

Pressing this key causes the radio to drop out of any Menu display and return to the Group display. Pressing this key is functionally equivalent to pressing the CLR button on the radio.

LTR

LTR Lock

LTR Lock will cause the LTR radio to ignore call activity from a specific LTR System during scanning. First, Highlight the desired channel. Next, use the User and User Select keys to select the user id for the system to be locked out. Finally, press the LTR Lock key. The LTR user id displayed in the Channel Status module will change to the color yellow to indicate that the user is locked out.

Note that the LTR lock locks out all users on a common LTR system. Therefore all User IDs with that system will be shown in yellow. To unlock a system, choose any User ID displayed in yellow and then press the LTR Lock key.

LTR Scan

Enable LTR radio system scanning by highlighting the desired channel and pressing the LTR Scan key. Scan will be displayed in the Channel Status module during the time there is no call activity.

LTR System Up and System Down

The LTR Sys Up and Down keys search the user ID list looking for the next or previous user ID with a different LTR system value than the currently selected user ID. Note that the order of the system values depends on how the user ID's were entered.

LTR User Up and User Down

The User up and User down keys are used to scroll through the User ID selections for the currently highlighted LTR channel. When the user presses the User up/down keys the next (or previous) user ID will be displayed blinking in the Channel Status module.

LTR User Select

During the time the user are reviewing the user ID’s, the radio system/group is not changed. The radio is commanded to change system/group only when the user presses the User Select key.

LTR Group Up/Down

Cycles up or down through the groups programmed into the radio.

iDEN

iDEN Emergency

This button allows the operator to initiate and clear an emergency call to an iDEN radio.

iDEN Local Area

This button allows the operator to initiate a local area call to an iDEN radio.

iDEN Wide Area

This button allows the operator to initiate a wide area call to an iDEN radio.

iDEN Target Area

This button allows the operator to initiate a targeted area call to an iDEN radio.

iDEN Call Alert

This button allows the operator to send a call alert to an iDEN radio.

iDEN Private Call

This button allows the operator to initiate a private call to an iDEN radio.

iDEN Group Up and Down

These buttons allow the operator to scroll through the programmed iDEN groups.

iDEN Group Select

This button allows the operator to select the current iDEN group displayed on the console channel display.

iDEN Channel Mode

This button allows the operator to change the iDEN channel mode between group and private.

iDEN End Call

The button allows the operator to terminate an iDEN private call or to remove the radio from an iDEN group call.

SDC (Sprint Direct Connect)

SDC Call Alert

This button allows the operator to send a call alert to an SDC radio.

SDC Private Call

This button allows the operator to initiate a private call to an SDC radio.

SDC Channel Mode

This button allows the operator to change the SDC channel mode between group and private.

SDC End Call

The button allows the operator to terminate an SDC private call or to remove the radio from an SDC group call.

Call List

Status Up and Down

These two buttons allow the operator to move between calls logged in the call history window.

Call Delete

This button deletes the currently selected/highlighted call in the call history window.

Call Reply

This button sets up a call to the radio ID of the currently selected call in the call history window.

MAP27

MAP27 Send

This button sets up a call to a MAP27 radio.

MAP27 Send Emergency

This button sets up an emergency call to a MAP27 radio.

MAP27 Send Priority

This buttons sets up a priority call to a MAP27 radio.

MAP27 Call Disconnect

This button disconnects the current connected MAP27 call.

Dispatcher

Radio Check

This button allows the M427 dispatcher to check the current availability status of a radio ID.

Radio Enable/Disable

This button allows the M427 dispatcher to enable or disable a radio ID.

Self Divert

This button allows the M427 dispatcher to divert a console-connected radio to another radio ID.

Divert Cancel

This button cancels a console-connected radio or field radio diversion.

3rd Party Divert

This button allows the M427 dispatcher to divert a field radio to another field radio ID.

Check ESN

This button provides the information about the electronic serial number (ESN) of a radio ID.

MDC-1200

MDC-1200 Selective Call

Selective call is a voice transmission placed to a particular radio ID.

