

DSR4402X Commercial Integrated Receiver/ Decoder Operator Guide



WARNING

The unauthorized modification of any decoder and the sale and use of any such decoder is prohibited by law. Any such modification or alteration of this product or any unauthorized reception of television programming could subject the user and seller and party modifying the decoder to fines, imprisonment, and civil damages.

NOTE: 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 digital apparatus does not exceed the Class A limits of radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Repairs and Assistance

For assistance on return or repair see Chapter 6.

Note to CATV System Installer:

This reminder is provided to call the CATV system installer's attention to Article 820-40 of the NEC that provides guidelines for proper grounding and, in particular, specifies that the cable ground shall be connected to the grounding system of the building, as close to the point of cable entry as practical.

Warning:

To prevent electrical shock, do not use the receiver electrical power plug (polarized) with an extension cord, receptacle, or other outlet unless the blades can be fully inserted to prevent blade exposure.

General Instrument Corporation doing business as the
Broadband Communications Sector of Motorola, Inc.
6450 Sequence Dr.
San Diego, CA 92121

OPERATION PRECAUTIONS

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.



The lightning flash with the arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of un-insulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.



The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

	CAUTION RISK OF ELECTRIC SHOCK DO NOT OPEN	
<small>TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR FRONT). REFER SERVICING TO QUALIFIED SERVICE PERSONNEL. THIS INSTALLATION SHOULD BE MADE BY A QUALIFIED SERVICE PERSON.</small>		

ATTENTION:

This commercial unit is intended for the decoding of DigiCipher® II television signals for commercial use. Possession of this device does not enable or entitle the possessor to receive DigiCipher II television signals. Contact program providers to obtain appropriate authorizations.

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Manufactured under license from Dolby Laboratories.

DIGICIPHER[®] II QUICK INSTALL

READ THIS FIRST!

DSR4402X Integrated Commercial Receiver/Decoder

Broadband Communications Sector of Motorola, Inc.
6450 Sequence Dr., San Diego, CA 92121
Customer Hotline (800) 457-1210

Before starting, the user must get this information from the user's programmer:

Programmer	Satellite	Transponder /L-Band Frequency	Polarity	Virtual Channel Table Number	Virtual Channel Number

What the user should do...

1. Check the packaging for the accessories (1 power cord and 4 connectors) included with this model.
2. Install the receiver in a 19-inch universal rack and connect the power. When the unit has power, the front panel Liquid Crystal Display (LCD) will display characters, and at least one Light Emitting Diode (LED) should be lit. If the LCD backlight is not on, press any front panel directional button (◀ ▶ ▲ ▼ Enter) to light.

Use the menu tree in the Operator Guide on page 12 to follow the steps for the LCD menus.

3. If the LCD menus are to be displayed in English, proceed to step 4 below. If you want the LCD menus to be displayed in Spanish, press the ▶ button. When the cursor is blinking next to the Select field label, press the Enter button. The cursor will move below the Select label. Scroll with the ▲ ▼ buttons to display Spanish in the field. Press Enter to confirm the selection. Then press the ◀ button to return the cursor to the left corner of the menu.
4. Press the ▼ button to display the main menu for the Installation group (see the menu tree in the Guide). Press Enter to enter Transmission Mode, then select Standard (DCII). Press the ◀ ▶ buttons to return to Transmission, then press ▲ ▼ buttons until the ManualTune menu appears. If the polarity of the signal is vertical, it is suggested that you program Port 0. If the polarity of the signal is horizontal, program Port 1. The factory default is P0: H; P1: V. Press the ▶ button to move the cursor to the Port field label. Press the Enter button, and scroll with the ▲ ▼ buttons to select 0 or 1. Press Enter to confirm the selection. If the satellite is North American C-band standard, the user may select the transponder number instead of entering a center frequency. If the satellite is not North American C-band, move the cursor to the Type field label, press the Enter button, and select Custom. Press Enter to confirm the selection. Move the cursor to the L_Freq field to input the satellite's L-band frequency.

5. Insert the L-band input to the port on the rear panel which was programmed in step 4. Use a DC block if necessary to prevent another receiver's LNB power output from shutting down the DSR4402X. Note that the signal LED will be lit when the DSR4402X detects a DigiCipher II signal. If desired, connect the other L-band input port for the remaining polarity. No manual tuning input is required for the second port.
6. To select the service (VCT number and the virtual channel), first make sure the cursor is in the upper left corner of any menu. Press the Enter button, and press the ▼ button until the main menu for the Channel Selection group appears (see the menu tree on page 12). Press the Enter button, and the CH_Select menu will appear. Press the ▶ button until the cursor is at the VCT field. If the current VCT matches the VCT desired, proceed to step 7. If you need to change the VCT, press Enter to select the field and scroll with the ◀ ▶ and ▲ ▼ buttons to make a selection. Press Enter to confirm the selection. It may take several minutes for a complete VCT download to complete, depending on other message traffic.
7. Use the ▶ button to move to the Channel (Chnl) field in the CH_Select menu, and press the Enter button. Use the ◀ ▶ and ▲ ▼ buttons to make a selection. Then press Enter to exit the field. Press the ◀ button to return to the menu name in the left corner. Now is the time to contact the programmer for an electronic message to authorize the receiver for the service on this channel. Give the programmer the 16-digit address (xxx-xxxxx-xxxxx-xxx) from the rear panel label. When the message is received, the Authorized LED will light.
8. Temporarily connect a local monitor and local audio amplifier with speakers to the DSR4402X. The video should be correct, but if the audio is not, first verify with the programmer that the language and mix desired is or will be available. Next, set up the audio – first by mode and then by language. To use the default stereo mode, skip to step 9. To use mono or dual mono, change the audio mix. From any menu, with the cursor in the upper left corner, press Enter, and scroll up to the Installation menu group. Press Enter, and scroll down to the Audio menu. Press the ▶ button to reach the AudioMix field label, and press Enter to select the field. Use the ▲ ▼ buttons to scroll to the Mono or Dual Mono selection. A Dual Mono selection provides one mono language in the Left Audio Out and a second language (or cue tones) in the Right Audio Out.
9. After selecting the correct audio mix, select the language(s). From any menu, with the cursor in the upper left corner, press Enter. Then scroll to the main menu for the Channel Selection group. Press Enter to select the group, and scroll down to the Language (Lang) menu. Press the ▶ button until the cursor is at the Left/Right field label(s), and press Enter to confirm the selection. Enter a language abbreviation such as eng00, spa00, por00, cue00, or kor00. Use the ▲ ▼ buttons to select the first letter of the language abbreviation, then use the ▶ button to select each of the other letters for modification. Select two numbers such as “00” (2 zeroes) to select the main or additional dialects of the language. Press Enter to confirm the selection. Repeat for second language if in Dual Mono mode. If the selected audio languages are not present, the audio output will be a default mix and language selected by the programmer until the selected mix and languages are available. Selecting Dual Mono for English/Spanish, for example, will give L1 audio output in English and R1 audio output in Spanish when they are provided by the programmer. See Chapter 10 for common language abbreviations.
10. After confirming proper operation, connect the video and audio outputs of the DSR4402X to the cable plant.

DVB QUICK INSTALL

READ THIS FIRST!

DSR4402X Integrated Commercial Receiver/Decoder

Broadband Communications Sector of Motorola, Inc.
6450 Sequence Dr., San Diego, CA 92121
Customer Hotline (800) 457-1210

What the user should do...

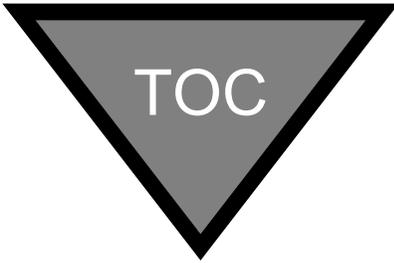
1. Check the packaging for the accessories (1 power cord and 4 connectors) included with this model.
2. Install the receiver in a 19-inch universal rack and connect the power. When the unit has power, the front panel Liquid Crystal Display (LCD) will display characters, and at least one Light Emitting Diode (LED) should be lit. If the LCD backlight is not on, press any front panel directional button (◀ ▶ ▲ ▼ Enter) to light.

Use the menu tree in the Operator Guide on page 12 to follow the steps for the LCD menus.

3. If the LCD menus are to be displayed in English, proceed to step 4 below. If you want the LCD menus to be displayed in Spanish, press the ▶ button. When the cursor is blinking next to the Select field label, press the Enter button. The cursor will move below the Select label. Scroll with the ▲ ▼ buttons to display Spanish in the field. Press Enter to confirm the selection. Then press the ◀ button to return the cursor to the left corner of the menu.
4. Press the ▼ button to display the main menu for the Installation group (see the menu tree in the Guide). Press Enter to reach Transmission Mode, then select the Standard (DVB). Select the desired Port and L_Freq. Manually enter the desired frequency. Press ◀ ▶ buttons to return to the ManualTune menu. Press ▲ ▼ buttons to reach the Modulation menu. Select Symbol, manually enter the desired symbol rate and press Enter. Select Code, scrolling up or down to select the desired code rate. Press the Enter button until the ManualTune menu appears. If the polarity of the signal is vertical, it is suggested that you program Port 0. If the polarity of the signal is horizontal, program Port 1. The factory default is P0: H; P1: V. Press the ▶ button to move the cursor to the Port field label. Press the Enter button, and scroll with the ▲ ▼ buttons to select 0 or 1. Press Enter to confirm the selection.
5. Insert the L-band input to the port on the rear panel which was programmed in step 4. Use a DC block if necessary to prevent another receiver's LNB power output from shutting down the DSR4402X. Note that the signal LED will be lit when the DSR4402X detects a DVB signal. If desired, connect the other L-band input port for the remaining polarity. No manual tuning input is required for the second port.
6. To select the service, first make sure the cursor is in the upper left corner of any menu. Press the Enter button, and press the ▼ button until the main menu for the Channel Selection group appears (see the menu tree on page 12). Press the Enter button, and the CH_Select menu will appear. Press the ▶ button until the cursor is at the Chnl field.

7. Use the **▶** button to move to the Channel (Chnl) field in the CH_Select menu, and press the Enter button. Manually select the desired channel. Use the **◀ ▶** and **▲ ▼** buttons to make a selection. Then press Enter to exit the field. Press the **◀** button to return to the menu name in the left corner.
8. Temporarily connect a local monitor and local audio amplifier with speakers to the DSR4402X. The video should be correct, but if the audio is not, first verify with the programmer that the language and mix desired is or will be available. Next, set up the audio – first by mode and then by language. To use the default stereo mode, skip to step 9. To use mono or dual mono, change the audio mix. From any menu, with the cursor in the upper left corner, press Enter, and scroll up to the Installation menu group. Press Enter, and scroll down to the Audio menu. Press the **▶** button to reach the AudioMix field label, and press Enter to select the field. Use the **▲ ▼** buttons to scroll to the Mono or Dual Mono selection. A Dual Mono selection provides one mono language in the Left Audio Out and a second language (or cue tones) in the Right Audio Out.
9. After selecting the correct audio mix, select the language(s). From any menu, with the cursor in the upper left corner, press Enter. Then scroll to the main menu for the Channel Selection group. Press Enter to select the group, and scroll down to the Language (Lang) menu. Press the **▶** button until the cursor is at the Left/Right field label(s), and press Enter to confirm the selection. Enter a language abbreviation such as eng00, spa00, por00, cue00, or kor00. Use the **▲ ▼** buttons to select the first letter of the language abbreviation, then use the **▶** button to select each of the other letters for modification. Select two numbers such as “00” (2 zeroes) to select the main or additional dialects of the language. Press Enter to confirm the selection. Repeat for second language if in Dual Mono mode. If the selected audio languages are not present, the audio output will be a default mix and language selected by the programmer until the selected mix and languages are available. Selecting Dual Mono for English/Spanish, for example, will give L1 audio output in English and R1 audio output in Spanish when they are provided by the programmer. See Chapter 10 for common language abbreviations.
10. After confirming proper operation, connect the video and audio outputs of the DSR4402X to the cable plant.

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Introducing the DSR4402X

The Motorola BCS DSR4402X multi-standard receiver is a commercial Integrated Receiver Decoder (IRD) designed for cable operators and other commercial satellite operations. After the program provider performs the required steps for setting up the DSR4402X, the unit can receive instructions from the satellite as part of the signal.

