ZETRON®

Model 4010 Radio Dispatch Console Operation

025-9226G.1

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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.

This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

The Ringer Equivalence Number (REN) for this terminal equipment is 0.1. The REN assigned to each terminal equipment provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the RENs of all the devices does not exceed 5.0.

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

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.

Pb

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.

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.

Release History

Release	Enhancements/Changes
Rev F 15 Oct 1998	Changes were not recorded in earlier revisions.
Rev G 16 Dec 2008	• Significant template change. • Changed references from CPS in programming manual to CPSW in installation manual. • Several minor corrections and clarifications throughout the manual. • Updated Figure 1. • Added Figure 3 and Figure 4 with associated text. • Added an *Index* on page 37.

Contents

Introduction

The Model 4010 Radio Dispatch Console is a self-contained, multichannel console that may be ordered as a desktop unit (M4010) or for rack mounting (M4010R). It is a single position console that interfaces directly to radio transceivers and telephone lines. It is suitable for use in public safety applications, such as police and fire communications, as well as public service applications, such as utility and industrial communications. The Model 4010 may be tailored to fit the size of the system, from 2 to 12 radio channels, by adding dual channel cards as required. The channels can be configured to support a mix of control types: DC remote, tone remote, local control, and E&M control.

When equipped with a Telephone Interface Card, the Model 4010 provides hands-free phone operation and automatic audio routing between the phone and radio channels. The numeric keypad is always live in the DTMF mode when the phone is off-hook and the phone has a “hold” mode to suspend telephone activity without disconnecting the line.

Figure 1: Model 4010 Dispatch Console

Figure 2: Model 4010R Dispatch Console (rackmount)

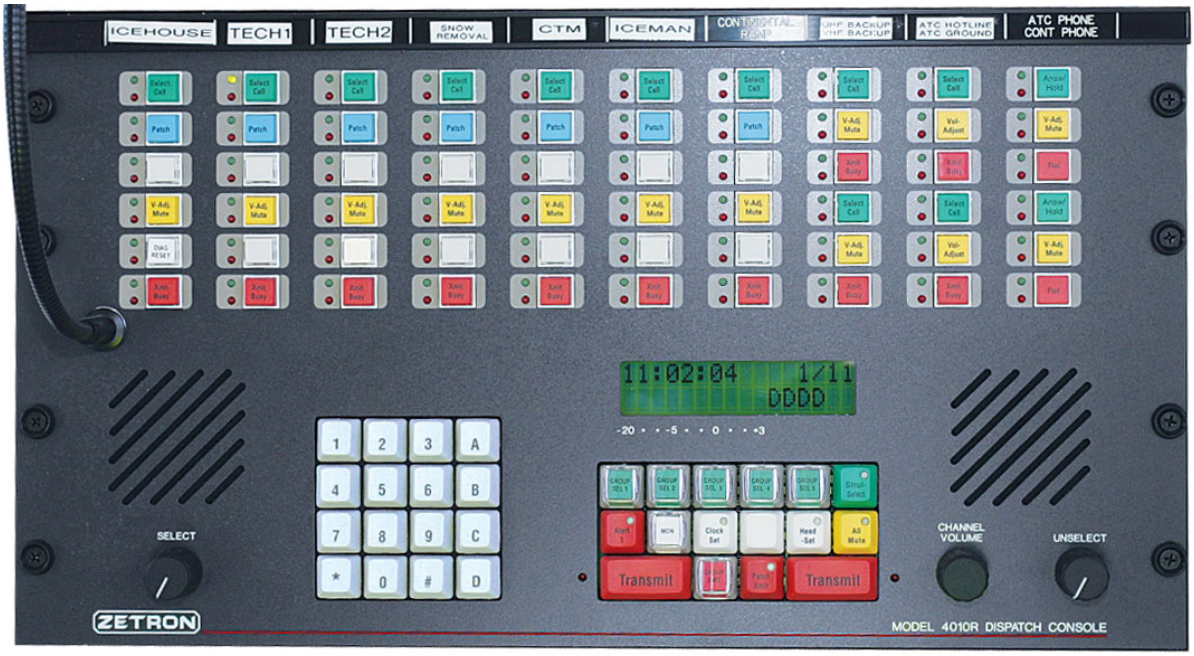
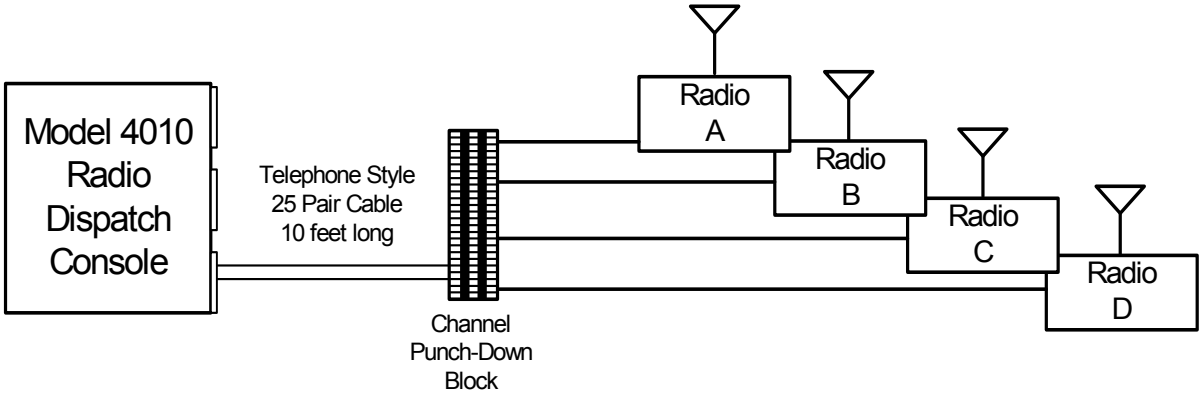


Figure 3 illustrates a Model 4010 Radio Dispatch Console configured with 4 radio channels. A console can be configured with up to 12 radio channels.

Figure 3: System Configuration



Manuals

There are several manuals which describe the operation, installation, service, and programming of the Model 4010 Radio Dispatch Console. This manual describes the

operation of the Model 4010. Below is a list of the Model 4010 manuals and a description of their contents.

Manual Title	Part Number	Description
Model 4010 Radio Dispatch Console Operator's Manual	025-9226	Presents an overview of the console panels, a description of the functions of each button, and a detailed description of the Model 4010.
Model 4010 Radio Dispatch Console Installation and Programming Manual	025-9227	Presents a description of how to install, configure, and program the Model 4010 console and accessories.

