

# Unity4600

Digital Media Receiver/Decoder



# Unity4600

## Professional Digital Media Receiver/Decoder User's Manual

800032-01 Rev. G

Data, drawings, and other material contained herein are proprietary to Wegener Communications, Inc., and may not be reproduced or duplicated in any form without the prior written permission of Wegener Communications, Inc.

The information contained herein is subject to change without notice. Revisions may be issued to advise of such changes and/or additions.

**WEGENER**<sup>®</sup>, **COMPEL CONTROL**<sup>®</sup>, **MEDIAPLAN**<sup>®</sup>, **ENVOY**, **UNITY**<sup>®</sup>, **UNITY-IP**<sup>®</sup>, and **iPUMP**<sup>®</sup> are trademarks of **Wegener Communications, Inc.** All other trademarks are the property of their respective owners.

© 2007 Wegener Communications, Inc. All rights reserved.

Portions copyright 1992-2001 FairCom Corporation. "FairCom" and "c-tree plus" are trademarks of FairCom Corporation and are registered in the United States and other countries. All Rights Reserved.

Correspondence regarding this publication,

800032-01 Rev. G  
Seventh Edition: December 2007

should be forwarded to:

Wegener Communications, Inc.  
Technology Park/Johns Creek  
11350 Technology Circle  
Duluth, GA 30097-1502

Phone: 770-814-4000  
Fax: 770-623-0698

The Wegener **Unity 4600** is approved under **FCC Part 15B Class A, UL/C-UL1950 3rd Edition, and CE [EN60950, EN55022(94), and EN55024(98)]**.



# TABLE OF CONTENTS

## CHAPTER 1 GENERAL INFORMATION

<b>1.1 Manual Overview</b> .....	<b>1</b>
<b>1.2 Unity 4600 Overview</b> .....	<b>2</b>
Functional Description .....	2
Physical Description .....	2
<b>Figure 1.1:</b> The Unity 4600 Digital Media Receiver/Decoder .....	2
<b>1.3 Unity 4600 Specifications</b> .....	<b>3</b>
<b>Table 1.1:</b> Technical Specifications .....	3
<b>Table 1.2:</b> Transport In Options .....	6
<b>1.4 Safety Summary</b> .....	<b>11</b>
<b>1.5 Glossary of Terms and Abbreviations</b> .....	<b>12</b>

## CHAPTER 2 INSTALLATION

<b>2.1 Unpacking and Inspection</b> .....	<b>17</b>
<b>2.2 Location and Mounting</b> .....	<b>17</b>
Rack Mounting .....	18
Desktop Installation .....	18
<b>2.3 Unity 4600 Connections</b> .....	<b>19</b>
Rear panel views .....	19
<b>Figure 1.2:</b> Unity 4600 rear panel without DTMF .....	19
<b>Figure 1.3:</b> Unity 4600 rear panel with DTMF .....	19
Transport In Options .....	19
<b>Figure 1.4:</b> Unity 4600 Transport In Options .....	19
Rear panel Connectors .....	19
<b>Table 1.3:</b> Rear panel Connectors .....	20
<b>Table 1.4:</b> Front-panel Connectors .....	22
<b>2.4 Serial Port Configuration</b> .....	<b>22</b>
Device assignments .....	22
Device configurations .....	22
<b>Table 1.5:</b> Device Configurations .....	22
Device handling .....	23
<b>2.5 Installation Testing</b> .....	<b>24</b>

RF input check . . . . .	24
Audio/video check . . . . .	24
DTMF Setup. . . . .	24
Relay Pulse Check. . . . .	25

## CHAPTER 3 OPERATION

<b>3.1 Theory of Operation . . . . .</b>	<b>27</b>
Functional summary. . . . .	27
Automated recovery. . . . .	27
Monitoring and control . . . . .	28
<b>Figure 1.5:</b> Unity 4600 Functional Block Diagram . . . . .	28
<b>3.2 Operation from Front Panel . . . . .</b>	<b>29</b>
Front-panel layout . . . . .	29
<b>Figure 1.6:</b> Unity 4600 Front-panel Layout . . . . .	29
LCD screen relationships. . . . .	29
<b>Figure 1.7:</b> LCD Screen Relationships . . . . .	30
LCD screen content . . . . .	30
<b>Figure 1.8:</b> Unity 4600 Top-level Screens . . . . .	30
<b>Table 1.6:</b> Summary of Top-Level LCD Screens and Their Functions . . . . .	31
Home and default screens. . . . .	32
Interpreting LEDs. . . . .	33
<b>Figure 1.9:</b> LED Indicators . . . . .	33
<b>Table 1.7:</b> Front-panel LED Indicator Descriptions . . . . .	33
Front-panel audio monitor . . . . .	35
<b>3.3 Operation from Local/Remote Terminal . . . . .</b>	<b>35</b>
Overview and syntax . . . . .	35
User commands. . . . .	35
<b>Table 1.8:</b> Command directory for Unity 4600 terminal commands. . . . .	35

