

# WEGENER®

## Advanced Digital Technologies

### Instruction Manual UNITY4000™ MPEG VIDEO INTEGRATED RECEIVER DECODER

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*Note: Features of the product described herein are covered by U.S. Patent # 4,985,895.*

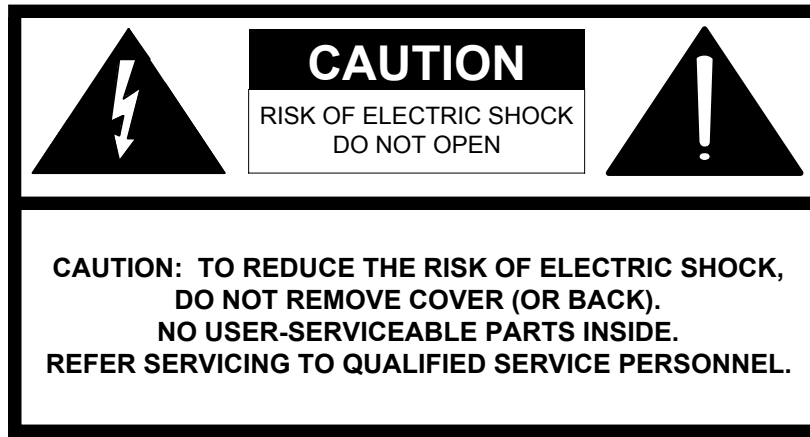
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# WEGENER®

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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

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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# SECTION 1

## GENERAL INFORMATION

### 1.1 GENERAL

The purpose of this manual is to describe the proper installation and operation of the Wegener Communications UNITY4000 MPEG Video Integrated Receiver Decoder.

### 1.2 INTRODUCTION

The UNITY 4000 IRD is an integrated receiver/decoder designed to receive SCPC or MCPC DVB-compliant digital video signals transmitted by satellite. The input to the IRD is an L-band (950-2150 MHz) RF signal which is processed to produce composite video, audio, e-mail output, auxiliary data, and relay cueing signals. The IRD is fully network-controlled via the WCI COMPEL™ control system.

The optional decryption feature for the IRD allows for use of WCI conditional access. Authorization of each IRD is under network control.

In addition to network control, the IRD features a front-panel LCD interface for gathering local status information. In addition, limited control of the IRD (*if allowed by the COMPEL™ network*) may be implemented via serial port, connecting either to a local terminal (or via phone modem) to a remote terminal.

The IRD has expansion ports for up to two add-in modules. Contact the Wegener Sales Department about available options.

### 1.3 UNPACKING AND INSPECTION

Carefully unpack the unit and inspect it for obvious signs of physical damage which 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.

### 1.4 PHYSICAL ENVIRONMENT

Mount the UNITY4000 IRD in a standard EIA 19-inch equipment rack located in a clean, dry environment, and do not place unsupported equipment on the unit. Make sure that total rack 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 10-40°C operating temperature specification only if adequate clearance around vent-holes is provided. The units may be

arranged without empty space between them, as long as enough rack ventilation is provided to prevent severe heat buildup. Please note the maximum per-unit power dissipation of 45 watts.

## 1.5 SECURITY LABELS

The UNITY4000 uses security labels over some of the screws. There are no user serviceable components within the unit, and tampering with the security labels or opening the units will void your warranty. If you have questions, contact Wegener's customer service department at the address, phone, or fax numbers listed in Section 1.7 of this manual.

**\* \* \* WARNING \* \* \***

**When connecting cables to “F” type connectors apply a force of no more than 12 inch lb. (Finger tight). Avoid connecting adapters directly to “F” type connectors. Use at minimum a 1 foot flexible extension cable between “F” type connectors and adapters.**

## 1.6 PHYSICAL SPECIFICATIONS

The operating temperature of the IRD is +10°C to +40°C in still air with *unblocked* side vents. (The unit is fan-cooled.)

**Table 1-1. Physical Specifications**

Parameter	Description
Size	19”W x 1.75”H x 13.75”D
Weight	10.5 Pounds
Operating Temperature	+10°C to +40°C
Power Requirements	115VAC, 60Hz, 0.8A Typ., or 230VAC, 50Hz, 0.5A Typ.

## 1.7 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](mailto:service@wegener.com)”.

**To return a product for service:**

1. Obtain a Return Material Authorization (RMA) number by completing and faxing a copy of the RMA Form (See Appendix D) to (678) 624-0294. You may E-Mail the same information instead to:

**service@wegener.com**

2. Plainly write the RMA number on the outside of the product shipping container.

***NOTE: Writing the RMA number on the outside of the shipping container will help us to return your equipment to you sooner. Thank you.***

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

Service Department RMA# \_\_\_\_\_  
Wegener Communications, Inc.  
359 Curie Dr.  
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.

## **1.8     MANUALS**

If you have any suggestions concerning this, or any Wegener Manual, please Email them to **manuals@wegener.com**. If you would rather mail them, please do so to the address shown below. Our preference is that you copy the page in question, mark it up, and fax or mail us the copy. We do appreciate constructive criticism.

Attn: Manuals  
Wegener Communications, Inc.  
11350 Technology Circle  
Duluth, GA 30097

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# SECTION 2

## SYSTEM CONFIGURATION

### 2.1 UNIT OVERVIEW

The UNITY 4000 IRD features several separate hardware components: The DC switching power supply, the main motherboard, an L-band DVB receiver, front-panel keypad controller card, a front-panel LCD assembly, and the L-band RF switch. The DC switching power supply provides all internal regulated DC power. The L-band RF switch is installed in the Module 2 expansion slot, and provides network or (if allowed by the network) local user selection of up to four separate RF feeds. The selected RF feed output is connected to the DVB-compliant L-band receiver card. This card tunes and demodulates the input QPSK carrier, and then applies two layers of error correction decoding. Its output is the original (possibly encrypted) multiplex MPEG transport stream which was input to the uplink IF modulator. This stream then feeds the main motherboard, which decrypts (if necessary) the stream and then demultiplexes out the selected video and audio elemental streams. These are, in turn, de-compressed and converted back to the original analog source material for output. Meanwhile, the user may query the IRD using the front-panel keypad for input and the LCD to read the returned status information.

### 2.2 BLOCK DIAGRAM DISCUSSION

Refer to Figure 2-1 (page 2-2) for the following discussion.

The DVB-compliant receiver card demodulates the incoming QPSK carrier. It implements both FEC decoding and de-interleaving per the DVB standard. The decoded byte stream is output to the main board.

The input to the main board is the multiplexed MPEG2 transport stream. If encryption is active, then the decryption function is executed. The resulting “clear” transport stream is then made available for output on the TRANSPORT OUT connector at the rear of the unit. In parallel, that stream is fed to the transport demultiplexor, this device selects the component elemental stream for selected video and audio programs, as well as the network control data streams. The selected video data is passed to an MPEG video decoder which converts the signal to linear digital video. This is then converted to analog NTSC in a final encoder for output. Meanwhile, the selected MPEG compressed audio stream is also routed to a combined decompression and digital-to-analog converter IC. The output is one stereo pair of audio signals (L and R) on Channel 1 at the back panel. In addition to the first stereo pair, a digital signal processor monitors and demultiplexes out another selected digital audio stream, which is also decoded and output as the stereo pair on Channel 2 at the back panel.

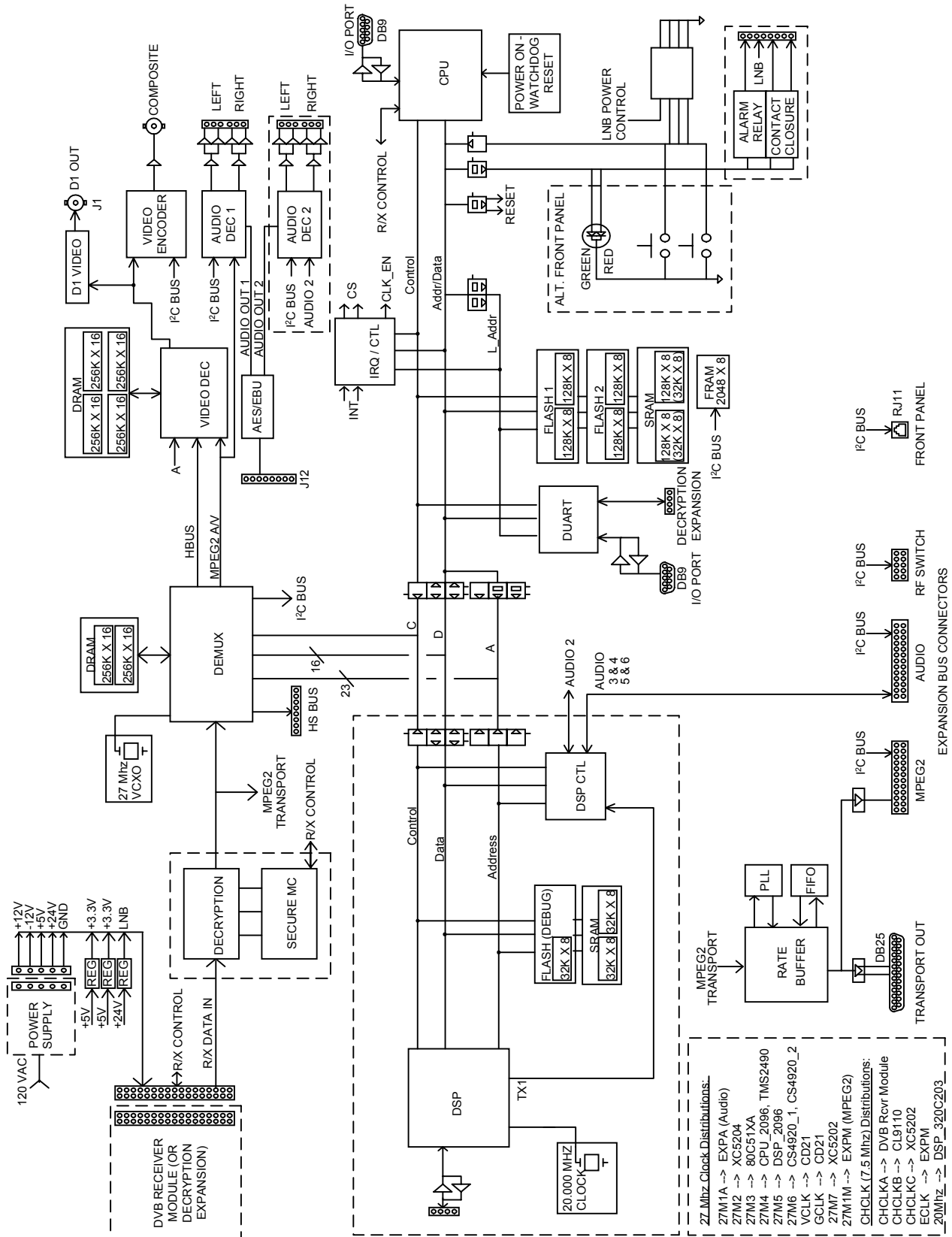


Figure 2-1. UNITY4000 BLOCK DIAGRAM



The control system on the main board is run by the main host processor. This processor interfaces with the COMPEL™ network as well as local users and then controls and monitors the unit's operations. To do its job, this processor accesses the control data streams recovered from the main transport demultiplexor. One of these may be a conditional access data stream (if used). The main processor sends this data to a separate secure microprocessor, which looks to see if its unit serial number is authorized to receive the broadcast signal and, if so, recovers the secret keys for decrypting the incoming encrypted transport stream. Meanwhile, the main host processor also communicates with several peripheral devices. It manages the data passed to/from the front-panel keypad controller (which lights status LED's, manages an LCD display, and reads back keypresses). It manages a serial port for terminal control (SERIAL 2), as well as one dedicated to printing local e-mail (SERIAL 1). It also controls the L-band receiver daughtercard and any installed options Modules (such as the RF switch).

For maximum flexibility, and to make value-added upgrades easily possible, the operating unit software is stored in flash memory and may be dynamically replaced via the local serial port or from the satellite network control channel.

## 2.3 SPECIFICATIONS

The receiver uses an integrated tuner and QPSK demodulator assembly.

### 2.3.1 L-Band Tuner

The tuner specifications are shown below.

**Table 2-1. Tuner Specifications**

Parameter	Specification
Input Frequency Range	950 - 2150 MHz
Input Level Range	-20 dBm total signal power down to -135 dBm/Hz signal power spectral density
Maximum Aggregate Input Power	-5 dBm
Input Impedance	75 ohms, unbalanced
Input VSWR	< 2.5:1
Input Noise Figure	8 dB MAX at minimum input level
L.O. Leakage at Input	≤ -55 dBm

### 2.3.2 QPSK Demodulator

The QPSK demodulator's input data rate is variable over the range shown in Table 2-2 (page 2-4), with a minimum transport-rate step size of 1 kbps. In Table 2-2, "threshold Eb/No" is that value of Eb/No at which the average number of uncorrected FEC frames exceeds one per minute.