Key Features

- A variable front-end allows the DSR4402X to be used in either full or partial transponder mode.
- Two L-band inputs.
- Demodulates DigiCipher II or DVB signals.
- The user is able to select an input L-band frequency of 950 to 2150 MHz. The user can select a code rate from these values: 5/11, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, and 7/8.
- The user can save and recall three presets with the following data: frequency, symbol rate, code rate, bit stream type, port, and polarity.
- Multiple Virtual Channel Tables (VCTs) can be stored in the DSR4402X so that the unit can be moved to various satellites/transponders.
- Once the IRD has acquired a DVB signal, the user can select a service from a list of services in the PAT.
- One video output. Outputs either 525-line NTSC/PAL M or 625-line PAL video formats, automatically matching based on the programmer's input format. (No conversion is done between 525-line and 625-line video.)
- VBI reinsertion on lines 10-21 supports data services such as North American Broadcast Teletext, SID/AMOL I & II, and Closed Caption.

- Bypass video and audio inputs enable connections of analog or digital signals to be passed through the unit and switched on or off when an alarm is triggered.
- Audio output consists of two stereo pairs. The programmer may configure these as four mono channels. When the programmer provides multiple audio choices, the audio pair can be selected. Programmers can tag audio channels with a language, and the receiver will select the audio material based on the language selected.
- MPEG-2 video and Dolby[®] Digital/MPEG-2 Layer I audio are employed for video decode/decompression and audio compression respectively.
- Asynchronous Serial Interface (ASI) output for digital transport stream output. The ASI can be configured to display a consistent PID mapping, regardless of service input.
- Isochronous data output.
- DTMF output for control of tape machines and other ad insertion equipment.
- One Form-C relay used for fault alarm indication
- Memory to recall the operating configuration when power sags or is removed.
- Security features include Motorola DigiCipher II security technology. The unit does not require a TVPass[®] card to operate with security. In the unlikely event that the code is broken, security can be renewed by inserting a card with a new code into the receiver. Programmers may also utilize fingerprinting techniques to aid in piracy control.
- A two line 40-character front panel with a time-out backlit Liquid Crystal Display (LCD).

2

Connecting the DSR4402X

Unpacking And Connecting The DSR4402X

Cable connections described in this chapter are made to the rear panel of the DSR4402X.

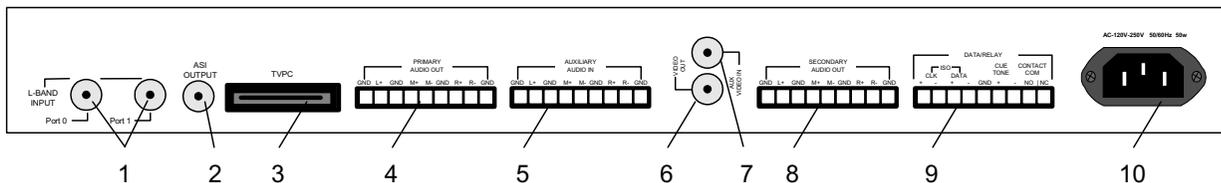


Figure 2-1: DSR4402X Back Panel

- | | |
|-----------------------|------------------------|
| 1. RF Input Ports | 6. Video Out |
| 2. ASI Output | 7. Aux Video In |
| 3. TVPass Card | 8. Secondary Audio Out |
| 4. Primary Audio Out | 9. Data/Relay |
| 5. Auxiliary Audio In | 10. Power |

Unpacking And Mounting

The shipping carton contains the DSR4402X, four quick disconnect terminals, and this Operator Guide.

The IRD should be installed in an Electronics Industry Association (EIA) compliant 19-inch rack. It is recommended that the IRDs have 1U spacing, above and below, for airflow. Mounting with an air gap between receivers or alternating receivers with low power consumption equipment that does not block the front to back air flow of the receiver chassis is suggested.

Connecting A Unit

To Connect a Unit for a New DigiCipher® II Service

First determine which satellite, transponder, Virtual Channel Table (VCT) number, virtual channel, and audio mode (stereo, mono, or dual mono) is to be used. Contact the programmer for this system information so that the desired services can be received.

Connect the L-band inputs from the dish antenna and LNB. Use a DC block, if necessary, to prevent another receiver's LNB power output from shutting down the DSR4402X.

- For a single polarity L-band satellite connection, connect the coax from the LNB (either horizontal or vertical) to Port 0 or Port 1.
- For installations using both polarities of a satellite, connect one LNB coax to each port. The polarity is programmable for the DSR4402X. The default polarity for Port 0 is Vertical and Port 1 is Horizontal. It is important to record which polarities and ports are connected to the LNB for later use when inputting information in the front panel menus. Labeling the coax at the rear panel is also a good practice.

To view video and on-screen diagnostics during installation, connect the Video Output on the unit to a 75 ohm video monitor. After the unit is authorized and outputting the desired service, reconnect the Video Output to the channel modulator.

To listen to audio during installation, connect the audio outputs to a local amplifier and speaker. A standard stereo system will suffice, but the lack of differential audio inputs may make the audio seem degraded. After the unit is authorized and outputting the desired service, reconnect these outputs to the channel modulator. Since these are differential pairs, it is recommended to use two pair shielded audio cables rather than the single wire and shield type. For best quality audio, please take care to ground the shield on both the IRD GND terminal and at the channel modulator end.

- For services transmitted in stereo and used in your plant as stereo, connect the Left Audio Out terminals (L+ and L-) to the left audio inputs on the channel modulator, and connect the Right Audio Out terminals (R+ and R-) to the right audio inputs on the channel modulator.
- For services transmitted in stereo and used in the plant as mono, connect the Mono Audio Out terminals (M+ and M-) to the audio inputs on the channel modulator. This mono output combines both left and right to produce mono.
- For services transmitted as a single mono, connect the Left Audio Out terminals (L+ and L-) to the audio inputs on the channel modulator. Right Audio Out terminals (R+ and R-) will also contain the single mono.
- For services transmitted in dual mono mode (for example, English and Spanish), connect the Left Audio Out terminals (L+ and L-) to the mono audio inputs on the channel modulator where the first language of the pair is to be used (English in this example), and connect Right Audio Out terminals (R+ and R-) to the mono audio inputs on the channel modulator where the second language of the pair is to be used (Spanish in this example).

The DSR4402X will be able to generate cue tones when commanded over the satellite link. If these internally generated cue tones are used, connect the 600 ohm differential Cue Tone+ and Cue Tone- terminals on the DSR4402X to the device that will be accepting the tones. The cautions on cable and grounding noted in the audio instructions (above) also apply to cue tones.

If isochronous data service is to be used, connect the Data+ and Data- and Clk+ and Clk- terminals on the DSR4402X to the appropriate connector on the device that will be accepting the data.

Plug the DSR4402X into a power source. Verify that the LCD is lit.

Proceed with the installation using the front panel menus.





Operating the DSR4402X

All operations described in this chapter require use of the front panel. As illustrated in Figure 3-1, the front panel has an operator's keypad and several LEDs used as indicator lights.



- | | |
|---------------|---|
| 1. Port 0 LED | 4. Authorized status LED |
| 2. Port 1 LED | 5. Bypass LED |
| 3. LCD Screen | 6. Signal LED |
| | 7. Keypad with direction buttons and ENTER button |

Figure 3-1: DSR4402X Front Panel

Using The Front Panel

The front panel LCD screen displays a series of menus that can be used to configure and control the system. The name of the current menu is always in the upper left corner of the screen for easy identification.

- For example, when the unit is first turned on, the Language menu will appear. A blinking cursor will appear to the left of the word Language.
- Beneath every menu name field are symbols representing key presses that are possible from the current cursor position in the menu. Note that the available keypad moves may change during the navigation between menu fields.

→Menu Name	Field	Field	Field
↔E	Setting	Setting	Setting

- The top row to the right of the menu name displays the name of each field available within that menu. These are called “field labels” because each label refers to the field beneath it.
- Beneath each field label is the current setting for each field.
- Some fields may be changed by the user and others are for display purposes only. Fields that can be changed have an arrow indicator just to the left of the field label. During left/right navigation, the cursor skips over the labels that cannot be changed.

The LCD is momentarily backlit with circuitry that turns off the backlighting from one to three minutes after the last button press or warning screen. To view the screen after backlighting has turned off, press any button once to turn on the backlighting.

In addition to the menus on the LCD screen, the LED indicators show the receiver’s current status. One of the two port LEDs (0 or 1) will always be lit if the power is on, but not both. The Signal light will be lit when the receiver recognizes a DigiCipher II system or DVB signal. The Authorized LED will be lit when the DigiCipher II system LED is lit and either (1) the programmer has transmitted the access messages to allow the receiver to decrypt the signal, or (2) the signal is formatted in an unscrambled or fixed scrambled mode. The Bypass LED is on when the Aux Video and Audio inputs are being routed to the receiver outputs instead of a DigiCipher II system or DVB signal.

Navigating The Menus

Even though the keypad options shown on the LCD screen may change for each menu and for each field, the control buttons basically do the same thing. The user may want to practice on a screen to become familiar with how the buttons work. Notice that:

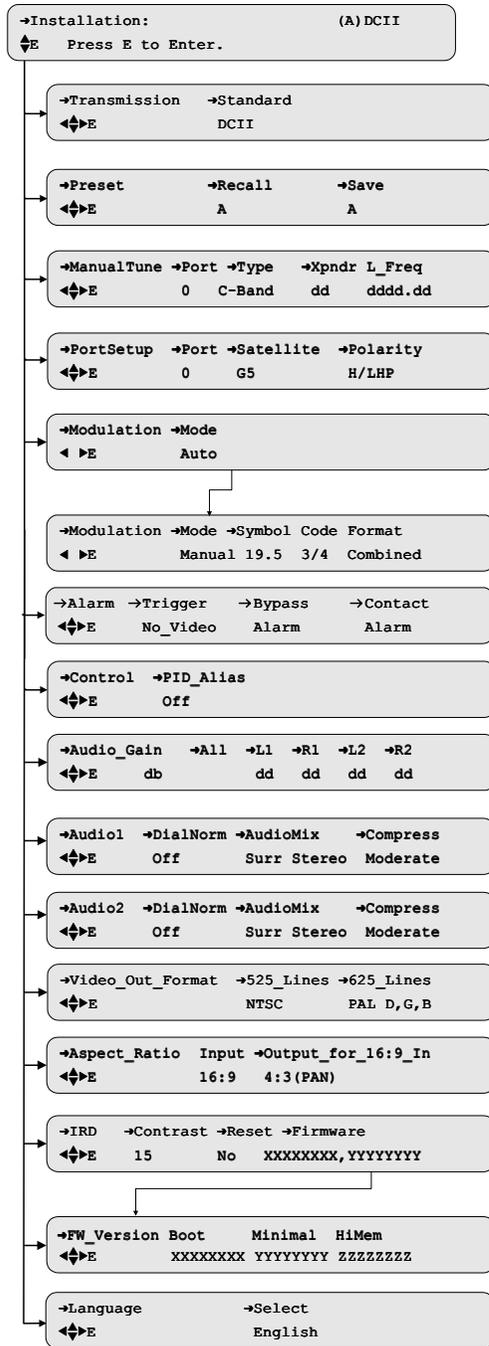
- Pressing the \blacktriangle \blacktriangledown buttons while the cursor is blinking next to the menu name (far left corner), will scroll to another menu.
- Pressing the \blacktriangleleft \blacktriangleright buttons while in the top line of the menu, will move between field labels (or the menu name and a field label). Pressing the \blacktriangleright button at the rightmost field label will wrap the cursor around to the left side of the screen (to the menu name). Likewise, pressing the \blacktriangleleft button when the cursor is at the menu name will wrap the cursor to the rightmost field label.
- When the cursor is blinking on a field label (top row), pressing the Enter button will move the cursor below the label and enter into the field so the setting can be changed.
- When the cursor is below the label, the displayed directional controls in the left corner show what buttons can be pressed to change the setting in that field. Usually the \blacktriangle \blacktriangledown buttons will be used. To record changes in a field and move back up to the label line, press the Enter button.

Caution: Outputs to subscribers may change based upon field selection settings. Make sure the proper selection has been made.