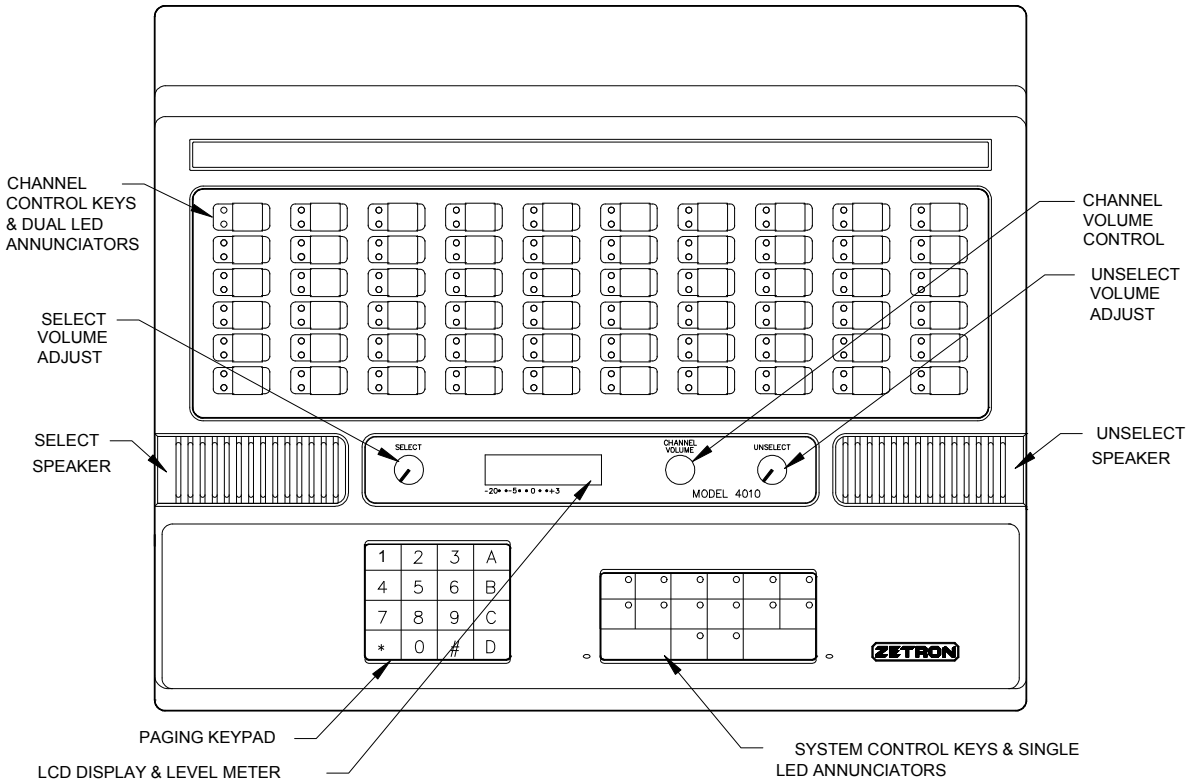
Console Overview

The Model 4010 Radio Dispatch Console is a single-position console. It contains the select and unselect speakers and their volume controls, channel volume control, 24-hour time display (or message display), level meter, and all channel and interface cards.

As shown in Figure 4, the field of 16 keys on the lower right-hand side of the dispatch console is the system control section. The layout and function of the keys in the system control section are tailored to your new system by using CPSW programming software. See *System Control Functions* on page 13 for a list of commonly used system control keys. The functions of these keys usually apply to either the selected channel or to all channels in general.

The field of 60 keys across the upper portion of the dispatch console is the channel control section. The layout and function of the keys in the channel control section is also tailored to your specific system by using CPSW. Usually the channel legend plaque above a column of keys indicates that those keys are used to control that channel. See *Channel Control Functions* on page 17 for a list of commonly used channel control keys.

Figure 4: Model 4010 Single Position Console



Console Features

Select/Unselect Speakers

The speakers of the console are contained within the console unit. The speaker on the left is the "select" speaker, with its volume control located immediately to its right. The speaker on the right is the "unselect" speaker, with its volume control located immediately to its left. Audio from the "selected" radio channel is heard on the "select" speaker. Combined audio from all "unselected" radio channels may be heard on the "unselect" speaker. When a telephone channel is activated, all radio channel audio is heard on the "unselect" speaker and the telephone audio is heard on the "select" speaker.

The knob immediately to the right of the LCD controls a rotary digital position encoder and is used for the adjustment of system functions such as clock set and channel volume level.

Microphone

The dispatch console may be equipped with either a handset, headset, desktop microphone or gooseneck microphone. Lifting the handset from its cradle or plugging the headset into its jackbox will usually cause the "Select" audio to be routed to the earpiece rather than the "Select" speaker. Optionally, the "**HEADSET**" key may be used to reroute the audio. The jackbox has a volume control for the headset earpiece.

The handset and desktop microphone options have a built-in PTT (push-to-talk) key, which when pressed, will transmit on the "Selected" radio channel. In typical configurations, the headset and gooseneck microphone are activated by the use of a foot-operated PTT switch or the "**TRANSMIT**" key on the console in order to transmit on the "selected" radio channel. The microphone will transmit audio on any channel that has a programmed "XMIT BUSY" key, regardless of which channel is currently "selected".

Time/Message Display

The top line of the two-line LCD on the dispatch console is normally used to show 12- or 24-hour time. In systems equipped with the Automatic Number Identification (ANI) option, the display is also used to show the numeric PTT ID of the calling unit. In the event of system changes (such as a failure), the display may also show diagnostic messages.

If desired, the time section of the display can be programmed to only show dashes. For example, when a facility master clock is used for time reference, this would be appropriate. Refer to the **Programming** chapter of the *Model 4010 Radio Dispatch Installation Manual* (P/N 025-9227) for programming information.

The right half of the second line is used to display prompts and messages during console paging and telephone functions. Depending on console status, the firmware version number may also display here.

The lower left of the LCD displays Dual Channel Card (DCC) control settings and options when the Program-Operate Switch is returned to "Operate" after being in the "Program" position. The lower left also displays a bar graph representation of the audio level as explained in the next item, Level Meter.

Level Meter

During transmit and intercom operation, the bar-graph level meter (under the time display) shows the level of your voice. During receive-operation, the meter will show the level of the audio on the "Selected" channel. There is a numeric level scale etched in white under the display that is roughly calibrated in Decibels.

Programming

The Model 4010 console is shipped from the factory programmed and labeled to customer specifications.

To accommodate changes in procedures or the system, the Model 4010 is fully field programmable by using CPSW, and a Windows PC (RS-232 serial port required). CPSW can configure channels for various types of base stations and can assign keys to any available function. The technician can reconfigure the keys at any time in order to accommodate new operating procedures or radio system changes. Channel control key-top labels are removable and do not require engraving.