## CHAPTER 4 MAINTENANCE AND TROUBLESHOOTING

<b>4.1 Maintenance. . . . .</b>	<b>51</b>
<b>4.2 General Troubleshooting . . . . .</b>	<b>51</b>
No output or indications. . . . .	51
No audio, video, or ASI output. . . . .	51
Missing an audio, video, or ASI output while others are okay . . . . .	52
<b>4.3 Alarms and Warnings . . . . .</b>	<b>52</b>
<b>Table 1.9:</b> Alarm and Warning Descriptions . . . . .	53

## CHAPTER 5 CUSTOMER SERVICE

<b>5.1 Warranty. . . . .</b>	<b>59</b>
------------------------------	-----------

**5.2 Technical Support . . . . . 59**

**Appendix A Monitoring and Control Details . . . . . 61**

**A.1 Basic Navigation . . . . . 61**

**A.2 Info Screens . . . . . 61**

**A.3 Menu Screens . . . . . 62**

**A.4 Parameter Screens . . . . . 63**

This page intentionally left blank

# CHAPTER 1 GENERAL INFORMATION

## 1.1 Manual Overview

This manual provides instructions and reference information for the proper installation and operation of the Wegener **Unity 4600** Digital Media Receiver/Decoder.

The manual is divided into the following chapters:

**Chapter 1 General Information** - a description of your **Unity 4600**, its functions and specifications, and a glossary of terms.

**Chapter 2 Installation** - procedures and information for the correct and safe installation of your **Unity 4600**.

**Chapter 3 Operation** - instructions for starting and operating your **Unity 4600**.

**Chapter 4 Maintenance and Troubleshooting** - information about maintaining your **Unity 4600** and resolving possible operating difficulties.

**Chapter 5 Customer Service** - Our warranty and information on obtaining help.

An **Index** of keywords is also provided to help you quickly locate needed information.

Please e-mail any suggestions or comments concerning this manual to [manuals@wegener.com](mailto:manuals@wegener.com). If you prefer to post them through the mail, please send your comments to the address below. If you have substantial or complex changes to recommend, our preference is that you copy the page(s) in question, mark your changes on that copy, and fax or mail us the copy. We always appreciate constructive criticism.

Our Address:

Attn: Manuals

Wegener Communications, Inc.  
Technology Park / Johns Creek  
11350 Technology Circle  
Duluth, GA 30097-1502

Our Fax Number: (770) 497-0411

## 1.2 Unity 4600 Overview

### Functional Description

The Wegener Model **Unity 4600** Digital Media Receiver/Decoder is a fully DVB-compliant satellite video IRD. The **Unity 4600** receives an L-band RF carrier from an external LNB, demodulates the carrier, extracts the MPEG transport stream, and provides the decompressed program or programs to DVB-ASI, composite video, and/or stereo audio outputs.

Features include:

- Control by local user or remote COMPEL<sup>®</sup> system
- Download of software application upgrades via satellite
- Supports COMPEL<sup>®</sup>/CA Conditional Access at transport level or by program
- Supports receiver card options using either DVB-QPSK or Advanced Turbo-Modulations (Turbo-QPSK, T-8PSK, or T-16QAM)
- DVB-ASI transport stream output with network-controlled program mapping
- Supports ISO 13818-1 transport rates from 2.5 to 55 Mbps (with local decompression) or up to 86.25 Mbps (to program-mapped ASI transport only)
- Local decompression of MPEG-2 video and MPEG-2 (L1 and L2) and/or Dolby AC-3 audio
- Auto-recognition and support of 525-line NTSC or 625-line PAL
- Audio-only mode option for radio networks
- Cueing relays and DTMF cue tone outputs standard (DTMF available only on units built before 10/07)
- Alarm relay
- Cueing relays
- Optional SCTE 35 DPI message filter for network control of local ad avails
- Optional front-panel audio and video monitors
- Web browser control (*August 2004*)

### Physical Description

The **Unity 4600** is housed in a standard, 1 RU, rack-mountable chassis. Its front panel (see **Figure 1.1**) provides a user interface through six push buttons and an LCD as well as monitoring through both audio and video ports. The rear panel holds connectors for input and output signals, LNB power supply, serial and Ethernet monitoring and control, alarm and user relays, and AC input power. The unit also includes two Unity expansion module slots.



