



**INSTALLATION GUIDE
UNITY5000
Digital Video
Integrated Receiver Decoder**

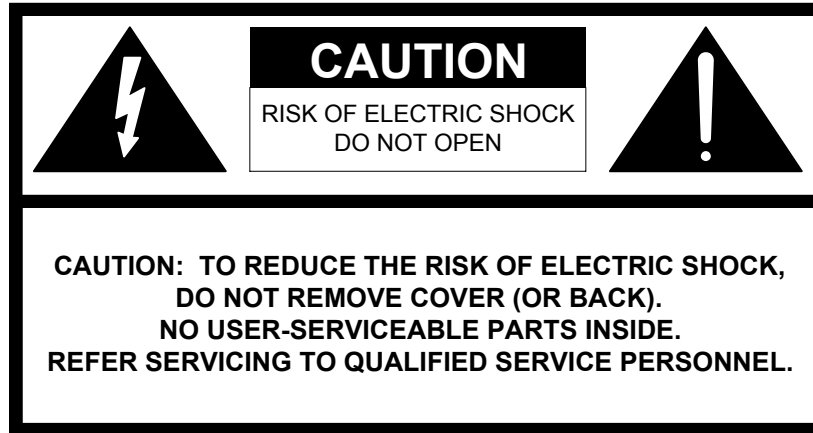
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When ordering parts from Wegener Communications, Inc., be sure to include the equipment model number, equipment serial number, and a description of the part.

In all correspondence with Wegener Communications, Inc., regarding this publication, please refer to 800005-01 C.

Third Edition: July 2002

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CAUTION

As this unit is intended to interface with other electrical/electronic systems, proper engineering practices must be adhered to during installation and check-out.

All AC power and ground must be installed in accordance with National Electric Code Standards as to conductor size and limitations (see NFPA 70, articles 200-280, as amended, if required), and lightning protection must be provided.

All RF interconnections must be properly shielded to prevent ingress or egression of potential interfering sources to existing services.

Any damage to this unit caused by improper wiring/interconnections will void any warranty extended.

WARRANTY

The following warranty applies to all Wegener Communications products.

All Wegener Communications products are warranted against defective materials and workmanship for a period of one year after shipment to customer. Wegener Communications' obligation under this warranty is limited to repairing or, at Wegener Communications' option, replacing parts, subassemblies, or entire assemblies. Wegener Communications shall not be liable for any special, indirect, or consequential damages. This warranty does not cover parts or equipment which have been subject to misuse, negligence, or accident by the customer during use. All shipping costs for warranty repairs will be prepaid by the customer. There are no other warranties, express or implied, except as stated herein.

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ABOUT THIS MANUAL

This manual was composed in Microsoft Word 97, and is configured to be used most easily as an electronic document. It can be printed and used as a hard copy, but some features, such as links, are not accessible in that mode.

If viewing the electronic version, we recommend you safeguard the original to avoid the effects of somehow altering your master copy.

Cross-references

Cross-references are internally linked for easy access. If you are viewing the electronic version of this manual, and see text that is blue and underlined, such as ([Record of Revisions](#)) you can “click” your mouse on that text and “link” to that section.

When you are ready to return to the previous section, “click” on the web toolbar “back” arrow and return. The web toolbar should appear automatically when you use a link, but if it does not you can invoke it from *Toolbars* on the *View* menu.

Because many users will print the manual, we have also included the page numbers for most links.

Table of Contents

You can also link from the Table of Contents to any listed page. This also applies to the List of Tables and List of Illustrations. Just “click” on the **page number** for any section, table, etc., you want to move to. Return to the Table of Contents as described in the “Cross-references” Section above.

Other Viewing Methods

In the electronic version, there are several methods of moving about a document. “Clicking” *Document Map* or *Online Layout* on the *View* menu will open a window showing the document outline. This is similar to the Table of Contents, and will allow you to move about the document by “clicking” on a section. It has the advantage of not going away when you move to another section. It also has the disadvantage of taking up screen space when it is open.

Another way to better view the document is to “click” on the “Up arrow” icon on the Web Toolbar. This will minimize many of the toolbars, freeing most of the screen for viewing the manual. “Click” the arrow again to restore the toolbars.

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SECTION 1 GENERAL INFORMATION

1.1 INTRODUCTION

The purpose of this manual is to describe the proper installation and operation of the Wegener Communications Model UNITY5000 Digital Video Integrated Receiver Decoder.

1.2 UNPACKING AND INSPECTION

Carefully unpack the unit and inspect it for obvious signs of physical damage that might have occurred during shipment. Any damage claims must be reported to the carrier immediately. Be sure to check the package contents carefully for important documents and materials.

NOTE: Please save the packing materials and original shipping containers in case you have to return the units for repair at some later date. Packing these units in other containers in such a way that they are damaged will void your warranty.

* * * **WARNING** * * *

This is a Class A product. In a domestic environment this product may cause radio interference, in which case the user may be required to take adequate measures.

1.3 PHYSICAL ENVIRONMENT

Mount the UNITY5000 in a clean, dry environment, and do not place unsupported equipment on the unit. Make sure that total rack or breaker power consumption does not exceed the limits of the AC branch circuit, and that a reliable earth safety ground is maintained. The unit will meet the full operating temperature specification (given on p. 18) only if adequate clearance around vent-holes is provided.

The operating temperature range of this product applies in still air with *unblocked* side vents. The units may be arranged without empty space between them, so long as enough rack ventilation is provided to prevent severe heat buildup.

To avoid damage to this and other equipment, or personal injury, the following items should be strictly observed.

1.3.1 Elevated Operating Ambient

If equipment is installed in a closed or multi-unit rack assembly, the operating ambient of the rack may be greater than the room ambient. Therefore, considerations should be given to the

Temperature Mounting Rack Ambient (TMRA), or the Ambient Air Temperature inside the Mounting Rack, and not just inside the room.

1.3.2 Reduced Air Flow

Installation of the equipment in a rack should be such that the amount of airflow required for safe operation of the equipment is not compromised.

1.3.3 Mechanical Loading

Mounting of equipment in a rack should be such that a hazardous condition is not achieved due to uneven loading. This unit is not very heavy, but total rack loading should be considered.

1.3.4 Circuit Overloading

Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits could have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

1.3.5 Reliable Earthing

Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connection to the Branch (use of power strips).

1.3.6 Desktop Installation

To set up the UNITY5000 in a desktop environment, place it on a flat surface where it will not be subject to being hit or pushed, and will not have anything spilled or dropped on it. In addition, the cables connected to the unit should be routed so they are not hit or pulled, which might cause damage to the connectors or to the unit itself. Additionally, there should be sufficient flow of cool air so the unit stays within its operating parameters

1.3.7 Rack Installation

When installed in an equipment rack, it is best that the UNITY5000 be supported by angle brackets or cross supports. These should be screwed or bolted securely to the equipment rack, and be capable of supporting the unit and its connecting cables. If you have doubts as to how to support the unit, contact Wegener Communications Customer Support at the addresses or numbers shown in Section [1.6](#) (Page 19) and on the back cover of this manual. If you cannot do that, consult your supervisor or other authority. Do NOT install the unit if you have doubts about the unit being safely supported.

There are also four holes in the front brackets, which are designed to accept anchor screws. It is essential that these brackets be used so the unit cannot be moved forward and fall from the rack.

It is **always** best to install the angle brackets or cross-members before setting the unit in place. Then, before installing cables, put anchored screws or bolts-and-nuts into place on the front brackets. Failure to do this can lead to pushing the unit out the front of the rack in later steps.

1.4 SECURITY LABELS

The UNITY5000 incorporates security labels over some of the screws. There are no user serviceable components within the IRD. Tampering with the security labels, or opening the unit, will void your warranty. If you have questions, contact Wegener's Customer Service Department at the address or numbers listed in Section 1.6 (Page 19) and on the back cover of this manual.

1.5 SPECIFICATIONS

Table 1. UNITY 5000 Specifications

PARAMETER	VALUE
<i>RF Input</i>	
<i>Input Frequency Range</i>	950-2150 MHz
<i>Symbol Rate Range</i>	2 to 45.0 Msps
<i>Input Signal Density (using RF switch and internal 3 dB pad on demod input)</i>	-101 to -126 dBm/Hz [Level range: -38 to -63 dBm at 2 Msps, -26 to -51 dBm at 30 Msps]
<i>Signal Level Warning limits</i>	Warns within +10/-5 dB of upper limit and +5/-10 dB of lower limit.
<i>Maximum Aggregate Input Power (using internal 3 dB pad)</i>	-17 dBm or $10[\log(500/Fs)] + Pi$, whichever is lower where Pi is intended carrier power and Fs is intended carrier symbol-rate
<i>Input Impedance</i>	75 ohms
<i>Input VSWR (RF switch input)</i>	< 2.5:1 in 75-ohm system
<i>L.O. Leakage at Input</i>	≤ -67 dBm max
Demodulator/FEC	To convert Symbol rate F_s to Transport Rate F_t , see (Page).
<i>Modulation</i>	QPSK, 8-PSK, or 16-QAM
<i>Aggregate MPEG Transport Rate</i>	2.5 to 100 Mbps (if not limited by symbol-rate for given modulation and FEC)
<i>Max Eb/No @ Quasi-error-free Threshold (less than one uncorrected error-event per hour)</i>	Per EN301 210 Section QPSK R=1/2: 4.5 dB QPSK R=2/3: 5.0 QPSK R=3/4: 5.5 QPSK R=5/6: 6.0 QPSK R=7/8: 6.4 8PSK R=2/3: 6.9 8PSK R=5/6: 8.9 8PSK R=8/9: 9.4 16QAM R=3/4: 9.0 16QAM R=7/8: 10.7

PARAMETER	VALUE
Settings Table	
<i>Number of entries</i>	<i>48</i>
<i>Channel Labels</i>	<i>Up to 10 alphanumeric characters each</i>
DVB-ASI I/O	
<i>Physical layer</i>	<i>270 M-baud signaling on coaxial cable</i>
<i>Minimum Byte-gaps</i>	<i>Down to 0-byte inter-byte gaps</i>
<i>Inputs</i>	<i>Two isolated selectable 75 ohm inputs</i>
<i>Outputs</i>	<i>Identical isolated 75 ohm outputs</i>
Video Decoder	
<i>Compression System</i>	<i>MPEG-1 or MPEG-2</i>
<i>Analog Output Format</i>	<i>NTSC or PAL-B,G,H composite</i>
<i>Chrominance Sampling</i>	<i>4:2:2 and 4:2:0</i>
<i>Supported Digital Video Resolutions (4:2:2 sampling)</i>	<i>Horizontal: 720, 704, 640, 544, 480, 352 pixels Vertical lines (NTSC): 512*, 480, 240 Vertical lines (PAL): 608*, 576, 288 * Extended Windows.</i>
<i>Aspect Ratios</i>	<i>4:3 or 16:9. May be set to auto-detect or to force original 16:9 material to 4:3 output using pan and scan vectors supplied by MPEG encoder.</i>
<i>VBI Support</i>	<i>Re-inserts both fields of domestic L21 data (per EIA 608) OR passes all compressed VBI lines desired using Extended Windows</i>
Composite Video Output	
<i>Output Level</i>	<i>1.0 Vp-p, $\pm 2\%$</i>
<i>Output Impedance</i>	<i>75 Ohms</i>
<i>Multiburst</i>	<i>From 0.5 to 4.2 MHz: $\leq \pm 0.3$ dB for NTSC From 0.5 to 5.0 MHz: $\leq \pm 0.3$ dB for PAL</i>
<i>Differential Gain</i>	<i>≤ 2 IRE</i>
<i>Differential Phase</i>	<i>$\leq 0.7^\circ$</i>
<i>L/C Gain Inequality</i>	<i>$\leq \pm 2$ IRE</i>
<i>L/C Delay Inequality</i>	<i>$\leq \pm 20$ ns</i>
<i>Line Time W-form Distortion</i>	<i>≤ 0.5 IRE p-p</i>
<i>Field Time W-form Distortion</i>	<i>≤ 3 IRE p-p</i>
<i>Video SNR Weighted</i>	<i>≥ 67 dB</i>
<i>Amplitude response</i>	<i>Per EIA-250C Fig 3 "Short Haul"</i>

PARAMETER	VALUE
<i>Short-time W-form Distortion</i>	$\leq 2\%$
<i>Damped Low-freq Distortion</i>	<i>W/o clamping: ≤ 35 IRE overshoot with 5 sec settling; With clamping: ≤ 8 IRE overshoot with 3 sec settling</i>
<i>Line-by-line DC offset</i>	$\leq \pm 2$ IRE
<i>Insertion Gain and Variation</i>	± 1.7 IRE
<i>Luminance Nonlinearity</i>	$\leq 2\%$
<i>Chrominance-to-luminance Intermodulation</i>	≤ 1 IRE
<i>Chrominance non-linear gain</i>	≤ 1 IRE
<i>Chrominance non-linear phase</i>	$\leq 1^\circ$
<i>Dynamic gain of video signal</i>	≤ 2 IRE
<i>Dynamic variation of sync signal</i>	≤ 1.2 IRE
<i>Transient synchronizing Signal non-linearity</i>	≤ 1 IRE
<i>Signal-to-low-frequency noise ratio, weighted</i>	≥ 53 dB
<i>Signal-to-periodic noise ratio</i>	≥ 67 dB
Serial Digital Video Output	
<i>Type</i>	<i>270 Mbps 4:2:2 component serial (per SMPTE 259M, no EDH support)</i>
<i>Impedance</i>	<i>75 ohm</i>
Audio Decoders	
<i>Compressed modes</i>	<i>MPEG-1 Layers 1 and 2, MPEG-2 Layer 2</i>
<i>Compressed data-rates</i>	<i>Up to 384 Kbps ES rate</i>
<i>Sample Rates Supported</i>	<i>32, 44.1, and 48 kHz</i>
Audio Outputs	Measured at 384 Kbps audio ES rate, dual mono mode
<i>Output Level-MAX PPL</i>	<i>+24.0 dBm into 600 ohms @ 0 dB atten. level</i>
<i>Output level adjust range</i>	<i>0 to 20 dB attenuation in 2 dB steps</i>
<i>Output Impedance</i>	<i>Balanced: <60 Ohms</i>
<i>Frequency Response</i>	<i>20Hz to 20 kHz, + 0.5/-1.5 dB 50 Hz to 15 kHz, ± 0.5 dB</i>
<i>Phase Accuracy</i>	<i>50 Hz to 15 kHz, $\leq \pm 2^\circ$ from linear phase</i>
<i>Harmonic Distortion (1 kHz test-tone, 1 dB below PPL)</i>	≤ 0.5 %

PARAMETER	VALUE
<i>S/N Ratio</i>	≥ 80 dB (22 Hz to 20 kHz) unweighted
<i>Dynamic Range</i>	20 bit audio samples
<i>A/V Sync</i>	$\leq +15/-45$ ms offset, where '+' sense is sound leading.
AES Audio Outputs	
<i>Audio Performance</i>	Decoded AES audio meets or exceeds all analog specs where not limited by external decoder performance. Audio level in digital output follows that of the associated analog output.
<i>Sample clock coherence</i>	Audio sample clock coherent with SDI clock timing
Front-panel Monitors	
<i>Video</i>	Composite video; 1 Vp-p, 75 ohms
<i>Audio</i>	Two stereo pairs, one for each audio port. Signals identical to main audio outputs, < 60 ohms, unbalanced
Test Signals	At local user command, test signals of 75% color bars and 1 kHz tone @ PPL -10 dB are output on video and audio outputs respectively
Genlock	High impedance loop-thru, 1Vp-p ref composite color video
<i>Lock time (with 50 PPM initial timing error)</i>	< 2 seconds
<i>Unit-to-unit timing variation</i>	Units may be aligned using internal adjustments: Video output timing may be adjusted in 1/4 pixel (~18 ns) increments. Composite video subcarrier phase may be adjusted in ~ 1.5° phase increments.
Serial Ports	
<i>Standard</i>	RS232, DCE
<i>Handshaking</i>	None
<i>Selectable services</i>	Auxiliary async output COMPEL E-mail character-based async output Terminal monitoring and control, tri-statable Modem alarm dialout
<i>Baud Rates</i>	Terminal – 19.2 kb Modem, Aux data, and E-mail – 1200, 2400, 4800, 9600, 19.2k, or 38.4 Kbaud.
<i>Formatting</i>	8 data-bits, one start, one stop-bit, half-duplex. Parity selection set by unit software.
<i>Daisy chaining</i>	Serial ports with Terminal or Modem devices assigned may be “daisy-chained” because all data output lines may be tri-stated.