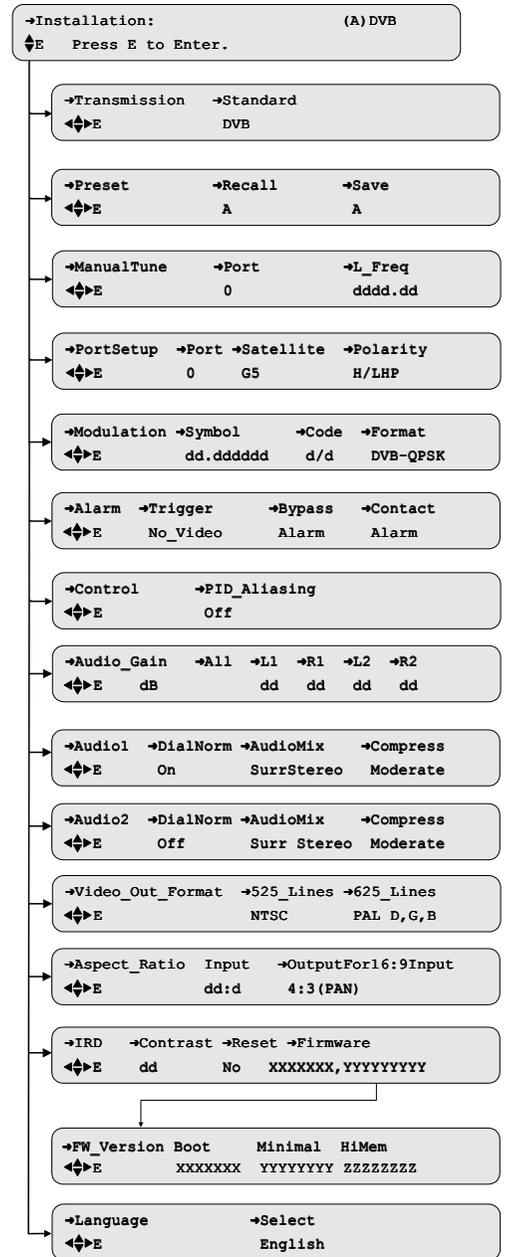
OVERVIEW OF THE LCD PANEL MENU TREE

Pressing the Enter button when the cursor is on a menu name will return the cursor to the main menu for that group. The charts on the following pages show the menus organized into into four main groups: installation menus, channel selection menus, status menus, and diagnostic menus. The upper right corner of the main group menu display the preset selection (A, B or C) and the transmission standard (DCII or DVB). The menus differ based on the transmission standard selected.

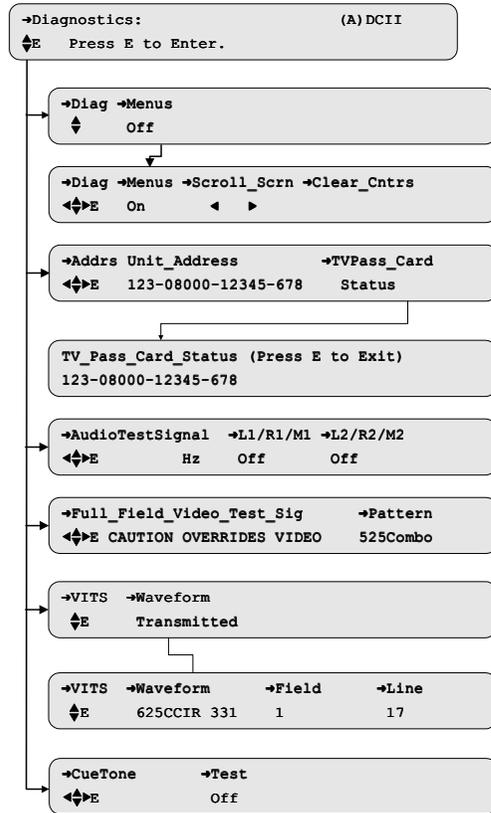
DCII INSTALLATION Menus



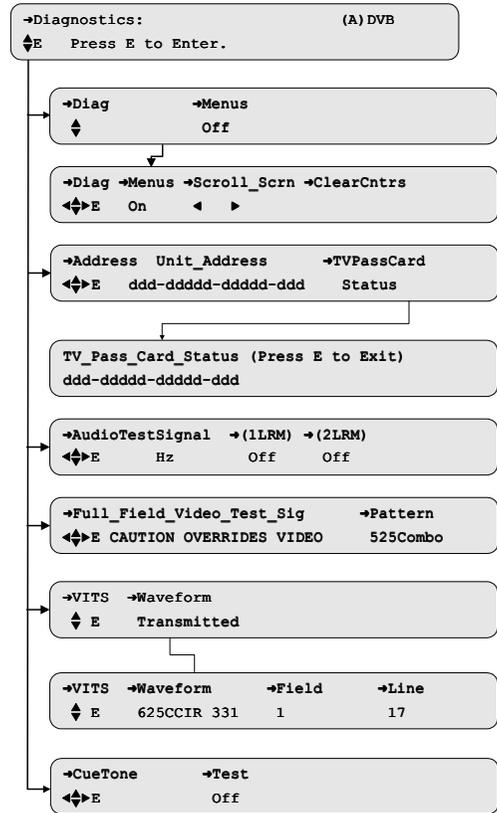
DVB INSTALLATION Menus



DCII DIAGNOSTICS Menu



DVB DIAGNOSTICS Menu

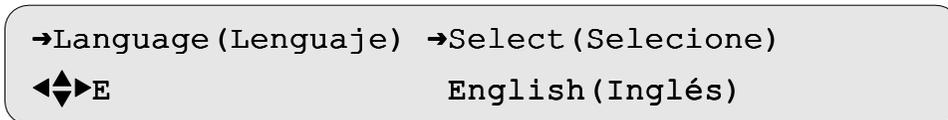


How To Use The Menus

Language Menu

The front panel LCD will display the Language menu when the unit is plugged in for the first time or after factory reset. This menu allows the user to select the language that will be displayed on the front panel menus—either English or Spanish. English is the default language.

- If the LCD menus are to remain in English, skip to Installation menu below.
- If the menus are to be presented in Spanish, press the **▶** button to move the cursor to the Select label, then press the Enter button. Toggle between English or Spanish with the **▲ ▼** buttons. Press the Enter button to confirm the selection. Return to the Language menu name using the **◀** button and press the **▲ ▼** buttons until the Installation group menus appear.

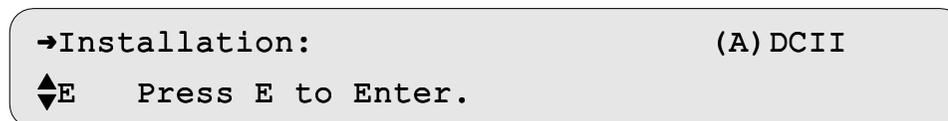


Group 1 Menus: Installation

The purpose of the installation menus is to configure the ports and choose settings that will remain fixed over a period of time. These settings include menu language selection, video output format, and bypass mode operation. This section describes in detail each of the installation menus, fields, and options displayed on the LCD panel.

Installation Menu

With the blinking cursor at the upper left, press the **▲ ▼** buttons until the Installation group menu appears. Press the Enter button to continue.



NOTE: The (A) denotes the recalled transmission mode.

Transmission Menu

This menu allows the user to select the type of transmission (DCII or DVB) to be used.

→Transmission	→Standard
↔E	DCII

→Transmission	→Standard
↔E	DVB

Preset Menu

This menu allows the user to save and recall up to three Manual Tune parameters in each transmission mode. Manual Tune presets are designated A, B, and C.

→Preset	→Recall	→Save
↔E	A	A

The current recalled/saved tune settings (A, B, or C) is shown previously in the transmission type.

Manual Tune (and Transponder Select) Menu

This menu allows the user to initially acquire a DigiCipher II system signal and download virtual channel tables by selecting a transponder frequency for each of the two L-band inputs, which are labeled Port 0 and Port 1.

- Because the North American C-band frequency plans are standardized, select a transponder number for these satellites. Use the Type field and the Xpndr (transponder) fields for these.
- If, however, selection of an International C-band, a functional transponder, or a Ku-band satellite is preferred, use the Custom option in the Type field and directly enter the L-band frequency. The DSR4402X requires no distinction between Ku-band and C-band signals after selecting the L-band carrier frequency.

The receiver will overwrite the selection of a port, frequency/transponder, and polarity once the download is complete and it begins using the data contained in the table. In short, the receiver will display and remember the satellite information it receives from the download, even if different information has been input.

DCII only	→ManualTune	→Port	→Type	→Xpndr	L_Freq
	◀▶E	0	C-Band	dd	dddd.dd

DVB only	→ManualTune	→Port	→L_Freq
	◀▶E	0	dddd.dd

Port Field

The Port field displays the port to which the receiver is currently tuned. It allows manual selection of the port so that the unit can acquire the DigiCipher II system signal and automatically download network data required for operation.

To select a port:

- Press the ▶ button until the cursor is at the Port label, and press the Enter button.
- Press the ▲ ▼ buttons to scroll to the port that is connected. Unless changed, a receiver will display values for Port 0. Press Enter to confirm the selection and return to the top line of the menu. Then move to the Type field and Xpndr field.

The following Caution screen will appear, asking the user to confirm the selection.

CAUTION: Service will be interrupted
 Press E to continue or ▶▶ to stop

If you press any ◀ ▶ ▲ ▼ button at this point, the Caution screen will disappear and the ManualTune menu will reappear without any changes. But, to make a selection, press the Enter button to set the port selection.

Type Field

The Type field allows selection of the frequency plan type for the satellite to which the unit is tuned. If the application is a North American C-band satellite, use the C-band option, and then select the transponder number in the Xpndr field. Otherwise, use the Custom option and the L_Freq field. The Custom option can be used for all satellites, including current C-band, Ku-band, and future satellites where the frequency plans are unknown at the time of receiver manufacture.

Press the **▶** button until the cursor is on the Type label. Then press the Enter button to move into the field. There are two choices, C-band (standard) or Custom. Press the **▲ ▼** buttons to display the choice. Then press the Enter button to confirm the selection.

- If C-band is selected, choose a transponder in the Xpndr field. The frequency in the L_Freq field will be set automatically based on internal transponder tables.
- If Custom is selected, dashes (--) will appear in the Xpndr field since the transponder/frequency relationship is not known. Select a transponder frequency between 950 and 2150 MHz in the L_Freq field. The user will not be able to select a transponder in the Xpndr field.
- The default setting is C-band. Note that the last Xpndr and L_Freq values, whether for C-band or Custom types, will be retained until changed or overwritten by the receiver using information from the downloaded tables.

Xpndr Field (for C-Band)

This field allows selection of an initial satellite transponder number and can only be used if C-band in the Type field is chosen. The Xpndr field cannot be edited if *Custom* in the Type field has been chosen. Press the **▶** button until the cursor is at the Xpndr label. Then press the Enter button to move into the field. Since this is a real-time field, the Caution screen will appear to confirm that the value for this field is changing. Press a **◀ ▶ ▲ ▼** button to leave this field unchanged and back out of it. To edit this field, press the Enter button again to continue.

Then press the **▲ ▼** buttons to select the desired transponder number. Since the associated transponder/frequency tables are stored in the unit, scrolling through the transponder numbers, the user will notice that the associated frequency (shown in the L_Freq field to the right) will automatically change with the selection (950-2150 MHz). There are 24 transponder options, and when the transponder selection is displayed, press the Enter button to confirm selection and move the cursor back up to the field label.

L-Freq Field (for Custom Plans)

This field allows the user to directly tune the frequency, if Custom in the Type field is chosen. The L_Freq field cannot be edited if C-band in the Type field is chosen. Press the **▶** button until the cursor is at the L_Freq label. Then press the Enter button to move into the field. Since this is a real-time field, the Caution screen will appear to confirm that the value for this field is changing. Press a **◀ ▶ ▲ ▼** button to leave this field unchanged and back out of it. To edit this field, press the Enter button again to continue.

Press the **◀ ▶** and **▲ ▼** buttons to select the desired frequency. The transponder number (shown in the Xpndr field) will continue to contain dashes since a transponder number is not required. A frequency between 950 MHz and 2150 MHz may be chosen. Press the Enter button to confirm a selection and move the cursor back up to the field label. The unit requires 30 to 60 seconds to download the network data. Afterward, the user can view the PortSetup menu for the active port to verify the satellite ID and transponder polarity (explained below in the *PortSetup Menu* section).

For non-C-band, use the Custom option to enter the exact center frequency of a carrier, rather than using a nearby, but not exact, C-band frequency. The receiver tuner will pull from a large offset to capture the signal, but long-term tracking is best if the user enters a precise carrier center frequency.

Contact the programmer or network operator for details about the satellite, transponder, and frequencies being used at purchase time. If one frequency is identified as the root transponder, using this frequency may expedite the download process during installation.

PortSetup Menu

Press the **▲ ▼** buttons until the PortSetup menu appears. This menu allows the user to (1) view the configuration for the active port, or (2) record satellite and polarity information for the inactive port. The active port is defined by the value shown in the Port field of the ManualTune menu. (The front panel LED also indicates which port is active.)