**Figure 1.1: The Unity 4600 Digital Media Receiver/Decoder**



## 1.3 Unity 4600 Specifications

**Table 1.1: Technical Specifications**

Characteristic	Specification
POWER	
Voltage	90-132 or 175-264 VAC auto-detect/selected
Frequency	60/50 Hz $\pm$ 2%
Consumption	< 35 watts typical with full LNB DC load & QPSK receiver
TRANSPORT IN OPTIONS	See See <b>Transport In Options</b> on page 6.
CONDITIONAL ACCESS	
Wegener COMPEL <sup>®</sup> /CA	Transport-level or by program
PIN Scrambling	
Turnaround option to bypass scrambled streams to ASI output	(Contact factory)
TRANSPORT DEMULTIPLEXING	
Aggregate MPEG Transport Rate	2.5 to 86.25 Mbps (55 Mbps in Release 1) if not limited by symbol-rate limits of installed receiver card. This rate is guaranteed for reception and transmission to ASI port only. For local decompression of audio and video, the maximum transport rate remains 55 Mbps.
Number of Programs	Unlimited
PSI Recognition	Automatic
DVB ASI OUTPUT	
Physical Layer	270 Mbaud signaling on coaxial cable
Levels	$\sim 1.1 V_{p-p}$ into 75 $\Omega$ unbalanced
Stream Padding	Minimum of one K28.5 null character padding in inter-byte gaps, strategy after that is to add equal pad amounts between bytes before adding extra padding between TS packets
Stream Processing (network-controlled)	Program mapping (routing of incoming program content to up to 16 virtual programs at output) and/or conditional DPI filtering.
PROGRAM DECOMPRESSION	
Video	MPEG-2, 4:2:0 Chroma sampling
Audio	MPEG-1 Layers 1 & 2
Audio	Dolby AC-3 (optional), L/R downmix only
COMPOSITE VIDEO OUTPUT	
Output Level	1.0 $V_{p-p}$ , $\pm$ 2%
Output Impedance	75 $\Omega$

Characteristic	Specification
<p>Multiburst</p> <p>Differential Gain</p> <p>Differential Phase</p> <p>L/C Gain Inequality</p> <p>L/C Delay Inequality</p> <p>Line Time W-form Distortion</p> <p>Field Time W-form Distortion</p> <p>Video SNR Weighted</p> <p>VBI Data Re-insertion</p>	<p>NTSC: From 0.5 to 4.2 MHz: <math>\leq \pm 0.8</math> dB</p> <p>PAL-B: From 0.5 to 4.8 MHz: <math>\leq \pm 1.2</math> dB</p> <p><math>\leq 4</math> IRE</p> <p><math>\leq 1.5^\circ</math></p> <p><math>\leq \pm 4</math> IRE</p> <p><math>\leq \pm 26</math> ns</p> <p><math>\leq 1.0</math> IRE p-p</p> <p><math>\leq 3</math> IRE p-p</p> <p><math>\geq 56</math> dB</p> <p>EIA 608 closed captioning &amp; XDS from ATSC and also Harmonic and Tandberg proprietary protocols</p>
<p><b>AUDIO OUTPUT</b></p> <p>Output Level-MAX PPL</p> <p>Output level adjust range</p> <p>Output Impedance</p> <p>Frequency Response</p> <p>Phase Accuracy</p> <p>SNR</p> <p>Dynamic Range</p>	<p>+18.0 dBm into 600 ohms @ 0 dB attenuation + 24.0 dBm is optional</p> <p>0 to 20 dB attenuation in 2 dB steps from Output Levels above</p> <p>Balanced: <math>&lt; 60 \Omega</math></p> <p>20Hz to 20 kHz, + 0.5/-1.5 dB 50 Hz to 15 kHz, <math>\pm 0.5</math> dB</p> <p>50 Hz to 15 kHz, <math>\leq \pm 2^\circ</math> from linear phase</p> <p><math>\geq 80</math> dB (22 Hz to 20 kHz) unweighted</p> <p>24 bits</p>
<p><b>DTMF OUTPUT (where available)</b></p> <p>Type</p> <p>DTMF tones</p> <p>Tone Timing</p> <p>Output Level Range</p>	<p>Low-Z balanced output</p> <p>16 tone-pairs, std. telco DTMF</p> <p><math>&lt; 230</math> ms to generate 4 tone-pair sequence</p> <p>+8 to <math>-2</math> dBm into <math>600 \Omega</math>; software adjustable in step increments of 6% of full-scale voltage</p>
<p><b>FRONT-PANEL MONITORS</b></p> <p>Video</p> <p>Audio</p>	<p>(actively-isolated from, but otherwise buffered copies of the standard analog outputs)</p> <p>Composite video; <math>1 V_{p-p}</math>, <math>75 \Omega</math></p> <p>One stereo pair (user-selectable from audio port 1 or 2), Level: <math>\sim -13</math> dB below main audio output (if set for +18 dBu output PPL) Impedance: <math>&lt; 60 \Omega</math>, unbalanced</p>