To change the function of a key, the technician selects new functions from a menu-style list on the computer screen. When all the selections are made, the new configuration is saved to a drive and can be printed for review. When ready, the stored configuration is downloaded to the console. A stored console configuration can also be uploaded from the Model 4010 console to your PC. All system programming, key definitions, and channel configurations, which were previously downloaded (except for channel and AUX I/O names) will be transferred back up to the PC. It can then be modified or saved to a drive and later downloaded as previously described.

The **Programming** chapter of the *Model 4010 Radio Dispatch Console Installation Manual* (P/N 025-9227) fully describes this procedure.

Caution! The CPSW version must be compatible with the firmware version in the console. Firmware prior to 1.80 requires CPS and is not be compatible with CPSW at all. Contact your local Zetron representative or Zetron Technical Support to verify the correct combinations.

Key Functions

System Control Functions

Some of the following functions may be present in the system control section of your console. In the descriptions below, the abbreviation to the right of the feature is the name typically found on the key label.

Transmit (TRANSMIT)

Pressing and holding this key allows you to transmit on all selected radio channels. This is paralleled with the optional foot-operated PTT switch. Whenever your console is transmitting, this key's red LED indicator will be illuminated.

Monitor (MONITOR)

Pressing this key will cause the selected radio channel to disable its coded squelch (PL) setting, thus allowing you to monitor for activity on the channel prior to transmitting. The red LEDs on Monitor keys are illuminated while the channel is being monitored.

When programmed on the lower panel as a System Key, the Selected channel will remain in the monitor condition until it is transmitted upon.

When programmed on the upper panel as a System Key, the Selected channel will only be monitored while the key is pressed.

Site Intercom (SITE I'COM)

Pressing and holding this key allows you to talk to the selected remote base station site without transmitting over the radio channel. This acts like an intercom between you and service personnel at the base station site. The red LED of this key will be illuminated while talking on the site intercom.

Alert (ALERT type)

While this key is pressed, you are transmitting an alert or test tone over all selected radio channels. The red LED of this key will be illuminated while doing so. There may be several types of alert keys on your console. If **ALERT type** is pressed while **SITE I'COM** is being pressed, the alert tone will be sent only as far as the base-station; it will not go over the transmitter.

Alert types on the console panels are differentiated by their keycap labels, "Alert 1", "Alert 2" and so forth. Any type may be associated with any label. The types available are 1000Hz Beeps, 1000Hz Steady Tone, Slow Siren, Fast Siren, Warble (high 880 Hz, low 480 Hz), and Model 25 Fast Warble.

All Mute (ALL MUTE)

Pressing this key causes all unselected channels to mute (be reduced in level). Pressing this key again will cause the mute to cancel, returning all channels to their previous audio levels. However, if this mute is optionally timed, it will eventually cancel itself. The red LED of this key, as well as all unselected channel's mute keys, will be illuminated while the **ALL MUTE** is invoked.

Simultaneous Select (SIMUL-SELECT)

This key allows selection of more than one radio channel at a time. To perform this, press and hold the **SIMUL-SELECT** key, then with the other hand, press the **SELECT**/ **INSTANT SELECT** keys of the desired channels. When all of the desired channels have been selected, release the **SIMUL-SELECT** key. Whenever more than one channel is selected, the red LED of the **SIMUL-SELECT** key will be illuminated. To cancel the simultaneous selection, press the **SELECT/INSTANT SELECT** key of a single desired radio channel.

Group Select (GROUP SEL n)

A **GROUP SELECT** key is used to automatically select a pre-defined set of radio channels with a single key stroke. There may be several **GROUP SEL** keys on a console. The **GROUP SEL** key is usually labeled with the name of the group it selects, such as **FIRE SELECT** or **POLICE SELECT**. While the group is selected, the red LEDs are illuminated on the appropriate **GROUP SELECT** key and each Channel's Select Key in that Group. The group selection is canceled by pressing any radio channel's **SELECT/ INSTANT SELECT** key.

Group Transmit (GROUP XMIT)

A predefined group of radio channels may be simultaneously transmitted on by pressing and holding a **GROUP XMIT** key. This will not change the currently selected channel(s). While a **GROUP XMIT** key is pressed, its red LED will be illuminated. There may be several **GROUP XMIT** keys on a console. A **GROUP XMIT** key is usually labeled with the name of the group it transmits on, such as **Fire Xmit** or **Police Xmit** or **APB**.

Patch Transmit (PATCH XMIT)

Pressing and holding this key allows you to transmit on all of the radio and telephone channels that are currently "patched" on your console. This key will only function when there is no "call" activity on any of the "patched" channels.

Last Call Transmit (LAST CALL XMIT)

This key operates like an instant transmit. It transmits on the radio channel that received the last call. Three types of last call transmit keys are available.

1. Last Call Any Channel: This key will transmit on the last channel that received a call.
2. Last Call Selected Channel: This key will transmit on the last selected channel that received a call.
3. Last Call Unselected Channel: This key will transmit on the last unselected channel that received a call.

ANI Review (ANI REVIEW)

There are two modes of ANI operation: reverse selective calling (RSC) and PTT ID. For more information about these modes, see *ANI Operation* on page 31. If you are operating under PTT ID mode, see *ANI REVIEW Key (PTT ID Mode)* on page 32. If you are operating under RSC mode, see the following paragraph.

When your console is called from a field unit using Automatic Number Identification (ANI), its unit number will be shown on your time/message display. Also the red LED of the **ANI REVIEW** key will illuminate. To clear the display and view the next ANI in sequence (if any), press the **ANI REVIEW** key. When the last ANI in the display buffer has been reviewed, the red LED of the key will be extinguished.

ANI Select (ANI SELECT)

You may automatically select the channel of the calling ANI unit, whose number is shown in your display, by pressing the **ANI SELECT** key.

Diagnostics Reset (DIAG RESET)

If your console is equipped with this key, then any diagnostic messages that come to your display can only be cleared by pressing this key. The red LED of this key will be illuminated and flashing as long as a diagnostic message is being displayed. If this happens, you should write down the message and the time and give it to the maintenance personnel prior to resetting the message. If not equipped with this key, then the diagnostic message is cleared when any key on your console is pressed. This key may also be labeled **FAULT ACK**.

Headset (HEADSET)

Pressing the **HEADSET** key will cause the select audio (and optionally the unselect audio) to be rerouted from the speaker to the headset or handset earpiece. Pressing the key again will route the audio back to the speaker. While routed to the head/handset, the red LED will be illuminated. Plugging in a headset to the jackbox option automatically causes the audio to be routed to the headset earpiece. You can press the Headset key to override this routing and send audio back to the speaker.

Priority Marker (PRI'TY MARKER)

Pressing this key will transmit a brief tone over the radio channel every few seconds while radio traffic is idle.