PARAMETER	VALUE
Ethernet Port	
<i>Physical Layer</i>	<i>10base-T, 100base-T (twisted pair) on RJ45 jack</i>
<i>Media Access and Link Layers</i>	<i>Per IEEE 802.3 (Ethernet)</i>
<i>Network and Transport Layers</i>	<i>Not implemented in First Release.</i>
Alarm/Warning Relays	<i>One relay dedicated to indicate full ALARMS and one relay dedicated to indicate WARNINGS. These relays both de-energize for alarm/warning conditions so that power loss to the unit indicates as both an alarm and warning.</i>
<i>Type</i>	<i>Form C, wiper contacts NC contact when de-energized and NO contact when energized</i>
<i>Polarity</i>	<i>Internal jumper establishes whether energized state opens or closes contacts</i>
<i>Rating</i>	<i>30VDC open circuit, 100 mA max current closed</i>
User Contact Closures	Two user or network-controlled contacts, shorted when activated or “ON”
<i>Type</i>	<i>Open collector, optically-isolated</i>
<i>Rating</i>	<i>Hold off up to 30VDC when OPEN; output voltage < 1VDC at up to 8.0 mA current when CLOSED.</i>
Front-Panel Network E-mail	<i>512 characters max</i>
Expansion Module slots	<i>Allowable options. 4-way RF switch DTMF/audio option Expansion audio options Expansion relay option Synchronous data option</i>
LNB DC Power	
<i>Activation</i>	<i>User/network controlled selectable ON/OFF through front-panel</i>
<i>Availability (when activated)</i>	<i>On rear-panel terminal strip “LNB DC PWR” On RF-IN center-pin</i>
<i>Voltage</i>	<i>~ +18.7 VDC nominal @ no loading, +18.0 VDC min at max loading</i>
<i>Current (full load)</i>	<i>350 mA max, sum of both possible connections</i>
<i>Short-circuit protection</i>	<i>Thermal fuse, tripping at ~500 mA</i>

PARAMETER	VALUE
AC Power	
<i>Voltage</i>	<i>90-132 or 175-264 VAC auto-detect/selected</i>
<i>Frequency</i>	<i>50 or 60 Hz</i>
<i>Current</i>	<i>0.8 Amps at 115 VAC; 0.5 Amps Max at 230 VAC with full LNB DC load, optional 4:1 RF switch, and DTMF/Aux option cards.</i>
Environment	
<i>Operating Temperature</i>	<i>+10°C to +50°C* / 50°F to + 122°F*</i> <i>* EN60950 rating +10°C to +40°C only</i> <i>Unit gives warning indication for over-temperature conditions</i>
<i>Storage Temperature</i>	<i>-20°C to +70°C / -4°F to 158°F</i>
Chassis Physical	
<i>Height</i>	<i>Std. 2RU (3.5 inches / 8.9 Cm nominal)</i>
<i>Width</i>	<i>EIA std. 19 inch / 48.3 Cm rack mounting</i>
<i>Depth</i>	<i>Back of rack-ears to rear panel: 12.54 inches / 31.85 Cm</i> <i>Depth of front-panel plastic: 0.405 inches / 1.03 Cm</i>
<i>Weight (2 option cards)</i>	<i>~ 15 lb. / 6.8 Kg</i>

1.6 TECHNICAL SUPPORT

In the event the unit fails to perform as described, contact Wegener Communications Customer Service at (770) 814-4057, FAX (678) 624-0294, or E-mail “service@wegener.com”.

To return a product for service:

Obtain a Return Material Authorization (RMA) number by completing and faxing a copy of the RMA Request Form ([Appendix D](#), Page 69) to (678) 624-0294. You may E-mail the same information instead to:

service@wegener.com

To help us identify and control returned units, plainly write the RMA number on the *outside* of the product-shipping container. This will help us return your unit to you as quickly as possible.

Return the product, freight prepaid, to the address below:

Service Department RMA# _____
Wegener Communications, Inc.
359 Curie Drive
Alpharetta, GA 30005

NOTE: All returned material must be shipped freight prepaid. C.O.D. Shipments will not be accepted.

Please contact Customer Service at the number above if you have any questions regarding service procedures.

1.7 MANUALS

If you have any suggestions concerning this, or any Wegener Manual, please E-mail them to manuals@wegener.com. If you would rather mail them, please do so to the address shown below.

If you have substantial or complex changes, our preference is that you copy the page(s) in question, mark it up, and fax or mail us the copy. We do appreciate constructive criticism.

Our Fax Number: (770) 497-0411

Our Address: Attn: Manuals
Wegener Communications, Inc.
Technology Park / Johns Creek
11350 Technology Circle
Duluth, GA 30097-1502

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SECTION 2 INSTALLATION

2.1 GENERAL

This section provides information and procedures for installing the unit. It gives descriptions of the inputs and outputs, shows front and rear panels, and gives instructions for unit hookup.

2.2 FRONT PANEL

The front panel indicators and controls are shown in [Figure 1](#) (Page 22) and described in Sections [2.2.3](#) (Page 22), [2.2.4](#) (Page 23), and [2.2.5](#) (Page 24).

The front panel consists of a 2 X 20 LCD and six push buttons. Essentially all control available through the terminal is also available via the front panel. The front panel can also be used to view a COMPEL downloadable text message (called E-mail or COMPEL front-panel E-mail). This message is volatile and can contain up to 512 characters. The LCD has several operating modes and screen types, and these define the behavior of the buttons.

2.2.1 LCD Modes

The LCD can be in one of the following modes:

Table 2. LCD Modes

Mode	Description
<i>VIEW</i>	<i>Information is being displayed on the LCD for the user to view. None of the push buttons can be used for editing in this mode.</i>
<i>EDIT</i>	<i>This mode is entered from the VIEW mode. This is where the user has the ability to edit a parameter. The LCD cursor is on the edit field when in this mode. The cursor will be an inverted (black for white) character field.</i>

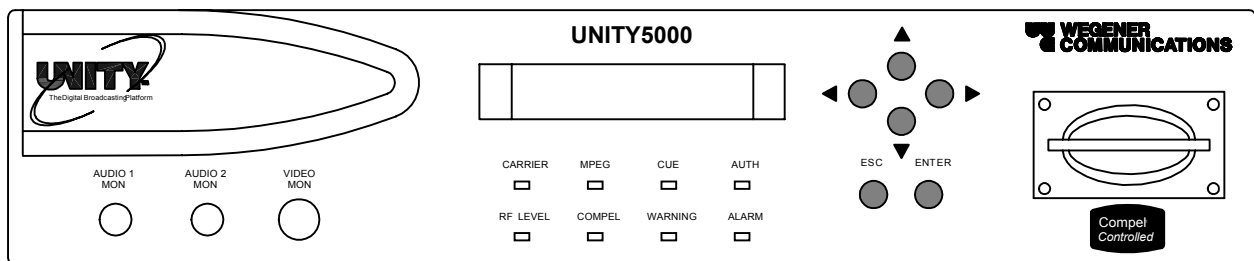
2.2.2 LCD Screen Types

The following table lists the screen types:

Table 3. LCD Screen Types

Type	Description
INFO	<i>This is another type of read-only screen that displays information that is NOT editable. The Home Screen is considered this type of a screen. Other screens of this type display the status of the IRD or display help on how to navigate the front panel screens.</i>
MENU	<i>This type of screen will display the menu name for a command group. This command group may be the current RF settings or the settings for the serial ports. The level "beneath" a menu screen type might contain any of the other screen types (i.e. other menus, information screens, etc. This type of screen is read-only.</i>
PARAMETER	<i>This type of screen displays a specific parameter associated with a command group that CAN be edited (if the correct authority has been established). This is the only type of screen that can enter the EDIT mode. A PARAMETER screen will contain a field that can be different types (alphanumeric or list select). There will be no carries or borrows when wrapping on a numeric field (i.e. to go from 0999 to 1000, 4 digits have to be edited).</i>

Figure 1. UNITY5000 Front Panel



2.2.3 Front Panel Connectors

2.2.3.1 Audio 1 Monitor

This jack is convenient for monitoring the Audio 1 Port output. Its signal is identical to that of the Audio 1 Port on the rear panel, except that its level is 19 dB lower.

2.2.3.2 Audio 2 Monitor

This monitor jack has an output identical to the Audio 2 Port on the rear panel, except that its level is 19 dB lower.

2.2.3.3 Video Monitor

This is a BNC connector which outputs a 1 Vp-p composite video signal, identical to the Rear Panel Composite Video output.

2.2.4 Front Panel Indicators

2.2.4.1 CARRIER (Green)

ON if RF receiver board is tracking a carrier. Otherwise OFF. Note that this LED remains OFF while operating on an ASI Transport input.

2.2.4.2 MPEG (Green)

ON if synched on Transport stream. Otherwise OFF. Note that exact meaning of synch is that unit is receiving the MPEG2 packet framing (0x47 sync byte at beginning of 188-byte packet).

2.2.4.3 CUE (Green)

ON while any solid-state contact is closed (shorted). Otherwise OFF.

2.2.4.4 AUTH (Green)

ON if this IRD is authorized for current Transport stream (or selected Program) and have Transport synch. If Transport Stream is “in the clear” (no CA), then all Transport Streams are “authorized”. LED FLASHES if this IRD is not authorized to receive current Stream and CA is protecting that Stream (unauthorized state). LED remains OFF when no valid Transport Stream is available.

2.2.4.5 LEVEL (Green)

ON if RF level is OK and receiver board is tracking. FLASH if RF level is HIGH or LOW and receiver board is tracking. Otherwise OFF (receiver board is not tracking RF carrier).

2.2.4.6 COMPEL (Green)

The COMPEL LED may be in one of four states, which are listed below with the conditions causing that state to exist.

1. ON – COMPEL has been detected within the last two minutes.
2. OFF – There is no transport stream, OR COMPEL is not detected. This is overridden by the FLASH condition when appropriate (See FLASH, below.).

- 3. FLASH (Slow Blink) – COMPEL has not been detected for over two minutes AND COMPEL is required.
- 4. FLUTTER (Fast Blink) – Unit has been addressed by COMPEL with the last five seconds.

2.2.4.7 WARNING (Yellow)

FLASH if two or more Warning conditions exist, or if a single Warning is caused by a failed Application Self-test. LED is ON for any other single Warning condition. OFF otherwise.

2.2.4.8 ALARM (Red)

ON for Alarm conditions. OFF otherwise.

2.2.5 Push Button Definitions

The push buttons react differently based on what mode the user is in and what screen type is currently being displayed. The following table describes this interaction. Note that this is a general guideline. Section [3.4.3](#) (Page 36), which details all the LCD screens, notes the specific exceptions.

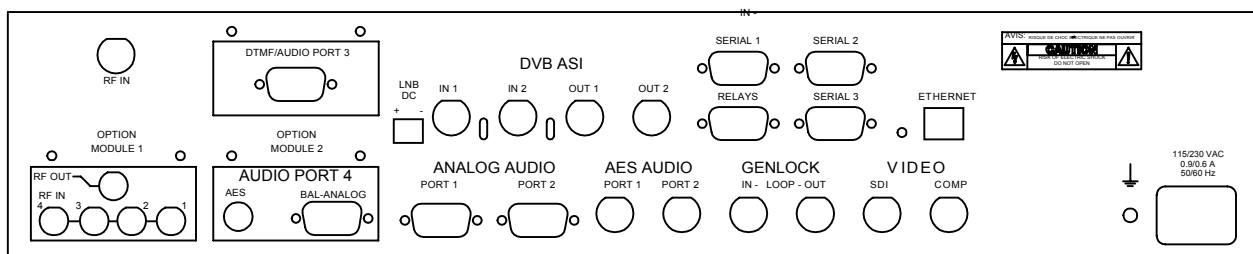
Table 4. Push Button Descriptions

LCD Mode	Push Button	Screen Type	Function
<i>VIEW</i>	<i>ENTER</i>	<i>MENU</i>	<i>Go to next level and display the first screen on that level.</i>
		<i>INFO</i>	<i>N/A</i>
		<i>PARAMETER</i>	<i>Enter EDIT mode and set cursor on first digit if alphanumeric or blink entire field if field type is list select. EDIT mode is only entered if the user has the authorization to edit the parameter.</i>
	<i>ESCAPE</i>	<i>(All)</i>	<i>Go to previous level and display the current screen OR display the first screen at the current level if at the highest level. The first screen at the top level is the HOME screen. Therefore, pressing ESCAPE numerous times will eventually return the user to the HOME screen.</i>
	<i>UP</i>	<i>(All)</i>	<i>N/A</i>
	<i>DOWN</i>	<i>(All)</i>	<i>N/A</i>

LCD Mode	Push Button	Screen Type	Function
	LEFT	<i>(All)</i>	<i>Display the previous screen at the current level OR the last screen if currently on the first screen.</i>
	RIGHT	<i>(All)</i>	<i>Display the next screen at the current level OR the first screen if currently on the last screen.</i>
EDIT	<ENTER>	PARAMETER	<i>Accept the changes that were made and enter the VIEW mode.</i>
	<ESCAPE>	PARAMETER	<i>Abort any changes made to the parameter and enter the VIEW mode.</i>
	<UP>	PARAMETER	<i>List Select: Scrolls up to next value in the list or wraps if currently on the last item in the list.</i> <i>Alphanumeric: Increases the value of the current field. If numeric and the current value is 9 (if decimal) or 0xF (if hex), the value will wrap to a 0. If alphanumeric, the value will wrap to the first ASCII value when at 0x7F.</i>
	<DOWN>	PARAMETER	<i>List Select: Scrolls down to previous value in the list or wraps to the last item if currently on the first item in the list.</i> <i>Alphanumeric: Decreases the value of the current field. If numeric and the current value is 0, the value will wrap to 9 (if decimal) or to 0xF (if hex). If alphanumeric, the value will wrap to the last ASCII value when at the first.</i>
	<LEFT>	PARAMETER	<i>List Select: N/A</i> <i>Alphanumeric: Moves to the previous digit. Wraps to the last digit if currently on the first.</i>
	<RIGHT>	PARAMETER	<i>List Select: N/A</i> <i>Alphanumeric: Moves to the next digit. Wraps to the first digit if currently on the last.</i>

2.3 REAR PANEL

Figure 2. UNITY5000 Rear Panel



2.3.1 Rear-panel LED Indications

Ethernet – Green LED: ON if Broadcast or addressed packet received by IRD in last 5 seconds. OFF otherwise.

ASI Inputs – Red/Green LED pair for each: Both OFF if not selected. Red ON if selected but not locked. Green ON if selected and locked. Lock is defined as having Frame sync without buffer over/under-flow over last 5 seconds.

Genlock – Red/Green LED pair: Green if a valid video reference is detected. Red if no reference is detected. Both OFF if an invalid video reference is detected. This means that if the unit is configured for NTSC and a PAL signal is detected, or vice-versa, both Genlock LED's will be OFF.

Table 5. Rear Panel Connectors

Connector Designation	Type	Pin #	Signal Name
<i>115/230 VAC</i>	<i>Std IEC receptacle</i>		<i>AC Line In</i>
<i>Ethernet</i>	<i>RJ-45 jack</i>	<i>1 (On left as viewed from rear of unit)</i>	<i>EN_Out +</i>
		<i>2</i>	<i>EN_Out -</i>
		<i>3</i>	<i>EN_In +</i>
		<i>4</i>	<i>NC</i>
		<i>5</i>	<i>NC</i>
		<i>6</i>	<i>EN_In -</i>
		<i>7</i>	<i>NC</i>
		<i>8</i>	<i>NC</i>
<i>Comp Video</i>	<i>BNC jack</i>		<i>Composite Video out</i>
<i>SDI Video</i>	<i>BNC jack</i>		<i>Serial 270 Mbps component Digital Video out</i>
<i>Serial 1, 2, and 3</i>	<i>9-pin D female jacks</i>	<i>1</i>	<i>DCD (internally pulled to +5V)</i>
		<i>2</i>	<i>RxD (output)</i>
		<i>3</i>	<i>TxD (input)</i>
		<i>4</i>	<i>DTR (not connected)</i>
		<i>5</i>	<i>GND</i>
		<i>6</i>	<i>DSR (internally pulled to +5V)</i>
		<i>7</i>	<i>RTS (not connected)</i>
		<i>8</i>	<i>CTS (internally pulled to +5V)</i>
		<i>9</i>	<i>RI (internally pulled to +5V, with weak current limiting)</i>

Connector Designation	Type	Pin #	Signal Name
<i>Relays</i>	<i>9-pin D female jack</i>	<i>1</i>	<i>R1_COM, User contact 1 ‘-‘</i>
		<i>2</i>	<i>R2_COM, User contact 2 ‘-‘</i>
		<i>3</i>	<i>R3_COM, Warning relay common</i>
		<i>4</i>	<i>R4_COM, Alarm relay common</i>
		<i>5</i>	<i>GND</i>
		<i>6</i>	<i>R1_OUT, User contact 1 ‘+’</i>
		<i>7</i>	<i>R2_OUT, User contact 2 ‘+’</i>
		<i>8</i>	<i>R3_OUT, Warning relay selected contact</i>
		<i>9</i>	<i>R4_OUT, Alarm relay selected contact</i>
<i>Genlock In</i>	<i>BNC jack</i>		<i>Genlock Reference video input</i>
<i>Genlock Out (Loop out)</i>	<i>BNC jack</i>		<i>Genlock ref video loop-thru output</i>
<i>DVB ASI In 1, 2</i>	<i>BNC jacks</i>		<i>ASI Transport Inputs #1 and #2, selectable</i>
<i>DVB ASI Out 1,2</i>	<i>BNC jacks</i>		<i>ASI Transport Outputs #1 and #2</i>
<i>AES Audio Ports 1, 2</i>	<i>BNC jacks</i>		<i>SPDIF Digital audio Ports 1 and 2</i>
<i>Analog Audio Ports 1, 2</i>	<i>9-pin D female jacks</i>	<i>1</i>	<i>Left ‘+’</i>
		<i>2</i>	<i>Left Ground</i>
		<i>3</i>	<i>Shield ground</i>
		<i>4</i>	<i>Right Ground</i>
		<i>5</i>	<i>Right ‘-‘</i>
		<i>6</i>	<i>Left ‘-‘</i>
		<i>7</i>	<i>Shield ground</i>
		<i>8</i>	<i>Shield ground</i>
		<i>9</i>	<i>Right ‘+’</i>
<i>LNB DC PWR</i>	<i>2-pin Combicon removable screw-terminal plug mounting on mating header</i>	<i>1 (On left as viewed from rear of unit)</i>	<i>LNB DC (when active)</i>
		<i>2</i>	<i>Ground</i>
<i>RF In</i>	<i>Type F jack</i>		

2.4 OPTION MODULES

See [Appendix C](#) (Page 79) for information on the Option Modules.