Characteristic	Specification
<p><b>SERIAL PORTS</b></p> <p>Standard</p> <p>Handshaking</p> <p>Selectable Services</p> <p>Baud Rates</p> <p>Formatting</p>	<p>RS232, DCE</p> <p>None</p> <p>Terminal monitoring and control Modem dial-in Auxiliary async data output (Release 2 or later) COMPEL<sup>®</sup> E-mail character-based async output Local COMPEL control input (testing only)</p> <p>Up to 38.4 kilobaud</p> <p>8 data bits, one start, one stop-bit, half-duplex. Parity selection set by unit software.</p>
<p><b>ETHERNET PORT</b></p> <p>Physical Layer</p> <p>Media Access and Link Layers</p> <p>Network and Transport Layers</p>	<p>Full-duplex, auto-negotiating 10baseT, 100baseT (twisted pair) on RJ45 jack</p> <p>Per IEEE 802.3 (Ethernet)</p> <p>Binds to TCP/IP stack which enables Web-based control (Release 4 or later).</p>
<p><b>ALARM/CUEING RELAYS</b></p> <p>Type</p> <p>Polarity</p> <p>Rating</p>	<p>One relay dedicated to indicate unit ALARMS and two relays dedicated to user control (such as cueing). The ALARM relay automatically de-energizes for alarm conditions so that power loss to the unit indicates as an alarm. The user-cue relays may also be placed in a nonvolatile "Follow Warning" setting such that the relay is ON for unit warning states and OFF when there is no warning. When in "Follow Warning", the relay will not respond to volatile settings, the Pulse command, or any nonvolatile commands sent to "all" relays. An individual relay must be addressed directly to set it back to ON or OFF.</p> <p>Form C, wiper contacts NC contact when de-energized and NO contact when energized</p> <p>Common, NC and NO contacts supplied externally</p> <p>30VDC open circuit, 100 mA max current closed</p>
<p><b>FRONT-PANEL EMAIL</b></p>	<p>Up to 512-character messages from COMPEL<sup>®</sup>. New messages over-write older messages. May also be cleared by local user.</p>
<p><b>CHASSIS</b></p> <p>Height</p> <p>Width</p> <p>Depth</p> <p>Weight</p>	<p>Std. 1RU 1.75 inches (4.45cm)</p> <p>EIA std. 19 inches (48.26cm)</p> <p>Back of rack-ears to rear panel: 14.9 inches (37.85 cm) Back of rack-ears to end of connectors: 15.7 inches (39.88 cm)</p> <p>~10.5 lb. (with Receiver card &amp; AV monitor option only)</p>

Characteristic	Specification
Cooling	Fan-cooled with left-side inlet and right-side exhaust (viewed from front). Fan is activated after unit reaches specific temperature.
ENVIRONMENTAL	
Operating Temperature	+10°C to +50°C (+50°F to +122°F) Unit gives warning indication for over-temperature conditions
Storage Temperature	-20°C to +70°C (-4°F to 158°F)
AGENCY APPROVALS	
UL	UL1950, 3rd Edition
FCC	Part 15B Class A, per Title 47 CFR (FCC rules)
CE	EN60950, EN55022(94), and EN55024(98)—tested per EN61000-4-2(95), -4-3(02), -4-4(95), -4-5(95), -4-6(96), and -4-11(94)