Changes in the PortSetup menu do not effect the IRD hardware. The receiver updates and displays active port information from the downloaded table when the VCT and virtual channel are selected in the Channel Selection menu. It is recommended to use the menu for the inactive port as a scratch pad and input the inactive port information to record this installation for future reference. When necessary, the receiver will use internal logic to determine that the desired data streams are not on the active port. It will then change to the second port to find the desired data streams. It will download the DigiCipher II system signals on the second port, and display satellite and polarity information for the second port based on the downloaded table it finds at that time.

Active Port**Port Field**

This field allows the user to select which port to view or configure. Press the **▶** button until the cursor is at the Port label, and press the Enter button to move into the field. Press the **▲ ▼** buttons to view the desired port. There are two options, 0 and 1.

The active/inactive status of either port cannot be changed from this menu. Press the Enter button to confirm the selection.

Satellite Field

If the active port has been selected, this field cannot be changed. It displays the three-character abbreviation for the transponder which the unit has acquired. The unit obtains this abbreviation from the downloaded tables for the currently acquired satellite transponder.

If it has not acquired the transponder and the tables have not yet been downloaded, this field will display dashes (--).

If this is an initial installation and the inactive port has been selected, it is suggested that the user enter the field and record the connections that have been made to the rear panel for future reference. Press the **▶** button until the cursor is at the Satellite label. After pressing the Enter button to enter this field, use the **◀ ▶** buttons to select the character position to be changed. Then use the **▲ ▼** buttons to scroll through the character choices. Press the Enter button to confirm selection and exit the field. Although this field can be changed at any time (if the inactive port has been selected), it is suggested that this field remain unchanged after the initial installation (unless the coax input installed on this port has been changed), because the user may overwrite valid satellite information that the unit has stored from the download tables.

Polarity Field

If the active port has been selected, this field cannot be changed. It displays the polarity of the transponder that the unit has acquired. The unit obtains this information from the downloaded tables for the currently acquired satellite transponder.

If this is an initial installation and the inactive port has been selected, it is suggested that the user enter the field and record the connections that have been made to the rear panel for future reference. Press the **▶** button until the cursor is at the Polarity label. After pressing

the Enter button to enter this field, there are two options: V/RHP (Vertical/Right-Hand Polarity) or H/LHP (Horizontal/Left-Hand Polarity). The default polarity for port 0 is V/RHP. The default polarity for port 1 is H/LHP. Press the ▲ ▼ buttons to display the options. Although this field can be changed at any time (if the inactive port has been selected), it is suggested that this field remain unchanged until after the initial installation because the user may overwrite valid satellite information that the unit has stored from the download tables.

If the transponder number (for C-band) or frequency in the Manual Tune menu has been entered, these fields may be used to verify the satellite and polarity of the acquired transponder after the network data has been downloaded. If the field for the active port still contains dashes (--), then the network did not download the data. Check to see if the Signal LED is lit. If it is lit, refer to *Chapter 4 - Troubleshooting*. If the Signal indicator light is not lit, verify the connection to the correct L-band coax for the desired satellite and the correct polarity to the appropriate port. If the input port and coax feed are correct, then return to the Manual Tune menu and repeat the installation there. Finally, move the coax to the opposite port(s), and check this PortSetup menu again, looking at both ports.

Return the cursor to the menu name (PortSetup) position.

Modulation Menu

Press the ▼ button until the Modulation menu appears. In order to expedite the acquisition process, scroll through and select the modulation field items used by the programmer. In a new or reset unit, if the user has selected the Symbol/Code/Bitstream combination, the unit will park only on that format until a carrier is found. If a new or reset unit does not have entries in these fields, the receiver will search all rate combinations until it finds one with the VCT number entered in the Channel Select menu. Press the ▲ ▼ buttons until the Modulation menu appears. Press the Enter button to continue.



Mode Field

Press the ▶ button until the cursor is at the Mode label, and press the Enter button to move into the field. Press the ▲ ▼ buttons to display the options: Manual and Auto. Select a mode and press Enter to exit the field.

NOTE: In Manual mode, the unit will only search for what is displayed in the Symbol/Code/Bitstream field. However, the user must go back to the Manual Tune Menu and re-enter the Xpndr or L_Freq field to activate this option. If Auto has been selected, there is no displayed information, and the unit will search through all possible combinations to acquire a signal.

DCII only →Modulation →Mode →Symbol Code Format
 ◀ ▶E Manual 19.5 3/4 Combined

DVB only →Modulation →Symbol →Code →Format
 ◀◀▶▶E dd.ddddd d/d DVB-QPSK

Symbol/Code/Bitstream Field

Press the ▶ button until the cursor is at the Symbol label, and press the Enter button to move into the field. Press the ▲ ▼ buttons to display the options. Using the ▲ ▼ buttons, scroll through the Symbol/Code/Bitstream combinations. Select the combination provided by your programmer and press Enter to exit.

Control Menu

Press the ▼ button until the Control menu appears. It allows the user to set up different bypass modes in case the unit loses the DigiCipher II system service authorization. There are three choices: Bypassed, Disabled, and Auto. The default setting is Auto.

The Bypass field allows selection of the type of mode. Press the ▶ button until the cursor is at the Bypass label, and press the Enter button to move into the field. Press the ▲ ▼ buttons to display the options. If you select Bypass, the bypass mode will be activated, and the unit will loop through the auxiliary inputs video and audio regardless of DigiCipher II system service authorization status. The Bypass On LED on the front panel will be lit when the unit is in the bypass state.

→Control →PID_Alias
 ◀◀▶▶E Off

If Disabled is selected, the unit will ignore the auxiliary inputs for video and audio. It will always attempt to output the satellite data regardless of authorization status.

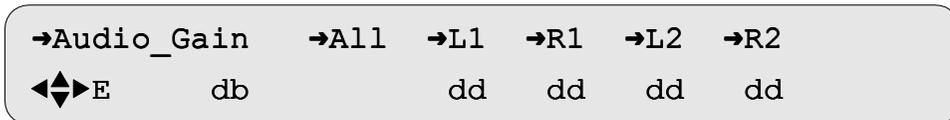
If Auto is selected, the unit will automatically switch to the bypassed state if it loses the DigiCipher II system service authorization. At such times, the Aux Video and Audio inputs will be routed to the IRD's output, and the front panel LED will be lit. When

DigiCipher II system service authorization is restored, the unit will switch back to satellite video and audio.

The PID_Alias field allows the user to turn On and Off the PID Aliasing feature utilized by the ASI output.

Audio_Gain Menu

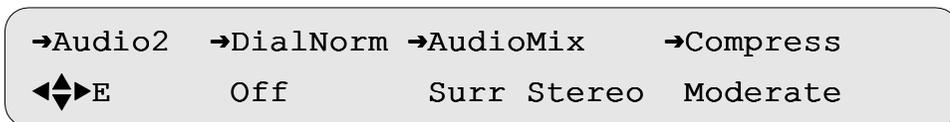
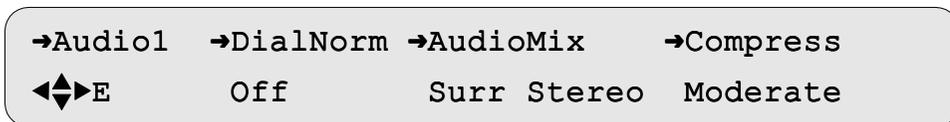
Press the \blacktriangle \blacktriangledown buttons until the Audio_Gain menu appears. This menu allows adjustment of the audio signal output level from 0 to -15dB in 1dB increments.



The (L & R) fields allow adjustment of the output level of the left and right audio signals. Press the \blacktriangleright button until the cursor is at the desired label, and press the Enter button to move into the field. Press the \blacktriangle \blacktriangledown buttons to simultaneously adjust the output level for the left and right audio signals. The default setting is zero. Press the Enter button to confirm the selections.

Audio 1 and 2 Menus

Press the \blacktriangle \blacktriangledown buttons until an Audio Menu appears. These menus have three fields that allow the user to customize the audio output based on options provided by the Dolby digital compression system. (These options are not provided with the MPEG-2 Layer 2 audio option.)



DialNorm Field

Press the \blacktriangleright button until the cursor is at the DialNorm label. This field allows the user to normalize speech levels to a constant level over all channels—raising or lowering the volume of the dialogue to a level that is appropriate for the background sound track. Press

the Enter button to move into the field. There are two options, On and Off. The default selection is On. Press the \blacktriangle \blacktriangledown buttons to change the setting. Press Enter to confirm selection.

AudioMix Field

Press the \blacktriangleright button until the cursor is at the AudioMix label, and press the Enter button to move into the field. This field allows selection of the audio downmix options. The choices are Stereo, Stereo Surround, Mono, or Dual Mono (two completely different audio outputs on the left and right channels, usually in different languages). Press the \blacktriangle \blacktriangledown buttons to display the options. The default setting is Stereo Surround. When programmers broadcast in stereo (versus stereo surround), a receiver set to Stereo Surround will perform as if set to Stereo. Therefore, the preferred default is Stereo Surround.

If you select Dual Mono, two warning screens will appear sequentially. The first warning screen always appears, and it cautions that the rear panel output for the center “Derived Mono” will be garbled, and only outputs marked left and right will function. Check the rear panel connections. Press the Enter button to continue, or any directional (\blacktriangleleft \blacktriangleright \blacktriangleup \blacktriangledown) button to stop and back out of the field without selecting Dual Mono.

CAUTION: Derived mono (L+R) will be muted
Press E to continue or $\blacktriangleleft\blacktriangleright$ to stop

The second warning screen is needed because of possible conflicts between this menu and the channel selection menus that specify language. It appears if the user had previously used the Language menu (channel selection group) to select a single language for Mono or Stereo output and then change to Dual Mono output. The unit will now seek to have a language defined for both left and right dual mono outputs.

- By pressing the Enter button (ignoring the caution and taking no action in the Lang menu of the channel selection group), the unit will change to Dual Mono, and it will use the language previously selected for Mono (or Stereo) for both.
- Conversely, if the user had previously selected Dual Mono output in two languages, but later changed to Stereo or Mono output in this menu (and if no action is taken in the Lang menu of the channel selection group), the output will default to the Dual Mono language that has been defined for the left channel.

CAUTION: Check Audio Language selection
Press E to continue or $\blacktriangleleft\blacktriangleright$ to stop

Compress Field

Press the **▶** button until the cursor is at the Compress label, and press the Enter button to move into the field. This field allows control of the degree of audio level compression. The options are Heavy, Moderate, and Off. The default setting is Moderate. Press the **▲ ▼** buttons to display the options. Press the Enter button to confirm the selection.

Video_Out_Format Menu

Press the **▲ ▼** buttons until the Video_Out_Format (video output format) menu appears. It has two fields that allow modification of the output format. Note that the receiver does not convert 525-line video to 625-line video or convert 625-line video to 525-line video. When the input to the uplink encoder is 525-line, the field here selects the receiver output to be NTSC or PAL M, and the 625-line field has no impact. When the input to the uplink encoder is a 625-line, the field selects the type of PAL the receiver outputs, and the NTSC or PAL M selection has no impact.



525-Lines Field

Press the **▶** button until the cursor is at the 525-lines label, and press the Enter button to move into the field. This field allows selection of the output format for 525-line video as either NTSC or PAL M. The default setting is NTSC. Press the **▲ ▼** buttons to display the options. Press the Enter button to confirm the selection.

625-Lines Field

Press the **▶** button until the cursor is at the 625-lines label, and press the Enter button to move into the field. This field allows selection of the output format for 625-line video as either PAL B, PAL D, PAL G, PAL I, or PAL N. The default setting is PAL D, G, B. Press the **▲ ▼** buttons to display the options. Press the Enter button to confirm the selection.