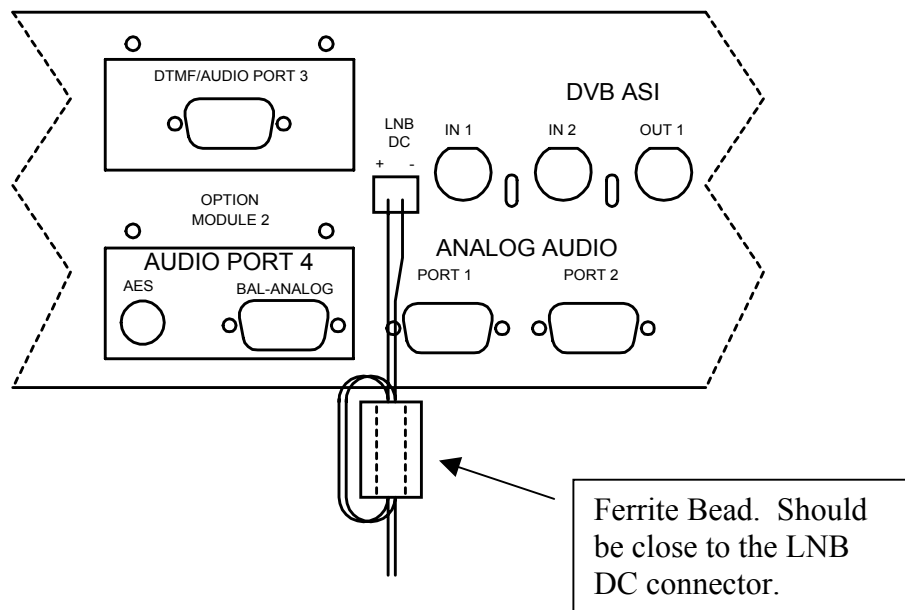
2.5 FCC-MANDATED SUPPRESSION OF RADIATED EMISSIONS

In order to comply with the requirements of FCC Part 15, Subpart B, Class A emissions, please read the following instructions on the protection of all output wiring and cabling. See [Figure 3](#), (below) for a view of the installation.

2.5.1 LNB Header Cable

1. When connected, the LNB header **MUST** have a ferrite core installed on the connecting cable or wires. This ferrite should minimize RF emissions which otherwise might cause interference on nearby equipment.
2. This core is supplied with the UNITY5000.
3. The pair of wires should pass through the core twice, leaving minimum wire between the unit and the core. Installed correctly, the cable or wires will adequately support the ferrite.

Figure 3. Ferrite Core Installation



2.5.2 Ethernet Cable

If the Ethernet port has a cable connected to it, that cable **MUST** be properly shielded and grounded. This must be done to minimize RF emissions, which could interfere with nearby equipment.

SECTION 3 OPERATION

3.1 INTRODUCTION

This section discusses the operation of the UNITY5000, along with its operational parameters.

3.2 SERIAL PORTS

3.2.1 Device Assignments

The Unity 5000 has three external serial ports. A “device” must be assigned to each of these serial ports, but no “device” may be assigned more than once. In addition, for the Terminal and Modem devices, only one of the two may be assigned at the same time. Control of the device port assignment and device configuration (see below) may be performed only at the unit front-panel, and the network may disable this capability. The possible devices are:

- Printer (including COMPEL e-mail and reports)
- Terminal
- Modem (“modem” being remote terminal via modem)
- Auxiliary Data
- Line 21 Data
- Local COMPEL

3.2.2 Device Configurations

When a serial port configuration command is received, the specified configuration is immediately stored for the specified *device* (e.g. for the “Printer” device). If a serial port is currently assigned another *device*, then its output buffer is immediately flushed and the port re-configured. Communication is fixed at 1 start, 1 stop, and 8 data bits, with no hardware handshaking. In this Release, there is no provision for software handshaking either. The serial port’s behavior for each of its device types is described in the following table:

Table 6. Device Configurations

Device	Serial Port Behavior (<i>Italics are programmable, Bold are fixed</i>)
<i>Printer</i>	<i>Configured to B, P, 8, 1. This is an output only (all inputs are ignored).</i>
<i>Terminal</i>	<i>Configured to 19.2k, N, 8, 1. The unit responds to the terminal commands as described in Appendix A (Page 69).</i>
<i>Modem</i>	<i>Configured to B, P, 8, 1. The unit responds to the commands as described in Appendix A (Page 69).</i>
<i>Aux Data</i>	<i>Configured to B, P, 8, 1. This is an output only (all inputs are ignored).</i>
<i>Line 21</i>	<i>Configured to B, P, 8, 1. This is an output only (all inputs are ignored).</i>
<i>Local COMPEL</i>	<i>Configured to B, P, 8, 1. This is an input only.</i>

The legal values for *B* and *P* are:

‘*B*’: may be 1200, 2400, 4800, 9600, 19.2k, or 38.4 Kbaud.

‘*P*’ may be ‘O’, ‘E’, or ‘N’ for Odd, Even, or No parity.

3.2.3 Device Handling

3.2.3.1 Printer Output

For the Printer device, there are two output types--COMPEL E-mail and COMPEL Requested Reports. The uplink, through COMPEL, may elect to send e-mail or request report dumps. (See the COMPEL manual about COMPEL E-mail.) The report dumps are the same as those the local user may select using the “R” terminal commands.

3.2.3.2 Terminal I/O

The Terminal device is used for command and control of the IRD. This I/O is a basic VT100-like emulation. All I/O is prompted by user input text strings terminated in carriage-returns. The terminal, whether local or (via modem) remote, should be set to local echo ON because the IRD only echoes a carriage-return/linefeed and then a ‘>’ prompt after entry of a command-line terminated in carriage-return.

3.2.3.2.1 Daisy Chain Communication

The Unity 5000 IRD supports “daisy-chaining” of Terminal control. This involves sharing of a serial bus between two or more IRD’s. The serial bus consists of both the TX and RX serial port lines wired in parallel, connected to a serial port on all the IRD’s and the terminal communication device (either a local terminal or modem).

Certain operating states are defined for the IRD’s using this daisy-chain capability. These are “Talker,” “Idle,” and “Waiting for password.” Units will transition from either “Talker” or “Idle” over to “Waiting for password” when a wakeup “hotkey” is received from the user (see Section [A.2](#) (Page 69)). Then, after the two digit ID passcode is received, any unit matching that passcode proceeds to “Talker” (and switches their serial output to active), while all others proceed to “Idle”. While in an Idle state, a unit’s serial port which is allocated as a Terminal and/or Modem device has an electrically isolated (tri-state) output and responds only to a hotkey input. When in the Talker state, the unit issues prompts and responds to commands normally. *Note that these states are held only in volatile memory, and a unit reverts to the Idle State DURING and after a unit reset.*

The unit ID may be assigned by the user and is a non-volatile setting. Assigning a Unit ID of ‘00’ effectively disables this daisy-chain capability. This leaves an IRD continuously in the normal “talker” state, even through unit resets.

3.2.3.3 Modem I/O

The Modem device operates in a similar manner to the Terminal device. Whereas the Terminal device was limited to a specific configuration, the modem device may be set to one of several. The Modem device does not use special handshaking or special control characters, and only supports auto-answer modems. In fact, in the standard interface, the IRD would not know if a local or remote (via modem) terminal were actually attached to the port. To access the modem command interface, the serial-port device must first be set to Modem (using only the Front-panel control interface). The discussion above on emulation's and echoing would then apply. The user would send the unit a carriage return, and then the unit would return a prompt to enter the password. If the correct password is entered, then modem access is enabled. Upon enabling modem access, the IRD will output a welcome banner. After that, I/O is indistinguishable from normal Terminal access, with the same restriction on local user access as set by the Network. Modem access is disabled when either (1) a new serial-port device is selected, (2) when there is no user input for 10 minutes, (3) the OH command is received, or (4) the unit is reset.

3.2.3.4 Aux Data Output

This device is defined to allow async data streams to be carried within the Transport stream and their raw payload output on an IRD serial port. The PID of these streams may or may not be assigned to a Program Number within a PMT. To recover the data, the IRD need only be given the PID and baud-rate. The range of legal PID's is established by the ISO 13818 standard as 20 to 1ffe (hex). This may be done either through COMPEL command, or by the local user. A local user, if allowed by the LOCAL CONTROL ENABLE setting, uses the AUXDATA terminal command or the Aux Data submenu under Hardware Setup/Serial Ports in the front-panel LCD control screens.

3.2.3.5 Line 21 Data Output

This device is defined to allow for both fields of the Line 21 data to be output as a serial asynchronous data stream on an IRD serial port. This feature is not supported in Release 1.

3.2.3.6 Local COMPEL

This is a special one-way serial transmission mode for injection of a COMPEL control stream direct from the COMPEL host into an IRD. It is generally used for testing only.

3.3 ALARM/WARNING SYSTEM

The alarm and warning system is intended to provide indications to local user of a critical failure or imminent failure. The indications persist only so long as the causative condition lasts, except where otherwise noted. See Section [3.3.1](#) (Page 31) on Unit Reporting for actual indications.

3.3.1 Alarm Conditions

Generally, if the unit is unable (or presumed to be unable) to present video output decoded from a selected Transport Stream, then that is an alarm state. The following list defines all alarms

during normal operation. They are listed in order of priority for which will be reported on the front-panel Home screen indication.

1. RF receiver card run-time failure
2. Fade mode > 5 seconds
3. Installation mode
4. Carrier search mode
5. Header search mode
6. No MPEG data > 5 seconds
7. Selected Program not available
8. IRD not authorized for present program/carrier under detected CA
9. Eb/No below alarm level while tracking RF carrier
10. Failure of various outputs if allowed by programmable control mask (see section below)

3.3.2 Warning Conditions

Generally, the unit presents Warnings when an Alarm condition may be imminent from unit stress or poor signal conditions. The following list defines all warnings during normal operation. They are listed in order of priority for which will be reported on the front-panel Home screen indication.

1. CA secure microprocessor run-time failure or SN mismatch (if applicable)
2. Fade mode < 5 seconds
3. NO MPEG data < 5 seconds
4. Unit reverted to backup Application software because of self-test failure of requested Application (continues until user keypress)
5. Selected audio program not available
6. Eb/No less than the alarm level plus the warning margin (“Marginal Eb/No”)
7. RF input level is too high (latched until a carrier is acquired with good RF levels)
8. RF input level is too low (latched until a carrier is acquired with good RF levels)
9. Network control stream required and no packets detected in last 2 minutes
10. Failure of various outputs if allowed by programmable control mask (see section below)
11. Unit overheating
12. Unread front-panel LCD e-mail present

3.3.3 Maskable Alarm and Warning Conditions

All the following may be unit alarms, unit warnings, or no indication, as programmed. They are listed in order of priority for which will be reported on the front-panel Home screen indication. Defaults are shown in braces {}.

1. No carrier ID tags received for > 5 seconds, if required {Default: Warn on failure}
2. No Genlock sync {Default: Warn if no sync}
3. All standard audio output failures {Default: Warn on failure}

4. Serial Digital Video output failure {Default: Warn on failure}
5. ASI Transport output failure {Default: Warn on failure}
6. Expansion audio failures {Default: Warn on failure}
7. Other option card output failures {Default: No indication}

3.4 ACQUISITION MODES

The state diagram in Figure 3 shows the transitions for each of the acquisition modes. In the diagram, the term “carrier” may be considered synonymous with the more generic “Transport Stream source” if ASI inputs are installed.

3.4.1 Overview

There are several transitions not shown in [Figure 4](#) (Page 34). These are:

1. After unit reset, the unit will re-enter the mode it was in before the reset. The exceptions are Fade and Tracking. The unit will go to Installation mode after reset, if it was in Fade or Tracking mode before reset.
2. If a new channel setting command is received from a valid source, the unit always transitions to Installation mode.

[Table 7](#) (Page 35) describes the IRD’s behavior for each of the acquisition modes and the defined timeouts. For more information see SETTIMEOUT terminal command in Section [A.4](#) (Page 69). Recall that, in this discussion, “carrier” is the generic source of the Transport Stream and may mean “RF carrier” or “ASI stream.”