**Table 1.2: Transport In Options**

Characteristic	Specification
DVB-QPSK RECEIVER OPTION (No RF Switch)	
RF INPUT	
Input Impedance	75Ω unbalanced
Input VSWR, 75-Ω system	< 2.1:1 (9.0 dB R.L. min), 950-1450 MHz < 3.0:1 (6.0 dB R.L. min), 1450-2150 MHz
Surge Resistance	Guaranteed survival from up to 10 direct-coupled 8kV discharges (per IEC 801-2)
RF TUNING	
Input Frequency Range	950 to 2150 MHz
LO Leakage at Input	≤ -50 dBm
Symbol-rate Range	2 to 45 Msps (may be limited by Transport Rate limits)
Tuning Resolution	10 kHz
Input Signal Level Range	-25 to -65 dBm
Signal Level Warning Limits	warns within +10/-5 dB of upper limit and +5/-10 dB of lower limit
Maximum Aggregate Input Power	-5 dBm min
DEMODULATOR/FEC	
Modulation	QPSK ( $\alpha = .35$ ) per DVB (EN 300 421)
Carrier acquisition range	±1 MHz or ± 10% of symbol-rate QPSK, whichever is greater

Characteristic	Specification																
<p>Max <math>E_b/N_0</math> @ Quasi-error-free threshold (less than one uncorrected error-event per hour)</p> <p>RF Power Level Estimator (locked to carriers or not)</p>	<p>Per EN300 421:</p> <p>QPSK R=1/2: 4.5 dB,                      QPSK R=2/3: 5.0 dB,                      QPSK R=3/4: 5.5 dB,                      QPSK R=5/6: 6.0 dB,                      QPSK R=7/8: 6.4 dB</p> <p>Unitless metric SIGNAL corresponds to input power as follows:</p> <table border="0"> <tr> <td>above -25dBm</td> <td>Extrapolated from 90 up to 100+</td> </tr> <tr> <td>-25dBm</td> <td>90</td> </tr> <tr> <td>-35dBm</td> <td>70</td> </tr> <tr> <td>-45dBm</td> <td>50</td> </tr> <tr> <td>-55dBm</td> <td>30</td> </tr> <tr> <td>-65dBm</td> <td>10</td> </tr> <tr> <td>below -65dBm</td> <td>Extrapolate from 10 down to &lt;0</td> </tr> <tr> <td>no signal</td> <td>&lt;0</td> </tr> </table> <p>Accuracy: unit to unit <math>\pm 5</math> dBm; over frequency <math>\pm 10</math> dBm</p>	above -25dBm	Extrapolated from 90 up to 100+	-25dBm	90	-35dBm	70	-45dBm	50	-55dBm	30	-65dBm	10	below -65dBm	Extrapolate from 10 down to <0	no signal	<0
above -25dBm	Extrapolated from 90 up to 100+																
-25dBm	90																
-35dBm	70																
-45dBm	50																
-55dBm	30																
-65dBm	10																
below -65dBm	Extrapolate from 10 down to <0																
no signal	<0																
<p>LNB DC POWER</p> <p>Activation</p> <p>Voltage</p> <p>Current (full load)</p> <p>Short-circuit protection</p> <p>European "Universal LNB"</p>	<p>(supplied on RF center conductor)</p> <p>User- or network-controlled selectable: ON or OFF</p> <p>~ +18.7 VDC nominal at no loading, +18.0 VDC min. at max loading</p> <p>350 mA max</p> <p>Thermal fuse, tripping at ~500 mA.</p> <p>Software may be upgraded for "Universal Single LNB" polarization and freq-band control per ASTRA recommendation</p>																
<b>DVB-QPSK RECEIVER WITH 4-PORT RF SWITCH OPTION</b>																	
<p>SWITCHED RF INPUTS</p> <p>Input Impedance</p> <p>Isolation, port-to-port</p> <p>Input VSWR, 75-<math>\Omega</math> system, selected port</p> <p>Input VSWR, 75-<math>\Omega</math> system, unselected port</p>	<p>75<math>\Omega</math> unbalanced</p> <p>&gt; 45 dB, 950-1450 MHz &gt; 40 dB, 1450-2150 MHz</p> <p>&lt; 2.6:1 (7 dB R.L. min), 950-1450 MHz Not guaranteed, 1450-2150 MHz</p> <p>&lt; 2.0:1 (10 dB R.L. min), 950-1450 MHz Not guaranteed, 1450-2150 MHz</p>																