Three types of priority marker keys are available:

1. Specific channel: This key will enable the priority marker on one specific channel. The key's red LED will be illuminated as long as the priority marker is enabled.
2. Transfer: This key will enable the priority marker on whichever channel's **SELECT** key is next pressed. The key's green LED will blink until a channel select key is pressed or an internal timeout expires. The key's red LED behaves the same as the selected channel(s)' key (described next). This key is implemented as a toggle function. If the priority marker is currently enabled on the chosen channel, pressing this key sequence will disable it.
3. Selected channel(s): This key will enable the priority marker on the currently selected radio channel(s). While the priority marker is enabled on the selected channel(s), the red LED of the key will be illuminated. While it is illuminated, pressing the key again will disable the marker on the selected channel(s). Markers operating on unselected channels are indicated by a blinking red LED on the **PRIORITY MARKER** key.

Clock Set (CLOCK SET)

When the **CLOCK SET** key is momentarily pressed, the console will enter the clock-set mode. The display will change to a time display with one of its time units highlighted with an underscore. The highlighted unit is adjusted using the **CHANNEL VOLUME** knob. The first unit to be adjusted is the seconds. The next five momentary presses of **CLOCK SET** will then allow you to adjust the minutes, hours, month, day and year in order. The units separator will change from a colon (:) to a slash (/) when the month/day/year is being displayed. Pressing **CLOCK SET** one more time while the year is highlighted will return the console from the clock-set mode to normal.

Volume Reset (VOL RESET)

This key will cause the volume on all channels to be reset to the default level set by CPSW.

Channel Test (TEST)

Pressing the **TEST** key will cause all LEDs to flash for all channels that have failed or are not present in the system. No LEDs will flash if all programmed channels are operational.

Channel Control Functions

Some of the following keys may be present in the channel control section of your console. In the descriptions below, the abbreviation to the right of the key name is the name typically found on the key label.

Select (SELECT/CALL)

A radio channel is selected by pressing its **SELECT/CALL** key. Pressing the **SELECT** key will also unselect all other radio channels. The key's green LED indictor will illuminate while the channel is selected. The second LED of this key is usually a **Call-Busy** indicator. This red LED will blink when the channel is receiving audio (Call) and will illuminate solid when the channel is being transmitted on (Busy).

Frequency Select (F<n>)

Some radio channels have multi-frequency base stations. In these situations you will find one or more frequency select keys for the channel. These are usually labeled **F1**, **F2**, etc. To select a frequency, press the desired key. The green LED will illuminate on whichever frequency is currently selected.

Some two-frequency channels may have only one key to select between them. In this case, it may be labeled **F1/F2**. Pressing the key will cause the frequency selection to alternate between the two frequencies. The selected frequency will have the adjacent LED illuminated and the other extinguished.

Instant Select (F<n> SEL/CALL)

INSTANT SELECT keys are exclusive features of the Zetron console. In systems that allow this, **INSTANT SELECT** is a direct way of simultaneously selecting both the radio channel and the frequency for the channel. If your console is equipped with such keys, you will not find the standard **SELECT/CALL** key, but rather keys labeled like **F1 SELECT/CALL**, **F2 SELECT/CALL**, etc. Every **INSTANT SELECT** key has its own red **Call/Busy LED**. Only one **Call/Busy** LED per channel will be active at a time, and this on the currently selected frequency. This is so that you may associate the receive-activity with the actual selected frequency. Usually the **INSTANT SELECT** keys, with solid green indicators, show which frequency of the unselected channel is active. The **INSTANT SELECT** key with the blinking green indicator shows which channel is selected as well as the active frequency for that channel.

Instant Transmit (XMIT/BUSY)

Pressing and holding the **INSTANT TRANSMIT** key of a radio channel will cause transmission on that channel, without changing channel selection. The red LED of this key will illuminate whenever this channel is being transmitted on.

Volume Adjust (VOL ADJ)

The volume of a channel, relative to full amplification (100%), may be adjusted using the channel's **VOL ADJ** key and the **CHANNEL VOLUME** knob. Press and hold the **VOL ADJ** key and notice the display change to a two-digit value. The value being displayed is the percentage volume currently set. To adjust the volume up or down turn the **CHANNEL VOLUME** knob clockwise (up) or counterclockwise (down) while the **VOL ADJ** key is still being pressed. The display will increase or decrease in value. When you release the **VOL ADJ** key, the display will return to its previous indicators.

Mute (MUTE)

Press the **MUTE** key and the volume level of the channel will be reduced to the level programmed in CPSW. Press the **MUTE** key again and the volume will be restored to its previous level. While the channel is muted, the red LED of the **MUTE** key will be illuminated.

Mute/Volume Adjust (V ADJ/MUTE)

Press the **MUTE** key and the volume level of the channel will be reduced to a predetermined level. Press the **MUTE** key again and the volume will be restored to its previous level. While the channel is muted, the red LED of its **MUTE** key will be illuminated. If the **CHANNEL VOLUME** knob is turned while the **MUTE** key is pressed, the channel will become unmuted and the volume of the channel will be changed as described for the **VOLUME ADJUST** key. While in adjustment mode, the green LED will be illuminated. Note that whenever the **MUTE** key is pressed, the current volume level is briefly displayed for your review.

Patch (PATCH)

A patch may be set up between channels or from a channel to a telephone line. Any number of channels may be included in a patch. To set up a channel in the patch, press the **PATCH** key. While the patch is active for the channel, the green LED of its **PATCH** key will be illuminated. During operation, the first channel to have receive-activity will cause its receive-audio to be transmitted on all other channels in the patch.

Note that only one audio source can be active. The other members of the patch must wait for the first channel's audio to drop out before speaking. Full-duplex patching is not supported on the Model 4010.

Main/Standby (MAIN/STBY)

Pressing the **MAIN/STANDBY** key will cause the system to switch to the radio channel's standby base station. Pressing the key again will cause the main base station to be switched back in. While the main is active, the key's green LED will be illuminated. While the standby is active, the key's red LED will be illuminated.

Monitor (MON)

Pressing this key will cause the radio channel to disable its coded squelch (PL) setting, thus allowing you to monitor the channel before transmitting.

Volume Up (VOL UP)

Pressing this key will cause the current volume setting for the channel to be displayed. Holding the key will cause the volume to increment up approximately three times per second. Release the key when the desired volume is reached.

Volume Down (VOL DOWN)

Pressing this key will cause the current volume setting for the channel to be displayed. Holding the key will cause the volume to be decremented. Release the key when the desired volume level is reached.

Miscellaneous Functions

Some of the following optional keys may be present in the channel control section of your console. In the descriptions below, the abbreviation in quotation marks is the name typically found on the key label.

Private Line Select (PL<n>)

Private line (or PL) selection on a channel is performed much like frequency selection. **PL SELECT** keys are typically labeled **PL1**, **PL2**, etc. To select a PL, press the key labeled with the desired PL number and the key's green LED will illuminate (all other PL selections in the channel will extinguish). With just one **PL** key, an alternating selection will occur. In some cases, these may be included as **INSTANT SELECT** keys in which case they may be labeled **PL1 SELECT/CALL**, **PL2 SELECT/CALL**, etc.