Figure 4. Acquisition States

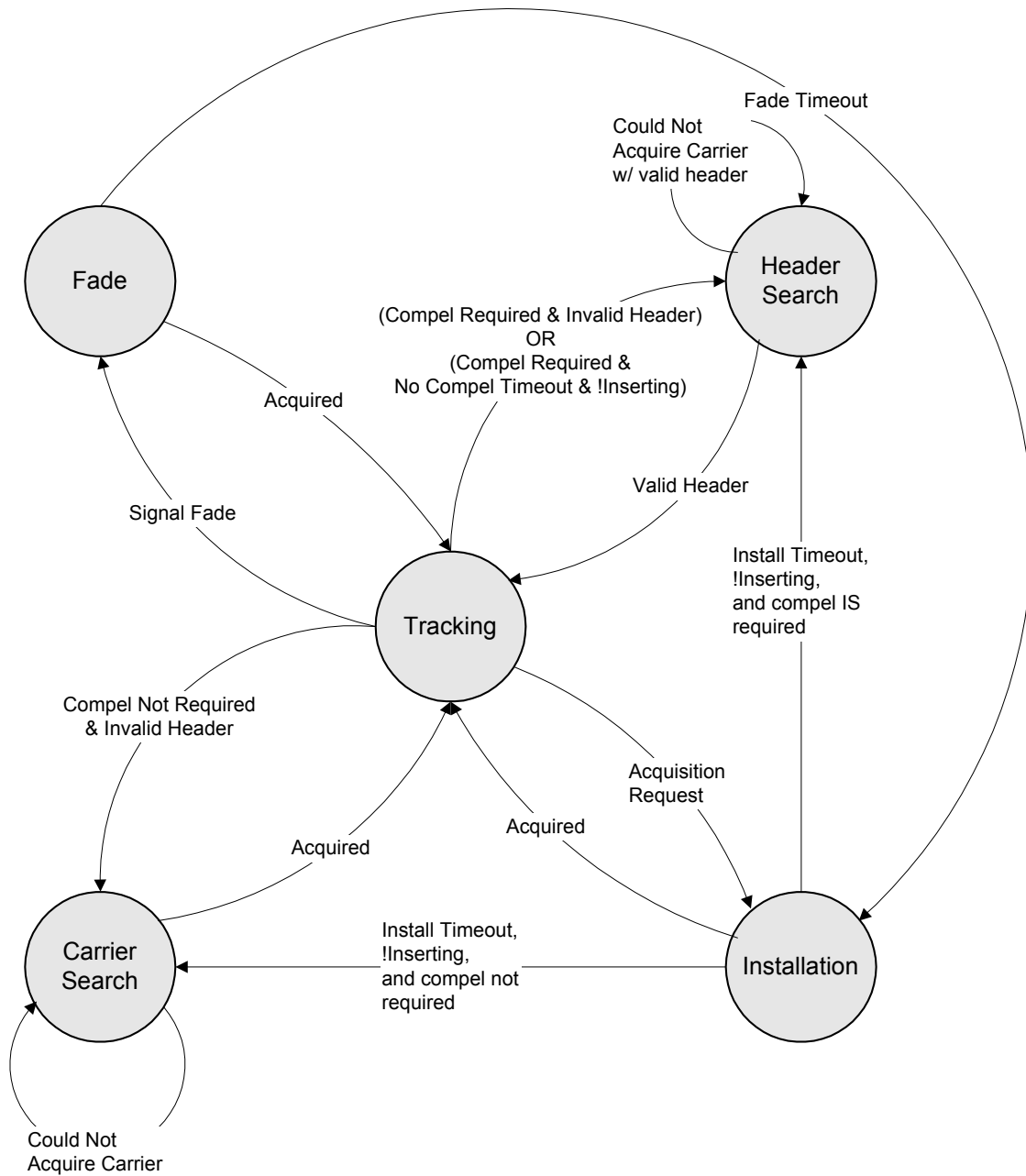


Table 7. Acquisition Modes and Descriptions

Acquisition Mode	Description
<i>Tracking (or “Lock” for ASI Inputs)</i>	<i>While in Tracking Mode, the unit simply tracks (monitors) an acquired carrier. This is the only mode in which the unit can provide video, audio, and/or aux data. The unit will pass into a Header Search mode if COMPEL is required and (1) an invalid network header is detected in the COMPEL network stream, or (2) the time since the last valid network header was detected exceeds the NO COMPEL Timeout (#3 in SETTIMEOUT command). The unit will pass into Carrier Search mode if COMPEL is NOT required and an invalid network header is received.</i>
<i>Fade</i>	<i>The purpose for this mode is to reacquire a faded carrier (caused by rain, sun-transits, etc.). The unit allows the receiver daughter-card to automatically re-acquire the carrier on it’s own using a restricted search algorithm. This mode is vacated for the Installation mode after the Fade Timeout (#1 in SETTIMEOUT command).</i>
<i>Installation</i>	<i>While in this mode, the unit continually performs an installation type acquisition on the requested carrier. Installation type acquisitions cover a ~+/-2 MHz range, and should occur in under 30 seconds. This mode is generally used at power up and for all user-requested acquisitions. After Installation Timeout (#2 in the SETTIMEOUT command), this mode is vacated. If COMPEL network connection is required, the unit moves to Header Search mode. If COMPEL network connection is NOT required, then the unit moves to Carrier Search mode.</i>
<i>Carrier Search</i>	<i>While in this mode, the IRD resorts to the Settings Table for finding a carrier. The IRD continually moves down the table performing one complete installation-type acquisition on each valid entry in the table, including the last acquired and last requested entries. Each search lasts ~30 seconds. After the last entry is searched, the unit repeats the search from the top of the table. This mode is vacated only if a carrier is successfully acquired, OR if a local user issues a tuning command. However, after expiration of the Local Recovery Timeout (#5 in the SETTIMEOUT command), if Local Control had been disabled, then it is re-enabled.</i>
<i>Header Search</i>	<i>Identical to Carrier Search, except that the unit is looking for a carrier with valid COMPEL headers present. If a carrier is encountered, the unit will wait the amount of time given by the Header Seek Timeout (#4 in the SETTIMEOUT command) before moving on to try other carriers in the Settings Table. This mode is vacated only if a carrier is successfully acquired and then a COMPEL stream with valid network Headers is detected, OR if a local user issues a tuning command. However, after expiration of the Local Recovery Timeout (#5 in the SETTIMEOUT command), if Local Control had been disabled, then it is re-enabled.</i>

3.4.2 RF Signal Acquisition Sequence

Acquisition of Transport Streams from DVB RF carriers includes the steps listed following. This applies to any state transition from “Fade”, “Installation”, or a “Search” to “Tracking” as shown in [Figure 1](#) (Page 22).

1. Receiver card is tuned by IRD application software for appropriate parameters for RF Channel Settings. Spectral ambiguity setting is also toggled if applicable. If in Fade mode, software does not intervene with receiver card, assuming that it is already properly set. This is the GET_RF submode.
2. Receiver card achieves timing and carrier tracking. If not achieved, return to step 1.
3. Data stream input to CA (if installed) and Demultiplexer. Demux detects valid MPEG framing. If no framing detected, return to step 1.
4. COMPEL data stream is detected bearing Carrier ID Tags. While waiting for the first Tag whose “Site” matches current Channel Setting, the unit is in the GET_TAG submode.
5. If Tag matches, IRD is considered to be in Tracking Mode (unless the previous mode was “Header Search.” If no Tag match, return to step 1.
6. If in “Header Search” mode, then wait for COMPEL packets to see if they bear a network header matching the unit. While waiting, the unit is in GET_COMPEL submode.
7. If COMPEL is valid, then IRD is considered to be in Tracking Mode. If not, or if COMPEL SEEK timeout expires while waiting for valid COMPEL, then the Header Search is resumed on the next entry in the Settings Table.

3.4.3 ASI Signal Acquisition Sequence

Acquisition of Transport Streams from DVB-ASI streams include the steps listed following. This applies to any state transition from “Fade” or “Installation” to “Tracking” as shown in [Figure 4](#) (Page 34).

1. ASI input circuits are set by the IRD application software for the Input Port given by the Channel Settings. *If in Fade mode, software does not intervene with ASI circuits, assuming that they are already properly set.*
2. ASI circuits stabilize input FIFO to indicate stream timing acquired. If not achieved, return to step 1.
3. Data stream input to CA (if installed) and Demultiplexer. Demux detects valid MPEG framing. If no framing detected, return to step 1.
4. If in “Header Search” mode, then wait for COMPEL packets to see if they bear a network header matching the unit. While waiting, the unit is in GET_COMPEL submode.
5. If COMPEL is valid, then IRD is considered to be in Tracking Mode. If not, or if COMPEL SEEK timeout expires while waiting for valid COMPEL, then the Header Search is resumed on the next entry in the Settings Table.

3.5 MENU SCREENS

Table 8. Menu Screens

Main Level	Second Level	Third Level	Fourth Level	
<i>Home Screen</i>				
<i>Download Screen (Shown only if applicable)</i>	<i>Indicator Screens</i>			
<i>Warning/Alarm (Shown only if applicable)</i>	<i>Individual warning or alarm message screens</i>			
<i>Email</i>	<i>Read Email Message</i>			
<i>Current Settings (only the applicable 2nd level screens listed here are actually shown)</i>				
	<i>Transport Source (if applicable)</i>			
	<i>RF port (if applicable)</i>			
	<i>ASI Input port (if applicable)</i>			
	<i>Transport Data Rate (if applicable)</i>			
	<i>Modulation/FEC (if applicable)</i>			
	<i>Program Number</i>			
	<i>Tag Site (if applicable)</i>			
<i>Unit Setup</i>	<i>New Channel from Table</i>	<i>Select Channel (individual)</i>		
	<i>View/edit Channel settings in Table</i>	<i>Select Channel</i>	<i>[See “Current Settings” level 2]</i>	
	<i>Video Settings</i>	<i>Aspect Ratio Mode</i>		
		<i>Genlock Timing Offset</i>		<i>Horizontal (1/4 pixel)</i> <i>Color Subc. Phase</i>
	<i>Audio Settings</i>		<i>Select Audio Port by #</i>	<i>Attenuation</i>
				<i>Assigned Audio stream</i>
				<i>Routing</i>

Main Level	Second Level	Third Level	Fourth Level		
	<i>SNR Alarm/Warning Setup</i>	<i>SNR Alarm Threshold</i>			
		<i>SNR Margin Warning</i>			
	<i>Acquisition Mode Timeout Settings</i>	<i>Fade</i>			
		<i>Install</i>			
		<i>NO COMPEL</i>			
		<i>Header Seek</i>			
		<i>Local Recovery</i>			
	<i>Serial Port Device Selection</i>	<i>Serial Port 1</i>			
		<i>Serial Port 2</i>			
		<i>Serial Port 3</i>			
	<i>Serial Device Setup</i>	<i>Modem Settings</i>			<i>Modem Password</i>
					<i>Modem Baud Rate</i>
		<i>Printer Settings</i>		<i>E-mail Enabled</i>	
				<i>Printer Baud Rate</i>	
				<i>Printer Parity</i>	
		<i>Aux Data Settings</i>		<i>Aux Data PID</i>	
				<i>Aux Data Baud Rate</i>	
				<i>Aux Data Parity</i>	
		<i>Line 21 Data Settings</i>		<i>Line 21 Data Baud Rate</i>	
				<i>Line 21 Data Parity</i>	
		<i>Local COMPEL Settings</i>		<i>Baud Rate</i>	
				<i>Parity</i>	
		<i>Test Mode selection</i>			
		<i>LNB LO Frequency Port 1 (or just "LNB LO Frequency" if no RF Switch)</i>			
	<i>LNB LO Frequency Port 2 (if applicable)</i>				
	<i>LNB LO Frequency Port 3 (if applicable)</i>				

Main Level	Second Level	Third Level	Fourth Level
	<i>LNB LO Frequency Port 4 (if applicable)</i>		
	<i>User Solid State Contact Closures</i>		
	<i>Unit Label</i>		
	<i>Unit ID, Terminal control</i>		
	<i>Application Software Switch</i>	<i>Switch activation</i>	
	<i>LNB DC Control</i>	<i>Rear Panel Header</i>	
		<i>RF IN Center-pin</i>	
	<i>DTMF Setup (shown if option is installed)</i>		
	<i>ASI Descramble enable</i>		
<i>Unit Reset</i>			
<i>Status Reports</i>	<i>Settings Status</i>	<i>Current Channel Settings (only the applicable 4th level screens listed here are actually shown)</i>	<i>RF IN port, Frequency, Data-rate, Tag</i>
			<i>Mod & FEC, Program #, Label</i>
			<i>ASI port, Data-rate</i>
			<i>Program #, Label</i>
	<i>Carrier/ASI Stream Status (shown if Tracking or Locked. Only the applicable 3rd level screens listed here are actually shown)</i>	<i>Mode, Last Acquired</i>	
		<i>First Acquired, Availability</i>	
		<i>Highest/Lowest Eb/No</i>	
		<i>Number of Fades</i>	
		<i>Error'd Seconds</i>	
		<i>Mode, Last Acquired</i>	
		<i>First Acquired, Availability</i>	
		<i>Number of Signal Losses</i>	
	<i>Error'd Seconds</i>		

Main Level	Second Level	Third Level	Fourth Level	
	<i>Acquisition Status (shown if seeking Carrier or ASI stream, only the applicable 3rd level screens listed here are actually shown)</i>	<i>Mode, Duration</i>		
		<i>Acquisition Sub-mode</i>		
		<i>No MPEG count, No Tag count</i>		
		<i>Bad Tag count, Bad Header count</i>		
		<i>No MPEG count, Bad Header count</i>		
	<i>MPEG/Video/Audio Status</i>	<i>Conditional Access status</i>		
	<i>MPEG/Video/Audio Status (Continued)</i>	<i>Program Presence?</i>	<i>Program Presence Display</i>	
		<i>Video Status</i>		
		<i>Video Format (NTSC or PAL)</i>		
		<i>Video Chroma Sampling (4:2:2 or 4:2:0)</i>		
		<i>Genlock Status</i>		
		<i>Video Aspect Ratio</i>		
		<i>Video Window Size</i>		
		<i>Line 21 Data Insertion Mode</i>		
		<i>Video History</i>		
		<i>Audio Stream Presence?</i>		<i>Audio Stream display</i>
		<i>Nth Audio Port Status</i>		
<i>Nth Audio Port History</i>				
<i>(above two screens are repeated N-1 more times)</i>				
<i>Delaying Time</i>				
	<i>Network Control Status</i>	<i>Serial Number, COMPEL lock status, COMPEL-required setting</i>		

Main Level	Second Level	Third Level	Fourth Level
		<i>Local Control Enable status, Network Protection mode</i>	
		<i>Time since Last Header, Time since Last addressed Header</i>	
		<i>Total History, Total processed COMPEL packets</i>	
		<i>Packets with invalid Header, Packets with invalid Checksum</i>	
		<i>Packets with Invalid Length, Buffer overflow</i>	
		<i>Packets with Syntax Errors</i>	
	<i>Installed Options</i>	<i>Audio Ports installed</i>	
		<i>C/A Secure Microprocessor</i>	
		<i>4-port RF switch</i>	
		<i>DTMF option</i>	
		<i>Sync Data option</i>	
		<i>Expansion relays option</i>	
	<i>Current Version Info</i>	<i>Application, current</i>	
		<i>Application, backup</i>	
		<i>Boot Loader</i>	
		<i>Receiver Card</i>	
		<i>MP Xilinx Version</i>	
		<i>MP Lattice Version</i>	
		<i>AV Xilinx Version</i>	
		<i>CS24 Video Decoder</i>	
		<i>CS24 Audio Decoder</i>	
		<i>Expansion MPEG Audio</i>	
		<i>Expansion SMPTE302 Audio</i>	

Main Level	Second Level	Third Level	Fourth Level
		<i>CA Secure Microprocessor</i>	
		<i>Installed Descrambler</i>	
		<i>Pressing <ENTER></i>	
		<i>Pressing <ENTER> (more)</i>	
<i>Navigation Help</i>	<i>Pressing Rt/Left arrows</i>		
	<i>Pressing Rt/Left arrows (more)</i>		
	<i>Pressing Up/Down arrows</i>		
	<i>Pressing <ESCAPE></i>		

3.5.1 Default LCD Screens

No matter where a user may be in the LCD menu hierarchy, if no front-panel keypress is made for more than 5 minutes, then the LCD Menu State reverts to the default screen. The default screen is always a “Main Level” screen as defined in the Table above. Typically, this is the “Home Screen.” However, there are events where this rule must be overridden. If any of the conditions listed below apply, then the alternate screen given becomes the default. If more than one applies simultaneously, then the priority follows the list order. (Note that if more than one applies simultaneously, the user may still access all the applicable screens by using an arrow key to traverse the “Main Level.”)

If the IRD is in an ACCEPT PACKETS Download state, then the “Download Screen” becomes default.

If there are Alarm or Warning conditions, then the “Alarm Screen” becomes default.

If there is unread front-panel e-mail stored in unit, then the “Email Screen” becomes default.

3.5.2 Home Screen

The “Home Screen” is a special INFO screen. No matter where the user is in the menu hierarchy, pressing the ESCAPE button repeatedly returns to the Home Screen. See Section [3.5.1](#), above, for rules on default screens. There are two possible Home screens shown in the next two subsections.

3.5.2.1 Selected Transport is from RF input

u	u	u	u	u	u	u	u	u	u	S	N	s	s	s	s	s	s	
x	x	x	x	x	x	x	x	x	x	E	b	N	o	:	e	e	.	e

Where **uu...uu** is a user-defined Unit Label (or “UNITY 5000” if none is supplied) and **sssss** is the unit serial number. The **ee.e** field is the average Eb/No if the IRD is locked to a carrier (blank otherwise). The **xx...xx** field is the current Channel (setting) Label *if it has been supplied*. If not, then it is a “marquee” field, which rotates between the following values as shown below:

P	R	O	G	:	n	n	n	n	n											
---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--

Where **nnnnn** is the Program Number.

The next screen is shown only if an RF switch option is installed.

R	F		P	O	R	T	n													
---	---	--	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--	--	--

Where **n** is the RF switch port number.

f	f	f	f	f	f	f	M	H	z											
---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--

Where **ff...ff** is the RF downlink frequency in MHz. The form will be **ffff.ff** MHz for frequencies below 10 GHz and **fffff.f** MHz (truncated to 0.1 MHz increment) for frequencies above 10 GHz.

The next screen in the marquee is shown if the unit is in a Temporary Insert or in special acquisition search mode.

<	x	x	x	x	x	x		>												
---	---	---	---	---	---	---	--	---	--	--	--	--	--	--	--	--	--	--	--	--

Where **xx...xx** is TEMP for a Temporary Insert and SEARCH for a Carrier or Header Search (until the alarm is cleared).

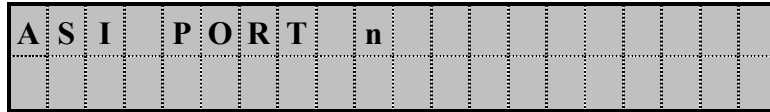
3.5.2.2 Selected Transport is from ASI input

u	u	u	u	u	u	u	u	u	u	S	N	s	s	s	s	s	s			
x	x	x	x	x	x	x	x	x	x											

Where **uu...uu** and **sssss** are defined as above. The **xx...xx** field is the current Channel (setting) Label *if it has been supplied*. If not, then it is a “marquee” field that rotates between the following values as shown below:

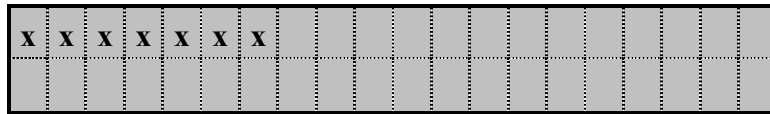
P	R	O	G	:	n	n	n	n	n											
---	---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--	--

Where **nnnnn** is the Program Number.



Where **n** is the ASI input port number.