Characteristic	Specification
Surge Resistance	Guaranteed survival from up to 10 direct-coupled 8kV discharges (per IEC 801-2) whether port is selected or not
RF TUNING	Same as QPSK option described above
DEMODULATOR/FEC	Same as QPSK option described above
LNB DC POWER	Supplied on separate 2-pin header. Performance otherwise the same as QPSK option described above
<b>TURBO PSK RECEIVER OPTION, BROADCOM PROTOCOL</b>	
RF INPUT	
Input Impedance	75Ω unbalanced
Input VSWR, 75-Ω system	<1.9:1 (10 dB R.L. min), 950-1450 MHz < 1.9:1 (10 dB R.L. min), 1450-2150 MHz
Surge Resistance	Guaranteed survival from up to 10 direct-coupled 8kV discharges (per IEC 801-2)
RF TUNING	
Input Frequency Range	950 to 2150 MHz
LO Leakage at Input	≤ -60 dBm
Symbol-rate Range	1 to 30 Msps (may be limited by Transport Rate limits)
Tuning Resolution	10 kHz
Input Signal Level Range	-25 to -65 dBm
Signal Level Warning Limits	warns within +10/-5 dB of upper limit and +5/-10 dB of lower limit
Maximum Aggregate Input Power	0 dBm max
DEMODULATOR/FEC	
Modulation	1. DVB-QPSK ( $\alpha = .35$ ) per EN 300 421 2. Advanced "Turbo-QPSK" ( $\alpha = .20$ default; $R = \frac{1}{2}, \frac{3}{4}$ ) per Broadcom proprietary protocol 3. Advanced "Turbo-8PSK" ( $\alpha = .20$ default; $R = \frac{2}{3}, \frac{5}{6}, \frac{8}{9}$ ) per Broadcom proprietary protocol. [ $R = \frac{3}{4}$ Type I and II; contact factory.] 4. Advanced "Turbo-16QAM" ( $\alpha = .20$ default; $R = \frac{3}{4}$ ) per Broadcom proprietary protocol
Carrier acquisition range	±1 MHz or ± 10% of symbol-rate QPSK, whichever is greater

Characteristic	Specification																
<p>Max <math>E_b/N_0</math> @ Quasi-error-free threshold (less than one uncorrected error-event per hour)</p> <p>RF Power Level Estimator (locked to carriers or not)</p>	<p>1. DVB-QPSK                      QPSK R=1/2: 4.5 dB,                      QPSK R=2/3: 5.0 dB,                      QPSK R=3/4: 5.5 dB,                      QPSK R=5/6: 6.0 dB,                      QPSK R=7/8: 6.4 dB</p> <p>2. Turbo-QPSK                      R=1/2: 2.4,                      R=3/4: 3.6</p> <p>3. Turbo-8PSK                      R=2/3: 4.8 dB,                      R=3/4(I): 5.4,                      R=3/4(II): 5.8,                      R=5/6: 6.8,                      R=8/9: 8.2</p> <p>4. Turbo-16QAM                      R=3/4: 6.6 dB</p> <p>Unitless metric SIGNAL corresponds to input power as follows:</p> <table border="0"> <tr> <td>above -25dBm</td> <td>Extrapolated from 90 up to 100+</td> </tr> <tr> <td>-25dBm</td> <td>90</td> </tr> <tr> <td>-35dBm</td> <td>70</td> </tr> <tr> <td>-45dBm</td> <td>50</td> </tr> <tr> <td>-55dBm</td> <td>30</td> </tr> <tr> <td>-65dBm</td> <td>10</td> </tr> <tr> <td>below -65dBm</td> <td>Extrapolate from 10 down to &lt;0</td> </tr> <tr> <td>no signal</td> <td>&lt;0</td> </tr> </table> <p>Accuracy: unit to unit <math>\leq \pm 5</math> dBm; over frequency <math>\leq \pm 10</math> dBm</p>	above -25dBm	Extrapolated from 90 up to 100+	-25dBm	90	-35dBm	70	-45dBm	50	-55dBm	30	-65dBm	10	below -65dBm	Extrapolate from 10 down to <0	no signal	<0
above -25dBm	Extrapolated from 90 up to 100+																
-25dBm	90																
-35dBm	70																
-45dBm	50																
-55dBm	30																
-65dBm	10																
below -65dBm	Extrapolate from 10 down to <0																
no signal	<0																
<p>LNB DC POWER</p> <p>Activation</p> <p>Voltage</p> <p>Current (full load)</p> <p>Short-circuit protection</p> <p>European "Universal LNB"</p>	<p>(supplied on RF center conductor)</p> <p>User- or network-controlled selectable: ON or OFF</p> <p>~ +18.7 VDC nominal at no loading, +18.0 VDC min. at max loading</p> <p>350 mA max</p> <p>Thermal fuse, tripping at ~500 mA.</p> <p>Software may be upgraded for "Universal Single LNB" polarization and freq-band control per ASTRA recommendation</p>																