Repeat On/Off (RPT ON/RPT OFF)

Pressing the **REPEAT ON/OFF** key will cause the repeater function at the base station to be disabled. While disabled, the red LED will be illuminated. Pressing the key again will

cause the channel's repeat function to be enabled. While enabled, the green LED will be illuminated.

Coded/Clear (CODED/CLEAR)

Pressing the **CODED/CLEAR** key will cause the voice scrambler at the base station to be disabled (clear). While disabled, the red LED will be illuminated. Pressing the key again will cause the channel's voice scrambler to be enabled (coded). While enabled, the green LED will be illuminated.

Second Receiver On/Off (R2 ON/R2 OFF)

Pressing the **SECOND RECEIVER ON/OFF** key will cause the console to mute the base-station's second receiver. While muted (off) the red LED of this key will be illuminated. Pressing the key again will cause the second receiver to unmute. While unmuted (on) the green LED of this key will be illuminated.

ANI Source (ANI SOURCE)

These indicators are used to identify the source of ANI information on systems equipped with the ANI option. The red LED indicator will illuminate when an ANI has been received on this channel. If the ANI currently displayed on the console is from this channel, the green LED indicator will be illuminated. When all pending ANIs from this channel have been reviewed using the **ANI REVIEW** key, the red indicator will extinguish.

Wild Card On/Off (WC ON/WC OFF)

This function allows remote control of miscellaneous equipment at the base-station site. This is often used to turn on or off generators, beacons and the like. Usually, the label of such keys will reflect the equipment it controls.

Telephone Functions

These functions are found only on telephone line channels.

Answer/Hold (ANSW/HOLD)

Note This function was previously called SELECT.

The initial press of this key will take the phone Off-Hook and route the receive audio from all radio channels to the console Unselect speaker. Console Mic audio is sent to the phone transmit output and the phone receive input audio is sent to the console Select speaker or

headset. The console is now connected to the phone line in a full-duplex live audio mode. The key's green LED will be on when live audio is going to the phone.

Pressing this key again toggles the phone into the Hold mode. All receive and transmit phone audio is blocked but the phone remains Off-Hook. The key's green LED will flash when Hold is active.

Release (RELEASE)

Note This function was previously called ON HK/OFF HK.

Pressing this key will hang-up the phone and route all radio audio back to its normal destination. This key will have no effect if the phone is On-Hook (it cannot be used to take the phone Off-Hook). The key's red LED will be constantly on whenever the phone is Off-Hook.

Hook Flash (FLASH)

This key is used to send a hook flash to the telephone system. Hook flash is normally used to transfer a call to another phone extension.

Paging Functions

The Model 4010 Console has a built-in paging encoder with features similar to the Zetron Model 25 encoder. The following features and keys may therefore be present. In the following descriptions, the abbreviation to the right of the feature is the name typically found on the key label.

Paging Keypad

The 16-key keypad is always present and is used for manual entry of paging codes. If the Model 4010 Console has been programmed to recognize more than one paging format, the first keypad digit entered instructs the encoder which format is to be sent. The remaining digits entered determine the page code within the format.

Instant Call

Instant Call allows a single keystroke to send preprogrammed paging sequences over preprogrammed console channels. These keys are typically labeled with the name of the individuals or apparatus that are signaled by the programmed page(s).

The LEDs next to each **INSTANT CALL** key are useful in determining the state of the associated page:

Channel Control Key Panel	
Solid Green	Selected and pending transmission
Solid Red	Paging transmission in progress
Blinking Green	Pages were sent

System Control Key Panel	
Solid Red	Selected; pending transmission or paging in progress
Blinking Red	Pages were sent

Enter (PAGE ENTER)

This key is activated prior to entering a manual page using the gray keypad on the lower panel (when there is more than one paging format defined). This key also terminates a manual paging code entry (entered via the paging keypad). The termination function is only required for paging formats which have a variable number of paging digits (e.g., DTMF). Fixed-length paging formats (such as Motorola/GE Two-Tone) are self-terminating when the required digits have been entered, as indicated by the slash (/) terminator character in the display. This key's red LED will blink whenever one or more pages have been manually entered.

Send (PAGE SEND)

This key terminates manual paging code entries (under the same conditions as the Page Enter key). It then transmits the previously entered page(s) (the "page stack") on the currently selected channel(s) in the same order as the pages were entered. The same page stack can be retransmitted (on different channel(s), for example) by merely pressing the **PAGE SEND** key again. The current page stack will be retained until the **PAGE CLEAR** key is pressed or a new manual page entry is started. This key's red LED will be illuminated during the page stack transmission.

Clear (PAGE CLEAR)

This key's operation depends on the current Model 4010 paging mode.

1. If manual paging code entry is in progress, **PAGE CLEAR** will abort the current key entry sequence and clear the paging display. Any previously entered pages will be retained.
2. If manual or instant-call paging transmission is in progress, **PAGE CLEAR** will immediately abort the paging transmission, flush all manual and instant-call page stacks, and extinguish all page key LEDs.
3. For all other Model 4010 operating modes, **PAGE CLEAR** will clear all manual and instant-call page stacks and extinguish all page key LEDs. This key's red LED is illuminated while it is pressed.

Safety (PAGE SAFETY)

This function only applies to instant-call paging and is only operational if the **PAGE SAFETY** key has been programmed. In this case, when one or more instant-call page keys have been pressed, the paging transmission will not begin until the **PAGE SAFETY** key is pressed. Otherwise, the paging transmission would start immediately after the first **INSTANT-CALL** key is pressed. This key's red LED will blink when any instant-call page is pending and continues to blink during instant-call paging transmission.

Operation

Radio Receive Operation

When receive-activity is present on a radio channel, that channel's red Call LED indicator will blink. This indicator is usually next to the **SELECT** or **INSTANT SELECT** key. If the channel is selected, the activity will be heard through the select speaker (or handset/ headset). If the channel is unselected, the activity may be heard through the unselect speaker. If the channel is selected, the receive audio level is shown on the bar-graph level meter under the time/message display.

The **SELECT VOLUME** and **UNSELECT VOLUME** knobs may be used to adjust the speaker audio levels. Headset earpiece volume is adjusted using the knob on the headset jackbox. Each channel's receive volume may be independently adjusted using the **CHANNEL VOLUME** knob and/or the channel's **VOL ADJ** key. See the description of the **VOL ADJ** key in *Channel Control Functions* on page 17.

Radio Transmit Operation

Prior to transmitting, be sure the radio channel is clear. First, select the desired channel/ frequency. If the transmitter is already in use, the channel's red "Busy" indicator will be solidly illuminated (distinguishing it from a blinking "Call" indication). Listen to the select audio, and observe the "Call" indicator to see if there is receive activity on the channel. On channels equipped with PL (coded squelch), press the **MONITOR** key to check for any coded channel activity. Use of **MONITOR** is required by the FCC for systems using PL.