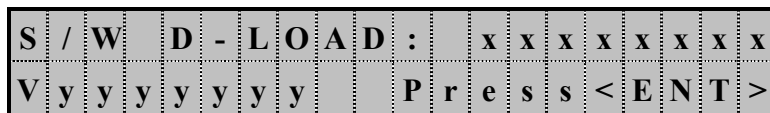
The next screen in the marquee is shown if the unit is in a Temporary Insert or in special acquisition search mode.



Where **xx...xx** is TEMP for a Temporary Insert and SEARCH for a Carrier or Header Search (until the alarm is cleared).

3.5.3 Software Download Screen

At the main menu level, the following screen is displayed *only* if new software is being downloaded (ACCEPT PACKETS) download state. See Section [3.5.1](#) (Page 42) for rules on default screens.



Where **xx...xx** is right-justified text which is one of the following:

IDLE means that an initial download attempt is about to commence.

INPROGR means download in progress (ACCEPT PACKETS state).

ERRORS means that at least one download has been attempted, and that corrupt packets were received and discarded. The unit is remaining in the ACCEPT PACKETS state waiting further download attempts.

DONE-OK means that download is successfully completed, and the unit has returned to the IDLE State

DONE-BAD means that the download(s) failed to load a new application that passes CRC and the unit has returned to the IDLE State.

Where **yy...yy** is the version string of the new software being downloaded.

Without local user intervention, this screen clears ~60 seconds after the last download attempt is complete or the download timeout expires. Beforehand, if the front-panel <ENTER> key is pressed, and then the first 2nd level screen below is displayed. The subsequent wrapping set of screens are shown if the ARROW keys are pressed (RIGHT is downward).



Where **xxx** is the total size of host application code file to be downloaded in bytes.

Where **yyy** is number of bytes successfully loaded so far during current download.

S	/	W	:	P	A	C	K	E	T	:	x	x	x						
				M	I	S	S	E	D	:	y	y	y						

Where **xxx** is the number of COMPEL packets bearing download code data received OK with good CRC.

Where **yyy** is the number of COMPEL packets bearing download code data received corrupted and rejected.

D	O	W	N	L	O	A	D	T	I	M	E	O	U	T	-				
T	I	M	E		R	E	M	A	I	N	I	N	G	:	m	m	:	s	s

Where **mm:ss** is time remaining before the Download timeout expires (in minutes and seconds).

A	P	P	:	W	A	I	T	I	N	G		C	Y	C	L	E	#		
											m	m	:	s	s			y	y

Where **mm:ss** is elapsed time since last COMPEL packet-bearing download data was received (in minutes and seconds).

Where **yy** is number of consecutive download attempts.

3.5.4 Warning/Alarm Screen

At the main menu level, the following screen is displayed *only* if an alarm or warning condition is active. See Section [3.5.1](#) (Page 42) for rules on default screens.

W	A	R	N	I	N	G	/	A	L	A	R	M							
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Where **xx...xx** is a marquee field which rotates between an Indication or the text “Info? Press <ENTER>”. If it is an Indication, then it is either a description of the priority Alarm or, if no Alarms, the priority Warning condition.

Pressing <ENTER> (at any time) while in the screen above, displays a set of one or more second-level screens showing all current Alarms and Warnings. The order is Alarms first, Warnings second (and then wrapping) while using RT-ARROW. Within each, conditions are listed in order of priority as shown in Section [3.3](#) (Page 31).

x	x	x	x	x	x	x													
y	y	y	y	y	y	y	y	y	y	y	y	y	y	y	y				

Where **xx...xx** is either ALARM or WARNING and **yy...yy** is a string identifying the warning or alarm condition.

3.5.5 Email

At the main menu level, one of three screens is *always* displayed, depending on the status of e-mail (none, e-mail present but not read, or e-mail present but read). They are shown in that order below. Note that if there is *unread* e-mail, this may be the default unit LCD screen. See Section [3.5.1](#) (Page 42) for rules on default screens.

```

E M A I L :   N O N E
  
```

```

E M A I L   R E A D : < E N T E R >
  
```

```

E M A I L   R E A D : < E N T E R >
          C L E A R : < E S C A P E >
  
```

From the third screen above, pressing ESCAPE clears the e-mail buffer and sends the user back to first (“no e-mail”) e-mail screen. If e-mail is present, then, after pressing <ENTER> at the above screens, the following second-level screen appears, with the start of the e-mail message IS left justified.

```

<   E M A I L M E S S A G E   >
T H E   Q U I C K   B R O W N   F O X
  
```

The symbols ‘<’ and ‘>’ are shown when scrolling is necessary to view email message. Each keypress of the left (or right) arrow moves the text by 2 to 4 characters. The ‘//’ marks signify the start/end of the message (it will wrap on the screen as shown below). To exit these screens for the “EMAIL READ/CLEAR” screen above, press ESCAPE.

```

<   E M A I L M E S S A G E   >
E   L A Z Y   D O G   /   /   T H E   Q U I C
  
```

3.5.6 Current Channel Settings

This screen allows for viewing or editing the current channel setting.

```

V I E W / E D I T   C U R R E N T   C H
S E T U P ?   P r e s s
  
```

Pressing <ENTER>, moves user to 2nd level screens under “CURRENT SETTINGS.” Note that all variable fields shown will start showing the current setting. If local control is enabled, and if changes are made to any parameter, then the user must scroll to the SAVE/CANCEL screen to

activate those changes (ESC out of any screen, even if changes were made, will NOT activate the changes).

The first screen after <ENTER> is pressed is a choice to retain or change the type of Transport Stream source:

T	R	A	N	S	P	O	R	T	S	O	U	R	C	E			
S	E	L	E	C	T	:									x	x	x

Where **xxx** is Transport Stream source (RF or ASI). If <ENTER> is pressed, then an identical edit screen is presented. If a right or left arrow key is pressed, then a set of wrapping screens is presented as given in Sections [3.5.6.1](#) (Page 47) or [3.5.6.2](#) (Page 48), whichever is applicable. If a change to Transport Stream source is made *here*, then the corresponding set of screens is entered. The selection does not take effect until <ENTER> is pressed at a SAVE/CANCEL screen (see below).

3.5.6.1 If Current Setting is an RF Input

The screen below is shown only if the RF switch option is installed.

			R	F	-	I	N	P	U	T	P	O	R	T	:		
							n										

Where **n** is the RF switch port number (1-4).

D	O	W	N	L	I	N	K	F	R	E	Q	U	E	N	C	Y	:
			f	f	f	f	f	.	f	f	M	H	z				

Where **ffff.ff** is RF downlink carrier frequency in MHz.

T	R	A	N	S	P	.	D	A	T	A	R	A	T	E	:		
			d	d	d	.	d	d	d	M	b	p	s				

Where **ddd.ddd** is the Transport data rate in Mbps.

R	F	-	M	O	D	/	F	E	C	R	A	T	I	O	:		
			m	m	m	m	r	/	r								

Where **mm...mm r/r** is a combination of modulation and FEC inner code ratio. The choices are given in Section [1.5](#) (Page 13) . The modulations are abbreviated as QPSK, 8PSK, 16QAM.

P	R	O	G	R	A	M	N	U	M	B	E	R	:				
			n	n	n	n	n										

Where **nnnn** is the Program Number or a wildcard '*'. Values from 00001 to 65535 are legal entries and choosing '00000' selects the wildcard.

				T	A	G	S	I	T	E	:				
							n	n							

Where **nn** is the Tag Site number between 00 and 15 inclusive.

				C	H	A	N	N	E	L	L	A	B	E	L	:			
				x	x	x	x	x	x	x	x	x	x	x					

Where **xx...xx** is the Label for the channel setting. The Label will be blank if the user has begun editing the channel setting. A Label entry, which duplicates another Label in the Settings Table, will not be accepted.

S	A	V	E	A	L	L	C	H	A	N	G	E	S	?				
Y	E	S	<	E	N	T	E	R	>	N	O	<	E	S	C	>		

<ENTER> saves the entry (setting unit to new setting) and returns to Main level screens. <ESC> also returns, but without saving the entry. *This screen is not shown if Local Control access is disabled by network.*

3.5.6.2 If Current Setting is ASI Input

				A	S	I	-	I	N	P	U	T	P	O	R	T	:		
								n											

Where **n** is the ASI Input port number (1 or 2).

				P	R	O	G	R	A	M	N	U	M	B	E	R	:		
				n	n	n	n	n											

Where **nnnnn** is the Program Number or a wildcard '*'. Values from 00001 to 65535 are legal entries and choosing '00000' selects the wildcard.

				C	H	A	N	N	E	L	L	A	B	E	L	:			
				x	x	x	x	x	x	x	x	x	x	x					

Where **xx...xx** is the Label for the channel setting. The Label will be blank if the user has begun editing the channel setting. A Label entry that duplicates another Label in the Settings Table will not be accepted. See Section 1.5 (Page 13) for max length.

S	A	V	E	A	L	L	C	H	A	N	G	E	S	?				
Y	E	S	<	E	N	T	E	R	>	N	O	<	E	S	C	>		

<ENTER> saves the entry (setting unit to new setting) and returns to Main level screens. <ESC> also returns, but without saving the entry. *This screen is not shown if Local Control access is disabled by network.*

3.5.7 Unit Setup

U	N	I	T	S	E	T	U	P	?								
P	r	e	s	s	<	E	N	T	E	R	>						

Moves user to 2nd level screens under “UNIT SETUP.” In these screens, the user may make changes to IRD setup.

3.5.7.1 Channel Selection

Commands IRD to switch to a channel setting in the Settings Table.

S	E	L	E	C	T	C	H	A	N	N	E	L	?				
P	r	e	s	s	<	E	N	T	E	R	>						

If <ENTER> is pressed, user moves to 3rd level edit screen as shown below.

S	E	L	E	C	T	C	H	A	N	N	E	L	:			n	n
														x	x	x	x

Where **nn** is the Table entry number and **xx...xx** is the channel setting Label (may be omitted). Here, the user uses the RIGHT/LEFT arrow keys to select the desired channel setting screen. *Only screens for valid entries are shown.* Pressing <ENTER> for a particular screen causes an immediate switch to the new setting and control returns to the 2nd level screen shown above.

3.5.7.2 View/edit Channel

Allows viewing or editing of an entry in the Settings table.

V	I	E	W	/	E	D	I	T	C	H	A	N	N	E	L	S	?
P	r	e	s	s	<	E	N	T	E	R	>						

If the user presses <ENTER>, then the screens to select a channel are shown.

S	E	L	E	C	T	C	H	A	N	N	E	L	:			n	n
P	r	e	s	s	<	E	N	T	E	R	>	x	x	x	x	x	x

Where **nn** is the entry number and **xx...xx** is the assigned Label (if applicable). RIGHT/LEFT arrow buttons scroll to ALL possible entries, used and unused. Pressing <ENTER> moves the user to a 3rd level set of screens where that entry’s channel settings may be viewed or edited. It is identical to the Current Settings screens shown earlier.

3.5.7.3 Video Settings

V	I	D	E	O	S	E	T	T	I	N	G	S	?				
P	r	e	s	s	<	E	N	T	E	R	>						

Pressing <ENTER> moves the user to 3rd level screens for video settings.

A	S	P	E	C	T	R	A	T	I	O	M	O	D	E	:				
																x	x	x	x

Where **xxxx** is AUTO, 16:9, or 4:3. If set to AUTO, video output aspect ratio follows the input to the original MPEG video encoder. Otherwise, the output is forced to either 4:3 or 16:9.

G	E	N	L	O	C	K	T	I	M	I	N	G						
O	F	F	S	E	T	P	r	e	s	s	<	E	N	T	E	R	>	

Pressing <ENTER> opens up two lower level screens shown next.

G	E	N	L	O	C	K	T	I	M	I	N	G						
H	O	R	I	Z	A	D	J	U	S	T	:				x	x	x	

Where **xxx** ranges from +63 to -61 (¼ pixels steps).

G	E	N	L	O	C	K	T	I	M	I	N	G						
S	U	B	C	P	H	A	S	E	:	x	x	x	x	d	e	g		

Where **xxx** ranges from -180 to +180 degrees in 1.5 degree steps. (Unit will actually set to nearest multiple of 1.4 degrees.)

3.5.7.4 Audio Settings

A	U	D	I	O	S	E	T	T	I	N	G	S	?					
P	r	e	s	s	<	E	N	T	E	R	>							

Moves user to 3rd level screens under “AUDIO SETTINGS.”

At next level, one screen for each installed audio output port is displayed. The **n**th screen is shown here:

A	U	D	I	O	P	O	R	T	#	:	N							
P	r	e	s	s	<	E	N	T	E	R	>							

Pressing SELECT moves to the 4th level menu screens.

A	U	D	I	O	P	O	R	T	#	:	N							
A	T	T	E	N	U	A	T	I	O	N	:	z	z	d	B			

Where **n** is the selected port (from previous level) and **zz** is the audio attenuation (varies from 00 to max allowed per [Table 1](#) Page 13).

*If local control is enabled, the following screens are shown for the **n**th audio port:*

A	U	D	I	O	P	O	R	T	#	:	N								
D	E	S	C	R	I	P	T	O	R	(L	A	N	G)	:	x	x	x

Where **xxx** is the “language” descriptor for the selected audio stream. If the IRD is connected to a Transport Stream source, the **xxx** field is an enumeration of (1) All the currently available audio streams on the selected Program, (2) The current setting (if not available on this program), and (3) The ‘*’ wildcard. With no Transport Stream available, the user may select any alphanumeric string. So the legal selections are 0-9 and A to Z or null (nulls must lead). To select the ‘*’ wildcard, the user must scroll any character one position past ‘Z’. For a null character, scroll one more position (before wrapping back to ‘0’).

A	A	A	O	P	O	R	T	#	:	N		
R	O	U	T	E	:	r	r	r	r	r	r	r

Where **rr...rr** is the selected audio routing: NORM STEREO, SUM ON BOTH, LEFT ON BOTH, and RIGHT ON BOTH.

3.5.7.5 SNR Alarm Threshold

Similar to SNR terminal command.

S	N	R	A	L	A	R	M	/	W	A	R	N	I	N	G		
S	E	T	U	P	?	P	r	e	s	s	<	E	N	T	E	R	>

If <ENTER> is pressed, then the user is taken to 3rd level menu screens for alarm and margin warning.

S	N	R	A	L	A	R	M	T	H	R	E	S	H	O	L	D	:
												x	x	.	x	d	B

Where **xx.x** is the Eb/No alarm threshold in dB. Allowed alarm trip points 2.0 to 9.0 dB inclusive.

S	N	R	M	A	R	G	I	N	W	A	R	N	I	N	G	:	
												x	x	.	x	d	B

Where **xx.x** is the Eb/No margin warning zone in dB. "Allowed Margin limits" is 14-a dB where ‘a’ is the Alarm trip point (see above).

3.5.7.6 Acquisition Mode Timeout Settings

A	C	Q	M	O	D	E	T	I	M	E	O	U	T	S	?
P	r	e	s	s	<	E	N	T	E	R	>				

Pressing <ENTER> moves user to 3rd level screens shown next.

See Section 3.4 (Page 33) for definitions for the following screen parameters. For each, **hhh:mm:ss** is the time-out setting in hours, minutes, and seconds. Note that the legal limit for Fade timeout is a lessor value (see SETTIMEOUT terminal command).

F	A	D	E	:					s	s	S	E	C	O	N	D	S
---	---	---	---	---	--	--	--	--	---	---	---	---	---	---	---	---	---

I	N	S	T	A	L	L	:		h	h	h	h	:	m	m	:	s	s		
								I	N	H	R	S	:	M	I	N	:	S	E	C

N	O		C	O	M	P	E	L	:	h	h	h	h	:	m	m	:	s	s	
								I	N	H	R	S	:	M	I	N	:	S	E	C

H	D	R		S	E	E	K	:	h	h	h	h	:	m	m	:	s	s		
								I	N	H	R	S	:	M	I	N	:	S	E	C

L	O	C		R	E	C	O	V	:	h	h	h	h	:	m	m	:	s	s	
								I	N	H	R	S	:	M	I	N	:	S	E	C

3.5.7.7 Serial Port Device Selection

S	E	R	I	A	L		P	O	R	T		D	E	V	I	C	E	?
P	r	e	s	s			<	E	N	T	E	R	>					

Pressing <ENTER> moves user to 3rd level screens.

Several screens are shown, one for each serial port. The *n*th screen is shown:

S	E	R	I	A	L		P	O	R	T		n	:					
D	E	V	I	C	E	:		*		d	d	d	d	d	d	d	d	d

Where *dd...dd* is an enumeration between TERMINAL, MODEM, PRINTER, AUX DATA, and LINE 21 DT. Note that selecting a device already allocated to another port will cause the ‘*’ to be displayed. This is a warning that another port is going to be de-allocated. (Its assignment will be null.)

3.5.7.8 Serial Device Setup

S	E	R	I	A	L		D	E	V	I	C	E		S	E	T	U	P	?
P	r	e	s	s			<	E	N	T	E	R	>						

Pressing <ENTER> moves user to 3rd level screens shown next.