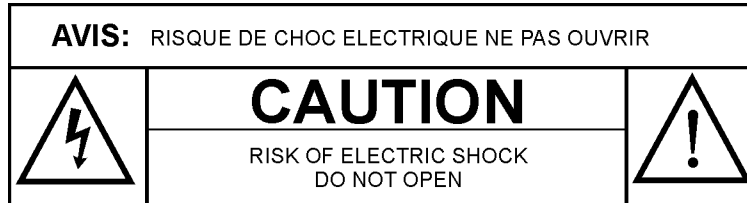
Characteristic	Specification
<b>TURBO PSK RECEIVER WITH 4-PORT SWITCH OPTION</b>	
RF SWITCH INPUT	4-port, single-throw switch
Input Impedance	75Ω unbalanced
Isolation, port-to-port	> 45 dB, 950-1450 MHz > 40 dB, 1450-2150 MHz
Input VSWR, 75-Ω system, selected port	< 1.9:1 (10 dB R.L. min), 950-1450 MHz < 1.9:1 (10 dB R.L. min), 1450-2150 MHz
Input VSWR, 75-Ω system, unselected port	< 1.9:1 (10 dB R.L. min), 950-1450 MHz < 1.9:1 (10 dB R.L. min), 1450-2150 MHz
Surge Resistance	Guaranteed survival from up to 10 direct-coupled 8kV discharges (per IEC 801-2) whether or not port is selected
RF TUNING	Same as Turbo PSK option described (above)
DEMODULATOR/FEC	Same as Turbo PSK option described (above)
LNB DC POWER	Supplied on RF Input Port 4 - same electrical characteristics as described for single-input Turbo PSK option (above)
<b>ASI TRANSPORT INPUT OPTION</b>	
DVB-ASI INPUT	One input per DVB ASI per EN50083-9 Annex B
Physical layer	270 Mbaud signaling on 75Ω coax cable
Minimum byte gaps	Down to 0-byte interbyte gaps
Transport data rate	Limited to rates allowed by parent IRD



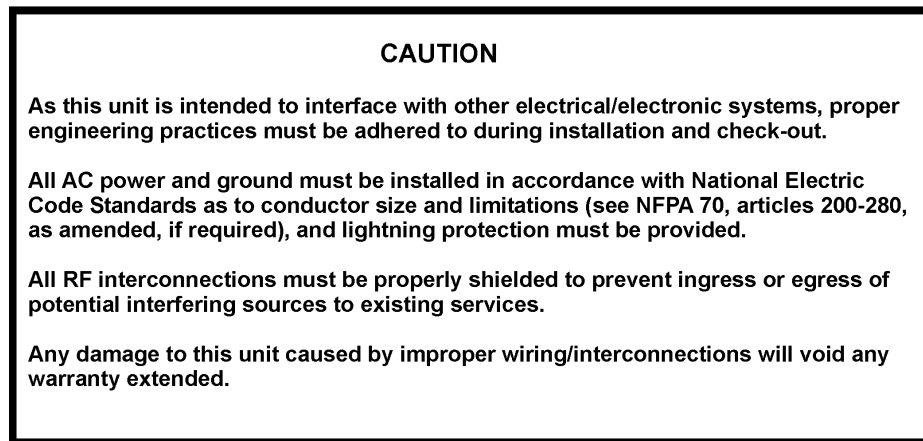
## 1.4 Safety Summary

The **Unity 4600** is designed for safe use with few special precautions required of the user. The following items are basic precautions to use when installing and working with your **Unity 4600**:

Do not open the **Unity 4600** chassis cover.



The **Unity 4600** incorporates security labels over some of the screws. There are no user-serviceable components within the **Unity 4600**. Tampering with these security labels or opening the unit will void your warranty. If you have questions, contact Wegener's Customer Service Department at the address or numbers listed in **Chapter 5 Customer Service** on page 59.