Aspect_Ratio Menu

Press the **▲ ▼** buttons until the Aspect-Ratio menu appears. It displays the current input aspect ratio and has one field that allows the output aspect ratio to be changed when the

uplinked video has an aspect ratio of 16:9. Note that if the unit receives input of 4:3, the output will always be 4:3.

```

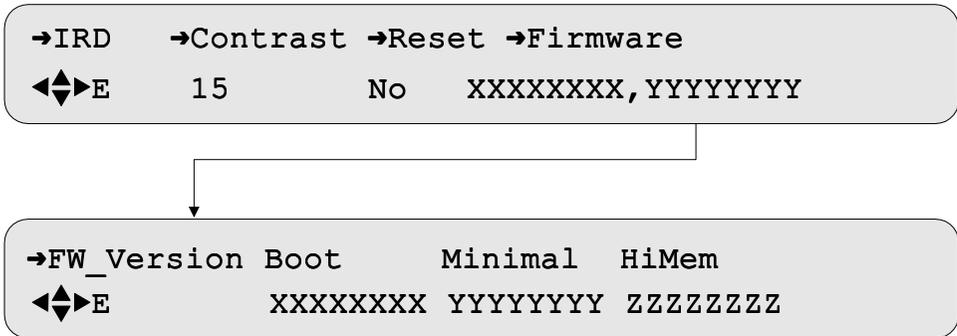
→Aspect_Ratio  Input  →Output_for_16:9_In
◀◆▶E          16:9   4:3 (PAN)
  
```

Output Field

Press the ▶ button until the cursor is at the Output label. Press the Enter button to enter the field. There are three options: 16:9 (produces dark bands above and below the image on a 4:3 screen), 4:3 Pan (information in the video material directs which portion of the 16:9 image to output), or 4:3 Center (outputs the center portion of a 16:9 image). Press the ▲ ▼ buttons to display the options. Press the Enter button to confirm the setting. The output default setting is 4:3 PAN, but if 4:3 PAN information is not available, the default will be 4:3 Center.

IRD Menu

Press the ▲ ▼ buttons until the IRD menu appears. This menu allows the user to change the front panel LCD contrast, reset the system to factory programmed values, and check the unit's firmware version number.



Contrast Field

To adjust the LCD contrast, press the ▶ button until the cursor is at the Contrast label. Press the Enter button to move into the field. Press the ▲ ▼ buttons to select a value between 1 and 31, with 1 representing the least contrast and 31 the most. Try to adjust the contrast so that the LCD panel can be read clearly from the angle at which the screen is normally viewed. Press the Enter button to confirm the selection.

Reset Field

The Reset field allows the user to reset the system to the programming values originally set by the factory firmware.

Caution: Pressing reset will delete all setups that have been entered and all downloaded information. Use this option cautiously. It will interrupt service output.

Press the **▶** button until the cursor is at the Reset label, and press the Enter button to move into the field. Press the **▲ ▼** buttons to display the options. The Yes option allows the user to reset the unit. A warning message appears saying that all programming will be lost if the action proceeds. Press a directional (**◀ ▶ ▲ ▼**) button to back out of the field and leave it unchanged. Otherwise, make the selection and press the Enter button to confirm it.

CAUTION: IRD memory will be reset
Press E to continue or **◀▶** to stop

Firmware Field

This field displays the unit's firmware release information, which is equivalent to the product version number. This field cannot be changed, but since the firmware is periodically updated, this field will confirm that the update was successful. This is used most commonly in troubleshooting.

Language Menu

This menu is a duplicate of the Language menu displayed when the unit was turned on for the first time. If the language setting that was made earlier is satisfactory, proceed to the italicized "Note" below. This duplicate menu allows the language setting for the front panel menus to be changed at a later time. There are two choices, either English or Spanish. English is the default language.

To change the language, press the **▶** button to move the cursor to the Select label, then press the Enter button. Toggle between English or Spanish with the **▲ ▼** buttons. Press the Enter button to confirm the selection. Return to the language menu name using the **◀** button, and press the **▲ ▼** buttons until the desired group menu appears.

→Language (Lenguaje) →Select (Selección)
◀▶E English (Inglés)

NOTE: Having completed the installation menus, move the cursor to the menu name. Then press the Enter button to move to the main menu for the installation group. Now press the **▲ ▼ buttons until the Channel Selection menu appears.**

Group 2 Menus: Channel Selection

Channel Selection Menu

Press the \blacktriangle \blacktriangledown buttons until the Channel Selection menu appears. This menu allows access to the entire group of channel selection menus. Press the Enter button to continue.

DCII only \rightarrow Channel Selection: (A) DCII
 \blacktriangle \blacktriangledown E Press E to Enter.

DVB only \rightarrow Channel Selection: (A) DVB
 \blacktriangle \blacktriangledown E Press E to Enter.

CH_Select Menu

Press the \blacktriangle \blacktriangledown buttons until the CH_Select (Channel Select) menu appears. This menu allows the user to select an active VCT, view the current network ID, select the virtual channel, and view the available VCTs in receiver memory. This menu has three editable fields.

The DigiCipher II system allows for retune events in which a programmer sends over-the-satellite messages to specified receivers to change the service they output for a specified time period, then return to a specified service. During a retune event, the user is locked out from changing VCTs to ensure that the receiver does not get lost when returning from the retune event.

DCII only \rightarrow CH_Select \rightarrow VCT Xpndr \rightarrow Chnl \rightarrow VCTs
 \blacktriangle \blacktriangledown \rightarrow E xxxxx dddddddd dddd Avail

DVB only \rightarrow CH_Select \rightarrow Chnl
 \blacktriangle \blacktriangledown \rightarrow E dddd

VCT Field

This field allows selection of a virtual channel table (VCT) number. (Read the section entitled *Changing Networks/VCT.*) Please contact the program provider for the correct VCT number to enter for that commercial system. Press the **▶** button until the cursor is at the VCT label, and press the Enter button to move into the field. Use the **◀ ▶** buttons to select the digit to change. Press the **▲ ▼** buttons to display the required VCT. Options include Def or an index number from 000 to 254. If Def has been selected, the default VCT for the selected transponder will also be selected. Press the Enter button to confirm the selection.

Transponder (Xpndr) Field

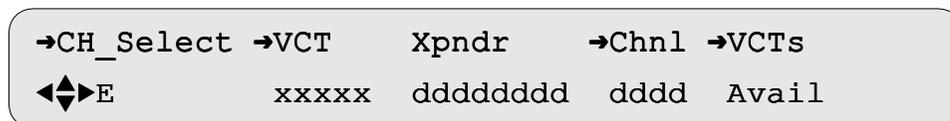
This non-editable field displays the current transponder name (alpha/numeric) that is downloaded. If you change the VCT or the frequency in the ManualTune menu (*Installation section*), this field will be invalid until the new VCT is loaded. The unit will display dashes (--) until the load has been completed.

Channel (Chnl) Field

This field allows selection of the virtual channel for the output service. An asterisk to the right of the channel number denotes the current channel, for example, 346*. Channels that do not exist will appear within parentheses, for example (346). Virtual channel options within the table range from 000 to 999. Press the **▶** button until the cursor is at the Chnl label, and press the Enter button to move into the field. Use the **◀ ▶** buttons to select the digit to change. Press the **▲ ▼** buttons to display the desired virtual channel. Press the Enter button to confirm the selection. If the user changes the VCT or the frequency in the ManualTune menu, this field will be invalid, and the unit will display dashes (--).

VCTs Field (Avail)

Press the **▶** button until the cursor is at the VCT label, and press the Enter button to move into the field. The Available_VCT_ID sub-menu will appear.



Available_VCT_ID Sub-Menu

The Available_VCT_ID sub-menu allows the user to view and select VCTs that are currently available in receiver memory. Press the **▶** button until the cursor is at the ID Number label, and press the Enter button to move into the field. Press the **▲ ▼** buttons to display the ID numbers (alpha/numeric). Press the Enter button to confirm the selection.

To exit the field without selecting the number, press the ◀ button. As the user scrolls through the VCT in memory, the currently selected VCT number from the VCT field of the CH Select menu will be displayed with an asterisk, for example 346*. When finished, press the ◀ ▶ buttons until the cursor is on the sub-menu name. Press the Enter button to return to the CH_Select menu.

```
→Available_VCT_ID      →ID_Number
◀ ▶E                  dddd
```

(Channel) Language (Lang) Menu

This menu has four fields that allow the user to modify and view the status of the language, subtitle, and text options. The available fields are Display, Left, Right, Sub, and Text. Press the ▲ ▼ buttons until the Language menu appears.

NOTE: The xx in the Left, Right, Sub, and Text fields indicate the occurrence of the specified (xx) language. The range is between 00 and 99. For example, “Eng13” for the 13th version of English. This feature is used when there are multiple dialects within a language.

Display (Dspl) Field

Press the ▶ button until the cursor is at the Display label, and press the Enter button to move into the field. The Display field allows the user to select the options that are displayed in the Left, Right, Sub, and Text fields. There are three options: All, Avail, and Status. Press the ▲ ▼ buttons to display the options.

The All option allows the user to scroll throughout the languages that exist in the database while in the Left, Right, Sub, and Text fields. You may wish to select languages that are not functional at this time but will be functional in the future - when they are present on the channel. Press the Enter button to confirm the selection.

```
→Lang1   →Dspl   →Left   Right   →Sub   →Text
◀▶E     All    eng00  engdd  engdd  engdd
```

The Avail option allows the user to scroll through the languages supported by the system while in the Left, Right, Sub, and Text fields. Furthermore, selection of this option allows the user to scroll through only the languages available for the virtual channel that have been selected in the Left, Right, Sub, and Text fields. If this channel has only six languages listed in the VCT, only six will appear. If the user changes channels, the number of languages may also change. Press the Enter button to confirm the selection.



Left and Right Fields

Press the **▶** button until the cursor is at the left label, and press the Enter button to move into the field. If the user selects Dual Mono (in the Audio menu of the installation menu group), Left and Right will have separately editable fields (see screen below). Otherwise, they will be controlled together as a pair from the left field alone. These fields allow the user to scroll throughout the following four options: (1) all languages—64, if the Display field is set to All, (2) the currently available languages if the Display is set to Avail, or (3) Def (default). Press the **▲ ▼** buttons to display the options. Press the Enter button to confirm the selection.

When making choices, keep the following factors in mind:

- If Def (default) is selected, the output(s) will default to the first language in the VCT. It is suggested that programmers run their VCT listing so that this default is the language in which lip movements match the audio.
- If Stereo Surround, Stereo, or Mono language is not available, the audio output will be the default language.
- In case of a Dual Mono language pair, the receiver will select and output the first occurrence of the left mono choice, if a pair is not available to match both left and right languages. The system cannot take a left from one audio pair and a right from another.

There is an interaction between the (Lang) menu and the AudioMix field of the Audio menu (installation menu group):

- If the user had previously selected Stereo or Mono in the AudioMix field and a specific language as the audio output in the Lang menu, but later changes the AudioMix menu setting to Dual Mono, the dual mono will change in this menu to the same language specified for both dual mono channels. A caution screen will also appear. After changing the AudioMix menu to Dual Mono, the user should reselect the languages desired here, in this menu.
- If the user previously selected Dual Mono in the AudioMix field with two different languages as audio outputs in the Language menu, but later selects Stereo, Stereo Surround, or Mono in the AudioMix field, the output in this Language menu will default to the first occurrence of a specified language (the one defined for the left channel first, then for right channel if there is no match for the left). The same caution screen will appear.

CAUTION: Check Audio Language selection
Press E to continue or ◀▶ to stop

Sub Field

This field allows selection of the language for subtitle output. Press the ▶ button until the cursor is at the Sub label, and press the Enter button to move into the field. Press the ▲ ▼ buttons to display the options. Press the Enter button to confirm the selection.

Text Field

This field allows selection of the language for text output. Press the ▶ button until the cursor is at the Text label, and press the Enter button to move into the field. Press the ▲ ▼ buttons to display the options. Press the Enter button to confirm the selection.

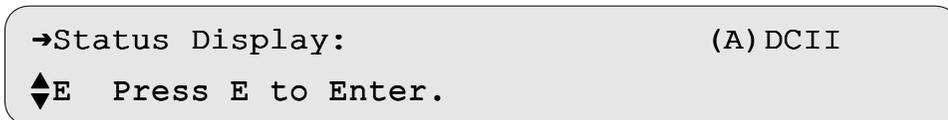
NOTE: Having completed the channel selection menus, move the cursor to the menu name. Then press the Enter button to move to the main menu for the channel selection group. Now press the ▲ ▼ buttons until the Status Display menu appears.

Group 3 Menus: Status Display

Status display menus provide information regarding the current status of the unit. They group together important parameters and display them conveniently together for the user to review the receiver's operation. These fields are not editable, and the displayed information is either (1) the result of changes in an installation or channel selection menu, or (2) a parameter the receiver reports as part of its operation.

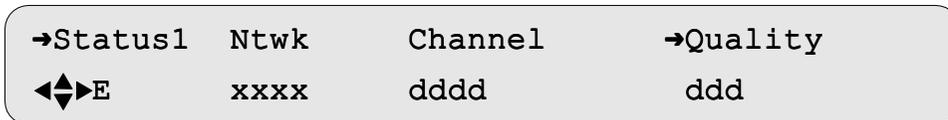
Status Display Menu

Press the \blacktriangle \blacktriangledown buttons until the Status Display menu appears. Press the Enter button to continue.