M	O	D	E	M	S	E	T	T	I	N	G	S	?				
P	r	e	s	s	<	E	N	T	E	R	>						

P	R	I	N	T	E	R	S	E	T	T	I	N	G	S	?				
P	r	e	s	s	<	E	N	T	E	R	>								

A	U	X	D	A	T	A	S	E	T	T	I	N	G	S	?				
P	r	e	s	s	<	E	N	T	E	R	>								

L	2	1	D	A	T	A	S	E	T	T	I	N	G	S	?				
P	r	e	s	s	<	E	N	T	E	R	>								

L	O	C	C	O	M	P	E	L	S	E	T	T	I	N	G	S	?				
P	r	e	s	s	<	E	N	T	E	R	>										

3.5.7.9 Serial Device Settings

Pressing <ENTER> at any of the above screens moves the user to the 4th level menus. The Serial Port Section [3.2](#) (Page 29) gives the legal choices for each device. *The following screens are shown ONLY when applicable for the device selected.*

P	R	I	N	T	E	R	E	M	A	I	L						
E	N	A	B	L	E	D	:							x	x	x	

Where xxx is YES or NO.

M	O	D	E	M	P	A	S	S	W	O	R	D	:						
														x	x	x	x	x	x

Where xx...xx is up to six alphanumeric character password for access via phone-modem. Password field is left justified because length is variable. Edit sessions accept 0 to 9, or A to Z, and null.

A	U	X	D	A	T	A	P	I	D	:											
																	p	p	p	p	p

Where ppppp is the PID of the auxiliary data stream *in hex*.

d	d	d	d	d	d	d	d	d	d	B	A	U	D	R	A	T	E	:
										b	b	b	b	b	b	b	b	

For the device **dd...dd**, **bbbbbb** is the baud rate in Hz.

d	d	d	d	d	d	d	d	d	d	P	A	R	I	T	Y	:		
										p	p	p	p					

For the device **dd...dd**, **pppp** is the parity, either “Odd,” “Even,” or “None.”

3.5.7.10 Test Mode

T	E	S	T	M	O	D	E	:										
									x	x	x	x	x	x	x	x	x	x

Where **xx...xx** is either “DISABLED” or “ENABLED.”

3.5.7.11 LNB LOs

If No RF Switch option installed, then one screen is shown.

L	N	B	L	O	F	R	E	Q	U	E	N	C	Y	:				
					f	f	f	f	f	.	f	f	M	H	z			

Where **ffff.ff** is the frequency presumed for the LNB LO (in MHz), or *if optional RF Switch installed, four screens are shown, each as below:*

L	N	B	L	O	F	R	E	Q	U	E	N	C	Y	:				
P	O	R	T	n	:	f	f	f	f	f	.	f	f	M	H	z		

Where **n** is RF switch port number (1-4) and **ffff.ff** is described above.

3.5.7.12 User (solid-state) Contact Closures

Two screen appear next where **n** is first ‘1’ and then ‘2’.

C	O	N	T	A	C	T	#	n	S	T	A	T	U	S	:			
																x	x	x

Where **xx...xx** is the current setting (OPEN or CLOSED) of corresponding contact.

3.5.7.13 Unit Front-panel Label

U	N	I	T	L	A	B	E	L	:									
										u	u	u	u	u	u	u	u	u

Where **uu...uu** is the front-panel Unit Label. The default is “UNITY 5000” if the user has made no other selection.

3.5.7.14 Unity ID, for Daisy-chain shared serial bus

U	N	I	T	I	D	T	E	R	M	C	O	N	T	R	O	L
																u u

Where **uu** is the unit ID number between ‘01’ and ‘99’. If ‘00’ is assigned, unit is always a talker and normal terminal access is enabled permanently.

3.5.7.15 Application Software Switch

U	N	I	T	S	O	F	T	W	A	R	E	S	W	I	T	C	H
T	O	B	-	U	P	P	r	e	s	s	<	E	N	T	E	R	>

Where pressing <ENTER> leads the user to the following screen:

S	W	F	R	O	M	V	x	x	x	x	x	x	T	O			
V	y	y	y	y	y	P	r	e	s	s	<	E	N	T	E	R	>

Where **xxx** is the version string of the currently running software, and **yyy** is the version string of the backup software to which the unit will be switched. (Note that activating this will cause a unit reset.)

3.5.7.16 LNB DC Power output

L	N	B	D	C	O	U	T	P	U	T						
								X	X	X						

The next level edit screens show first the RP HDR field and then the RF-IN field. Press <ENTER> to edit the field. Options are OFF, Rear Panel, or RF Tuner. The LNB DC Output can be OFF, or switched to **either** the Rear Panel output or the RF Tuner output (but not both).

L	N	B	D	C	O	U	T	P	U	T						
								O	F	F						

L	N	B	D	C	O	U	T	P	U	T						
								R	e	a	r	P	a	n	e	l

L	N	B	D	C	O	U	T	P	U	T						
								R	F	T	u	n	e	r		

3.5.7.17 DTMF (option) Setup

This screen is only shown if the DTMF/Aux audio option card is installed.

D	T	M	F	E	N	C	O	D	E	R	O	P	T	I	O	N	
S	E	T	U	P	?	P	r	e	s	s	<	E	N	T	E	R	>

Where pressing <ENTER> sends the user to the lower level screen shown next.

D	T	M	F	T	E	S	T	T	O	N	E	:	x			
V	O	L	:	y	y	y	y	y	y	y	y	y	y	y	y	y

Where x is the current tone being played and where yy...yy is a set of blocked-out characters representing volume (all ON max volume, and all OFF tone off).

3.5.7.18 ASI Transport Descramble Enable (option)

This screen is only shown if a CA descrambler option is installed.

A	S	I	T	R	A	N	S	P	O	R	T	O	U	T	P	U	T
								x	x	x	x	x	x	x	x	x	

Where xx...xx is either CLEAR (to signify that the output has been descrambled and is “in the clear”) or SCRAMBLED (to signify that no CA descrambling function has been performed on the stream).

3.5.7.19 Unit Reset

T	O	R	E	S	E	T	U	N	I	T	:					
P	r	e	s	s	<	E	N	T	E	R	>					

3.5.8 Status Reports

S	T	A	T	U	S	R	E	P	O	R	T	S	?			
P	r	e	s	s	<	E	N	T	E	R	>					

Pressing <ENTER> moves user to 2nd level screens under “STATUS REPORTS.”

3.5.8.1 Settings Status

S	E	T	T	I	N	G	S	S	T	A	T	U	S	?			
P	r	e	s	s	<	E	N	T	E	R	>						

Pressing <ENTER>, sends the user to a set of 3rd level INFO screens giving the current channel settings.

C	U	R	R	E	N	T	S	E	T	T	I	N	G	S	:				
x	x	x		y	y	y	y	y		h	h	:	m	m	:	s	s		

Where xxx is RF or ASI (for Transport Stream source). In addition, yyyyyy is operating source of the current setting, either PERM for permanent, TEMP for temporary, or SEARCH for search table (in a Search Mode). If TEMP, then hh:mm:ss is shown and it is the time remaining in the insert in hours:minutes:seconds.

After the above screen, one of the next two sets of screens appears.

If the Current Setting is an RF Signal, the Following Screen Appears:

If RF switch option is installed:

R	F	I	N	:	n		f	f	f	f	f	.	f	f	M	H	z	
d	d	d	.	d	d	d	M	b	p	s		T	A	G	:	t	t	

Otherwise:

f	f	f	f	f	.	f	f	M	H	z		T	A	G	:	t	t	
d	d	d	.	d	d	d	M	b	p	s								

After one of the two above screens is shown, the following is shown.

m	m	m	m	m	r	/	r		x	x	x	x	x	x	x	x	x	
P	R	O	G	:	p	p	p	p	p									

Where n, ffff.ff, mmmmm, r/r, ppppp, and tt are defined in RF signal’s Current Settings screens earlier. In addition, xx...xx is the channel setting label (if available).

If the Current Setting is an ASI signal, the Following Screen Appears:

A	S	I	P	O	R	T	:	n										
---	---	---	---	---	---	---	---	---	--	--	--	--	--	--	--	--	--	--

x	x	x	x	x	x	x	x											
P	R	O	G	:	p	p	p	p	p									

Where n and ppppp are defined in ASI signal’s Current Settings screens earlier. In addition, xx...xx is the channel setting label (if available).

3.5.8.2 Carrier Status

C	A	R	R	I	E	R	/	A	S	I	S	T	R	E	A	M		
S	T	A	T	U	S	?	P	r	e	s	s	<	E	N	T	E	R	>

Pressing <ENTER> sends the user to a set of 3rd level INFO screens. There are four possibilities for that set, depending on the conditions stated in the following subsections.

3.5.8.3 Tracking an RF carrier

If the carrier tracking is lost while viewing the screens shown in this section, control will jump immediately over to the set of screens in the next subsection:

M	O	D	E	:	T	R	A	C	K	I	N	G					
L	A	S	T	A	C	Q	:	h	h	h	h	:	m	m	:	s	s

Where **hhhh:mm:ss** is the elapsed time since the RF carrier was last acquired (in hours, minutes, and seconds).

F	I	R	S	T	A	C	Q	:	h	h	h	:	m	m	:	s	s		
A	V	A	I	L	A	B	I	L	I	T	Y	:	x	x	x	.	x	x	%

Where **hhhh:mm:ss** elapsed time since this carrier was first acquired, either by user or network command, or from a Search mode (before any intervening signal fades, in hours, minutes, seconds).

Where **xxx.xx** is the percentage of the elapsed time since the carrier was first acquired that the receiver has been tracking that carrier. Fades and install acquisitions resulting from fades are deducted from total tracking time to get available time.

H	I	G	H	E	b	/	N	o	:	h	h	.	h	d	B
L	O	W	E	b	/	N	o	:	i	i	.	i	d	B	

Where **hh.h** is the highest and **ii.i** the lowest Eb/No (in dB) observed since the RF carrier was first acquired. Note that the Eb/No readings are 10-second averages.

N	U	M	B	E	R	O	F	F	A	D	E	S				
S	I	N	C	E	L	A	S	T	A	C	Q	:	n	n	n	n

Where **nnnn** is the number of signal fades recorded since the RF carrier was first acquired.

E	R	R	O	R	'	D	S	E	C	O	N	D	S			
S	I	N	C	E	L	A	S	T	A	C	Q	:	s	s	s	s

Where **ssss** is the number of one-second intervals where uncorrectable error'd Transport packets were output by the RF receiver system. *The count is cleared for signal fades.*

3.5.8.4 Attempting to Acquire an RF carrier

If the carrier tracking is gained while viewing the screens shown in this section, control will jump immediately over to the set of screens in the previous subsection:

M	O	D	E	:				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	
D	U	R	A	T	I	O	N	:	h	h	h	h	:	m	m	:	s	s					

Where **xx...xx** is current acquisition mode, FADE, INSTALL, CARRIER SRCH, HEADER SRCH per Section 3.4 (Page 33).

Where **hhhh:mm:ss** is the elapsed time since this mode was entered (in hours, minutes, and seconds).

A	C	Q	U	I	S	I	T	I	O	N	S	U	B	M	O	D	E	:					
											x	x	x	x	x	x	x	x	x	x	x	x	x

Where **xx...xx** is carrier acquisition sub-mode (See Section 3.4, Page 33).

The following two screens are shown only if applicable (values non-zero). All these counts clear to zero if good valid Transport stream is found (RF carrier tracking, MPEG sync, and no invalid network headers detected).

N	O	M	P	E	G	:	n	n	n	A	T	T	E	M	P	T	S							
N	O	T	A	G	:	m	m	m	A	T	T	E	M	P	T	S								

Where **nnn** is number of times unit timed out in GET MPEG sub-mode and receiver card was still tracking the RF carrier. **mmm** is the number of times the unit timed out in GET TAG sub-mode and rx card was still tracking.

B	A	D	T	A	G	:	n	n	n	/	f	f	f	f	f	.	f	f					
B	A	D	H	D	R	:	m	m	m	A	T	T	E	M	P	T	S						

Where **nnn** is number of times has seen a wrong tag in GET TAG sub-mode and **ffff.ff** is the value of the last received Carrier ID Tag. **mmm** is number of times unit has seen an invalid network header in GET COMPEL sub-mode. [These counters clear each time unit enters TRACKING mode.]

3.5.8.5 Locked on Transport Stream from ASI source

If the Transport Stream is lost while viewing the screens shown in this section, control will jump immediately over to the set of screens in the next subsection.

M	O	D	E	:	L	O	C	K	E	D													
L	A	S	T	A	C	Q	:	h	h	h	h	h	:	m	m	:	s	s					

Where **hhhh:mm:ss** is the elapsed time since lock on the current Transport stream was last achieved (in hours, minutes, and seconds).

F	I	R	S	T	A	C	Q	:	h	h	h	:	m	m	:	s	s
A	V	A	I	L	A	B	I	L	I	T	Y	:	x	x	.	x	x

Where **hhhh:mm:ss** elapsed time since lock on the current Transport stream was first achieved, either by user or network command, or from a Search mode (before any intervening signal losses, in hours, minutes, seconds).

Where **xxx.xx** is the percentage of the elapsed time since the stream lock was first achieved that the unit has been locked on the Transport stream. Fades and install acquisitions resulting from fades are deducted from total lock time to get available time.

N	U	M	B	E	R	O	F	S	I	G	L	O	S	S	E	S
S	I	N	C	E	L	A	S	T	A	C	Q	:	n	n	n	n

Where **nnnn** is the number of signal losses (“fades”) recorded since the lock on the ASI stream was first achieved.

E	R	R	O	R	'	D	S	E	C	O	N	D	S			
S	I	N	C	E	L	A	S	T	A	C	Q	:	s	s	s	s

Where **ssss** is the number of one-second intervals where uncorrectable error'd Transport packets were detected. *The count is cleared for signal losses (transitions to “fade” mode).*

3.5.8.6 Seeking Signal Lock on ASI source

If the Transport stream lock is achieved while viewing the screens shown in this section, control will jump immediately over to the set of screens in the previous subsection:

M	O	D	E	:	x	x	x	x	x	x	x	x	x	x	x	x		
D	U	R	A	T	I	O	N	:	h	h	h	h	:	m	m	:	s	s

Where **xx...xx** is current acquisition mode, FADE, INSTALL, CARRIER SRCH, HEADER SRCH. See Section [3.4](#) (Page 33).

Where **hhhh:mm:ss** is the elapsed time since this mode was entered (in hours, minutes, and seconds).

A	C	Q	U	I	S	I	T	I	O	N	S	U	B	M	O	D	E	:
											x	x	x	x	x	x	x	x

Where **xx...xx** is “carrier” acquisition sub-mode See Section [3.4](#) (Page 33).

The following screen is shown only if applicable (values non-zero). All these counts clear to zero if good valid Transport stream is found (MPEG sync and no invalid network headers detected).

N	O	M	P	E	G	:	n	n	n	A	T	T	E	M	P	T	S
B	A	D	H	D	R	:	m	m	m	A	T	T	E	M	P	T	S

Where **nnn** is number of times unit timed out in GET MPEG sub-mode and unit was still locked on the ASI stream. **mmm** is number of times has seen an invalid network header in GET COMPEL sub-mode. [These counters clear each time unit enters LOCKED mode.]

3.5.8.7 MPEG Status

M	P	E	G	/	V	I	D	/	A	U	D	S	T	A	T	U	S	:
P	r	e	S	s	<	E	N	T	E	R	>							

Pressing <ENTER> sends the user to a set of 3rd level INFO screens.

C	O	N	D	I	T	I	O	N	A	L	A	C	C	E	S	S		
S	T	A	T	U	S	:					x	x	x	x	x	x	x	x

Where **xx...xx** is the status of Conditional Access: either NONE for none detected, AUTH if CA is detected and unit is authorized for service and Program, NOT AUTH if CA is detected and unit is unable to decrypt.

Pressing <ENTER> at the next screen takes the user to the 4th level INFO screen shown below it.

P	R	O	G	R	A	M	P	R	E	S	E	N	C	E	:			
P	r	e	S	s	<	E	N	T	E	R	>							

<	P	R	O	G	R	A	M	P	R	E	S	E	N	C	E	>		
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	

Where **xxxxx** are available program numbers. The symbols <,> are shown only if scrolling is necessary. LEFT and RIGHT arrow buttons allow the scrolling. The ‘//’ marker shows where the list ends and starts as the list wraps on the screen.

V	I	D	E	O	S	T	A	T	U	S	:						
												x	x	x	x	x	x

Where **xx...xx** is the video state, either NORMAL, MUTED, or FROZEN.

V	I	D	E	O	F	O	R	M	A	T	:						
												x	x	x	x		

Where **xxxx** is either (525-line) NTSC or (625-line) PAL.

V	I	D	E	O	C	H	R	O	M	A							
S	A	M	P	L	I	N	G	:					x	x	x	x	x

Where xxxx is either 4:2:2 or 4:2:0.