**Table 2-2. QPSK Demodulator Requirements**

Inner Code Rate	Symbol Rate	Transport Rate	Threshold Eb/No
1/2	2.71-30 Msps	2.5-27.647 Mbps	4.0
2/3	2.04-30 Msps	2.5-36.863 Mbps	5.0
3/4	1.81-30 Msps	2.5-41.471 Mbps	5.5
5/6	1.63-30 Msps	2.5-46.078 Mbps	6.0
7/8	1.55-30 Msps	2.5-48.382 Mbps	6.4

### 2.3.3 Transport DEMUX

The transport demux is used to extract the desired video and audio streams from the multiplexed data stream.

### 2.3.4 System Processor

The main system processor is an extended architecture processor, and uses flash memory for microcode storage with download capability via either terminal or satellite channel.

The unit also has an MPEG2 video processor ASIC, and an audio processor ASIC.

### 2.3.5 Auxiliary Data Processing

An asynchronous user-data stream embedded in the transport stream may be routed to SERIAL 1 or SERIAL 2 ports under user or network control. The controller need merely supply the PID of the MPEG packets bearing the data and the output baud rate.

### 2.3.6 Composite Video Encoder

The IRD supports the video resolutions given in Table 2-3. The unit automatically senses the format (NTSC or PAL) and reconfigures the video decompression system accordingly.

**Table 2-3. Video Resolution Requirements**

NTSC	PAL
704H x 480V (Full Resolution)	704H x 576V
544H x 480V (3/4 Resolution)	544H x 576V
480H x 480V	480H x 576V
352H x 480V (1/2 Resolution)	352H x 576V
352H x 240V	352H x 288V

### 2.3.7 Video Specifications

NTSC video performance is specified below for use with NDS System 3000 at a 9 Mbps video PES rate, maximum resolution.

**Table 2-4. Video Specifications**

Parameter	Production Specification
Signal Type	Composite
Output Level	1.0 V <sub>p-p</sub> , ± 2%
Output Impedance	75 Ohms
Multiburst NTSC (0.5 to 4.2 MHz)	NTSC (0.5-4.2 MHz) ≤ ± 0.5 dB PAL (0.5-4.8 MHz) ≤ ± 0.6 dB
Differential Gain	≤ 4 IRE
Differential Phase	≤ 1.5°
L/C Gain Inequality	≤ ± 4 IRE
L/C Delay Inequality	≤ ± 26 nS
Line Time W-form Distortion	≤ 1 IRE p-p
Field Time W-form Distortion	≤ 3 IRE p-p
Video S/N Weighted	≥ 56 dB

### 2.3.8 Audio Specifications

Audio performance is specified below for use with NDS System 3000 at a compressed-audio PES rate of 256 kbps.

**Table 2-5. Audio Specifications**

Parameter	Specification (each channel of stereo pair)
Output Level-MAX PPL	+14.0 ±0.5 dBm into 600 ohms, <i>level at 0 dB audio attenuation</i>
Impedance	Balanced: < 60 Ohms
Frequency Response	20Hz to 20 kHz, + 0.5/-1.5 dB 50Hz to 15 kHz, ± 0.5 dB
Phase accuracy	50 Hz to 15 kHz, ≤ ± 2° from linear phase
Harmonic Distortion (1 kHz test-tone, 1 dB below PPL)	≤0.5 %
S/N Ratio	≥ 80 dB (22 Hz to 20 KHz) unweighted
Dynamic Range	16 bits
A/V Sync	≤ ± 50 mS error

### 2.3.9 Serial ASYNC Data, Monitor and Control of IRD

Two serial ports (SERIAL 1 and 2) for data to/from the IRD have the following characteristics:

**Table 2-6. Serial ASYNC Port Requirements**

Parameter	Specification
Signal Type	Serial Asynchronous Character Data
Levels	RS-232
Mode	Always 8 data-bits, one start, one stop-bit, half-duplex.
Pin-outs	DCE to AT-compatible serial port, 3-wire subset (Rxd, Txd, and Ground) without handshake lines. Connects directly to AT-compatible PC 9-pin serial port, and requires null modem cable when connecting to modem.

### 2.3.10 Encryption

The WCI decryption option includes a secure microprocessor and a decryption ASIC. Different levels of security may be implemented with software and ASIC changes.

### 2.3.11 Transport Output

The TRANSPORT output supplies the original received MPEG2 transport stream in Synchronous Parallel format.

### 2.3.12 Option Modules for Expansion Ports

The IRD has two expansion slots - one high speed and one low speed. The high speed expansion port provides the transport layer multiplexed stream while the low speed expansion port provides the filtered packet data. An I<sup>2</sup>C bus provides control for option modules. The specifications for individual modules are included in documentation for the module.

### 2.3.13 AC Power

The unit features a universal-input power supply. AC line is fed into a standard IEC jack. The nominal inputs are 115 or 230 VAC  $\pm$  10% at 50-60 Hz  $\pm$  2%. The total AC current consumption with the 4:1 RF switch option and max LNB DC load is 0.8A at 115 VAC, and 0.5A at 230 VAC.

### 2.3.14 LNB DC Power

The unit may feed DC power to an external antenna-mounted LNB using either the RF-In connector's center-pin or a terminal on the rear-panel terminal strip (with an external DC power inserter). The nominal voltage supplied is +17 to +24 VDC, while the maximum load current is 250 mA. The output is short-circuit protected by a thermal fuse. A rear panel MODE DIP switch may be used to activate/de-activate the DC output (see section 2.4.2.1). An internal

jumper (J22) is used to enable/disable DC power on RF-In center-pin. (Therefore, to get DC power on the RF-In center pin, both J22 and DIP switch must be set.)

### 2.3.15 Four Input / One Output RF Switch (Optional)

#### 2.3.15.1 Description

The module is installed into the MODULE 2 option-slot position on the back of the parent IRD. It allows the IRD to select one of four antenna / LNB inputs when its RF OUTPUT jack is connected via a 75-ohm coax cable to the IRD RF INPUT. There is no power pass for LNB DC power. (DC for the LNB is provided on the UTY4000 rear terminal strip and requires an external DC power inserter. No DC voltage is applied to any F connector.) The input and output RF connectors are Type-F jacks, and they are located on the option module rear panel.

No user-accessible controls or indicators are located on the module.

#### 2.3.15.2 Electrical Characteristics

The characteristics described in Table 2-7 are measured at a -25 dBm input level.

**Table 2-7. RF Switch Characteristics**

Parameter	Specification
Input Isolation, Port to Port (all ports terminated)	$\geq 35$ dB, 950-1450 MHz $\geq 24$ dB, >1450-2150 MHz
Input VSWR (selected port, 75-ohm system)	$\leq 2.5:1$ , 950-1450 MHz $\leq 3.5:1$ , >1450-2150 MHz
Insertion Loss	$\leq 1.5$ dB, 950-1450 MHz $\leq 4$ dB, >1450-2150 MHz

## 2.4 LOCAL CONTROLS AND INDICATORS

### 2.4.1 Front Panel

See Figure 2-3 (page 2-12) for a view of the front panel.

#### 2.4.1.1 Front Panel Display

The front-panel includes a 2-line by 20-character display to support the local user monitor/control interface. See Table 3-11 (Page 3-12), and Appendix B for details on the messages displayed there, as well as the menus supporting the keypad interface described in section 2.4.1.2.

### 2.4.1.2 Front Panel Keypad

The front-panel includes a keypad for user input. The keys are right, left, up, down arrows and SELECT, and ENTER. See section 3.9, and Appendix B for details on their use.

### 2.4.1.3 Indicator LED's

**Table 2-8. Front Panel LED's\***

Label Mnemonic	Meaning (see section 3.2)	Color
CARRIER	Carrier Tracking indication	Green
MPEG	Main MPEG mux indication	Green
CUE	Contact-closure activation	Green
AUTH	Authorized to receive KMS program	Green
AGC	Signal Level Warning	Green
COMPEL™	Network control indication	Green
WARNING	General warning indication	Yellow
ALARM	Link lost or other major alarm indication	Red

**\*For an explanation of the Front Panel LED's , see section 3.2**

### 2.4.2 Rear Panel

See Figure 2-4 (page 2-12) for a view of the rear panel, where the following controls are located.

#### 2.4.2.1 MODE Control DIP-Switches

A four position DIP switch is located on the IRD rear panel. See Section 3.6.4 for an explanation of its functions and controls.

#### 2.4.2.2 Standard DVB Synchronous Interface

**Table 2-9. Standard DVB Synchronous Parallel Interface Pinout**

Pin #	Signal	Pin #	Signal	Pin #	Signal
1	CLK+	11	VALID+	21	D2-
2	GNDD	12	SYNC+	22	D1-
3	D7+	13	GNDS	23	D0-
4	D6+	14	CLK-	24	VALID-
5	D5+	15	GNDD	25	SYNC-
6	D4+	16	D7-		
7	D3+	17	D6-		
8	D2+	18	D5-		
9	D1+	19	D4-		
10	D0+	20	D3-		

There is a DB-25 connector on the rear panel labeled “Transport Out.” It supplies the original MPEG2 transport stream as a synchronous parallel output. The pinout for this connector is shown in Table 2-9.

## 2.5 EXTERNAL INPUTS AND OUTPUTS

**Table 2-10. Input and Output Connectors**

Name	Description
RF Switch ( <i>Optional</i> )	Four female Type-F RF INPUTS (1-4) and one female Type-F RF OUTPUT (no powered ports)
RF IN	Female Type F, L-band input, 950-2150 MHz
VIDEO OUT	75 ohm female BNC, NTSC composite video output
BALANCED AUDIO CH1 L	Plug-in terminal strip, +/-/com for Left mono of Channel 1 stereo pair
BALANCED AUDIO CH1 R	Plug-in terminal strip, +/-/com for Right mono of Channel 1 stereo pair
BALANCED AUDIO CH2 L	Plug-in terminal strip, +/-/com for Left mono of Channel 2 stereo pair
BALANCED AUDIO CH2 R	Plug-in terminal strip, +/-/com for Right mono of Channel 2 stereo pair
SERIAL 1	Female 9 pin D Connector (local COMPEL□, Printer, Modem or Terminal) (See Table 2-11 for pin-outs.)
SERIAL 2	Female 9 pin D Connector (local COMPEL□, Printer, Modem or Terminal) (See Table 2-11 for pin-outs.)
TRANSPORT OUT	Female 25 pin D Connector (Standard DVB Synchronous Parallel Interface)
LNB	Plug-in terminal strip, LNB DC
GND	Plug-in terminal strip, LNB DC current return
ALARM	Plug-in terminal strip, alarm relay contacts
CLOSURE 1	Plug-in terminal strip, network-controlled solid-state relay contacts
CLOSURE 2	Plug-in terminal strip, network-controlled solid-state relay contacts
AC Input	AC power connected through a standard IEC connector

**Table 2-11. Serial 1 and Serial 2 Port Pin-outs**

SERIAL 1		SERIAL 2	
Pin #	Signal	Pin #	Signal
B1	CTS	A1	DCD
B2	RXD (Output)	A2	RXD (Output)
B3	TXD (Input)	A3	TXD (Input)
B4	RTS	A4	DTR
B5	GNDS	A5	GNDS
B6	DSA	A6	DSA
B7	DTR	A7	RTS
B8	DCD	A8	CTS
B9	RI	A9	RI

### 2.5.1 Balanced Audio Outputs

There are two audio channel outputs on the rear panel. Each Channel (Ch1 & Ch2) has a right and left mono pair. Each of these pairs is a balanced, low-impedance audio output, with terminals labeled “+, -, and com.” These are accessed through terminal strips which plug through the rear panel into the main PWB. These strips have screw terminals which accept standard audio cables.

**Please note that audio should be terminated with 600-ohm loads for correct output levels.**

### 2.5.2 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:

For each monaural audio output (two per stereo channel), and for each alarm or user-controlled relay output THAT IS USED, a single ferrite core must be used for EMI emission suppression. The ferrite cores are supplied in the shipping container along with the Unity4000 IRD. Details on assembly of the ferrite cores on the wiring are shown in Figure 2-2. Note that each pair (or three, if the audio grounds are included) of wires must pass through the core twice. Be sure that this is done as close to the removable screw-terminal strip as possible. If minimal slack is used in the outer “turn,” the ferrite core should be properly restrained by the wiring alone.

In addition to the above precautions for the wiring to the screw-terminal strips, the user is cautioned to only use high-quality shielded cabling for the SERIAL 1, SERIAL 2, and TRANSPORT OUTPUT connectors.