Status1 Menu

Press the \blacktriangle \blacktriangledown buttons until the Status1 menu appears. This screen displays the network name, network number, and the signal quality.



Network (Ntwk) Field

This field displays the network name, which was entered by the programmer or network operator at the encoder/uplink to identify the network.

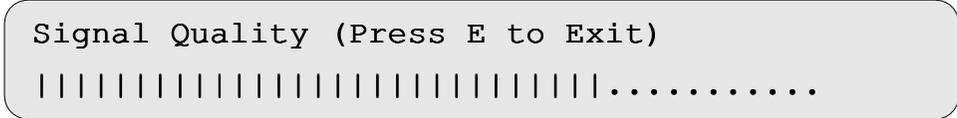
Channel Field

This field displays the selected virtual channel number (from the CH_Select menu) and name from the downloaded VCT.

Quality Field

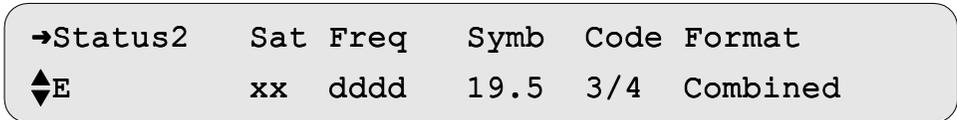
This field displays a number from one to 100 so that the quality level of the signal can be judged. *If the signal is 50 or less, it is marginal. If it is 35 or less, take action to increase the dish size or improve the LNB to prevent occasional loss of output.* This field also allows the user to display the signal quality in a large bar graph that expands to fill the entire LCD screen. If this is desired, press the \blacktriangleright button until the cursor is at the Quality

label, and press the Enter button. The bar graph will appear. Press the Enter button again to return to the normal Status1 menu display.



Status2 Menu

Press the ▲ ▼ buttons until the Status2 menu appears. This screen displays the satellite name, frequency, and status of the bypass mode.



Satellite (Sat) Field

This field displays the satellite name from the downloaded VCT.

Frequency (Freq) Field

This field displays the downlink frequency of the current virtual channel. This may be different from the frequency which had initially been chosen in the Manual Tune menu.

Symbol (Symb) Field

This field displays the symbol rate (megasymbols per second).

Code Field

This field displays the code rate (error control coding for forward error correction).

Bypass Field

This field displays the current setting of the decoder: Disabled, Bypassed, or Auto.

Status3 Menu

Press the ▲ ▼ buttons until the Status3 menu appears. This screen displays the Sync, Eb/No and Auth_State of the IRD.

Sync Field

This field displays the acquisition Sync state. The Sync state can be either “locked” or “Tuning”.

Eb/No Field

This field displays the Eb/No. Eb/No is a measure of signal to noise.

Auth_State Field

This field displays the authorization state of the current selected channel. Auth_State indicates “how” the IRD is authorized. If the Auth_State is “Not Authorized”, the field will alternate, with an indication of “Why” it is not authorized, such as “Not in Sync”.

→Status3	Sync	Eb/No	Auth_State
↕E	Tuning	dd.d	Subscribed

Recommendations for Status1, Status2 and Status3 Menus

It is recommended that the unit be run with either the Status1 or Status2 menu display showing at all times during normal operation. When the unit senses a No Video Out condition, the receiver will flash Alarm in the Status field. In addition, if sync is lost, the Status field will flash Searching to indicate that it is searching for a valid carrier. The LCD will be lit when the Alarm or Searching mode starts, but will time out after its normal period.

→Searching	Ntwk	Channel	→Quality
↕E	xxxxxxxxxx	xxxxxxxxxxxxx	80

Group 4 Menus: Diagnostics

The unit's diagnostic menus allow the user to isolate problems to the unit or the satellite using the front panel. They also enable the user to test waveforms and use other diagnostic information displayed on an NTSC television monitor connected through the rear panel Video Output.

Caution: Turning on diagnostics will change the video or audio output, and these diagnostic screens or tones may be transmitted to the cable customers if the receiver is connected to the cable plant.

Diagnostics Menu

The Diagnostics menu provides access to the diagnostic capabilities of the unit. Press the **▲ ▼** buttons until the Diagnostics menu appears. Press the Enter button to continue.

```
→Diagnostics:                               (A) DCII
◆E      Press E to Enter.
```

Diag Menu

Press the **▲ ▼** buttons until the Diag menu appears.

```
→Diag →Menus
◆      Off
```

Menus Field

The Menus field allows the user to enable or disable the on-screen diagnostics. Press the **▶** button until the cursor is at the Menus label, and press the Enter button to move into the field. Press the **▲ ▼** buttons to toggle between On or Off.

Press the Enter button to confirm the selection. The first time the Diag menu is turned on, the following caution screen will appear, indicating that diagnostic menus will replace video. Press the Enter button to continue, or press a **◀ ▶ ▲ ▼** button to stop and back out of the screen.

```
CAUTION: Menus will replace video
Press E to continue or ◀▶ to stop
```

Notice that if the Menus field is On, the Scroll_Scrn field and Clear_Cntrs field will appear on the Diag menu.



Scroll_Scrn (Screen) Field

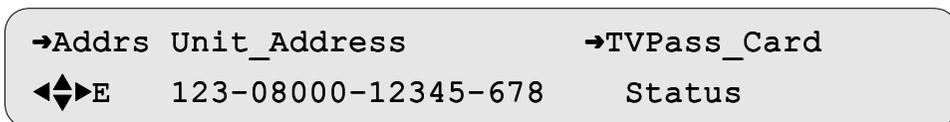
This screen allows the user to scroll through a tier of diagnostic screens on the television monitor. Press the ▶ button until the cursor is at the Scroll_Scrn label, and press the Enter button to move into the field. Press the ◀ ▶ buttons to scroll to the televised screen of choice. Refer to *Chapter 8 - Diagnostic Display* for a description of possible diagnostic output and its definition. Press the Enter button to exit this field.

Clear_Cntrs (Counters) Field

This field allows the user to reset selected counters in the on-screen diagnostics to zero. This field is primarily for use with Hotline troubleshooting, and it is recommended that it be used only when so directed. If used, it will not effect receiver operation, but it may give misleading troubleshooting results. To clear counters, press the ▶ button until the cursor is at the Clear_Cntrs label, and press the Enter button to reset the counters to zero.

Address (Addr) Menu

Press the ▲ ▼ buttons until the Addr(ess) menu appears. This menu is for display only, and it shows the unit address, TVPass[®] card address (if present), and the card revision number (if present).



Unit_Address Field

The Unit_Address field displays the decoders electronic address in decimal digits. The program provider uses this address to identify a specific unit for authorization and to retune messages. The display enables the user to see the address from the front panel rather than moving to the unit's rear panel to read the label.

TVPass_Card Field

Press the **▶** button until the cursor is at the TVPass_Card label. By pressing the Enter button from this field, the screen will display the TVPass_Card Status screen.

TV_Pass_Card_Status Screen

The unit does not initially require a TVPass card, but if one is required, the program provider will supply one. The program provider uses the TVPass card's address and decoder address to identify a specific unit for authorization and to retune messages. The display enables the user to see the TVPass card address from the front panel of the unit. There are three options: (1) not inserted, (2) xxx-xxxxx-xxxxx-xxx (a unique TVPass card address), and (3) xxx-xxxxx-xxxxx-xxx needs mating. Press the Enter button to exit.

```
TV_Pass_Card_Status (Press E to Exit)
123-08000-12345-678
```

AudioTestSignal Menu

Press the **▲ ▼** buttons until the Audio_Test_Signal menu appears. This menu allows the user to select an audio test signal and has one editable field. There are three options in the (L, R, M) field: (1) 1000 Hz at +16 dBm (for mono), (2) 3960 Hz or 4040 Hz at +4 dBm each (for left and right), or (3) None. Test signals override any active service component

Caution: Audio output to the customers may be interrupted.

In order to terminate an audio test signal, scroll to None (prompt) or exit the menu.

```
→AudioTestSignal →L1/R1/M1 →L2/R2/M2
◀↕▶E           Hz      Off      Off
```

FullField_Video_Test_Sig(nal) Menu

Press the **▲ ▼** buttons until this menu appears. A full-field video test signal is available, and the user can display different test patterns by selecting the Pattern field. Press the **▶** button until the cursor is at the Pattern label, and press the Enter button to move into the field. Press the **▲ ▼** buttons to display the test patterns.

Choose from the following options in the Pattern field (525 Composite is shown under the Pattern label in the screen example near the bottom of the page):

Table 3-1 Pattern Field Options

NTSC/PAL M	PAL
525 Composite	625 CCIR 17
525 Combination	625 CCIR 18
525 Color Bar	625 CCIR 330
525 Y Ramp	625 CCIR 331
525 Matrix	625 Matrix
525 VP	625 VP
Program (Off)	Program (Off)

Test signals override any active service component, and the unit displays diagnostics over the video test patterns if diagnostics are enabled. Disable the selected signals by displaying Program in the Pattern field and then exiting the menu. Press the Enter button to exit from the field.

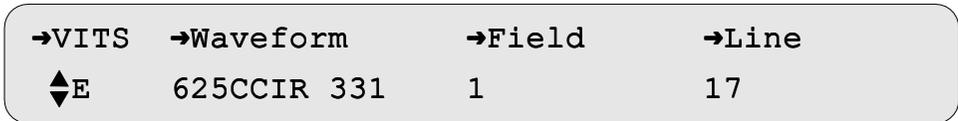


Vertical Interval Test Signal (VITS) Menu

Press the ▲ ▼ buttons until the Vertical Interval Test Signal (VITS) menu appears. This menu allows the user to insert VITS on lines 17 or 18. Choose from the following options in the Waveform field (525 Composite is shown in the example screen below the chart):

Table 3-2 Waveforms

WAVEFORMS
525 Composite
525 Combination
525 Color Bar
525 Y Ramp
625 CUR 17
625 CUR 18
625 CUR 330
625 CCIR 331
Transmitted
Disabled



Waveform Field

The Waveform field allows the user to insert a VITS from several internally stored patterns, from a pattern transmitted over the satellite link, or to turn off VITS insertion. Press the **▶** button until the cursor is at the Waveform label, and press the Enter button to move into the field. Press the **▲ ▼** buttons to display the options. The default waveform is “Transmitted” (indicating whatever signal is provided over the satellite link by the programmer, if one is present). Press the Enter button to confirm the selection.

Field Field

The Field field allows the user to select the field on which the VITS is reinserted by the receiver. There are two choices, field 1 or field 2. Press the **▶** button until the cursor is at the Field label, and press the Enter button to move into the field. Press the **▲ ▼** buttons to display the two options. Press the Enter button to confirm the selection.

Line Field

Press the **▶** button until the cursor is at the line label, and press the Enter button to move into the field. Press the **▲ ▼** buttons to display the options. The available line numbers are 17 or 18. The default is line 17. Press the Enter button to confirm the selection.

CueTone Test Menu

Cue tones are signals generated by the unit, but controlled by the uplink programmer. Local cable companies use cue tones to control and to queue the insertion of commercials in cable headends. There is one dedicated digital DTMF differential output for cue tones. The cue tone test menus allow the user to turn cue tones on and off.

Caution: Output to the customers may be interrupted.

When turned on, the signal can be sent to the local headend equipment. Press the **▲ ▼** buttons until the CueTone test menu appears. It has one field.

The Test field lets the user turn the cue tone test on and off. Press the **▶** button until the cursor is at the Test label, and press the Enter button to move into the field. Press the **▲ ▼** buttons to display the options. If On is selected, the unit will generate a DTMF code 0-9 on the cue tone output. This test will keep repeating until turned Off. Press the Enter button to confirm the selection.



Caution Screens

For reference, the following caution screen list, and information about where they appear, is provided.

Channel or VCT Related Caution Screens

The following caution screen indicates that the channel XXX does not exist (is not present in the current virtual channel table), possibly due to operator selection error in the CH_Select menu.

```
CAUTION: Chn XXX Does Not Exist
Press E to continue or ◀▶ to stop
```

The following caution screen indicates that the channel XXX exists in the virtual channel table, but the associated service is inactive. Refer to the CH_Select menu. Contact the programmer for current/future channel lineups.

```
CAUTION: Chn XXX Exists but Inactive
Press E to continue or ◀▶ to stop
```

The following caution screen indicates that channel XXX exists in the virtual channel table but is not present on any input of the chassis (perhaps because the feed was not connected or has the wrong polarity.) Refer to the CH_Select menu, the ManualTune menu, or see For

```
CAUTION: Chn XXX Exists but not on Input
Press E to continue or ◀▶ to stop
```

more information, refer to Chapter 2 "Connecting the DSR4402X" on page 3.