G	E	N	L	O	C	K	S	T	A	T	U	S	:									
														x	x	x	x	x	x	x	x	x

Where xx...xx is either LOCKED or UNLOCKED.

V	I	D	E	O	A	S	P	E	C	T	R	A	T	I	O	:			
					x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

Where xx...xx is either SRC 4:3-OUT 4:3, SRC 16:9-OUT 4:3, or SRC 16:9-OUT 16:9. "SRC" means the original source material at the MPEG encoder, and OUT is the IRD's output.

V	I	D	E	O	W	I	N	D	O	W	S	I	Z	E	:			
										x	x	x	x	x	x	x	x	x

Where xx...xx is either STANDARD or EXTENDED.

L	2	1	D	A	T	A	I	N	S	E	R	T	I	O	N								
M	O	D	E	:												x	x	x	x	x	x	x	x

Where xx...xx is either ATSC, TANDBERG (proprietary), or DIVICOM (proprietary).

V	I	D	E	O	H	I	S	T	O	R	Y	:								
R	E	S	T	A	R	T	S	:								x	x	x	x	x

Where xxxxx is the count of all video re-starts since the current channel setting was acquired (if selected Program was originally detected).

Pressing <ENTER> at the next screen takes the user to the 4th level INFO screen shown below it.

A	U	D	I	O	S	T	R	M	P	R	E	S	E	N	C	E	:
P	r	e	s	s	<	E	N	T	E	R	>						

<	A	U	D	I	O	S	T	R	M	P	R	E	S	E	N	C	E	>
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	

Where xxx is the audio stream identifier (or "language"). The list scrolls the same as the "Program Presence" list above.

For *m* audio ports installed in the IRD, there are *n* such **pairs** of screens that follow here:

A	A	A		P	O	R	T		n		S	T	A	T	U	S	:
x	x	x	x	A	S	S	I	G	N	E	D		y	y	y	y	y

Where **xxx** is the audio stream descriptor assigned to the **n**th audio port (N/A if no legal audio stream is routed to that port). **yy...yy** is the audio mute state of that port, either NORMAL, MUTED, LMUTED (“left” output only), or RMUTED (“right” output only).

A	A	A		P	R	T		n		H	I	S	T	O	R	Y	:
R	E	S	T	A	R	T	S	:						x	x	x	x

Where **xxxxx** is the count of all independent audio re-starts for the **n**th port since the current channel setting was acquired (if selected Program and selected audio stream were detected). An “independent” audio re-start is one not coupled to a re-start of video.

3.5.8.8 Network Control Status

N	E	T	W	O	R	K		C	N	T	L		S	T	A	T	U	S	?
P	r	e	S	s	<	E	N	T	E	R	>								

Pressing SELECT sends the user to 3rd level INFO screens. Note that all counters listed in this section reset to zero at unit reset and count indefinitely afterward.

D	E	L	A	Y	I	N	G	:			h	h	:	m	m	:	s	s	

Time Delay until execution of COMPEL command where **hh:mm:ss** is time in hours, minutes, seconds. *If not applicable, N/A will be shown.*

S	/	N	:	s	s	s	s	s	s		x	x	x	x	x	x	x	x
C	O	M	P	E	L	:	y	y	y	y	y	y	y	y	y	y	y	y

Where **ss...ss** is unit serial number, **xx...xx** is COMPEL lock status (LOCKED or UNLOCKED), and **yy...yy** is COMPEL-required status (REQUIRED or NOT REQUIRED).

L	O	C	A	L		C	T	R	L	:	x	x	x	x	x	x	x	x
N	E	T	W	R	K		M	O	D	E	:	y	y	y	y	y	y	y

Where **xx...xx** is local control enable status (ENABLED or DISABLED), and **yy...yy** is network protection mode (PROTECTD or SHARED)

L	A	S	T	H	D	R	:	h	h	h	:	m	m	:	s	s
L	A	S	T	A	D	R	:	h	h	h	:	m	m	:	s	s

Where **hhh:mm:ss** is the elapsed time in hours, minutes, seconds, the LAST HDR is the time since the last COMPEL packet with a valid network header was received, and LAST ADR is the time since the last COMPEL packet with valid header was addressed to this particular IRD.

H	I	S	T	O	R	Y	:	h	h	h	h	:	m	m	:	s	s
T	O	T	P	R	O	C	E	S	S	E	D		x	x	x	x	x

Where **hhhh:mm:ss** is the elapsed time in hours, minutes, seconds since unit reset. **xx...xx** is the total number of COMPEL packets processed, including Keep-alives.

I	N	V	A	L	I	D	H	E	A	D	R	:	x	x	x	x	x
I	N	V	A	L	I	D	C	K	S	U	M	:	y	y	y	y	y

Where **xx...xx** is the total number of invalid COMPEL headers received. **yy...yy** is the total number of COMPEL packets received whose computed checksum did not match the transmitted value.

I	N	V	A	L	I	D	L	E	N	G	T	H	:	x	x	x	x	x
B	U	F	F	E	R	O	V	R	F	L	O	W	:	y	y	y	y	y

Where **xx...xx** is the total number of COMPEL packets received whose length did not appear to match the transmitted “length” value. **yy...yy** is the total number of times the processing storage space for COMPEL packet processing was exceeded, and some packets lost.

S	Y	N	T	A	X	E	R	R	O	R	S	:					
													x	x	x	x	x

Where **xx...xx** is the total number of COMPEL packets received with a syntax error.

3.5.8.9 Installed Options Status

I	N	S	T	A	L	L	E	D	O	P	T	I	O	N	S	?
P	r	e	s	s	<	E	N	T	E	R	>					

Pressing <ENTER> takes the user to 3rd level INFO screens on installed options.

A	U	D	I	O	P	O	R	T	S	:					
					1	2					y	y	y	y	

Where the **y**'s represent placeholders showing the available audio ports ('1' and '2' are always shown because they are always present). For those positions not installed, **y** = 'N'.

C	/	A	S	E	C	U	R	E	M	I	C	R	O	:				
x	x	x	x	x	x	x	x	x						y	y	y	y	y

Where **xx...xx** is either INSTALLED or NOT INST., showing whether a Secure Microprocessor (to support PIN scrambling or some version of WCI decryption) is installed and functional. **yy...yy** shows the operating status, either OK or FAULT.

4	-	P	O	R	T	R	F	S	W	I	T	C	H	:				
									y	y	y	y	y	y	y	y	y	y

Where **yy...yy** is either INSTALLED or NOT INST.

D	T	M	F	/	A	U	X	-	A	U	D	O	P	T	I	O	N	:
x	x	x	x	x	x	x	x	x						y	y	y	y	y

Where **xx...xx** is either INSTALLED or NOT INST. **yy...yy** shows the operating status, either OK or FAULT.

S	Y	N	C	D	A	T	A	:										
x	x	x	x	x	x	x	x	x						y	y	y	y	y

Where **xx...xx** is either INSTALLED or NOT INST. **yy...yy** shows the operating status, either OK or FAULT.

E	X	P	R	E	L	A	Y	S	x	x	x	x	x	x	x	x	x	x
									y	y	y	y	y	y	y	y	y	y

Where **xx...xx** designates whether 14-relay, expansion-card option is installed. If so, the **yy...yy** field is also shown, with each of the 14 positions representing relays 1 to 14 from left to right. 'O' is Open, and 'C' is Closed.

3.5.9 Current Version Information

Note that these screens may be used to get information on the currently loaded application software and other programmable components.

C	U	R	R	E	N	T	V	E	R	S	I	O	N	I	N	F	O
P	r	e	s	s	<	E	N	T	E	R	>						

Pressing <ENTER> moves user to 2nd level screens under "VERSION."

A	P	P	L	I	C	A	T	I	O	N	C	U	R	R	E	N	T	:
V	x	x	x	x	x	x												

xx...xx is version number of the *current* unit application software.

A	P	P	L	I	C	A	T	I	O	N	B	A	C	K	U	P	:	
V	x	x	x	x	x	x												

xx...xx is version number of the *backup* unit application software (if it exists).

B	O	O	T	L	O	A	D	E	R	:								
V	x	x	x	x	x	x												

Where xx...xx is version number of boot loader code.

R	E	C	E	I	V	E	R	C	A	R	D	:						
V	x	x	x	x	x					(T	Y	P	E	y	y)	

Where Vx...xx is the receiver-card software revision string, and yy is the card's type code.

M	P	P	W	A	V	E	R	S	I	O	N	:						
																	x	y

Where x is a hex code for the Main Processor PWB assembly revision level (A='1', B='2', etc.) and y is a hex code for "type" (one of a series of parts lists built on a PWB, where 700011-01 is type '1').

A	V	P	W	A	V	E	R	S	I	O	N	:						
																	x	y

Where x is a hex code for the Audio/Video Decompression PWB assembly revision level (A='1', B='2', etc.) and y is a hex code for "type" (one of a series of parts lists built on a PWB, where 700012-01 is type '1').

M	P	X	I	L	I	N	X	V	E	R	S	I	O	N	:				
								x	x	x	x	x	x	x	x	x	x	x	

Where xx...xx is the version string of the *installed* Xilinx FPGA programming software on the MP PWA.

M	P	L	A	T	T	I	C	E	V	E	R	S	I	O	N	:
									x	x	x	x	x	x	x	x

Where **xx...xx** is the version string of the *installed* Lattice CPLD programming software on the MP PWA.

A	V	X	I	L	I	N	X	V	E	R	S	I	O	N	:
									x	x	x	x	x	x	x

Where **xx...xx** is the version string of the *installed* Xilinx FPGA programming software on the A/V PWA.

C	S	2	4	V	I	D	E	O	D	E	C	O	D	E	R	:
									x	x	x	x	x	x	x	x

Where **xx...xx** is the version string of the microcode for the CS24's video decoder.

C	S	2	4	A	U	D	I	O	D	E	C	O	D	E	R	:
									x	x	x	x	x	x	x	x

Where **xx...xx** is the version string of the microcode for the CS24's audio decoder.

The screen below is shown only if expansion audio option is installed.

E	X	P	M	P	E	G	A	U	D	I	O	:				
(	C	S	4	9	3	3	X	)	x	x	x	x	x	x	x	x

Where **xx...xx** is the version string of the MPEG decompression microcode for the CS4933xx audio decoder IC.

The screen below is shown only if expansion DTMF/Aux audio option is installed.

E	X	P	S	M	P	T	E	3	0	2	A	U	D	I	O	:
(	C	S	4	9	3	3	X	)	x	x	x	x	x	x	x	x

Where **xx...xx** is the version string of the SMPTE302 (uncompressed) audio microcode for the CS4933xx audio decoder IC.

C	A	S	E	C	U	R	E	M	I	C	R	O	:			
V	x	x	x													

Where **xxx** is the version number of the secure (decryption) microprocessor. If the Vxxx field is blank, then that indicates that the CA Secure Microprocessor option has NOT been installed.

C	A	D	E	S	C	R	A	M	B	L	E	R	:				
x	x	x	x	x	x	x	x	x	x	x	x	x					

Shows the installed CA descrambler, where **xx...xx** is either NONE, 1ST GEN WCI (for 1997 WCI encryption), 2ND GEN WCI (for 2nd-generation WCI encryption), PIN (for PIN scrambling), or DVB (for DVB common scrambling).

3.5.10 Navigation Help

N	A	V	I	G	A	T	I	O	N	H	E	L	P	?			
P	r	e	s	s	<	E	N	T	E	R	>						

After pressing <ENTER>, the following screens are automatically displayed in order, at ~5 seconds per screen.

P	r	e	s	s		<	E	N	T	>	t	o	g	o	d	n	
l	v	l	o	r	s	t	a	r	t	e	d	i	t				

P	r	e	s	s		<	E	N	T	>	t	o					
a	c	c	e	p	t	c	h	a	n	g	e	s	A	L	S	O	

P	r	e	s	s		<	-	o	r	-	>	t	o				
t	r	a	v	e	r	s	e	a	m	e	n	u	l	v	l		

P	r	e	s	s		<	-	o	r	-	>	i	n	e	d	i	t
s	w	i	t	c	h	e	s	f	i	e	l	d	s	A	L	S	O

P	r	e	s	s		<	U	p	-	D	n	>	t	o			
c	h	a	n	g	e	v	a	l	u	e	i	n	e	d	i	t	

P	r	e	s	s		<	E	S	C	>	t	o	g	o	u	p	
l	v	l	o	r	c	a	n	c	e	l	e	d	i	t			

D	O	N	E	?													
P	r	e	s	s		<	E	S	C	A	P	E	>				

Control pauses here until the user presses ESCAPE. Then the user is returned to the HOME screen as if ESC had been pressed twice.

APPENDIX A TERMINAL/MODEM MODE

A.1 INTRODUCTION

The following discussions apply to both the Terminal and Modem devices. Once a user has fulfilled the password requirement for Modem access, the communication is identical to Terminal control.

A.2 DAISY-CHAIN TERMINAL COMMUNICATION

The wakeup “hotkey” is “Control-w.” This is ASCII hex code ‘17’. After it is sent, the very next two characters must match the previously assigned unit ID. Failure on any character forces the unit back to an Idle state where all communication to the Terminal (or Modem) device is blocked. [NOTE: If accessing a unit on a shared serial bus via modem, the user must *first* get an IRD to become a “talker” as described in Section [3.2.3.2.1](#) (Page 30), then issue a carriage-return to get the prompt for the modem password.]

A.3 OVERVIEW AND SYNTAX

Commands listed in this section detail command syntax and action taken. Commands consist of a command field and a parameter field. Each command field and parameter field is space delimited. Optional parameters are indicated by square brackets, [], and conditional parameters are indicated by braces, {}.

For example, `COMMAND_NAME parameter1 {parameter2} [parameter3]` indicates that *parameter1* must be entered, *parameter2* entered only when a certain condition is met (certain option is installed, etc.), and *parameter3* is optional. Both commands and parameters may be entered in upper or lower case; the interface is not case-sensitive.

Incorrect or incomplete commands result in "Invalid Command" being displayed at the terminal. Parameter errors on User commands generate "Invalid *parameter name*" where *parameter name* is the name of the incorrectly entered parameter.

A.4 USER COMMANDS

Those commands allowed *only if the network enables local control* are given in the section below. Local user commands that are always functional are given in Section [0](#) (Page 73).

ABORT

Insert is terminated. See TEMP command.

ADDS *location format [feed #] [carrier freq] [data rate] [FEC] [Tag Site] program# [label]*
location: Value from 1 up to 48 indicating location in settings table.

For *format*, *feed #*, *carrier freq*, *data rate*, *FEC*, *tag site*, *program #*, and *label* see PERM command.

The channel settings input are added as a new entry in the settings table at the location given.

APPSWITCH

Unloads the currently executing application software and, instead, loads and runs the backup software.

ARMODE *mode*

mode: auto – the output aspect ratio is the same as the input, whether 4:3 or 16:9.

4:3 – the output aspect ratio OUTPUT is forced to 4:3.

Sets the aspect ratio mode.

ASIOUT [*mode*]

Mode: Either SCR (for “scrambled”) or CLEAR.

Used to set the ASI Transport Output to be either a pre- or post-descrambled Transport stream. If parameter is omitted, then current setting is reported.

AUXPID [*PID*]

PID: Selects the PID (*in hex*) for the Transport packets carrying the desired data stream. Must be ‘20’ to ‘1ffe’ inclusive. If PID is omitted, the current value is displayed.

Sets the PID used for Aux Data extraction.

DELS *location*

location: Value from 1 up to 48 indicating entry number in settings table.

The entry in the settings table at the specified location is deleted. Ignored if there is only one entry in the settings table.

MUTE [*source*][*source*][*source*] [...]

source: If no source is specified then video and all audio’s are selected. *Source* can be any of the following:

V	To Indicate Video
A [specifier]	To indicate Audio. An ‘A’ without the specifier indicates all audio outputs. If present, the specifier consists of one or two characters. The first character specifies the audio port number and the second character specifies either the right or left channel, as in “A1L” (audio 1, left channel) or “A2R” (audio 2, right channel). If the second character is omitted, this indicates both stereo channels are included.

Mutes the specified outputs. Example: “MUTE V A1L A4 A3R” mutes the video, audio Port 1 left channel, audio port 4 (both channels), and audio port 3 right channel.

PERM format [feed #] [carrier freq] [data rate] [FEC] [Tag Site] program# [label]

format: If an RF input, one of the legal modulation formats: QPSK, 8PSK, or 16QM (for “16QAM”). For an ASI Transport input, specify ASI.

feed #: If an RF input, one of four possible RF feeds, 1, 2, 3 or 4. *Omit this field for RF inputs if RF switch option is not installed.* If an ASI input, one of two possible ASI feeds, 1 or 2.

carrier freq: If an RF input, the downlink carrier frequency in MHz (precision to two decimal places OK). Field is omitted for an ASI input.

data rate: If an RF input, the Transport data rate in Mbps (precision to two decimal places OK). Field is omitted for an ASI input.