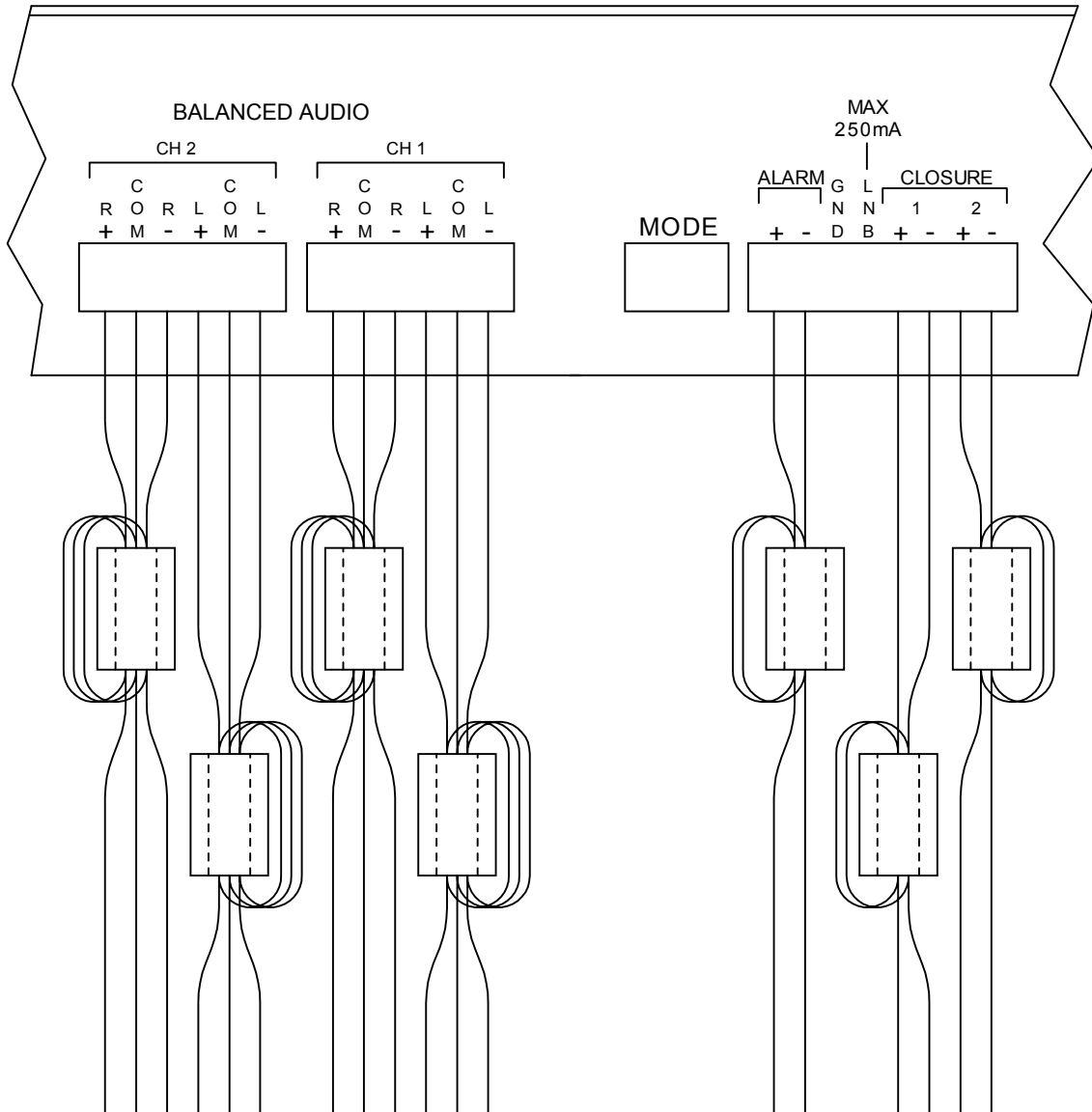
### 2.5.3 Alarm Relay and Addressable Contact Closures

The rear panel has an alarm relay and two network-controlled solid-state contact closures addressable from the COMPEL™ uplink computer. The alarm relay’s “alarm” conditions are the same as the front-panel ALARM LED. The alarm relay is factory-set so that an alarm condition or the loss of unit power will cause the rear panel alarm outputs to short together (alarm relay closed). Ratings for the alarm relay and network-controlled closures are 100 mA at 30 VDC.

The two contact closures are controlled via the COMPEL command stream from the uplink. See the COMPEL™ Manual for the commands and structure for the relay closures.



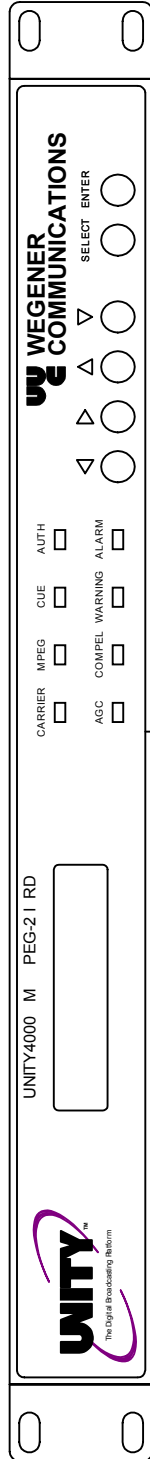
**Figure 2-2. Ferrite Bead Installation**



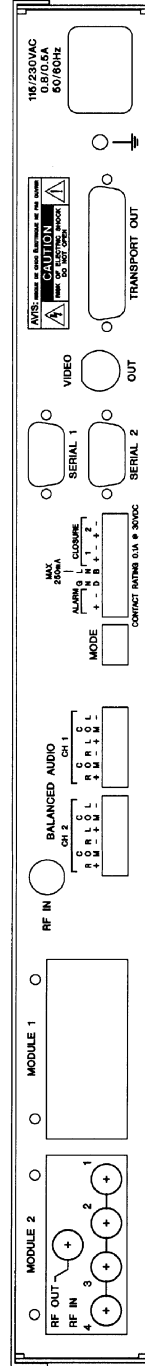
**\*\*\* CAUTION \*\*\***

To meet FCC requirements, the alarm and contact closures must have a ferrite bead installed on each pair of wires leading from them. See Section 2.5.2 and Figure 2-2 for instructions on their installation. There are 7 ferrite beads packed with the unit. Four of these are for use with the audio outputs, 1 is for the alarm relay output, and 2 are for the contact closures.

**Figure 2-3.**  
**UNITY4000 Front Panel**



**Figure 2-4.**  
**UNITY4000 Rear Panel**  
**(with Optional RF Switch)**



## 2.6 EXPANSION CARD CONFIGURATION

The purpose of this section is to detail the jumper settings and labeling instructions for the Unity Expansion Cards.

### 2.6.1 Balanced Audio Expansion Card

#### 2.6.1.1 Audio Card Jumper Configuration

Jumper settings – Dotted and Non-dotted. The headers used here have 3 pins, so a jumper connecting 2 of these pins can connect pins 1 & 2 or pins 2 & 3. The “Normal” position of this jumper is marked by a dot on the silkscreen near either pin 1 or pin 3.

**Dotted Position** - Jumpering pin 2, the center pin, to the pin nearest the dot.

**Non-Dotted Position** - Jumpering pin 2 to the pin furthest from the dot.

Installing one audio expansion card enables audio channels 3 and 4. You should set jumpers J2, J3, J4, J6, J7, and J8 on this Audio Card to the “dotted” position.

Installing a second audio expansion card enables audio channels 5 and 6. Set jumpers J2, J3, J4, J6, J7, and J8 on this Audio Card to the “non-dotted” position. Leave the jumpers on the first audio expansion card in the “dotted” position, which will continue to enable channels 3 and 4 on that card.

#### \* \* \* Caution! \* \* \*

When 2 audio expansion cards are installed, one must have the jumpers in the dotted position, and the other must have them in the non-dotted position. Failure to correctly configure the jumpers WILL cause operational problems.

Either available module slot may be used with the “non-dotted” card, but that card will be the Channel 5 & 6 card. The “dotted” card will be the Channel 3 & 4 card. Each card should also be labeled appropriately. (See the following section.)

#### 2.6.1.2 Audio Card Label Instructions

When a single balanced audio expansion card is installed (In either Module 1 or Module 2 slot), channels 3 and 4 are used. You should set the jumpers on that card to the “dotted” position, and label the Audio Card Bracket as [CH4 CH3]. To label it:

1. Peel the [CH4 CH3] label from the backing.
2. Press the label onto the rear of the Audio Card Bracket, within the blank rectangle provided or cover existing silkscreen text.

When a second balanced audio expansion card is installed, channels 5 and 6 are used. The second card is installed in the vacant module slot and connected to the first card and the motherboard by a 3-connector cable, rather than the 2-connector cable used with a single card.

The second card enables Channels 5 & 6 when the jumpers are set to the “Non-dotted” position. Labeling this card is done like the first card, except it will be labeled [CH 6 CH5].

## 2.6.2 SYNC Or ASI Data Card Jumper Configuration

### \* \* \* Caution! \* \* \*

When 2 SYNC or ASI expansion cards are installed, one must have the jumpers in the dotted position, and the other must have them in the non-dotted position. Failure to correctly configure the jumpers WILL cause operational problems.

When you install one SYNC or ASI expansion card, set jumper J9 on that card to the “dotted” position. See Section 2.6.1 for details on “Dotted” and “Non-dotted” jumper positions.

When installing a second SYNC or ASI expansion card, jumper J9 on that card must be set to the “non-dotted” position. Leave jumper J9 on the first data expansion card set to the dotted position.

# SECTION 3

## OPERATION

### 3.1 MODES OF OPERATION

#### 3.1.1 Power Up

At power up, the unit does a quick checksum test on the EEPROM. If the test passes, the unit then initializes various devices and configures itself according to the EEPROM settings. It then waits for the receiver board to complete its power up tests, which takes about 10 seconds. If the receiver board passes its test, the IRD sends a tune request to the receiver board and the Welcome Banner to the serial port. The IRD then enters alarm mode until all of the alarm conditions are cleared.

*Also, while in power up mode, each of the Unity 4000's LED's will FLASH (See Table 3-1, page 3-2.).*

#### 3.1.2 Boot Fail

If any of the boot fail conditions occur, the unit will enter "boot fail" mode. While in this mode, the unit is essentially dead. All audio and video is muted, the alarm relay is closed, the general purpose relays are all open, and the unit does not attempt carrier acquisitions, etc.

#### 3.1.3 Alarm, Warning, & Normal

See Sections 3.2.7 and 3.2.8 for a complete list of alarm/warning conditions and for information on the LED's during these modes. The overall behavior of the IRD is very similar for any of these modes, and the following is a list of their differences:

- Alarm and User Relays. See sections 3.2 and 3.3 for details.
- Video is alarm frozen if No MPEG Data for less than 5 seconds, No Video for less than 5 seconds, or in fade mode for less than 10 seconds.
- Video is muted for all alarm conditions except Alarming Eb/No.
- Audio is muted for all alarm conditions except Alarming Eb/No and No Video Data.
- LED's are unique for each of these modes.

### 3.2 LED & ALARM / WARNING CONDITIONS

The following definitions apply throughout this section:

**Table 3-1. LED and Alarm Conditions**

Blink	LED is OFF for 1 second, and then blinks on count times ( ON for 250 mS and OFF for 250 mS). This overall pattern is continued.
Flash	ON for 100mS, OFF for 100mS, ...
Flutter	ON for 50 mS, OFF for 50 mS.
AMBER	RED and GREEN turned ON at the same time.

The UNITY4000 has eight front panel LED's, each of which is described below.

**3.2.1 Carrier (Green)**

ON if receiver board is tracking (IRD not necessarily in tracking mode). Otherwise FLASH.

**3.2.2 AGC (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).

**3.2.3 MPEG (Green)**

ON if synced on MPEG stream. FLASH if no MPEG sync but locked on carrier. Otherwise OFF.

**3.2.4 Cue (Green)**

ON while any relay is closed. Also, relay must be ON for a minimum of 1 second. Otherwise, OFF.

*Note that the relays are often used for local video insertions. It is assumed that relay 1 is momentary and starts the system's insertion equipment. The actual switch is accomplished by the local commercial insertion controller.*

**3.2.5 COMPEL™ (Green)**

FLUTTER if COMPEL addressed to unit within last 5 seconds (keep alive commands are not considered to be addressed to unit). ON if COMPEL received within last 2 minutes. OFF if COMPEL is not required or unit is not in Tracking mode. Otherwise, FLASH (unit is in Tracking and no COMPEL within last 2 minutes).

**3.2.6 Authorized (Green)**

ON if authorized for current program and have MPEG sync. FLASH if not authorized for current program. OFF if no program is available.

### 3.2.7 Alarm (Red)

FLASH if any of following: (see Table 3-1, page 3-2)

1. EEPROM Boot Failure.
2. Receiver board diagnostics Boot failure.
3. Receiver board communications Boot failure.
4. Secure micro / host ID mismatch Boot failure.

ON if any of the following:

1. Receiver board run-time failure.
2. Fade mode > 10 seconds.
3. Installation mode > 10 seconds.
4. Carrier table search mode.
5. Header search mode.
6. Satellite search mode.
7. Alarming Eb/No.
8. No MPEG data > 5 seconds and locked on carrier.
9. Not authorized for current program.
10. Selected program not available.
11. Failure of an optional or special output (if allowed by factory reset control mask).
12. Overheating.