The following screen indicates that the selected virtual channel table is not currently available. Refer to the CH_Select menu. Contact the programmer to verify the VCT number.

```
CAUTION: VCT not present in unit
Press E to continue or ◀▶ to stop
```

System Update Caution Screens

This caution screen provides a 30-second warning before a system update takes place. Abort the update by pressing any front panel button, returning the unit to its previous state. In addition to this screen, the LCD back light will blink off and on for the duration of the 30-second countdown period. No user action is required. Only under unusual circumstances (troubleshooting, reinstallation, etc.) would a programmer, or the Hotline, direct the user to abort the update.

CAUTION: System update in 30 seconds
Press E  to abort and revert

After the 30-second countdown period, the system update will start if the user has not pressed any buttons. The update may take from several minutes to an hour to complete. During the download, the following screen will appear, the unit will be nonfunctional, and will not respond to front panel button presses. *Do not unplug the unit during a system update, or only partial firmware may be received.*

CAUTION: System update in progress
Front panel inactive, do not unplug unit

Installation Caution Screens

This Installation caution screen appears in the following cases: (1) if an attempt is made to edit the Port field in the ManualTune menu, (2) an attempt is made to edit the Xpndr field in the ManualTune menu, or (3) if an attempt is made to edit the L_Freq field in the ManualTune menu.

CAUTION: Service will be interrupted
Press E to continue or  to stop

This Installation caution screen appears if an attempt is made to select Dual Mono in the AudioMix field while in the Audio menu.

CAUTION: Derived mono (L+R) will be muted
Press E to continue or  to stop

This Installation caution screen appears (while working in the Audio menu's AudioMix field) if the user had selected a single language for stereo audio output and later changed to dual mono output (because the unit will seek to have a different language for left and right outputs). If the user had chosen English, the dual mono will default to English (Left) and English (Right). Similarly, if the user had earlier selected dual mono output in two languages and wished to change to stereo output, the stereo output will default to English, which is the left input.

CAUTION: Check Audio Language selection
Press E to continue or ◀▶ to stop

This Installation caution screen appears if an attempt is made to edit the Reset field in the IRD menu.

CAUTION: IRD memory will be reset
Press E to continue or ◀▶ to stop

Diagnostic Caution Screen

This Diagnostic caution screen appears when an attempt is made to turn on the Diag menu for the first time. This screen warns the user that diagnostic menus will replace Video 2.

CAUTION: Menus will replace video
Press E to continue or ◀▶ to stop



Troubleshooting

Before contacting the Hotline, please review the following problems and suggested solutions.

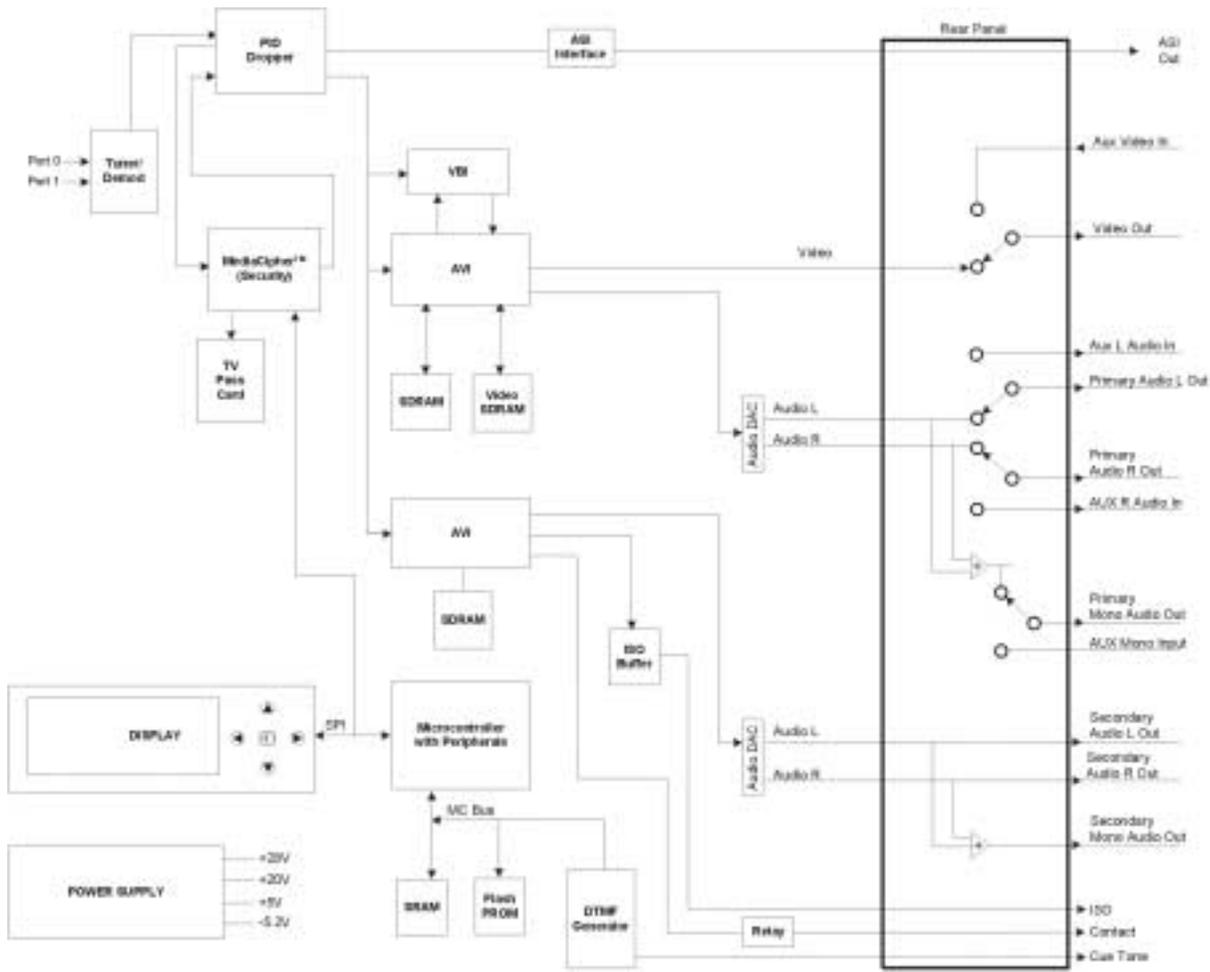
Table 4-1 Troubleshooting Solutions

PROBLEM	POSSIBLE CAUSE	SOLUTION	REFERENCE
LCD blank; no LEDs lit	No power to unit	Plug in the unit	
LEDs lit, but LCD blank, or too dark to read	LCD contrast out of adjustment	Adjust LCD contrast	See: IRD menu, Contrast field
No picture; no level indication	No LNB signal port	Connect LNB coax	See: Connecting a Unit
Poor audio quality or low audio level	Audio levels incorrect	Adjust audio levels	
No video or Bypass Video is present	Unit set in bypass mode	Change to channel available	
No audio or Bypass Audio is present	Unit set in bypass mode	Change to channel available	
Will not acquire	Port not configured	Check port configuration; check manual frequency tune	
Incorrect language	Wrong language setting	Check language screen settings	



5

Signal Flow







Product Support

Product Support And Equipment Returns

Product Support

For assistance on setup and operation, contact the Customer Service Hotline (8:30 a.m. to 8:30 p.m. Pacific Time).

From the United States, the Caribbean, or Canada

Dial toll-free: 1-800-457-1210

From Other Countries

If located in another country, dial the in-country toll-free number shown in column two of the chart below. Next, enter the toll-free Hotline number 1-858-404-2992, or an operator will ask you for it.

Table 6-1 Hotline Toll-Free Numbers

COUNTRY	IN-COUNTRY TOLL-FREE NUMBER	COMMENTS
Argentina	001-800-200-1111	
Belize	555	Note 1
Bolivia	0-800-1112	
Brazil	000-8010	
Chile	123-0-0311	

Table 6-1 Hotline Toll-Free Numbers

COUNTRY	IN-COUNTRY TOLL-FREE NUMBER	COMMENTS
China (PRC)	10810	
Colombia	980-11-0010	
Costa Rica	114	
Ecuador	000-119	
El Salvador	190	
Guatemala	190	
Guyana	165	
Honduras	123	Note 2
Hong Kong	800-1111	
Korea	00911	
Mexico	95-800-462-4240	Note 3
Nicaragua	174	
Panama	109	
Paraguay	0081-800	Note 2
Peru	191	Note 2
Suriname	156	
Taiwan (ROC)	008-010-288-0	
Uruguay	00-0410	
Venezuela	80-011-120	

Note 1: Not available from public phones

Note 2: May not be available from every phone/pay phone

Note 3: When calling from public phone, use phones marked "Ladatel"

Note 4: Public phone requires deposit of coin or phone card

COMMENTS

If Unable to Use Toll Free Numbers

If toll-free numbers are unavailable, the Hotline may be reached by calling the following U.S. number: (858) 457-1210.

Additional Assistance

The program supplier may provide the user with additional technical assistance, including network operational procedures.

IRD Repair Procedures

Motorola BCS has established policies and procedures for servicing and repairing its IRD products. As a system operator, return an IRD to a Motorola BCS Repair Center in accordance with the procedures outlined below.

Shipping IRDs for Repair

- Call or write the Motorola BCS Technical Response Center (phone numbers listed above) within the applicable warranty period at: Motorola BCS, 6450 Sequence Drive, San Diego, CA 92121, 1-800-457-1210. The Technical Response Center is open 7 days a week, 24 hours a day.
- Explain the problem. Ask whether the IRD should be returned for service or retained for servicing in place. Ask for a Return Service Authorization (RSA) number and for the address to send the IRD if the IRD is to be returned. If writing, be sure to include a copy of the sales receipt or other proof of purchase date, a copy of the warranty, a phone number, and return address. If the Technical Response Center instructs the user to return the IRD, pack it safely and securely, preferably in the original shipping carton. Put the RSA number on the outside of the shipping carton. Enclose a letter explaining the problem. Be sure to include a copy of the sales receipt or other proof of purchase date, a copy of the warranty, and a phone number and return address. Ship it insured to the authorized service center specified by Motorola BCS. All packing, shipping and insurance to return the IRD to Motorola BCS must be prepaid by the user. Motorola BCS shall pay return shipping charges.
- Ship multiple IRDs covered by the same RSA number at the same time.
- If there is no RSA number and cover letter with the IRD, there may be a delay in repair or replacement.

Receipt and Processing of Returned IRDs

- When Motorola BCS returns the repaired or replaced IRD, the RSA number will be referenced in the packing slip. Motorola BCS will prepay shipping costs on warranty returns. Return freight charges on non-warranty repairs will be charged C.O.D. The packing slip will include information regarding the old and new IRD's address codes and repair determination.

- If the warranty on the IRD is expired, voided, or inapplicable as determined by Motorola BCS in its reasonable discretion, Motorola BCS will not repair the IRD until the user agrees to pay for quoted charges. If the user does not agree within 30 days to pay the quoted charges, the IRD will be returned unrepared. The user is responsible for transportation charges both ways on IRDs which are not under warranty, or on which the warranty has been voided or is inapplicable.
- Motorola BCS charges for the following services:
 - All non-warranty IRD repairs.
 - IRDs returned with failures that Motorola BCS cannot duplicate (CND).
 - Repair or replacement of IRDs that, in Motorola BCS's sole discretionary judgment, have undergone tampering (voided warranty).
- IRDs returned during the original warranty period that are repaired or replaced will carry either a 90-day warranty or the remaining period of the original warranty calculated from the date the IRD is received at Motorola BCS's repair facility, whichever is longer. The IRD limited warranty policy appears on the last page of this Guide.
- Non-warranty repaired or replacement IRDs will carry a 90-day limited warranty.
- Motorola BCS will replace at full price and with a 90-day limited warranty any IRD returned for repair (warranty or non-warranty) that determines, in its sole discretionary judgment, has undergone tampering.
- These procedures shall not extend or modify the warranty terms and conditions set forth in the warranty policy herein.



Conversion Tables

Downlink/L-band Frequency Conversions

A distributor or programmer can provide the latest C-band and Ku-band frequency plans at purchase time.