FEC: If an RF input, the inner FEC ratio. Field is omitted for an ASI input.

The legal options: For QPSK1/2, 2/3, 3/4, 5/6, and 7/8;
For 8PSK2/3, 5/6, and 8/9;
For 16 QAM ..3/4, and 7/8.

tag site: If an RF input, the tag site for Carrier ID tag. Field is omitted for an ASI input.

program#: Program number, or ‘*’ for wildcard.

label: Channel setting label (optional, may be omitted).

Unit sets its permanent channel settings with the parameter values given.

PERMCH value

value: Either the value of a settings table entry number OR the label of an entry, priority given to label if any ambiguity. If an entry number, legal values range from 1 up to max 48.

Unit sets its perm settings to those retrieved from the settings table (See Perm Command above) according to *value*.

RE state [number]

state: O or C, to Open or Close, respectively.

[number]: 1 or 2, indicating the affected user relay. Both are specified if omitted.

The specified relay is opened or closed accordingly.

SET [parameter] [value]

SET TO [destination]

SET FROM [source]

Parameter: one of: *format, feed, freq* [for “carrier freq”], *rate* [for “data rate”], *FEC, tag* [for “tag site”], or *prog* [for “program”]. See PERM command for definitions and limits.

Value: value of the parameter as in any settings command (PERM, TEMP, ADDS, etc.)

Destination: PERM, TEMP, number *or label* of a table entry.

Source: PERM, CURR, number *or label* of a table entry.

SET sets the value of individual parameters in a ‘scratchpad’ settings group. *SET TO* will store the scratchpad settings to a search table entry or to the permanent or temporary settings (requires an insert time as a second parameter). *SET FROM* loads the scratchpad settings from a search table entry or from the current or permanent settings.

SETAUDIO *port route [program] [atten]*

port: Value of 1 to 6 indicating an audio port.

route: S - Stereo (Left and Right components routed as connected at original MPEG encoder)

1 - Original Left component to both L and R outputs

2 - Original Right component to both L and R outputs

M- Sum of Left and Right components to both L and R outputs

[program]: Can be a three character name or an '*'. If the 3-character name is specified, the unit will route the audio program with the specified name to the port. If '*' is specified, the unit will default to the first audio program that is not routed to another port.

[atten]: Must be a numeric value for attenuation in dB. Legal values are given in [Table 1](#) (Page 13) under "Audio Outputs". This programs the net audio attenuation, where '0' gives 0dB attenuation (maximum level). If field omitted, attenuation remains unchanged on that audio port.

The audio program is routed to the audio port *port*'s audio switch, and is then its components are routed to the Left and Right outputs according to *route*. That ports attenuation is changed to *atten* if supplied.

SETLABEL *label*

label: Unit label. Field entry is truncated at 10 characters.

Sets Unit Label displayed on IRD home LCD screen (and Terminal Welcome Banners).

SETTIMEOUT *source time*

source:

- 1 - Fade
- 2 - Installation
- 3 - No COMPEL
- 4 - Header Seek
- 5 - Local (Control) Recovery

time: Time-out value in seconds or HHHH:MM:SS format. Minimum value is 1, and maximum value is 30 for fade and 35999999 (9999:59:59 hrs) for all others.

Timeout.source is set to time.

TEMP *format [feed #] [carrier freq] [data rate] [FEC] [Tag Site] program# time*

For format, feed #, carrier freq, data rate, FEC, tag site, and program #, see PERM command.

time: Length of insert in HH:MM:SS format. Valid range is 00:00:00 to 18:00:00.

Executes temporary insert for an amount of time given by "time." Unit sets its temporary channel settings to those values given. Note that no label may be applied using this terminal command.

TEMPCH *value time*

value: Either the value of a settings table entry number OR the label of an entry, priority given to label if any ambiguity. If an entry number, legal values range from 1 up to max 48.

time: Same as for TEMP.

Unit sets its temporary channel settings to those retrieved from the settings table according to *value* for time given by *time*. See TEMP command.

UNMUTE [*source*][*source*][*source*][...]

source: Same as the MUTE command.

Identical to MUTE except specified services are unmuted.

A.5 LOCAL CONTROL COMMANDS

GLDELAY [*pixels*]

Pixels: Number of pixels offset. Limits are +63 to -61 (¼ pixels steps).

Adjusts horizontal delay for (genlocked) video timing. If *pixel* parameter omitted, command returns current setting.

GLPHASE [*degrees*]

Degrees: Number of degrees offset. Limits are +180 to -180 degrees in 1.5-degree steps.

Adjusts composite (genlocked) video subcarrier phase. Unit will actually accept input and set to nearest multiple of 1.414-degree increments. If *degrees* parameter is omitted, command returns current setting.

H [*command*]

command: Any of the terminal command names (H, R, TEMP, etc.).

If an 'H' or any invalid command beginning with an 'H' is entered and *command* is omitted, the whole help screen will be displayed, consisting of a list of all *currently* available commands and a brief description of each listing. If an 'H' or any invalid command beginning with an 'H' is entered and *command* is a valid User Command Name, then detailed help for *command* is displayed.

LNBPWR [*output*].

output is RPH (for rear-panel header), RFC (for RF IN center-pin), or NONE for no LNB DC power. If the *output* parameter is omitted, then the command returns the current setting.

OH

On hook. Disables modem access. Modem access is only re-enabled by successful modem password entry.

PC device baud

device: one of PRINTER, MODEM, TERMINAL, AUXDATA, LINE21, or COMPEL.

baud: 1200, 2400, 4800, 9600, 19200 or 38400.

parity: N, E, or O.

Configures communication parameters for any serial device. See Serial Port, Section [3.2](#) (Page 29) for details.

PORT *port_number device1[device2] [device3] [...]*

port_number: Number of serial port to which devices will be assigned, from 1-3

device1[23]: Devices to assign to the selected port, may be one or more of: TERMINAL, MODEM, PRINTER, AUXDATA, LINE21, or COMPEL. Multiple devices may be assigned to a single port if no more than one device receives input as with modem, terminal, or local compel devices.

Assigns the given devices to the selected port.

PW *password*

password: One to six alphanumeric characters.

Changes the modem password to *password*.

R *type [page]*

type: Indicates the type of report as follows:

- C - Carrier Status
- P - Parameters
- G - Group Status
- NC - Network Controller Status
- M - MPEG
- R - Relay Status
- S - Settings Status
- ST - Settings Table
- SP - Serial Port Configuration

[page]: This option can have a value of 1 to 40 and is only applicable for the group status report. Indicates the page to be reported. If omitted, all eight pages are reported and scroll off the terminal screen.

The specified report is issued.

RESET

Resets unit.

SETLNB {*rf_feed*} *LO_freq*

Rf_feed: This is an input to the 4-to-one RF optional RF switch (values 1 through 4). This field is ONLY applicable if RF switch option is installed. *Otherwise, it is an error to enter data here!*

LO_freq: This value represents the LNB LO frequency in MHz. It can have up to two decimal places and its valid range is from 0 to 14000.00.

Sets the assumed LNB LO frequency to the value entered in MHz. If there is an optional RF switch installed, then the *rf_feed* field data must be entered.

SETUID *[id]*

id: Unit ID number between 00 and 99 inclusive. ‘00’ is the factory default setting which also disables terminal daisy-chain capability. If the parameter is omitted, then this command returns the current unit ID setting.

Used for assigning the unit ID number for gaining “talker” access on a shared serial bus.

SNR *alarm_level margin_offset*

alarm_level: Units of dB with range from 2.0 - 9.0 and can have one decimal place.

margin_offset: Units of dB with range from 1.0 - x and can have one decimal place. Sum of *alarm_level* and *margin_level* cannot exceed 14.0.

Sets SNR Alarm Level and Margin Offset accordingly.

TESTMODE *mode*

Mode : E -- enable testmode.

D -- disable testmode.

If enabled, displays video test pattern (75% color bars) and has audio test tone (1kHz tone).

VER

Displays the Welcome banner and the versions of hardware and software components within the IRD, as given below:

Code	Description
Application, current:	<i>V####</i> . Application revision.
Application, backup:	<i>V####</i> . Application revision
Boot Loader	<i>V####</i> . Boot Loader revision.
Receiver:	<i> #(Type #)</i> . First number is the software version and the second is the board type. Both values are obtained directly from the receiver board.
MP PWA	<i>Version code: Type and revision</i>
AV PWA	<i>Version code: Type and revision</i>
MP Xilinx	<i>Version String for all installed Xilinx FPGA load</i>
MP Lattice	<i>Version String for all installed Lattice CPLD load</i>
AV Xilinx	<i>Version String for all installed Xilinx FPGA load</i>
CS24 Video Decoder	<i>String. CS24 Video Decoder microcode version.</i>
CS24 Audio Decoder:	<i>String. CS24 Audio Decoder microcode version.</i>
Expansion MPEG Audio:	<i>Strings. CS493302 microcode version for MPEG audio</i>
Exp SMPTE302 audio:	<i>Strings. CS493302 microcode version for SMPTE302 audio</i>
CA secure micro	<i>##. Secure micro. {if installed}</i>
Installed descrambler:	CA type: NORMAL, PIN, or TURNAROUND

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APPENDIX B CONVERTING BETWEEN TRANSPORT RATES AND SYMBOL RATES

B.1 GENERAL FORMULA

Ft = Transport Rate in Mbps

Fs = Symbol Rate in Msps

R = Inner FEC code ratio (not including RS outer code)

B.2 QPSK

Convert Symbol-rate to Transport Rate: $F_t = (2R * F_s) * (188/204)$

Convert Transport Rate to Symbol-rate: $F_s = (F_t/2R) * (204/188)$

B.3 8-PSK

Convert Symbol-rate to Transport Rate: $F_t = (3R * F_s) * (188/204)$

Convert Transport Rate to Symbol-rate: $F_s = (F_t/3R) * (204/188)$

B.4 16-QAM

Convert Symbol-rate to Transport Rate: $F_t = (4R * F_s) * (188/204)$

Convert Transport Rate to Symbol-rate: $F_s = (F_t/4R) * (204/188)$

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APPENDIX C OPTION MODULES

C.1 INTRODUCTION

There are two “option” modules available for the UNITY5000. One of these is the Audio Module with DTMF Tone encoder, and the other is the four-to-one RF Switch.

C.2 AUDIO/DTMF TONE MODULE

The Audio module with DTMF Tone encoder is installed in the “Option Module 2” slot, but also occupies the unnamed slot above that slot. The upper slot has an output called DTMF/Audio Port 3, while the lower slot has two outputs, digital AES, and balanced analog.

C.2.1 Audio

The two audio encoders are treated like standard expansion audio’s, and are otherwise controlled like the main board audio’s (Ports 1 and 2). The two audio decoders, Audio Port 3 and Audio Port 4, are targeted for different applications and feature fixed audio sample rates. Audio 3 has only balanced analog outputs, and is intended to be a voice-grade “shout-down” audio channel running at low data rates. Audio 4 has both balanced analog and unbalanced digital (SPDIF) outputs, and is intended to support only SMPTE 302 audio mode. This is a mode whereby uncompressed AES3 digital audio is carried in an MPEG audio PES with an STC for audio/video synchronization. Though it is intended to support only this special audio, the unit software can auto-detect either this or *standard MPEG* audio, and configure the decoder accordingly.

C.2.2 DTMF Encoder

The DTMF encoder is controlled by the COMPEL network stream. There are sixteen possible DTMF codes that are translated into an output audio tone or pair of tones. These tones are bridged across both the Left and Right outputs of Audio Port 3. The COMPEL commands specify which tone pairs are to be played and for how long.

To install the DTMF encoder in a station control system, the DTMF levels may be set “manually” using a test tone sequence and a front-panel adjustment screen. (See Section [3.5.7.17](#), Page 56.)

C.3 RF SWITCH OPTION

This option card supplies a 4-to-1 RF port selection capability, so that one of four separate antenna feeds may be selected. The unit software automatically recognizes the presence of this card and adjusts the field definitions in its Current and Settings Table channel settings entries. The RF switch is designed for the 950-2150 MHz L-band RF input frequencies. It is AC coupled so LNB DC will not pass. LNB DC may be obtained from the “LNB DC PWR” connector on the rear panel. See Section [3.5.7.16](#) (Page 55) for an explanation of how to turn the LNB Power on and off.

An external looping cable is supplied with this option to route the selected RF OUT back to the main unit's RF INPUT.

C.4 SPECIFICATIONS FOR AVAILABLE OPTIONS

Parameter	Value
4-way RF-switch	<i>L-band one-pole 4-way switch</i>
DC Isolation	<i>All input ports DC isolated to 50VDC</i>
Input Isolation, port-to-port (all ports terminated)	<i>> 35 dB, 950-1450 MHz > 24 dB, 1450-2150 MHz</i>
Input VSWR (selected port, 75 ohm system)	<i>≤ 2.5:1, 950-1450 MHz ≤ 3.0:1, 1450-2150 MHz</i>
Insertion Loss	<i>≤ 1.5 dB, 950-1450 MHz ≤ 3.0 dB, 1450-2150 MHz</i>
DTMF-Aux audio	
Output configuration	<i>One balanced stereo pair for aux audio output; DTMF output summed into each (L & R) channel of aux audio output</i>
DTMF output	<i>16 tone pairs per std. telco DTMF usage</i>
Tone timing	<i>< 230 mS to generate 4 tone-pair sequence</i>
DTMF encoder levels	<i>+8 to -2 dBm into 600 ohms, software adjustable in steps which are ~6% of full-scale voltage</i>
Aux audio formats	<i>Similar to standard audio decode; except that Audio 3 is intended for "shout-down" voice-grade audio channel (32 kHz compressed ES rates); and Audio 4 is intended to support uncompressed SMPTE302 audio (though it can auto-recognize and decode std MPEG audio)</i>
Aux audio sampling rates	<i>Audio 3: 32 kHz only Audio 4: 48 kHz only (see next)</i>
Audio 4, Non-compressed mode	<i>Full-rate (AES3) digital audio per SMTPE 302M, 2 channels per stream, 24-bit subframes.</i>
Aux audio performance	<i>Identical to audio specs for main unit's audio's</i>
Aux audio level	<i>Unloaded: +24.0 dBu @ 0 dB atten level Loaded with 600 ohms: +21.0 dBm @ 3 dB atten. level</i>
Aux audio impedance	<i>Balanced: <60 Ohms</i>
Aux attenuation control	<i>0 to 20 dB attenuation in 2 dB steps from Output Level shown above</i>

Table 9. Option Connectors & Pin-outs

Connector Designation	Type	Pin #	Signal Name
<i>4-way RF switch</i>			
<i>RF-Out</i>	<i>Type F jack</i>		<i>Selected RF output</i>
<i>RF-In 1,2,3,4</i>	<i>Type F jacks</i>		<i>RF Input Ports 1 to 4</i>
<i>DTMF/Audio Option</i>			
<i>DTMF/ Audio Port 3: (DTMF bridges both L and R outputs)</i>	<i>9-pin D female jack</i>	<i>1</i>	<i>Left '+'</i>
		<i>2</i>	<i>Left Ground</i>
		<i>3</i>	<i>Shield ground</i>
		<i>4</i>	<i>Right Ground</i>
		<i>5</i>	<i>Right '-'</i>
		<i>6</i>	<i>Left '-'</i>
		<i>7</i>	<i>Shield ground</i>
		<i>8</i>	<i>Shield ground</i>
		<i>9</i>	<i>Right '+'</i>
<i>Audio Port 4: Balanced Analog</i>	<i>9-pin D female jack</i>	<i>1</i>	<i>Left '+'</i>
		<i>2</i>	<i>Left Ground</i>
		<i>3</i>	<i>Shield ground</i>
		<i>4</i>	<i>Right Ground</i>
		<i>5</i>	<i>Right '-'</i>
		<i>6</i>	<i>Left '-'</i>
		<i>7</i>	<i>Shield ground</i>
		<i>8</i>	<i>Shield ground</i>
		<i>9</i>	<i>Right '+'</i>
<i>Audio Port 4: AES</i>	<i>BNC jack</i>		<i>SPDIF Digital audio</i>

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APPENDIX D RMA REQUEST FORM

service@wegener.com

Fax (678) 624-0294

Company Name:	_____
Bill-To Address:	_____ _____ _____
Ship-To Address:	_____ _____ _____
Contact Name:	_____
Phone # () - _____	Fax #: () - _____
Complete Model #:	_____
Serial #:	_____
In Warranty: Yes <input type="checkbox"/>	No <input type="checkbox"/>
Problem:	_____ _____ _____ _____ _____
Additional Comments:	_____ _____ _____ _____ _____

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SERVICE RETURN ADDRESS

Service Department RMA# _____
Wegener Communications, Inc.
359 Curie Drive
Alpharetta, GA 30005

SERVICE CONTACT NUMBERS AND EMAIL ADDRESS

Voice: (770) 814-4057
FAX: (678) 624-0294
E-mail: service@wegener.com