Otherwise, OFF

When an alarm or warning condition is active, that condition is displayed on the LCD. The IRD will not indicate (neither on LED's and LCD) multiple conditions; it will indicate only the most critical condition. Alarm conditions are considered more critical than warning conditions, and the list of alarm and warning conditions shown above and below are listed from most critical (1) to least critical (4 or 12).

*Note that the Alarm LED is only ON when the unit is either overheating or unable to produce video, or if a secondary output has failed (and if control mask allows for alarm or warning display).*

### 3.2.8 Warning (Amber)

ON if any of following:

1. E-mail received but not read. (See caution, pg 3-4, and section 3.9.3, page 3-14.)
2. Secure micro run-time failure.
3. Marginal Eb/No and locked on carrier.
4. RF level is HIGH.
5. RF level is LOW.
6. Fade or Installation mode < 10 seconds.

7. No MPEG data < 5 seconds and locked on carrier.
8. COMPEL required and no COMPEL within last 2 minutes.
9. Selected audio not available.
10. Failure of an optional or special output (if allowed by factory preset control mask).

Otherwise, OFF.

**\* \* \* CAUTION \* \* \***  
 E-mail messages should be read as soon as possible after receipt, because each message will be over-written by the next one.

### 3.3 RELAYS

This IRD supports 1 alarm relay and 2 solid state user relays. These relays are user controlled via COMPEL™ and the modem/terminal interface. The following table specifies the behavior of the relays for each of the modes. The sense of the alarm relay is set by an internal jumper (J17) on the unit motherboard to be either Normally Open (close on energize) or Normally Closed (Open on energize).

**Table 3-2. Relay Operation**

Mode	Alarm Relay	User Relays
Normal	Energized	User Controlled
Warning	Energized	User Controlled
Alarm	De-energized	User Controlled
Boot Fail	De-energized	Open
Power Off	De-energized	Open

*Note that the alarm relay is de-energized when the IRD's power is off. Power loss will look like any other alarm.*

### 3.4 PROGRAM SELECTION

Programs may be selected by network control and (if allowed by the network) by local user. A multiplexed MPEG transport stream may support some number of separate programs. Each program has a single video and some number of associated audio data streams associated with it in the main transport stream. The programs are designated with a number, but if none is supplied by the selection command (e.g. the "\*" designation) the lowest in number order will be selected by the IRD.

### 3.5 AUDIO HANDLING

The selected program (see section 3.4) has a number of separate compressed-audio data streams associated with it. These are assigned 3-letter mnemonic designations. Any of these may be routed to either the Ch1 or Ch2 stereo outputs on the back of the IRD (but not both!). The



selected stream is a stereo or dual-mono signal. It may be routed to the L and R connections in a specific relationship to the original audio connections at the uplink MPEG encoder unit:

**Table 3-3. Audio Handling**

Stereo	Original encoder L and R routed to corresponding L and R outputs on IRD
Reverse Stereo	Original encoder L routes to IRD R output, while original R routes to the L output
1 on both*	Original encoder L is routed to both L and R outputs on IRD
2 on both*	Original encoder R is routed to both L and R outputs on IRD

\* Originally, left “channels” were designated “1” and right as “2”. Now “channel” designates the selected audio program by PID.

### 3.6 SOURCES OF CONTROL

The IRD can be controlled via COMPEL™, terminal, modem, DIP switches, and Display / push buttons. Each of these methods of control is explained in the following sections, but you should see the COMPEL manual for a complete explanation of the COMPEL system.

#### 3.6.1 COMPEL™

The COMPEL command stream from the uplink is usually the unit’s primary source of control. This asynchronous stream is mux’ed into the aggregate MPEG data stream at the uplink. An IRD can also accept a local COMPEL command stream from its serial port if enabled by the satellite program provider. However, it can only process one of these streams at any given time. See the COMPEL Manual for a complete explanation of the COMPEL system.

#### 3.6.2 Terminal

The terminal command interface can be accessed by setting serial port 2 “device” to “Terminal” (using front panel control). You may then access the terminal commands if you have a terminal installed. These commands appear on a help screen and are documented in Appendix A of this manual. With the exception of the “R” and “H” commands, they are only available if local control is enabled.

#### 3.6.3 Modem

The modem command interface is similar to the terminal interface. That is, it does not utilize special handshaking or special control characters for this interface, and only supports auto-answer modems. In fact, the IRD does not distinguish between an attached terminal and a modem. To access the modem command interface, the serial port 2 “device” must be set to “Modem” (using front panel control). To access user commands, the user must enter the correct password at the prompt. The user then retains access until (1) the “OH” command is received, or (2) 10 minutes passes with no user input. As is the case for the terminal, the user commands are restricted when local control is disabled.

### 3.6.4 Dip Switches

The use of the four DIP switches is shown in the following table:

**Table 3-4. Dip Switch Function**

Dip Switch	Function ( <i>UP is the most common state.</i> )
1	NTSC - UP. PAL - DOWN
2	Reserved
3	Test Mode. UP:INACTIVE, DOWN:ACTIVE. While in test mode, the unit pulses 831 Hz tones out each audio output. The tones are ON for 1 second, OFF for 1 second, .... Also, a gray scale is output for video.
4	LNB Power. UP: OFF, DOWN: ON. <i>Not under software control.</i>

### 3.6.5 Display / Push Buttons

This interface supports the following functions:

1. Status.
2. Control.
3. Front panel email.

See the Display / Push Button Menus, Appendix A, for complete details.

## 3.7 SERIAL PORTS

The UNITY4000 contains two serial ports. Any of four “devices” may be assigned to either serial port, though higher-speed processes should prefer port 1 because it has more buffering. Also, any device may only be assigned once, with the additional restriction that if either the terminal or modem is assigned, the other cannot. Communication is fixed at 1 stop bit and 8 data bits, and there is no handshaking. The serial port’s behavior for each of its device types is shown in the following table.

**Table 3-5. Serial Device Settings**

Device	Serial Port Behavior
Printer	Configured to <i>B, P, 8, 1</i> (See note 1). All input data is ignored.
Aux Data	Configured to <i>B, P, 8, 1</i> (See note 2). All input data is ignored.
Terminal	Configured to <i>19200, N, 8, 1</i> . The unit responds to the terminal/modem commands as described in Appendix A.
Modem	Configured to <i>B, N, 8, 1</i> (See note 3). The unit responds to the terminal/modem commands as described in Appendix A.

Note 1. For Printer: 'B' may be 1200, 2400, 4800, 9600, or 19.2k baud; 'P' may be 'O' for Odd, 'E' for Even, or 'N' for No parity.

Note 2. For Aux Data: 'B' may be 1200, 2400, 4800, 9600, 19.2k, or 38.4k baud. 'P' may be 'O' for Odd, 'E' for Even, or 'N' for No parity.

Note 3. For Modem: 'B' may be 9600, or 19.2k baud; parity is always 'N' for No parity.

### 3.7.1 Printer Device Handling

For the Printer device, there are three legal output types: COMPEL E-mail, COMPEL Requested Reports, and Raw COMPEL (binary) data. If allowed, then the uplink, through COMPEL, may elect to send e-mail or request report dumps. (See the COMPEL ICD about COMPEL E-mail.) The report dumps are the same as those the local user may select using the 'R' terminal commands. This causes the literal COMPEL data stream to be output on the assigned serial port. (Note that this will include non-printing characters!)

### 3.7.2 Aux Data Device

This device is defined to allow for async data streams to be carried within the Transport stream and their raw payloads output on an IRD serial port. The PID of these streams may or may not be assigned to a Service within a PMT. To recover the data, the IRD need only be given the PID and baud-rate. 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.

## 3.8 RECEIVER FUNCTIONS

Note that throughout this manual, the term valid carrier means the absolute value of the difference between the LNB LO and the carrier is  $\geq 950$  MHz and  $\leq 2150$  MHz.

### 3.8.1 Perms, Temps, Searching & Settings

The term *settings* is used throughout this document and includes the following parameters:

**Table 3-6. Settings Parameters**

<i>{RF_In}</i>	Value from 1 - 4, specifying the RF input (if RF Switch is installed)
<i>Carrier</i>	The downlink frequency specified in MHz with up to two decimal places. This value's absolute difference with the LNB LO frequency must be $\geq 950$ MHz and $\leq 1450$ MHz.
<i>Data_rate</i>	The data_rate is the MPEG2 transport rate in Mbps. (See Table 2-2 for allowed ranges.) This figure can have up to three decimal places.
<i>Fec_rate</i>	The inner FEC code ratio, which can have one of the following values: 1/2, 2/3, 3/4, 5/6, or 7/8.
<i>Tag_site</i>	Value of 0-14 specifying the location of this carrier's tag frequency. See section 3.8.4 for special note on the use of Tag Site 15 to disable the requirement for Carrier ID Tags.
<i>[program]</i>	The program number from the MPEG Program Association Table. This must be a number from 1 to 65535. If omitted or an '*' is entered, the unit will select the first available program stream. Note that this number points to the PID for the Program Map Table for what we might call a "service" (a single video channel and associated audio signals).

The IRD is acting on one of three groups of settings at any given time, each of which is described in the following table:

**Table 3-7. Settings Types**

Settings Group	Description
Temp	These settings are entered via COMPEL or the TEMP / TEMPCH terminal commands. The unit is said to be inserting when it is configured to the temp_settings. The maximum length of an insert is approximately 18 hours (65535 seconds). An insert terminates when (1) it times out, (2) an ABORT command is received, (3) power is cycled, or (4) an invalid header is seen. Any Temp commands received while the receiver is currently inserting are ignored. If a Perm command is received while inserting, the perm_settings are updated but not acted on until the insert is terminated.
Perm	The perm_settings are entered via COMPEL or the PERM / PERMCH commands, OSD interface, or automatically from within a search mode (see below). The perm_settings are the only settings group that are stored in NVRAM.
Search	The search_settings are active while in Carrier Search, Header Search, and Satellite Search modes. When the unit finds what it is looking for in the search mode, it copies the search_settings to the perm_settings. These are then considered to be the active settings. See Acquisition Modes Section for more information on search modes.

### 3.8.2 Settings Table (or Search Table)

This is an internal database retained in nonvolatile memory (unaffected by loss of power) which contains a list of alternate carrier settings. Each valid entry is a complete description of a carrier/program setting (as used in a PERM command). This list is entered at customer request at the factory, and may be edited using COMPEL commands or ADDS and DELS terminal commands. The entries are referred to as “table entries” or “search settings entries,” etc. The Settings Table is typically used for one of two possible operations: (1) As a shorthand way for a local user to preprogram particular carrier/program combinations and quickly tune the IRD to them; or (2) as a source of alternate fallback carriers in the event that the “normal” carrier is lost (or has a failure in its COMPEL stream). The Carrier and Header Search IRD modes are examples of this second operation.

### 3.8.3 Signal Quality Monitoring

The IRD provides the following signal quality information:

**Table 3-8. IRD Signal Quality**

Eb/No	Both an a quick and an average Eb/No reading. The quick Eb/No is updated approximately every 500 mS, and the average is a running 10 second average of these quick readings. Display of Eb/No is based on readings from the OEM DVB receiver daughtercard.  The <i>Eb/No alarm</i> is generated when the averabe Eb/No is found to be lower than the “SNR Alarm Level.” A <i>margin warning</i> is generated when the average Eb/No is not yet low enough to be in full alarm, but it fails to exceed that alarm threshold by the “Margin Offset” (in dB).
RF Level	Unit will show WARNING if the RF level is detected to be above –20 dBm or below –60 dBm.
Signal Fades	A counter is maintained for transitions from Tracking to Fade mode.
RF Glitches	A counter is maintained for carrier “hits”. A “hit” is when the receiver board detects one or more uncorrectable Reed-Solomon frames, yet small enough not to cause a transition from Tracking to Fade mode. Note that an RF hit will induce a hit on the unit’s video/audio.
Availability	Shows the percentage of time that the unit has been locked on a carrier since that carrier was first acquired (timer.locked / timer.since_first_acquired).

### 3.8.4 Frequency Tagging

Under normal operation, the IRD can only acquire carriers that contain frequency tags (EXCEPTION: See next subsection.). These tags are inserted in the COMPEL control stream at the uplink and are used for identifying the carrier’s frequency. Tagging was mandated, because without them, the IRDs could have locked on some other, nearby, (adjacent) carrier while looking for the intended carrier. The tuning can be off by several MHz, which is due to minor offsets in the LNB and within the receiver itself. Traditionally, the tags have been sent at a rate of every 100 or 125 mS. The IRD supports both single and multiple tags. The tag\_site, which is part of the settings, tells the receiver which of these possible tags to use. See the SCPC

Frequency Tag Protocol Functional Specification (WCI # 16803) for details. An exception to that Protocol is that this IRD only allows for Tag Site designations from 0 to 15 inclusive, and '15' is specially reserved (see next). To reduce processing overhead, the unit only looks for tags while in the Get Tag sub-mode or when tag\_testing. The IRD does not provide an indication of time-since-last-tag.