When you are sure the channel is clear, you may transmit by pressing and holding the **TRANSMIT** key, the foot-operated Transmit switch, or the Handset PTT (push-to-talk) switch, depending on options installed. While you are transmitting, the red LED indicator of the **TRANSMIT** key will be illuminated. The "Busy" indicator of the channel(s) which you are transmitting on will also illuminate. While speaking, you should speak loud

enough and close enough to the microphone that you cause the level meter's indicator bars peaking just past the zero (0) in the middle of the scale underneath the LCD.

You may transmit on unselected channels by pressing and holding the desired channel's **INSTANT TRANSMIT** key.

Patching Operation

The console allows you to cross-patch a channel to several other channels or to a telephone line. To bring up the patch, press the **PATCH** keys for the desired channels. The **PATCH** key's green indicator will be illuminated. You may remove the channels or telephone line from the patch at any time by again pressing the desired **PATCH** key.

Once in operation, the first channel/telephone to have receive-activity will cause the console to retransmit the activity over all of the other patched channels/telephone lines. When the receive-activity has stopped on the source channel, transmission on the other channels will stop also. You will be able to monitor the patch in operation in the normal manner. You may also transmit to any single channel in the patch in the normal manner when there is no activity between the patched channels.

To speak to all patched channels, you press and hold down the "Patch Xmit" Key (when there is no activity on the patched channels).

Prior to adding a telephone party to the patch, you must first take the telephone line off-hook and dial the desired phone number. After you have informed the party, press the **PATCH** key so that the line becomes part of the patch. If you are answering the telephone via your console, see *Telephone Line Operation* on page 29.

Tip Patch users should be notified about proper radio procedure before using the patch. Specifically, the following three practices should be followed when using a patch:

First, as in any voice operated (VOX) patch, the first syllable is usually lost. Therefore, the first word spoken should not be expected to be heard. Many people find it helpful to begin each reply with "Ahhh" so that the remaining words will be heard. Also, after 2 to 3 seconds of silence, the patch circuit halts re-transmission; so long pauses in a reply should be filled with "Ahhh". It is best to plan in advance what is to be said.

Second, use the word "over" so that other parties know you are at the end of your transmission.

Third, after a transmission by any other party in the patch, wait until your radio indicates the end of the incoming call before trying to key up. This is usually 2 seconds on a Model 4010.

Paging Operation

This subsection describes the paging operation of the Model 4010.

Instant Call Operation

(Requires the Instant Call Paging option P/N 930-0030)

The **INSTANT CALL** keys provide the simplest operation available. To "tone-out" or page personnel or apparatus, simply push the key(s) labeled with the desired items. Each key represents one or more page sequences (call stack) used to access the labeled items.

When a key is pressed, the key's LED will turn on indicating that its transmission is pending. A maximum of 64 keys may be pending at one time. Usually, transmission will begin with the first key pressed and proceeds in the order that the remaining keys were pressed. After the key's pages have been transmitted, the LED will begin to blink providing a check-list of transmitted calls.

If the optional **PAGE SAFETY** key is present, transmission of pending Instant Calls will not begin until this key is pressed. When the first **INSTANT CALL** key is pressed, the **PAGE SAFETY** key's LED will begin blinking. When the **PAGE SAFETY** key is pressed, the LED will continue to blink until all pending Instant Calls have been transmitted.

The **PAGE CLEAR** key may be used to immediately terminate any Instant Call currently being transmitted. This will also clear all pending Instant Calls and their indicators.

Manual (Keypad) Operation

The keypad is normally used for paging seldom called, non-emergency equipment or personnel which may not merit an individual **INSTANT CALL** key. Typical operation from the keypad will probably be from a list which matches an individual to a keypad entry sequence and a send-channel.

The paging sequence from the list should be entered into the keypad. Keypad entries can only be made while there is no other paging activity going on (not transmitting or programming). As digits are entered, they will appear in the display. An invalid entry will display the "PAGE ERROR" message and abort that entry. If a mistake has been made in entering the code, the **PAGE CLEAR** key will clear the entry without affecting previous entries.

When entering a manual page, the leading digit (which defines the type of page) must be entered first. The actual paging digits are entered after the leading digit.

Note If only one paging format has been defined in CPSW, the leading digit is not necessary unless the leading digit is zero (0).

The **SEND** key: After keypad entry, the **SEND** key must be pressed to transmit the page. While the page is being transmitted, the LED of the **SEND** key will be on. As the page is transmitted, the display will show the pager code and any related paging messages or prompts, such as "talk", "dlay", or "kpad". After the page has been transmitted, it can be repeated by pressing the **SEND** key again.

The **ENTER** key: Several paging codes may be accumulated into the keyboard paging stack prior to sending. "Stacking" pages makes more efficient use of transmission time since the stack sequence will take less time than if each individual page were transmitted separately. Stacking is performed by making an entry and pressing the **ENTER** key. When this is done, the display will show the slash (/) terminator character and the **ENTER** key LED will blink. This shows there is an entry in the keyboard stack. This process can be repeated for several paging codes. The stack is quite large and it is unlikely that the limit will ever be reached, but if the stack does fill, the display will not change when the **ENTER** key is pressed.

The keyboard stack may be transmitted by pressing the **SEND** key. Transmission of the stack will begin with the first code entered and will proceed in the order of entry. As each pager code is transmitted, its code will appear in the display. After the page has been transmitted, the stack may be repeated by again pressing the **SEND** key.

The **CLEAR ENTRY** key: If a manual page keypad entry is in progress, this key is used for aborting the current keypad entry sequence. If a manual page keypad entry is not in progress, this key will clear the page stack and turn off all page key LEDs. If a paging transmission is in progress, this key will also abort the transmission.

Talk-Time Feature

If any page(s) in the call stack had a Talk-Time associated with them (done via CPSW software), the radio channel(s) these pages were transmitted on will remain keyed-up for the duration of the longest Talk-Time, with the audio source switched to the microphone. This Talk-Time duration may be extended/canceled by pressing the system **TRANSMIT** key or any PTT or footswitch. An **INSTANT TRANSMIT** channel key cannot be used to modify the Talk-Time duration due to the complexities and conflicts involved with multi-channel paging stacks.

Telephone Line Operation

Note Telephone line operation requires one of the following options:
Dual Phone Patch Card, P/N 950-9720
Phone Patch Card (single line), P/N 950-9719

When properly equipped, your console may be used to answer and originate telephone calls. Normally you will have several control keys for this purpose: **ANSWER/HOLD**, **RELEASE**, **V ADJ/MUTE**, and **PATCH**.