If desired, the following formulas have been provided to perform calculations for both C-band and Ku-band transponders, or if the user is installing for a new satellite.

Calculation for C-Band Transponders

Formula for L-band frequency:	Example calculation if downlink frequency = 3,740 MHz:
5,150 MHz	5,150 MHz
-Downlink frequency (MHz)	-3,740 MHz
L-band frequency (MHz)	1,410 MHz

Calculation for Ku-Band Transponders

Formula for Ku-band frequency:	Example calculation if downlink frequency = 12,019 MHz:
Downlink frequency (MHz)	12,019 MHz
-10,750 (MHz)	-10,750 MHz
L-band frequency (MHz)	1,269 MHz



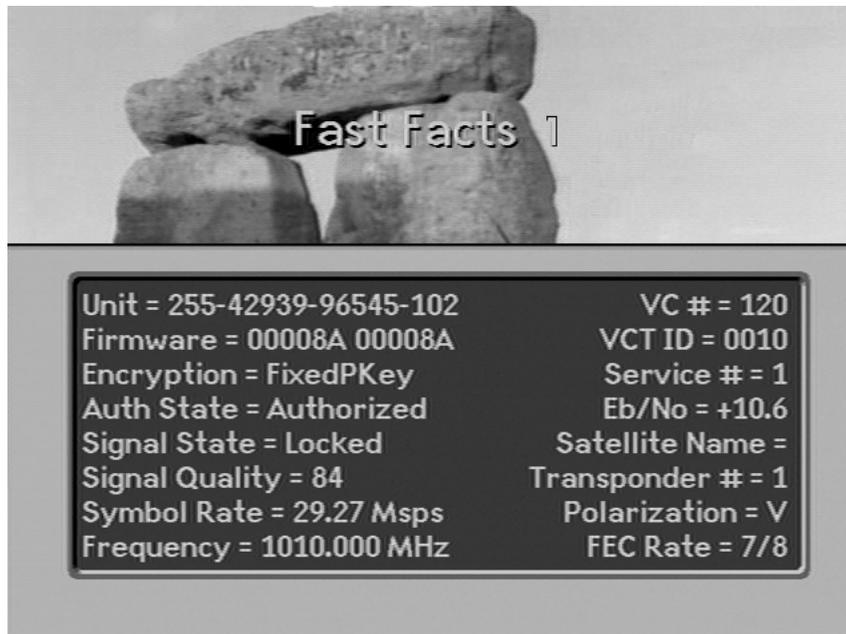


Diagnostic Display

On-Screen Diagnostic Display

The On-Screen Diagnostic (OSD) display contains many fields of information that indicate the status and history of the receiver. The Fast Facts menu is a summary of the information contained in the other menus.

Fast Facts Screen





Diagnostic Screen A

4402X					316
Product String or Version Number					Channel Number
255-03177-05987-128			Not In Support Mode		00
Unit Address			TvPC Address		Unit Control Byte
000043	000061	000061	000061	000000	ID
Boot Sector FW Version	Minimum FW Version	Application FW Version	Current FW Version	Target FW Version	Download Status
0012000C00000000		FE20	0	1000	109 29 1
Product Configuration		Time Zone	EMM Search State	EMM Provider ID	No. of Channels Current Epoch No. IPG Status
0229	On	225218AA	235DB92A	2268CE50	00
ECM PID	Daylight Savings Enable	Daylight Savings Entry	Daylight Savings Exit	GPS Time	Huffman Errors
13947	26	825	15278	4129:00-00	FF
Control Channel Message Counts	Packet Rate	VCT ID	Start Page of VCT Range	End Page of VCT Range	ADPstat12
0001	0FFA	0229	1FFF	1FFF	0FFE 1078
PID 0/1	PID 1 (EMM)	PID 2 (SCC)	PID 3 (APP1)	PID 4 (APP2)	PID 5 (Network) No. Audio Mutes
25	327	320	102	110	25858 0
PID 0/1 Counter	PID 1 Counter	PID 2 Counter	PID 3 Counter	PID 4 Counter	PID 5 Counter No. Video Mutes

Diagnostic Screen B

00 0DF9, 04EF, 0C58				1000, 7FFD		316
Geographic Region	Location X	Location Y	Location Z	Multicast Address (1)	Multicast Address (2)	Channel Number
1000	9C9D	C0	0000000000000000		00 87 0000	
Category Number	Category Sequence No.	Current Epoch Status	Diagnostic Key		TSODA Oscillator Test	
B0	F:4000	E:0000	D:0000	C:0000	passed	
Tier Type	Tier Bank Number	Base Tier Data (F-C)			TSODA Oscillator Test	
E0	B:0000	A:0000	9:0000	8:0000	121C68	
Base Tier Bank Evb/Ovb	Tier Data	Working Key Epoch Count			Encryption Mode Byte	
B0	7:0000	6:0000	5:0000	4:0000	1E8008 0	
Tier Data					Service ID Antitaping	
B0	3:0033	2:0200	1:1000	0:00A1	00 00 00 00	
Tier Data	Crypto Status	TvPC Health	TvPC Status	TvPC Auth Reason		
S/S	MP/NS	MP/NS	MP/NS	MP/NS	FF	
Current Auth State					Seed Health	
U/S	U/NS	U/NS	U/NS	U/NS	30	
Next Auth State					Current Epoch No.	

Diagnostic Screen C

07	000002FD	01	01	nBb	3/4	316
Acquisition State	Cumulative RSE	Loop Control	Modulation Mode	Multiplex	Coding Mode	Channel Number
	-1.125	19.51	479.51	20	65	FA
	Current LNB Offset	Symbol Rate	IF Frequency	Coarse DAC Value	Fine DAC Value	AFC State
0	85	121358/55305		2779	+10.9	
Instantaneous Signal Quality	Min. Signal Quality	Average Signal Quality		Time Above Signal Threshold	EbNo	
0-00	12087 :8	1270.000		0-122	C0000000	
Transport Waveform	Source ID: Service No.	RF Frequency		Transport Stream ID	Acquisition Debug Register	
					00CSDM	
					Re-acquisition Status	
					0	
					Video Mode	
0000	3CFF	0000	0000	0000	0CFF	0000 0000
Audio Mask Mute	Audio Mask Applicable	Audio Mask Override	Audio Mask Effective	Video Mask Mute	Video Mask Applicable	Video Mask Override
						Video Mask Effective

Diagnostic Screen D

							316
							Channel Number
0001	14	1	3+0	0	0	0	0
CCP 0							
0001	14	1	3+0	0	0	0	0
CCP 1 (EMM)							
0001	14	1	3+0	0	0	0	0
CCP 2 (SCC)							
0001	14	1	3+0	0	0	0	0
CCP 3 (APP1)							
0001	14	1	3+0	0	0	0	0
CCP 4 (APP2)							
0001	14	1	3+0	0	0	0	0
CCP 5 (Network)							

Diagnostic Screen E

0210 TSODA slot 0	10010	00000001 Download Primary Error	na Opportunity Day Count	023830 Free Memory	206 Channel Number
0210 TSODA slot 1	10010	00000000 Download Secondary Error	na Opportunity Window Count	02B9C0 Max Block	3 Reset Counter
1FFF TSODA slot 2	00000	22AB4567 Download Time			22897654 Reset Time
1FFF TSODA slot 3	00000	80123456 ODVARC/AVI.MCN			00010008 Reset Type
1FFF TSODA slot 4	00000	886655 TSODA.MCN			0004BF42 Reset Address
1FFF TSODA slot 5	00000				0011DA66 Faulted Address
0229 ECM slot 0	1xxx0				15 20:56 Days, Hours, Min since Boot
1FFF ECM slot 1	0xxx1				



Language Abbreviations

Note: This list of languages was recommended to system operators as the appropriate identifiers for audio, subtitle, and text information. Refer to Language Menu operation.

LANGUAGE	ABBREVIATION	LANGUAGE	ABBREVIATION
Arabic	ara	Japanese	jpn
Armenian	arm	Javanese	jav
Balinese	ban	Kashmiri	kas
Basque	Baq	Korean	kor
Batak (Indonesian)	btk	Kurdish	kur
Bengali	ben	Latin	lat
Bhojpuri	bho	Malay	may
Bulgarian	bul	Mandar	mdr
Burmese	bur	Marathi	mar
Catalan	cat	Miscellaneous Lang.	mis
Chinese	chi	Mongolian	mon
Croatian	scr	Nepali	nep
Cue (Tones)	cue	Norwegian	nor
Czech	cze	Otomian Lang.	oto
Danish	dan	Pahlavi	pal

LANGUAGE	ABBREVIATION	LANGUAGE	ABBREVIATION
Dutch	dut	Panjabi	pan
Egyptian	egy	Persian	per
English	eng	Philippine (Other)	phi
Esperanto	epo	Polish	pol
Faroese	fao	Portuguese	por
Finnish	fin	Rajasthani	raj
French	fre	Romanian	rum
German	ger	Russian	rus
Greek	gre	Samoan	smo
Gujarati	guj	Scots	sco
Hebrew	heb	Sindhi	snd
Hindi	hin	Swahili	swa
Hiri Motu	hmo	Swedish	swe
Hungarian	hun	Tagalog	tgl
Indonesian	ind	Tamil	tam
Interlingua	ina	Thai	tha
Iranian	ira	Urdu	urd
Irish	iri	Vietnamese	vie
Italian	ita	Welsh	wel



DSR4402X Specifications

Table 10-1

RF	
Input Frequency Range	950-2150 MHz
Input RF Level	-25 to -65 dBm
RF Port Impedance	75 Ohms
RF Port Return Loss	8 dB minimum
Port-to-Port Isolation	40 dB minimum

Table 10-2

VIDEO	
Frequency response	± 0.9 dB (1 kHz to 4.2 MHz) NTSC ± 0.9 dB (1 kHz to 4.8 MHz) PAL $+0/1.5$ dB (4.8 MHz to 5.5 MHz) PAL
Video Level	1.0V p-p $\pm 10\%$
Chrominance-luminance Delay Inequality	± 40 nsec
Differential Gain	4.5% p-p maximum (10% to 90% APL)
Differential Phase	4.5% p-p maximum (10% to 90% APL)

Table 10-3

TRANSMISSION STANDARD	
DCII Symbol Rates	3.25-29.27 Msps
DCII Code Rates	5/11, 1/2, 3/5, 2/3, 3/4, 4/5, 5/6, 7/8
DVB Symbol Rates	3.25-30 Msps
DVB Code Rates	1/2, 2/3, 3/4, 4/5, 7/8

Table 10-4

AUDIO	
Output level	+16.0 dBm \pm 1.0 dB into 600 Ohms, attenuation adjustable (0 to -15 dB)
Frequency Response	\pm 1.0 dB, 20 Hz to 20 kHz
Total Harmonic Distortion	1.25 dB pp or better at 1 kHz RE: +10 dBm, 20Hz -20 kHz
S/N	85 dB or better at 1 kHz RE: + 16 dBm, measured at 20 Hz-20 kHz
Isolation	80 dB, 1 kHz
Mono Level Balance	\leq 0.75 dB typical

Table 10-5

ELECTRICAL	
Power Requirements	90 to 250 VAC, 47/63 Hz, 40 W
LNB Power Supply	19-21 V minimum, 480 mA loaded
Connectors	
RF in	F-type

Table 10-5

ELECTRICAL	
Video in/out	BNC
QTone	Screw terminal
Audio in/out	Screw terminal
ISOC data	Screw terminal
Contact Closure	Screw terminal
ASI	BNC connector

Table 10-6

MECHANICAL	
Dimensions	H 3.1" (4.4 cm) x W 19.0" (48.3 cm) x D 20.50" (52 cm)
Weight	12 lbs.

***Audio/Data connectors may be ordered through Phoenix Contact part number MC1,5/10-ST-3, 81.**



LIMITED WARRANTY

Commercial Integrated Receiver Decoder

Original Commercial Purchaser

General Instrument Corporation doing business as the Broadband Communication Sector of Motorola, Inc. ("Motorola BCS") hereby warrants for the benefit of the original purchasers of Commercial Integrated Receiver Decoders ("IRD") furnished herewith ("the User"), that such IRDs shall be free from defects in material and workmanship for a period of twelve (12) months commencing from date of original shipment for commercial use. Motorola BCS's obligation under this limited warranty shall be limited to repairing, or at its option, replacing any such defective IRD, which shall be returned to Motorola BCS. A replacement unit need not be new.

This warranty shall apply only to IRDs which, after regular installation and normal usage, are found by Motorola BCS, in its reasonable determination, to have been defective or nonconforming within the warranty period.

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