Exceptions to the normal operation with respect to Carrier ID Tagging are:

- 1) If the IRD is in the nonvolatile 'ISOG E' state (see 'ISOG' terminal command), the Carrier Tags are not required. When in the GET CARRIER submode, and Carrier Lock is achieved, then the unit state transitions directly to TRACKING (passes through GET TAG).
- 2) If the Carrier Setting shows Tag Site '15', then that is treated as an 'ISOG E' command which is only effective as long as the IRD remains tuned to that Carrier Setting.

### 3.9 DISPLAY / PUSH BUTTONS

#### 3.9.1 Overview

The front panel consists of a 2 X 20 Display and six push buttons. Essentially all control available through the terminal is available via the front panel. The front panel can also be used to view a COMPEL down-loadable text message. This message is volatile and can contain up to 512 characters. The Display can be in one of the following modes:

**Table 3-9. Display Modes**

Mode	Description
HOME	Display shows ALARM or WARNING message (if applicable), or RF switch position, carrier frequency, program ID and TEMP (if inserting). Display returns to this screen after push buttons are inactive for 5 minutes <i>or if both ENTER and SELECT buttons are pressed simultaneously.</i>
SN	Unit Serial Number displayed for a few seconds if ENTER is pressed while in HOME screen.
MENU	Entered from Home mode. Display shows menu for each available command group.
PARAMETER	Entered from Menu mode. Display shows specific parameter associated with command group.
EDIT	Entered from Parameter mode. Display blinks edit field when in this mode.

### 3.9.2 Push Button Functions

**Table 3-10. Push Button Functions**

LCD MODE	PUSH BUTTON	FUNCTION
HOME	SELECT	N/A
	ENTER	Shows unit serial number for approximately 10 seconds
	^ (UP)	N/A
	∨ (DOWN)	N/A
	> (RIGHT)	Enters MENU mode.
	< (LEFT)	Enters MENU mode.
MENU	SELECT	Enters PARAMETER mode
	ENTER	N/A
	^ (UP)	N/A
	∨ (DOWN)	N/A
	> (RIGHT)	Scrolls forward through MENU selections.
	< (LEFT)	Scrolls backward through MENU selections.
PARAMETER	SELECT	Enters EDIT mode or exits EDIT mode (depending on displayed parameter)
	ENTER	N/A
	^ (UP)	N/A
	∨ (DOWN)	N/A
	> (RIGHT)	Scrolls forward through PARAMETER selections.
	< (LEFT)	Scrolls backward through PARAMETER selections.
EDIT	SELECT	Cancel changes, leaves EDIT mode, and enters PARAMETER mode.
	ENTER	Enters changes.
	^ (UP)	Increases value of number in edit field or scrolls up to next choice in list. In number field, button increments once per button push or can be held to scroll. Button acceleration occurs when push-button is depressed for more than 5 seconds.
	∨ (DOWN)	Decreases value of number in edit field or scrolls down to next choice in list. In number field, button decrements once per button push or can be held to scroll. Button acceleration occurs when push-button is depressed for more than 5 seconds.
	> (RIGHT)	Advances display to next edit field (if applicable).
	< (LEFT)	Displays last edit field (if applicable).

**Table 3-11. LC Display Menus**

*Note: Screens marked by ‘\*’ are not shown if local control is disabled (either programmed into non-volatile memory at factory or set by COMPEL command). Exception: “Audio Settings” screen is shown but only “Attenuation” may be changed by local user.*

MAIN LEVEL	SECOND LEVEL	THIRD LEVEL	
Home Screen	N/A	N/A	
Email	Email Msg		
Hardware Setup	Current Settings*	RF Feed (Optional), Carrier Frequency and Data-rate	
		FEC rate, Tag Site, and Program #	
	Channel Select*		
	Edit Channel*	<i>For each possible channel entry...</i>	
		RF Feed (Optional), Carrier Frequency and Data-Rate	
		FEC rate, Tag Site, and Program #	
	Audio Settings*	Channel 1	
		:	
		:	
		Channel n	
	SNR Alarm Threshold		
	Serial Ports	Select Serial Port Devices	
		Modem Password	
Printer Settings			
Modem Settings			
Aux Data Device Settings			
LNB LOs			
Unit Reset			
Status Reports	Settings Status	PERM, TEMP, or SEARCH settings	
	Carrier Status (Tracking)	Acq. Mode, Mode Duration	
		RF In, Carrier, Data Rate, FEC Rate	
		Tag, Program ID	
		EbNo Margin/Level	
		Last Acq., EbNo high/low	
		First Acq., Availability	
		RF Level, EbNo Level Status	

**Table 3-12. LC Display Menus (Continued)**

MAIN LEVEL	SECOND LEVEL	THIRD LEVEL
------------	--------------	-------------



Status Reports (Continued)	Carrier Status (Not Tracking)	Acq. Mode, Mode Duration
		RF In, Carrier, Data Rate, FEC Rate
		Tag, Program ID
		Acquisition Submode
		No MPEG, No Tag
		Wrong Tag
		Wrong Header
	MPEG Status	Aggregate MPEG Transport Rate
		Program Presence
		Video muting
		Audio Presence
		(Audio) Port 1 Program, Routing, Muted/Unmuted
		:
		:
	(Audio) Port n Program, Routing, Muted/Unmuted	
	Settings Table	RF In ( <i>if applicable</i> ), Carrier, Location, Data Rate, FEC
		Tag, Program ID
	NC Status	S/N, COMPEL Lock, COMPEL Control Required
		Local Control, Network Mode
		(Time Since) Last Header, Last Addr Header
		History, Total Processed
		Invalid Header, Invalid Checksum ( <i>if applicable</i> )
		Invalid Length, Buffer Overflow ( <i>if applicable</i> )
	Parameter Status	LNB LO ( <i>multiple for RF switch option</i> )
		SNR Alarm Level/Margin Offset
		Fade, Install Timeouts
		Search, No Compel Timeouts
		Compel Seek, Header Search Timeouts
		Audio Demux, Audio Ports Installed
		Encryption, RF Switch Option Status
		Sync Data Option Status
		DVB- ASI Option Status
		Expansion Relays Option Status
SDI (D1) Video Output / DVB-ASI Transport Out Status		

MAIN LEVEL	SECOND LEVEL	THIRD LEVEL
Status Reports	Serial Port Status	Email Enabled

(Continued)		Modem, Printer setup
	Relay Status	
Version	Application	
	Boot Code	
	Audio Demux (DSP)	
	Xilinx PLDs	
	Lattice PLD	
	Secure Micro	
	Video Decoder	
	Audio Decoder	
	Rx Card	
	Conditional Access	
Navigation Help	Left/Right Scroll	
	Select Button	
	Up/Down Scroll	
	Enter Button	
	Select Cancel	
	Return Press Select	

### 3.9.3 E-mail

E-mail messages may be sent from the uplink to the Unity4000 and displayed on the LC Display. To view E-mail messages, follow these steps:

1. When an E-mail message is received, the Warning light will be turned “ON” and the following message will normally be shown on the LC Display:

<p>WARNING: Email Present</p>
-----------------------------------

Press <▶> or <◀> to scroll through the top level menu until you see the E-mail menu display similar to the one shown in Step 2.

**NOTE:** If the “Warning” message above is not shown, you may reach the E-mail menu by scrolling through the top level menu until you see the E-mail menu display. If there is no E-mail message, you will see the following display.

EMAIL:NONE

If there is an E-mail message, the display in Step 2 will be shown:

2.

EMAIL READ:<SELECT>

Press <SELECT> to view the first 20 characters of the message on the display. To view more of the message press <▶>. You may scroll in either direction by pressing <▶> or <◀>. Pressing and releasing either of these keys will scroll the message 1 character.

3. When you pass the end of the E-mail message, the following will be displayed:

<--END OF EMAIL-->  
⌘Press <ENTER>

4. Press <ENTER >, which will end the current E-mail session, and cause the following message to display:

RETURN  
Press <SELECT>

5. Pressing <SELECT> will take you out of the E-mail menu, and return you to the top level menu. The following message will be displayed:

EMAIL READ:<SELECT>  
CLEAR:<ENTER>

6. At this point the E-mail is in the buffer, and you may leave

it, scroll through it, or clear (erase) it. You are effectively back at Step 2 (Top Level Menu), with the added option of “Clearing the message.” This option is not available until you have scrolled through the message once.

7. If you press <SELECT> you can scroll through the message again. If you stop at this point, the message remains in the buffer.

If you press <ENTER> you will erase the E-mail message and remain at the top level menu. The following message will be displayed:

EMAIL:NONE

8. At this point, pressing <▶> or <◀> will allow you to scroll through the top level menu.

**NOTE:** When moving through the front panel menus, pressing <ENTER> and <SELECT> at the same time will move you to the top level menu. This is an immediate move, and does not save any changes or inputs.

\* \* \* CAUTION \* \* \*

E-mail messages should be read as soon as possible after receipt, because each message will be over-written by the next one.

# APPENDIX A

## Terminal / Modem Commands

### \* \* \* CAUTION \* \* \*

**Terminal / modem commands fall into two categories, Status Commands and Control Commands. If Local Control is disabled, only Status Commands will be accepted by the unit. No Control Commands will be accepted until Local Control is enabled. For more information, see the commands listed below.**

Commands described 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.

### A1.0 STATUS COMMANDS

**These commands show status and help displays, but do not allow for changes to that status.**

#### A1.0.1 AH [*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 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.

## A1.0.2 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 8 and is only applicable for the group status report. Indicates the page to be reported. If omitted, all eight pages are reported and scrolls off the terminal screen.

## A1.1 CONTROL COMMANDS

Again, these commands are only active when “Local Control” is enabled. They are the commands by which you may change unit settings.

### A1.1.1 ABORT

Insert is terminated.

### A1.1.2 ADDS location settings

*location*: Value from 1 - 48 indicating location in settings\_table.

*settings*: See Perms/Temps/Searching & Settings Section.

The *settings* are added to the settings\_table at the specified location. Will also handle data rate rounding as explained for PERM.

### A1.1.3 DELS location

*location*: Value from 1 - 48 indicating location in settings\_table.

The entry in the settings\_table at the specified location is deleted. Ignored if only one entry in settings\_table.

### A1.1.4 MUTE [source][source]

*source*: If no source is specified then video, async data, and all audios are selected. *Source* can be any of the following:

V	To indicate Video.
A[/string]	To indicate Audio. An ‘A’ without the string indicates all audio outputs. The string which is contiguous, can contain one or more individual audio outputs (1L, 1R, 2L, ...6R), one or more paired audio outputs (1, 2, ...6), or any combination these. Multiple outputs must be separated by forward slashes

Mutes the specified outputs. Example: MUTE V A/1L/2/4/6R, mutes the video, audio Port 1 left, Ports 2 and 4 left and right, and audio Port 6 right.

### **A1.1.5 OH**

(Modem control only) When in a terminal control session via a modem, this discontinues user (password-authorized) access.

### **A1.1.6 PC device baud parity**

*device*: P or M, for Printer or Modem, respectively

*baud*: 9600 or 19200.

See Section 3.7 for details.

### **A1.1.7 PERM settings**

*settings*: See Section 3.8.1.

Unit sets its perm\_settings to *settings*. See Section 3.8.1 for more information.

### **A1.1.8 PERMCH location**

*location*: Value from 1 - 48 indicating location in settings\_table.

Unit sets its perm\_settings to those retrieved from the settings\_table according to *location*.

### **A1.1.9 PW password**

*password*: One to six alphanumeric characters.

Changes the modem\_password to *password*.

### **A1.1.10 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.

### **A1.1.11 SETAUDIO port route [program] [atten]**

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

*route*: S - Stereo (ch 1 on L, ch 2 on R)

1 - Ch 1 on both

2 - Ch 2 on both

R - Reverse stereo (ch 2 on L, ch 1 on R)

*[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]*: 0-14 dB or ( \_ ) to leave unchanged

The audio program is routed to the audio port *port*'s audio switch, and is then routed to the Left and Right outputs according to *route*.

#### **A1.1.12 SETLNB LO\_freq**

*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 *lnb\_lo\_freq* to *LO\_freq*.

#### **A1.1.13 SETTIMEOUT source time**

*source*: 1 - Fade

2 - Installation

3 - Carrier Search

4 - No COMPEL

5 - Header Seek

6 - Header Search

*time*: Time-out value in HH:MM:SS format. Valid range up to 4660 hours (except 30 seconds for fade).