MDC-1200 Call Alert

Call alert is a no-voice transmission call to a particular radio ID.

MDC-1200 Status Request

Status request is sent to a radio ID requesting its current status.

MDC-1200 Status Update

Status update is sent to an MDC-1200 channel to update its status.

MDC-1200 Radio Check

Radio check is sent to a radio ID requesting its acknowledgement.

MDC-1200 Radio Enable

This message is sent to a radio to re-enable itself.

MDC-1200 Radio Disable

This message is sent to a radio to disable itself.

MDC-1200 Remote Monitor Disable

This message is addressed to a radio to instruct it to close its microphone.

MDC-1200 Remote Monitor Enable

This message is addressed to a radio to instruct it to open its microphone.

MDC-1200 Emergency Alert

Emergency alert is a radio channel declaring an emergency.

MDC-1200 Emergency Ack

This message is sent as a response to an emergency alert to the radio that sends the emergency.

Menu Options

Placement

Menu Options can only be placed on the two columns of buttons to the right of the screen.

Aux I/O Menu Option

The state of contact closure inputs and outputs may be reviewed by pressing the Aux I/O menu option. The secondary function keys will be replaced with a list of input and output keys displayed in red, green or gray. The active and inactive colors are dependent upon the way the Aux I/O's have been configured.

EDACS Review

Clicking the EDACS Review Menu button brings up a view of the EDACS call history. Calls on the selected and unselected channels are shown separately.

LTR Menu

The LTR Menu allows the user to select an LTR system/group user identifier by pressing a pre-programmed user key.

Misc Menu

The Miscellaneous menu provides access to several system functions including:

- Console Intercom
- Console Takeover
- Move Channel (Channel Display setup)
- iDEN Reset
- MDC-1200 Squelch (requires enhanced MDC license)
- Toggle Border
- Always On Top
- Show Call Window
- Hide Call Window
- Define Select Groups
- Define Xmit Groups
- Define Patch Groups
- Enable ANI Transpd
- Set Consol Config
- Start/Stop Log
- Copy Files

The Miscellaneous menu provides the only way to exit the console software. The Misc Menu option is required for operating the console.

Page Select

If the system is configured for paging, the Page Select menu option will activate a menu used to send pages (Instant Call Paging) and to enter pages (Manual Paging).

Recall Recorder

Pressing the Recall Recorder menu option replaces the secondary function keys with a remote display and keys for remotely controlling a Zetron M3022 instant recall recorder.

Patch Groups

There are 16 patch groups that may be defined on the IntegratorRD. After one or more patch groups have been defined, it is possible to patch multiple channels with a single key press. To do this, press the Patch Groups menu option and then press one of the 16 Patch Group keys.

Patch groups may also be assigned to audio or expansion panel keys.

Select Groups

There are 16 select groups that may be defined on the IntegratorRD. After one or more select groups have been defined, it is possible to select multiple channels with a single key press. To do this, press the Select Groups menu option and then press one of the 16 Select Group keys.

Select groups may also be assigned to the audio or expansion panel keys.

Transmit Groups

There are 16 Transmit groups that may be defined on the IntegratorRD. After one or more transmit groups have been defined, it is possible to key multiple transmitters with a single key press. To do this, press the Xmit Groups menu option and then press and hold one of the 16 Transmit Group keys.

Note that performing a group transmit will not affect the channel selections.

Transmit groups may also be assigned to audio or expansion panel keys.

iDEN Call

The iDEN Call menu provides a list of the programmed iDEN subscribers and all the iDEN specific control buttons.

MAP27 Call

The MAP27 Call menu provides a list of the programmed MAP27 subscribers and all the MAP27 specific control buttons.

MAP27 Dispch

The MAP27 Dispatcher menu provides a list of the programmed MAP27 subscribers and all the M427 dispatcher specific control buttons.

MDC-1200 Call

The MDC-1200 menu provides a list of the programmed MDC-1200 subscribers and all the MDC-1200 specific control buttons. (Requires enhanced MDC license.)

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