Receiving a Call

When the phone is On-Hook, any incoming audio (ring tone) will be routed to the Console Unselect speaker and cause the **ANSWER** button's red LED to flash. Therefore, make sure the Unselect speaker volume control is turned up loud enough so that the ring signal can be heard. Pick up the call by pressing the **ANSWER** button and then talk and listen to the calling party just like on a regular telephone. When your conversation is finished, press the **RELEASE** button to hang-up the call.

Originating a Call

Press the **ANSWER** button to take the phone Off-Hook, wait for the dial tone, and punch in the desired phone number to call on the console's numeric keypad. Note that a leading digit is not required here since the console knows that this is phone interface. When the called party answers, talk and listen just like on a regular telephone. When your conversation is finished, press **RELEASE** to hang-up the phone.

Putting a Call on Hold

Pressing the **ANSWER/HOLD** button while the call is Off-Hook will toggle the phone line to the Hold mode. The phone receive and transmit audio will be blocked and all radio audio will be routed back to its normal destination. The call will remain Off-Hook but no audio will be passed. Press the **ANSWER/HOLD** button again to return the call to the active mode.

Transmitting on a Radio Channel While the Phone is Active

Pressing any transmit button or external PTT switch while the console call is active will temporarily place the call in the Hold mode described above, re-route all the audio to the radio channel, and initiate the radio transmit. When the transmit button is released, the call will return to the active state with the Mic and Select audio switched back to it.

Patching a Phone Channel

Pressing a phone channel's **PATCH** button will put the call in the Hold mode as described above and enable its audio to be patched to another channel. Note that the call must be Off-Hook before pressing the **PATCH** button and the call's receive audio will be sent to the Unselect speaker while it is patch-enabled.

The **PATCH-XMIT** button can be used to allow the operator to talk on all patched channels, including phone channel(s) if there is no current call activity on any of the patched channels. This is the only transmit function that will allow the Mic audio to go to a phone channel, but only if the phone is patched. If the phone is not patched, it acts like the other transmit functions described above. Hanging up a patched phone channel (by pressing the **RELEASE** button) will also cancel the patch.

Dual Phone Operation

When one phone line is active and the second phone line is taken Off-Hook, the first call is automatically put in the Hold mode. If the first call is returned to the active mode, both calls will be active and the receive and transmit audio is routed to both phone lines. The radio channel receive audio will continue to be sent to the Unselect speaker as long as either phone call is active.

Manual Paging on a Phone Channel

Any format page can be sent over the phone by entering the page (including the leading digit) on the numeric keypad before taking the phone line Off-Hook, taking the line Off-Hook (by pressing the **ANSWER** button), and then pressing the **PAGE SEND** button. This method is required to perform a Rotary Pulse dial since the numeric keypad defaults to the live DTMF format after the line is taken Off-Hook.

Instant-Call Paging on a Phone Channel

When an Instant-Call page designates a specific phone channel (13 or 14) as the destination, the following actions occur if the line is On-Hook:

1. The line is taken Off-Hook
2. The specified Key-Up delay (if any) occurs
3. The console waits up to 1.5 seconds for dial-tone audio
4. If audio is detected, the specified page is sent and the line becomes active as described above
5. If no audio is detected, the line will be put back On-Hook and the page aborted

When an Instant-Call page designates the selected channel(s) as the destination and at least one phone channel is active, the page is immediately sent to the phone line. No Key-Up delay will occur.

If an Instant Call page designates a mixture of radio and phone channels as the destination, the radio channels are ignored and only the phone channels are processed.

ANI Operation

Automatic Number Identification (ANI) allows a calling party to transmit a unique identification code and have it displayed on the console. ANI operation requires that one of several options be installed. ANI detection may be done on the selected channel only or on a specific channel or channels. ANI may be either DTMF, 5/6 tone, or FSK signaling.

Note The Model 4010 is able to decode only the unit identification in a PTT-ID. ANIs that are configured with fleet or group designation separated by a dash from the unit ID cannot be displayed on the 4010 LCD. Therefore, end users who have multiple fleet/group IDs need to insure that the Unit IDs assigned in one fleet/group are not duplicated in another or there may be confusion as to the source of the call.

There are two modes of ANI operation: PTT ID and reverse selective calling (RSC). The console ANI operating mode (PTT ID or RSC) is determined by the programming in CPSW. If neither a primary nor a secondary ANI address is programmed, the console will operate in the PTT ID ANI mode. If either a primary or secondary ANI address is programmed, the console will operate in the RSC mode.

PTT ID Mode

There are two types of ANI in PTT ID mode: emergency ANIs and PTT ID (non-emergency) ANIs. An emergency ANI is identified by a leading asterisk (*), hexadecimal E, preceding the ANI. A PTT ID (non-emergency) ANI is any ANI whose first digit is not an asterisk (*).

For an incoming ANI to be considered valid, at least three digits (excluding the leading *) must be received within 1 second. If more than six digits (excluding the leading *) are received during this 1-second window, only the last six are retained.

When a PTT-ID is received, the console will beep and display the number of the calling unit bracketed by dashes (-XXXXXX-). If the number is longer than six digits, only the last six digits are retained. If the user desires, CPSW can program the console to automatically unmute the channel to allow audio from the calling party to be heard.

If additional ANIs are received, the console will store them in an internal ANI stack. A maximum of six PTT-ID ANIs can be stored in the stack. The current stack number of the ANI being displayed is shown next to the PTT-ID (-XXXXXX- n ANI) where n = 1 to 6.

As each new ANI is received it pushes the previous ANI down one position in the buffer. The seventh ANI will cause the ANI then in the sixth position to be removed from the stack and the seventh ANI assumes position one in the Stack.

When there are multiple ANIs in the stack, the ANI REVIEW key may be used to look at each PTT-ID in turn. The ANI REVIEW key will illuminate and display the PTT-ID for as long as it is held down. When released, the display returns to normal showing the time and date. The stack is not cleared until new ANIs replace the old ones, the console is placed in the Program Mode or the power is interrupted.

Emergency ANIs

When a valid emergency ANI is received, it is placed into the ANI buffer. Then the channel unmutes, the ANI is displayed, the red LED on the channel's ANI SOURCE and ANI REVIEW key begins to flash, and an operator alert sounds. The last three actions continue until the **ANI REVIEW** key is pressed.

If multiple emergency ANIs are received, the most recent one is displayed and all others are put into the ANI buffer. The operator alert continues sounding, and the LEDS on the **ANI REVIEW** key and appropriate **ANI SOURCE** key (if programmed) continue flashing until all emergency ANIs in the buffer have been reviewed.

The emergency ANI operator alert temporarily stops when a call is received on any selected channel so that the call can be heard. The alert resumes when all call activity stops. This behavior continues until all emergency ANIs have been reviewed.