Timeout.*source* is set to *time*. The timeout sources are defined as follows: (1) FADE timeout: The amount of time that the unit software will allow the receiver card to re-acquire a faded carrier "on its own" without some intervention. (2) INSTALLATION Timeout: The amount of time that the unit will attempt to initially acquire (or, after FADE timeout) re-acquire the carrier before searching for alternate carriers found in the Settings Table (called "Carrier Search" mode). (3) CARRIER SEARCH: The amount of time the unit will remain in CARRIER SEARCH before attempting SATELLITE SEARCH mode [*not defined currently*]. (4) NO COMPEL: The amount of time the unit will remain parked on a carrier after it has last received a valid COMPEL network header before attempting to re-acquire carriers in its Settings Table to see if they carry valid COMPEL network traffic (called HEADER SEARCH mode). This is only applicable to IRDs whose COMPEL REQUIRED status is REQUIRED. (5) HEADER SEEK: The amount of time a unit in HEADER SEARCH mode will loiter on a carrier it has acquired awaiting valid COMPEL pack headers before proceeding to attempt the same on other carriers in the Settings Table. If it acquires a valid COMPEL header, it reverts to TRACKING mode. (6) HEADER SEARCH: The amount of time the unit will remain in HEADER SEARCH before attempting SATELLITE SEARCH mode [*not defined currently*].

#### **A1.1.14 SNR alarm\_level margin\_offset**

*alarm\_level*: Units of dB with range from 5.0 - 14.9 and can have one decimal place.

*margin\_offset*: Units of dB with range from 1.0 - 10.0 and can have one decimal place.

Sets *alarm\_level* and *margin\_offset* accordingly.

#### **A1.1.15 TEMP settings time**

*settings*: See Perms/Temps/Searching & Settings Section.

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

Will handle data rate rounding as explained for PERM. Unit sets its *temp\_settings* to *settings*. See Perms/Temps/Searching & Settings Section for more information.

#### **A1.1.16 TEMPCH location time**

*location*: Value from 1 - 48 indicating location in *settings\_table*.

*time*: Same as for TEMP.



Unit sets its temp\_settings to those retrieved from the settings\_table according to *location*.

**A1.1.17 UNMUTE [source][source]**

*source*: Same as the MUTE command.

Identical to MUTE except specified services are unmuted.

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# APPENDIX B

## FRONT PANEL DISPLAY

### B1.0 HOME SCREEN

If alarm or warning condition is active:

A	L	A	R	M															
m	s	g																	

or

W	A	R	N	I	N	G	:												
m	s	g																	

where *msg* is a string identifying the condition (See Section 3.2 for warning and alarm conditions.).

If unit uses optional RF switch:

R	F	I	N	:	x	F	R	E	Q	:	y	y		y	.	y	y		
P	R	O	G	:	z	z	z	z	z	z	z	z	z	a	a	a	a		

or else:

F	R	E	Q	:	y	y		y	.	y	y								
P	R	O	G	:	x	x	x	x	x					a	a	a	a		

where *x* is RF switch feed (if applicable), *yyyyy.yy* is carrier frequency, *zzzzz* is the program number (5 digits), and *aaaa* is optional TEMP indicator if temporary insert is being executed.

To provide easy access to the unit's serial number, press <ENTER> from the Home Screen to display the serial number for approximately 10 seconds.

### B1.1 EMAIL

At the main (first) menu level, one of three screens is displayed, depending on the status of e-mail (none, e-mail present and un-read, or e-mail present and read). They are shown in that order below. Also, the Warning LED will be illuminated.

If email is not received or email is cleared:

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

If EMAIL has been received and not read, top level menu:

E	M	A	I	L		R	E	A	D	:	<	S	E	L	E	C	T	>	
---	---	---	---	---	--	---	---	---	---	---	---	---	---	---	---	---	---	---	--

If email has been received and read:

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

From the screen above, press <ENTER> to clear the e-mail buffer and return to the first (no e-mail) screen. If e-mail is present, then, after pressing <SELECT> at the above second or third screen, the following screen (second level) appears:

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

'<' and '>' are shown only when scrolling is necessary to view email message. To exit email screen you must scroll to end of message.

<	-	-	E	N	D	O	F	E	M	A	I	L	-	-	>
E	Q	U	I	C	K	B	R	O	W	N	F	O	X	J	U

After pressing <ENTER> the exit screen appears:

R	E	T	U	R	N	:													
P	r	e	s	s		<	S	E	L	E	C	T	>						

## B1.2 HARDWARE SETUP

H	A	R	D	W	A	R	E	S	E	T	U	P							
P	r	e	s	s		<	S	E	L	E	C	T	>						

This moves the user to 2nd level screens under “Hardware Setup.” In these screens, the user may make changes to the IRD setup. NOTE: If local control is disabled, then changes to current settings, channel entry/selection, and audio settings are not allowed, and their screens will not be shown.

### B1.2.1 Current Settings

Tunes IRD to a new channel setting per user input. Equivalent to a PERM terminal command.

C	U	R	R	E	N	T	S	E	T	T	I	N	G	S	:				
P	r	e	s	s		<	S	E	L	E	C	T	>						

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

R	F	I	N	:	x	F	R	E	Q	:	y	y	y	y	.	y	y		
D	A	T	A	R	A	T	E	:	z	z	.	z	z	z					

Where “x” is the RF Switch Feed number (1 to 4, field only shown if option installed), yyyy.yy is the downlink carrier frequency in MHz, and zz.zzz is the transport data rate in Mbps.

F	E	C	:	x	/	x		T	A	G	:	y	y			
P	R	O	G	:	z	z	z	z	z							

Where “x/x” is the inner FEC code ratio (1/2, 2/3, 3/4, 5/6, or 7/8); yy is the tag site. For program designator, **zzzzz** is a number or wildcard ‘\*’. Program designator field is left-justified because length is variable. All edit sessions start on extreme left-hand numeric character. For any character in the field, the up/down arrows scroll through all numeric characters 0-9, except that the max allowed value will be ‘65535’. To select the ‘\*’ wildcard (lowest program # available), enter ‘00000’.

S	A	V	E	:				<	E	N	T	E	R	>		
C	A	N	C	E	L	:		<	S	E	L	E	C	T	>	

<ENTER> saves the entry (new setting) and returns to 2nd level screens under “HARDWARE SETUP”. <SELECT> returns without saving the entry.

### B1.2.2 Channel Selection

Tunes IRD to a channel from settings table. Equivalent to a PERMCH terminal command.

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

Where “xx” is a Settings Table entry number between 1 and 48 inclusive. If the user presses “Select”, then the ‘xx’ field flashes. Up/down arrows may select a new value. Pressing “Enter” tunes the IRD to the new channel settings in that Table entry.

### B1.2.3 Edit Channel

Edits an entry in the settings table. Equivalent to ADDS and DELS terminal commands.

E	D	I	T	C	H	A	N	N	E	L	:					x	x
---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	---	---

Where “xx” is a Settings Table entry number. If you press “Select”, then the ‘xx’ field flashes. Up/down arrows then select a new value between 1 and 48. Pressing “Enter” starts an edit session on the Table entry. The screens are the same as those under “Current Settings” above.

### B1.2.4 Audio Settings

Similar to SETAUDIO terminal command.

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

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

Shown for each installed audio channel. Below is shown the nth channel:

P	O	R	T	#	:	n				R	O	U	T	E	:	x	
L	A	N	G	:	y	y	y			A	T	T	E	N	:	z	z

Where n is the audio port, x is the routing, either “S” for normal stereo, “R” for reversed stereo, “1” for original Left to both, and “2” for original Right to both. zz is the audio attenuation, from 0 to 14 dB from max level, and yyy is the character name for audio program (or “language”), any set of three alphanumeric characters. Alternately, it may be “\*” which is wildcard. This forces the audio program with the lowest unselected PID (in PMT) associated with the selected program number (service) to be routed to this output. Edit session begins on left-most character. Up/down arrow scrolls through all alphanumerics as well as “\*”.

*If local control is disabled by the network, n (for n audio ports available) screens are shown, each like that shown here (instead of screen shown above). zz has the same meaning.*

R	E	T	U	R	N	:										
P	r	e	s	s	<	S	E	L	E	C	T	>				

Returns to 2nd level screens under “HARDWARE SETUP.”

### B1.2.5 SNR Alarm Threshold

This is similar to the SNR Terminal Command.

S	N	R	A	L	R	M	L	E	V	E	L	:	x	.	x	
S	N	R	M	A	R	G	O	F	F	S	E	T	:	y	.	y

“x.x” is the alarm level in dB, ranging from 2.0 to 7.0. “y.y” is the margin warning offset in dB. *The sum of alarm level and margin must be less than 12.0 dB.* See section 3.8.2.

### B1.2.6 Serial Ports

S	E	R	I	A	L	P	O	R	T	S						
P	r	e	s	s	<	S	E	L	E	C	T	>				

Moves user to 3rd level screens under “SERIAL PORTS.”

S	E	R	I	A	L	1	:			x	x	x	x	x	x	x	x
S	E	R	I	A	L	2	:			y	y	y	y	y	y	y	y

Where “xx...xx” is Serial Port 1 device assignment and “yy...yy” is the same for Port 2. Either may be assigned the PRINTER, TERMINAL, MODEM, or AUX DATA devices. See Section 3.7 for other limitations.

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

Where “xx...xx” is a six alpha-numeric character password for access via phone-modem. Password field is left-justified because length is variable. All edit sessions start on extreme left-hand character. On each character, the up-arrow will scroll through all alpha-numeric characters as well as null. However, all nulls, or nulls to the left of valid characters will not be accepted when “Enter” is pressed.

P	R	I	N	T	E	R		S	E	T	T	I	N	G	S				
B	A	U	D		x	x	x	x	x		P	A	R	I	T	Y		y	

**bb...bb** is baud-rate in bps, **p** is parity, either **O**, **E**, or **N**. See section 3.7 for details and limits.

M	O	D	E	M		S	E	T	T	I	N	G	S					
B	A	U	D		x	x	x	x	x		P	A	R	I	T	Y		N

**bb...bb** is baud-rate in bps, **p** is parity, either **O**, **E**, or **N**. See section 3.7 for details and limits.

A	U	X		D	A	T	A		P	I	D	:		p	p	p	p	p
B	A	U	D		b	b	b	b	b		P	A	R	I	T	Y		p

**ppppp** is the PID of the selected data-stream *in hex*, **bb...bb** is baud-rate in bps, **p** is parity, either **O**, **E**, or **N**. See section 3.7 for details and limits.

R	E	T	U	R	N													
P	r	e	s	s		<	S	E	L	E	C	T	>					

Returns to 2nd level screens under “HARDWARE SETUP.”

### B1.2.7 LNB LOs

If no optional RF Switch is installed:

L	N	B		L	O	:	x	x	x	x	x	.	x	x				

Where **ffff.ff** is the frequency presumed for the LNB LO (in MHz).

or... if optional RF Switch installed, two screens are shown, each as below:

L	N	B		L	O	:	x	x	x	x	x	.	x	x			n	
L	N	B		L	O	:	y	y	y	y	y	.	y	y			m	

Where **n** and **M** are RF feed numbers, and **xxxxx.xx** and **yyyyy.yy** are the respective LNB LO frequencies (in MHz).

### B1.2.8 Unit Reset

T	O		R	E	S	E	T		U	N	I	T						
---	---	--	---	---	---	---	---	--	---	---	---	---	--	--	--	--	--	--

```
P r e s s < E N T E R >
```

```
R E T U R N  
P r e s s < S E L E C T >
```

Returns to Main level screens from “HARDWARE SETUP.”

### B1.3 STATUS REPORTS

```
S T A T U S R E P O R T S  
P r e s s < S E L E C T >
```

#### B1.3.1 Settings Status

```
S E T T I N G S S T A T U S  
P r e s s < S E L E C T >
```

*If RF switch option is installed:*

```
R F I N : n f f f f f . f f a a a a  
d d . d d d r / r h h : m m : s s
```

```
f f f f f . f f a a a a  
d d . d d d r / r h h : m m : s s
```

```
T A G : t t a a a a  
P R O G : x x x x x h h : m m : s s
```

```
R E T U R N  
P r e s s < S E L E C T >
```

Settings Status report displays the current conditions and provides the following information:

Mode: **aaaa** is either PERM, TEMP, or SRCH settings. If TEMP, then **hh:mm:ss** is shown and it is time remaining in insert.

RF IN: **n** is the (*optional*) RF feed, 1-4.

FREQ (Mhz) { ‘-’ if searching }: **ffff.ff** is the carrier downlink frequency in MHz.

DATA RATE (Mbps) { ‘-’ if searching }: **dd.ddd** is the Transport data-rate in Mbps.

FEC Rate: { ‘-’ if searching }: **r/r** may be R= 1/2, 2/3, 3/4, 5/6, or 7/8.

TAG SITE: **tt** is the tag site 0-15 (‘15’ is special value, see section 3.8.4)

Program: **ppppp** is up to 5 digit program number (see section 3.4)



### B1.3.2 Carrier Status

C	A	R	R	I	E	R	S	T	A	T	U	S				
P	r	e	s	s	<	S	E	L	E	C	T	>				

If TRACKING

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

MODE Always shows TRACKING

DURATION **hh:mm:ss** is Time Since Last Acquired (the carrier, for whatever reason) in hours, minutes, seconds.

R	F	I	N	:	1	f	f	f	f	f	.	f	f				
d	d	.	d	d	d	r	/	r									

RF IN: **n** is only shown if optional RF switch is installed. Otherwise, this is omitted and **ffff.ff** fills to left. The variable fields **n**, **ffff.ff**, **dd.ddd**, and **r/r** are defined in Settings Status above.

P	R	O	G	:	p	p	p	p	p								
T	A	G	S	I	T	E	:	r	/	r							

The variable fields **ppppp** and **tt** are defined in Settings Status above.

[If carrier is lost while viewing any of the following four screens, will jump to MODE & DURATION screen under NOT TRACKING.]

E	B	N	O	1	0	S	E	C	A	V	E	R	A	G	E		
M	A	R	G	I	N	:	x	.	x	A	V	G	:	y	y	.	y

MARGIN **xx** is average Eb/No margin level over last 10 seconds.

EBNO **yy** is average Eb/No level over last 10 seconds. See section 3.8.2.

L	A	S	T	A	C	Q	:	h	h	h	:	m	m	:	s	s		
H	I	/	L	O	E	B	N	O	:	x	x	.	x	/	y	y	.	y

LAST ACQ **hh:mm:ss** is elapsed time since this carrier was last acquired in hours, min, sec.

HI/LO EBNO **xx.xx** is the highest and **yy.y** the lowest average Eb/No (in dB) observed since carrier was last acquired.

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	%

FIRST ACQ **hh:mm:ss** is elapsed time since this carrier was first acquired (before any intervening signal fades) in hours, minutes, seconds.

AVAILABILITY **xxx.xx** is the percentage of the above elapsed time that the IRD has been tracking the carrier OK.

R	F	L	E	V	E	L	:	O	K								
E	B	N	O	L	E	V	E	L	:	G	O	O	D				

RF                    xxxx may be HIGH, LOW, OK

EBNO LEVEL    yy...yy may be GOOD, MARGINAL, ALARMING (see section 3.8.2)

R	E	T	U	R	N												
P	r	e	s	s		<	S	E	L	E	C	T	>				

If NOT CURRENTLY TRACKING CARRIER:

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

MODE            xx...xx is current acquisition mode

DURATION    hhh:mm:ss Elapsed time since this mode was entered, in hours, minutes, seconds.

R	F	I	N	:	1		0	0	0	0	0	.	0	0			
0	0	.	0	0	0		1	/	2								

RF IN: n is only shown if optional RF switch is installed, otherwise omitted and ffff.ff fills to left. The variable fields n, ffff.ff, dd.ddd, and r/r are defined in Settings Status above.

P	R	O	G	:	p	p	p	p	p								
T	A	G		S	I	T	E	:	t	T							

The variable fields ppppp and tt are defined in Settings Status above.

*[If tracking mode is entered while viewing any of the following three screens, the display will jump to MODE & DURATION screen under TRACKING.]*

S	U	B	M	O	D	E	:	x	x	X	x	x	x	x	x	x	x
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

SUBMODE    xx...xx is carrier acquisition sub-mode.

The following two screens are shown only if applicaable (values non-zero):

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

B	A	D	T	A	G	:	n	n	n	/	f	f	0	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 IRD has seen wrong (or corrupted) tag in GET TAG sub-mode, and **ffff.ff** is the last one's value. {if non-zero}; where **mmm** is number of times IRD has seen an invalid network header while in GET COMPEL sub-mode.

R	E	T	U	R	N													
P	r	e	s	s	<	S	E	L	E	C	T	>						

### B1.3.3 MPEG Status

M	P	E	G	S	T	A	T	U	S									
P	r	e	s	s	<	S	E	L	E	C	T	>						

A	G	G	R	E	G	A	T	E	M	P	E	G	:					
T	R	A	N	S	@	d	d	.	d	d	d	M	B	P	S			

TRANS **dd.ddd** is TRANSPORT stream data-rate in Mbps

<		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			

Where "xxxxx" is program number. The <> marks only shown if scrolling is needed to view all.

If AUTHORIZED (applicable only to CA systems) or no CA:

V	I	D	E	O	:													
x	x	x	x	x	/	y	y	y	y	y	y	y						

**xx...xx** is video command state (NORMAL MUTED, or ALARM), and **yy...yy** is video alarm state.

If NOT AUTHORIZED (applicable only to CA systems):

V	I	D	E	O	:													
N	O	T	A	U	T	H	O	R	I	Z	E	D						

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

Where xxx is audio program identifier (or “language”). Must scroll to end of presence list to exit.

There are n screens like the following, where n is total number of audio ports available.

P	O	R	T	n	:		x	x	x			y	y	y	y	y	y	
L	:	a	a	a		a	a	a	a		R	:	b	b	b	b	b	b

For the nth port,xxx is the selected audio program (“language”), yy...yy is the routing, and **Ala.** and **bb...bb** is the muting status of the left and right component outputs respectively.

R	E	T	U	R	N													
P	r	e	s	s		<	S	E	L	E	C	T	>					

### B1.3.4 Settings Table

S	E	T	T	I	N	G	S		T	A	B	L	E					
P	r	e	s	s		<	S	E	L	E	C	T	>					

Pressing <SELECT> allows for display of all valid Settings Table entries, including “Last Acquired” carrier and “Last Requested” carrier settings. Each setting is displayed as a pair of screens. Scroll through each pair and from pair-to-pair with the right/left arrow keys. (See section 3.8.4. for info on Settings Table.)

R	F	I	N	:	a		b	b	b	b	b	.	b	b		c	c	c
d	d	.	d	d	d		e	/	e									

Else:

f	f	f	f	f	.	f	f							a	a	a
d	d	.	d	d	d		r	/	r							

T	A	G	:	f	f									a	a	a
P	R	O	G	:	p	p	p	p	p							

R	E	T	U	R	N													
P	r	e	s	s		<	S	E	L	E	C	T	>					

The Settings Table report displays the current conditions and provides the following information:  
 Table Entry: **aaa** is either ACQ (“last acquired”) or REQ (“last commanded”) or a valid Table entry number.

For **n**, **ffff.ff**, **dd.ddd**, **r/r**, **tt**, **ppppp**, see definitions in Settings Status screens, section 1.3.1.

### B1.3.5 NC Status

N	C	S	T	A	T	U	S												
P	r	e	s	s	S	e	l	e	c	t									

The following screen shown only if applicable (value non-zero):

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

Delay time to execution of COMPEL command where **hh:mm:ss** is hours, minutes, seconds.

S	/	N	:	s	s	s	s	s	s		x	x	x	x	x	x	x	x	x
C	O	M	P	E	L	:	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			
N	E	T	W	R	K	M	O	D	E	:	y	y	y	y	y				

Where **xx...xx** is local control enable status (ENABLED or DISABLED), and **yy...yy** is network protection mode (PROTECTED 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. 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	:	m	m	:	s	s			
T	O	T	L	P	R	O	C	E	S	S	D	:	x	x	x	x	x	x	x

Where **hhh:mm:ss** is the elapsed time in hours, minutes, seconds. HISTORY is the time since reset (usually power-up). TOTL PROCESSD: **xx...xx** is the total number of COMPEL packets seen (including keep-alives) in that period.

*The following 3 screens are shown only if applicable (valud non-zero):*

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 since reset; and **yy...yy** is the total number of packets received (and rejected) with bad checksums.

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 (since reset). Where **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	:	x	x	x	x	x
---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

**xx...xx** is the total number of COMPEL packets received with syntax error (since reset).

R	E	T	U	R	N													
P	r	e	s	s		<	S	E	L	E	C	T	>					

### B1.3.6 Parameter Status

P	A	R	A	M	E	T	E	R	S	T	A	T	U	S				
P	r	e	s	s		<	S	E	L	E	C	T	>					

*If no optional RF switch is installed:*

L	N	B	L	O	:	f	f	f	f	f	.	f	f					
---	---	---	---	---	---	---	---	---	---	---	---	---	---	--	--	--	--	--

Where **ffff.ff** is the frequency presumed for the LNB LO (in MHz).

*or... if optional RF Switch installed, two screens are shown, each as below:*

L	N	B	L	O	:	f	f	f	f	f	.	f	f					n
L	N	B	L	O	:	f	f	f	f	f	.	f	f					m

Where **n** and **m** are RF feed numbers, and **xxxxx.xx** and **yyyyy.yy** are the respective LNB LO frequencies (in MHz).

S	N	R	A	L	R	M	L	E	V	E	L	:	x	x	.	x		
S	N	R	M	A	R	G	O	F	F	S	E	T	:	y	y	.	y	

Where **xx.x** is the average Eb/No level at and below which the IRD will show an “SNR” unit alarm. Where **yy.y** is the margin *above that alarm level* up to which the unit will display an “SNR” warning (e.g. if ALARM level is 4.0 dB and Margin is set to 2.0 dB, then a Warning is displayed on unit front-panel if average Eb/No falls just below 6.0 dB).

See SETTIMEOUT terminal command (section A1.1.13) for explanation of the following three timeout screens given in **hh:mm:ss** format (hours, minutes, seconds).

F	A	D	E	:					h	h	h	:	m	m	:	s	s
I	N	S	T	A	L	L	:		h	h	h	:	m	m	:	s	s

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

C	M	P	L	S	E	E	K	:		h	h	h	:	m	m	:	s	s
H	D	R	S	R	C	H	:			h	h	h	:	m	m	:	s	s

A	U	D	D	E	M	U	X	:	x	x	x	x	x	x	x	x	x	x
A	U	D	I	O	P	O	R	T	S	:	(	y	y	y	y	y	)	

Where **xx...xx** indicates the presence of the DSP which allows for multiple (>1) audio output ports, either INSTALLED or NOT INSTALLED. Where **yy...yy** is a string of consecutive numeric characters showing all available audio ports (“1” is not shown because it is always present).

E	N	C	R	Y	P	T	I	O	N	:	x	x	x	x	x	x	x	x	x
R	F	S	W	I	T	C	H	:		y	y	y	y	y	y	y	y		

Where **xx...xx** shows whether a Secure Microprocessor (to support WCI CA or PIN scrambling) is installed. Where **yy...yy** shows whether the RF Switch option is installed.

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

Where **xx...xx** shows whether the Sync Data option is installed, and, if so, it’s status.

D	V	B	-	A	S	I	:	x	x	x	x	x	x	x	x	x	x		

Where **xx...xx** shows whether the ASI Transport output option is installed, and, if so, it’s status.

E	X	P	A	N	S	I	O	N	R	E	L	A	Y	C	A	R	D		
x	x	x	x	x	x	x	x	x											

Where **xx...xx** shows whether the Expansion Relay option is installed.

D	1	O	U	T	P	U	T	:	x	x	x	x	x	x	x	x	x	x	x
T	R	A	N	S	P	O	R	T	O	U	T	:	y	y	y	y	y	y	

Where **xx...xx** shows whether the Serial Digital Component Video (“D1”) output option is installed, and, if so, it’s status. Where **yy...yy** shows the status of the standard DVB-SPI Transport stream output.

R	E	T	U	R	N														
P	r	e	s	s		<	S	E	L	E	C	T	>						

### B1.3.7 Port Status

S	E	R	I	A	L	P	O	R	T	S	T	A	T	U	S
P	r	e	s	s	<	S	E	L	E	C	T	>			

E	M	A	I	L	:		x	x	x	x	x	x	x	x	

Where **xx...xx** shows if COMPEL (printer-device) e-mail is enabled or not.

M	O	D	E	M	:				b	b	b	b	b	p	d	s
P	R	I	N	T	E	R	:		b	b	b	b	b	p	d	s

RS232 settings for modem and printer devices: **bb...bb** is baud rate, **p** is parity (N for none, E for Even, and O for Odd), **d** is number of data-bits, and **s** is number of stop bits.

*Note that future software upgrades will put Aux Data Device settings screen here!*

R	E	T	U	R	N										
P	r	e	s	s	<	S	E	L	E	C	T	>			

### B1.3.8 Relay Status

R	E	L	A	Y	S	T	A	T	U	S					
1	:	O	P	E	N			2	:	C	L	O	S	E	D

*[If optional expansion relay card is installed, then it's status screen appears here. See Unity Installation and Operations Guide for Expansion Relay option.]*

### B1.4 VERSION

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

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

A	P	P	L	I	C	A	T	I	O	N					
V	x	.	x												

Where "x.x" is the version number of the main unit application software.

B	O	O	T	C	O	D	E	:							
V	x	.	x												



Where “x.x” is the version number of the boot code.

A	A	A	I	O	D	E	M	U	X	(	D	S	P	)					
V	x	.	x																

Where x.xx is the version number of the audio demux DSP.

X	I	L	I	N	X	P	L	D	s	:									
x	x	x	x	x	x														

Where xxxxxx is the version string for the Xilinx PLD code

L	A	T	T	I	C	E	P	L	D	:									
x	x	x	x	x	x														

Where xxxxxx is the version string for the Lattice PLD code.