PTT ID (Non-emergency) ANIs

When a valid non-emergency ANI is received, it is placed into the ANI buffer. Then the ANI is displayed, and the green LED on the channel's **ANI SOURCE** key (if programmed) begins to flash. The last two actions continue for 5 seconds or until the ANI call stops, whichever is longest. Pressing the **ANI REVIEW** key immediately removes the ANI from the display and turns off the LED.

All incoming PTT ID ANIs are ignored if an unreviewed emergency ANI exists in the ANI buffer.

ANI REVIEW Key (PTT ID Mode)

The six most recent ANIs are permanently stored in an ANI buffer in the order they are received. When a new ANI is received, it replaces the oldest ANI in the buffer.

The contents of the ANI buffer can be reviewed at any time by pressing and holding the **ANI REVIEW** key. While the key is held, the appropriate **ANI SOURCE** key LED (if programmed) is lit to indicate the channel on which the displayed ANI was received. Each press and release of this key displays the next ANI in the buffer. When the end of the buffer is reached, the display shows "last ANI". The next press of the **ANI REVIEW** key starts this sequence again.

The red LED of the **ANI REVIEW** key begins blinking when an emergency ANI is received and continues to blink as long as any unreviewed emergency ANIs exist in the ANI buffer.

An **ANI REVIEW** key must be defined with CPSW programming if the console is to receive any ANIs.

ANI SOURCE Key (PTT ID Mode)

The **ANI SOURCE** key itself does nothing. Its LEDs are used to indicate the type of ANI received and the channel it was received on. The green LED indicates a PTT ID ANI. The red LED indicates an emergency ANI. A flashing LED indicates an ANI that has just been received or that has not yet been reviewed. When pressing the **ANI REVIEW** key, a solidly lit LED indicates the channel and type of ANI.

Reverse Selective Calling Mode

When a valid ANI is received, the console will beep and display the number of the calling unit bracketed by dashes (-XXXXXX-). If the number is longer than six digits, only the last six digits are retained. If the calling unit's channel is muted, it will automatically be unmuted to allow the audio from the calling party to be heard (this can be changed with CPSW). If additional ANIs are received, the console will store them in an internal ANI stack. A maximum of 24 ANIs can be stored in the stack. The current number of ANIs in the stack is displayed next to the "-XXXXXX-" display (for example "-123456- n ANIs", where n = 1-24). The ANI displayed is the first one in the buffer and remains displayed until the ANI Stack is examined by using the ANI REVIEW key.. If more than 24 ANIs are received before the the Stack is reviewed, the 25th and following ANIs are not displayed nor stored in the stack.

ANI REVIEW Key (RSC Mode)

When the console's ANI stack contains only one ANI, the **ANI REVIEW** key's red indicator will illuminate. If the ANI stack contains two or more ANIs, the indicator will flash. Each press of the **ANI REVIEW** key will remove the current ANI from the stack (the one being displayed) and display the next oldest ANI until the stack is empty, at which time all ANI information is removed, the time and date are re-displayed, and the **ANI REVIEW** indicator is turned off.

ANI SOURCE Key (RSC Mode)

If a channel has been programmed with an **ANI SOURCE** key, its red indicator will illuminate if the displayed ANI is from that channel. If the ANI stack contains an ANI from a channel but it is not currently being displayed, that channel's indicator will blink. When there are no more ANIs in the stack for a channel, then its indicator will be turned off. This can be useful if a different channel is selected after one or more ANIs have already been received.

The originating channel for the currently displayed ANI unit may be selected by pressing the **ANI SELECT** key if present. If two or more channels are "simul-selected", all incoming ANIs will be reported for the lowest-numbered selected channel.

Clock/Calendar Setting

Clock setting is initiated by pressing the **CLOCK SET** key on the front panel (if programmed).

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.

Parallel Operation

Two Model 4010s can be connected in parallel to the same radio channels. When the frequency of a radio is changed on one console, the corresponding frequency indicator will illuminate on the other console. The console pair is linked by a cable attached to the "COMB" port on the side of the desktop or back of the rackmount unit.

This feature cannot be used if the optional expansion key panel is installed.

Operational Messages

During normal operation, it is common to have messages show up on your display. These usually occur only briefly. The following table shows the various operational messages and their meanings.

Message	Meaning
vX.XX	The firmware control program version number is displayed whenever the Model 4010 is powered up or switched out of program mode.
NoOption	You attempted to access a feature that requires a Model 4010 option that has not been installed.
TimeOut	The CPSW programmed transmission time-out expired on a system channel. This may be due to a stuck transmit switch.
DnLoading CPS	Your console is in the program mode and is being loaded with data from your PC.
UpLoading CPS	Your console is in the program mode and is transferring its configuration data to the attached PC.
DONE	Your console is in the program mode and has finished transferring data with your PC.
PageErr	You tried to enter an invalid page or selected an invalid paging format (e.g., undefined leading digit).
PageFull	You have exceeded the memory limit of the internal paging stack by entering too many consecutive pages. Transmit the paging stack before entering more pages.
BUSY	You attempted to transmit on a channel that was already in use by a parallel remote. This is sometimes caused by rapid sequential transmissions on the same channel using the TRANSMIT key.
ffffffff	The 8-character MS-DOS filename prefix (ffffffff) of the CPSW configuration file used to program this console is displayed whenever the Model 4010 is powered up or switched out of program mode.
PROGRAM	Your console is in the program mode and is waiting to transfer data with the attached PC.
TaDbXcPeNi	The console system configuration is displayed whenever the Model 4010 is powered up or switched out of program mode. The lower-case letters represent the following numbers: a - the number of tone/local channels found b - the number of DC channels found c - the number of Aux. I/O cards found e - the number of phone channels found i - the number of ANI cards found NOTE - This configuration represents the actual physical cards detected by the firmware and not necessarily the configuration programmed by CPSW (although they should agree for proper console operation).

Diagnostics Messages

In the event that the continuous system diagnostics finds a problem, the console LCD will display a diagnostic message. This message will indicate the general nature of the problem. To aid service personnel, you should record the message and the specific console activity that caused the message to appear. For information on clearing the diagnostics message, see the description of the *Diagnostics Reset (DIAG RESET)* on page 15. The following table shows the various diagnostics messages and their meaning.

Message	Meaning
SeeLog	Diagnostics information has been printed on the diagnostics log. (This feature has not yet been implemented.)
THX nnn	An internal error has occurred on your console. "nnn" is a three-digit, decimal number that the factory can use to help isolate the condition. Be sure to record this number and the specific operation the console was trying to perform. This does not usually prevent normal operation.
CardErr	The programmed channel configuration of your console does not match the channel cards in the console. Channels which are affected will not operate until the problem is corrected.
CPSdataErr	The configuration data has been corrupted or never initialized. Reprogram the Model 4010. Refer to the **Programming** chapter of the *Model 4010 Radio Dispatch Console Installation and Programming Manual* (P/N 025-9227) for more information.

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