S	E	C	U	R	E	P	L	D	:										
V	x	.	x																

Where x.x is the version number of the secure (decryption) microprocessor. *If nothing is shown here, then that indicates that the Secure Microprocessor needed to support WCI CA or PIN scrambling has not been installed.*

V	I	D	E	O	D	E	C	O	D	E	R	:							
V	x	.	x																

Where “x.x” is the version number of the microcode for the video decompression IC.

A	A	A	I	O	D	E	C	O	D	E	R	:							
V	x	.	x																

Where “x.x” is the version number of the microcode for the audio decoder IC.

R	E	C	E	I	V	E	R	C	A	R	D	:							
V	x	.	x					(	T	y	p	e		y	y	)			

Where x.x is the receiver card firmware revision, and yy is the card’s type code.

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

Where xx...xx shows the type of Conditional Access (CA) installed (if any), or if the special TURNAROUND option is installed (allowing for routing of encrypted Transport Streams for output without attempting decryption).

R	E	T	U	R	N														
P	r	e	s	s		<	S	E	L	E	C	T	>						

## B1.5 NAVIGATION HELP

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

P	r	e	s	s	<	-	o	r	-	>	t	o			
S	c	r	o	l											

P	r	e	s	s	<	S	e	l	e	c	t	>	t	o	
s	t	a	r	t	E	d	i	t	m	o	d	e			

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

P	r	e	s	s	<	E	n	t	e	r	>	t	o		
a	c	c	e	p	t	c	h	a	n	g	e	s			

P	r	e	s	s	<	S	e	l	e	c	t	>	t	o	
c	a	n	c	e	l	c	h	a	n	g	e	s			

R	E	T	U	R	N										
P	r	e	s	s	<	S	E	L	E	C	T	>			

# Appendix C

## Glossary of Terms

**AMBER** - An LED with the red and green both “On.”

**ASIC** - Application-specific Integrated Circuit: A general term for any highly integrated circuit (in a single package that historically very complex operations solders to a printed-circuit-board) implementing.

**BLINK** - An LED which is ON for 250 mS and OFF for 250 mS, with the pattern continuing for some time, is said to “Blink.” See Table 3-1, page 3-2. Also, see “Flash” and “Flutter.”

**COMPEL™** - Wegener's patented satellite network control system. This is a system which features a control data stream embedded along with the payload services, where a single central control site may control all aspects of network operation: database management, program selection and setup by site, grouping of sites, scheduling, etc.

**DAC** - Digital-to-Analog Converter. A device that converts a sequence of numbers representing signal amplitudes in electronic binary format to actual analog signals.

**EEPROM** - Electrically-Erasable Programmable Read-Only Memory. This acronym is used to describe any non-volatile memory device which can be read- or written-to a nearly unlimited number of times, but which retains its last written data when power is turned off.

**FEC** - Concatenated FEC: Forward Error Correction. A method of mapping digital data for transmission over a noisy, error-creating medium, and then un-mapping it, such that error-reduction is achieved. This allows for lower-power (but wider bandwidth) carriers to be used than would otherwise be required on a satellite link. Concatenated FEC means that a bit-level convolutional FEC is embedded "inside" a byte or frame-level Reed-Solomon FEC within the transmission path. This is done to create a far more powerful error-reduction system than either type of FEC alone could provide.

**FLASH** - An LED which is ON for 100 mS and OFF for 100 mS, with the pattern continuing for some time, is said to “Flash.” See Table 3-1, page 3-2. Also, see “Blink” and “Flutter.”

**FLUTTER** - An LED which is ON for 50 mS and OFF for 50 mS, with the pattern continuing for some time, is said to “Flutter.” See Table 3-1, page 3-2. Also, see “Blink” and “Flash.”

**MCPC** - Multiple-Channel-Per-Carrier. Means that one or more services or programs are present on a particular radio-frequency carrier.

**NTSC** - National Television Standards Committee. This is a shorthand description for the standard 525-line, 30-frames-per-second analog baseband television signal format used in the US

**MPEG, MPEG Transport Stream** - Moving Picture Experts Group. This catchall abbreviation is used to describe the digital compression (redundancy reduction) of linearly-digitized audio and video signals as well as the mode of multiplexing and transporting that compressed data. The Transport stream is a packetized system consisting of a sequence of 188-byte packets, each with a sync-byte and a specific payload identified by a payload ID (or PID). The stream contains packets not only for the compressed audio and video, but also auxiliary data, program information and allocation data, and conditional access information.

**PID** - Payload Identifier (or ID). See "MPEG."

**QPSK** - Quadrature Phase Shift Keying. This is a popular mode of transmitting digital information by varying the phase of a radio-frequency carrier.

**SCPC** - Single-Channel-Per-Carrier. Only one service or program is present on a particular radio-frequency carrier.

**SETTINGS TABLE** - An internal table of alternate carrier/program settings stored in the IRDs non-volatile memory (remembered through power cycles). This table may be used in the following ways: (1) If an IRD is unable to acquire the commanded carrier, then it will, after an appropriate time-delay, search for and lock onto any carriers in the table it may be able to find. (2) If local control is enabled, a user, may, through the front-panel or terminal command, tune the IRD to a new setting found in the table using the shorthand of the Settings Table entry number.

# RMA REQUEST

Company Name: \_\_\_\_\_

Bill-To Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Ship-To Address: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Contact Name: \_\_\_\_\_

Phone #: (     )     -     \_\_\_\_\_

Fax #: (     )     -     \_\_\_\_\_

Complete Model #: \_\_\_\_\_

Serial #: \_\_\_\_\_

In Warranty? Yes  No

Problem: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Additional Comments: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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# DEFAULT CUSTOMER CONFIGURATION SHEET

( When customer supplied, WCI must receive this information at least two weeks before delivery to avoid additional processing charges to the customer.)

Model Number: \_UTY4000\_\_\_\_\_ Release: \_\_\_\_\_  
Customer: \_\_\_\_\_ Header: \_\_\_\_\_ (WXXX)  
Sales Order Number: \_\_\_\_\_  
Uplink Encoder Make/Model: \_\_\_\_\_ Video Format: \_\_\_\_\_

Customer Approval: \_\_\_\_\_ Date: \_\_\_\_\_

(only required for nonstandard configuration)

Special Instructions or

Clarifications: \_\_\_\_\_

## Equipment Settings

(Circle or write-in requirements, default values are shown bold and underlined. Consult Wegener Engineering about changes to default settings shown with '!' exclamation mark.)

**1.0 MODE DIP Switch:** Position 1, 2: Reserved

Position 3: Test Mode (leave in UP position to disable)

Position 4: LNB Power off (up) / **LNB Power on (down)**

**2.0 LNB DC (on RF-In jack)** ( **Yes** --jumper J22 , No -- no jumper on J22 )

**3.0 Alarm Relay-contact Polarity** [Note: Relay is in "alarm" state when unit power is off] (Close-on-alarm--J17 non-dot , **Open-on-alarm--J17 dot**)

**4.0 Initial Carrier Settings:**

4.1 Carrier Frequency: \_\_\_\_\_ MHz ( 3700.00 to 14000.00) **12000.00 MHz**

4.2 Feed Port (if RF switch option is installed) ( **1**, 2, 3, 4)

4.3 Transport Rate: \_\_\_\_\_ Mbps (2.500 to 48.382 in 0.001 Mbps steps) **6.000 Mbps** \*

4.4 Program Number: \_\_\_\_\_ (default is \* for lowest found)

4.5 FEC Rate: ( 1/2 , 2/3, **3/4**, 5/6, 7/8 )

4.6 Tag Site Number: \_\_\_\_\_ (0 -15) **0** -- Tag Site 15 designates no--COMPEL or tags

4.7 SNR (Eb/No) Alarm Level \_\_\_\_\_ dB (2 to 7 dB) **4 dB**

4.8 Margin Warning Offset \_\_\_\_\_ dB **2 dB** -- sum of this and SNR Alarm level <12 dB

\* Check product spec for legal upper limits on aggregate Transport rate vs. FEC Rate.

**5.0 LNB LO Settings** (std. domestic Ku-band is 10750 MHz, C-band is 5150 MHz)

5.1 LNB LO Frequency (if **no** RF Switch is installed): \_\_\_\_\_ MHz **10750 MHz !**

5.2 LNB LO Freq. (for Feed Port 1 only if RF switch installed): \_\_\_\_\_ MHz **10750 MHz !**

5.3 LNB LO Freq. (for Feed Port 2 only if RF switch installed): \_\_\_\_\_ MHz **10750 MHz !**

5.4 LNB LO Freq. (for Feed Port 3 only if RF switch installed): \_\_\_\_\_ MHz **10750 MHz !**

5.5 LNB LO Freq. (for Feed Port 4 only if RF switch installed): \_\_\_\_\_ MHz **10750 MHz !**

**6.0 Initial Audio Settings**

6.1 Ch 1 Audio Routing: ( **Stereo**, Reverse Stereo, Orig L to both, Orig R to both)\*

6.2 Ch 2 Audio Routing: ( **Stereo**, Reverse Stereo, Orig L to both, Orig R to both)\*

6.3 Ch 1 Program: \_\_\_\_\_ ( need three-character code, default is \* for lowest found)

6.4 Ch 2 Program: \_\_\_\_\_ ( need three-character code, default is \* for lowest found)

\* "Orig L or R" designates original L or R inputs to the MPEG encoder unit.



**7.0 Initial Serial Ports Configuration**

- 7.1 Serial Port 1 Device: ( Terminal , Modem , **Printer** , Aux Data )
- 7.2 Serial port 2 Device: ( **Terminal** ! , Modem , Printer , Aux Data )
- 7.3 Modem baud/Password B=( **9600** , 19.2k ) , P-word= \_\_\_\_\_ ( **PASSWD** )
- 7.4 Local Terminal/front-panel Control: ( **Enabled** / Disabled )
- 7.5 Printer baud/parity: Baud=( 9600 , **19.2 k** ) ; P=( odd , even , **none** )
- 7.6 Aux Data PID [hex]: ( \_\_\_\_\_ , **1ffe** )
- 7.7 Aux Data Baud/Parity: B=( 1200, 2400, 4800, **9600**, 19.2k, 38.4k ); P=( odd , even , **none** )

**8.0 Misc. Audio/Video Setup Parameters**

- 8.1 PCR mode ( auto-adjust to data-rate , **static** ! ) -- “Auto-adjust” required with DVT2000
- 8.2 PCR offset [hex]: ( \_\_\_\_\_ , **0** ! ) -- Applicable if “static” above is selected
- 8.3 D1 Pedestal Setup: ( Disabled, **Enabled** ! ) -- “Enabled” matches DVT2000
- 8.4 Horizontal Sync Control [hex]: ( \_\_\_\_\_ , **74** ! ) -- 0x72 is optimum with DVT2000
- 8.5 A/V Sync [hex]: ( \_\_\_\_\_ , **f98e** ! ) -- default value is hex for ‘-1650’ decimal
- 8.6 Optional outputs home-screen alarm/warning bitmask on failure:  
 SPI Transport Output: ( **None** , Warning , Alarm ); Sync Data: ( **None** , Warning , Alarm )  
 Serial Dig Video [D1]: ( **None** , Warning , Alarm ); ASI Transport: ( **None** , Warning , Alarm )

**9.0 Network Settings**

- 9.1 COMPEL PID [hex]: ( \_\_\_\_\_ , **1026** ! ) -- Next alternate is usually 1030
- 9.2 Wegener CA PID [hex, if applicable]: ( \_\_\_\_\_ , **1028** ! ) -- Next alternate is usually 1032
- 9.3 Netcon Lock: ( Locked , **Unlocked** )
- 9.4 Shared Mode ( Shared , **Protected** )
- 9.5 COMPEL Required ( Required , **Not required** )
- 9.6 Tag Bypass: ( **No** ! , Yes ) -- “Yes” is also known as “ISOG-enabled”
- 9.7 Timeouts:

#	Description	Allowed Range	Default	Change from Default
1	Fade	0 - 30 seconds	15 seconds !	
2	Install	0 - 4660 hours	4660 hours !	
3	Carrier Search	0 - 4660 hours	48 hours !	
4	No COMPEL	0 - 4660 hours	2 hours !	
5	COMPEL Seek	0 - 4660 hours	5 minutes !	
6	Header Search	0 - 4660 hours	48 hours !	

**10.0 Information On Option Module Setups:**

**Inboard Module 1:**

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**Outboard Module 2:**

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**11.0 Initial Search Table**

<b>Ent ry</b>	<b>RF Feed *</b>	<b>Carrier</b>	<b>Data Rate</b>	<b>FEC Rate</b>	<b>Tag Site</b>	<b>Program</b>
<i>* This field only used if RF Switch option installed, otherwise not shown.</i>						
1	Value from 4.2	Value from section 4.1	Value from 4.3	Value from 4.5	Value from 4.6	Value from 4.4
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						

<b>Entry</b>	<b>RF Feed *</b>	<b>Carrier</b>	<b>Data Rate</b>	<b>FEC Rate</b>	<b>Tag Site</b>	<b>Program</b>
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42						
43						
44						
45						
46						
47						
48						