## 1.5 Glossary of Terms and Abbreviations

Term	Definition
Ad avail, digital	The opportunity for a local program splicer to insert local content in the MPEG PES streams in substitution for "regular" network-distributed programming. The avail is bounded by "splice out" and "splice in" points. "Splice points" are seamless insertion points (located for the splicer by DPI messages) where the compressed stream may be broken and substituted without frame-by-frame interruption of video.
Ad avail, analog	The opportunity for local users to switch from the network-supplied programming to locally-generated content (commercials). This is signaled by use of DTMF tones or closures of cue relays.
Alarm	A condition or notification of a condition that prevents proper <b>Unity 4600</b> functioning.
Application Software	The main host software which sets up the unit hardware, runs the process of acquiring transport stream sources, sets up and monitors the demux and decompression processes, monitors unit operations, and interfaces with the network and local users.
ASI (or DVB-ASI)	An "asynchronous" bit-serial physical interface for transport streams. Transmitting and receiving functions are designed such that the time relationships between all packets and their timing references are unchanged.
Audio Language Descriptor	Legacy 3-character MPEG descriptor applied to a program's audio streams. It was originally allocated to designate languages, but is now used for generic identification.
Automated Recovery (or Recovery)	The mechanism used when the <b>Unity 4600</b> is unable to acquire a valid transport stream, loses network control or detects an invalid control stream, or is unable to deliver the required services using its current settings. The unit automatically begins attempting operations under "backup" unit settings stored in the presets table until it can return to normal operation or is stopped by local user command.
Boot loader	Software residing in non-writable zone of flash which executes at unit reset. It will verify and load the preselected application.
CA	See "Conditional Access".
COMPEL®	Wegener's network control software that may be used to manage your <b>Unity 4600</b> as well as other hardware.
Conditional Access	Wegener's system for securing the transmitted transport stream from unauthorized access. It features distribution of ciphered authorizing messages within a special PID. Upon deciphering in secure processors within the IRD, these messages continuously update the IRD with the current descrambling key.
DPI	Digital Program Insert. A special message, borne in an MPEG PID associated with a particular program, that signals the boundaries of ad avails.
DTMF	Dual-Tone Multi-Frequency. Tone signaling system used by the legacy telephone system. Tone pairs represented each of the keyboard items 0-9, *, and #. This system may be used to control external cueing equipment.
DVB	Digital Video Broadcast working group. This is a shorthand designation for a group of industry standards that provide enhancements in the use of MPEG transport streams. (For example, one DVB standard defined the standard way QPSK-modulated carriers would convey these streams over satellite world-wide.)
$E_b/N_0$	Energy-per-bit per Noise density-per-Hertz. This is a unitless ratio that expresses signal-to-noise ratio in carrier transmission systems that convey digital data. A quality measurement for any such system is the $E_b/N_0$ needed to just convey the digital data within acceptable error rates. This is called the " $E_b/N_0$ threshold".

Term	Definition
Ethernet	The widely-used LAN technology specified by IEEE standard 802.3
IRD	Integrated Receiver-Decoder. A product which features a "receiver" to extract transport streams from satellite-borne carriers and a companion "decoder" to decompress MPEG elementary streams (from within said transport streams) in order to recreate the original audio/video/data signals. The <b>Unity 4600</b> is an IRD.
Keep-alives (COMPEL)	Simple COMPEL network messages, addressed to "all", bearing date and time. These are transmitted regularly (every 5 seconds, for example) so that IRDs may quickly and continuously verify their network connection.
KMS	Key Management System. The sub-system within the Wegener Conditional Access system that creates and ciphers the scrambling keys and then distributes them to the uplink UMX5010 and all downlinked IRDs conveyed in a special PID within the transport stream.
LAN	Local area network. Your <b>Unity 4600</b> may be connected to an Ethernet LAN.
LCD	Liquid crystal display. The front-panel screen on your <b>Unity 4600</b> is a liquid crystal display.
LED	Light-emitting diode. The front-panel indicator lights on your <b>Unity 4600</b> are LEDs
Mbps, kbps or Msps	Units of data transport rate - Megabits per second (1 million bits per second), kilobits per second (1 thousand bits per second), or million symbols per second (1 million symbols per second)
MPEG	Moving Picture Experts Group - refers to the method of video compression established by this group. (The <b>Unity 4600</b> utilizes the MPEG2 format for video.)
Network Protection Mode	A non-volatile setup parameter whose value is "Shared" or "Protected" (or "not Shared"). Similarly, each network control stream has a "Share" status field as part of the COMPEL packet framing. A network control stream is considered "invalid" to the <b>Unity 4600</b> if the network ID in the stream differs from that of the IRD and if either the network stream or the <b>Unity 4600</b> are set to be "Protected". For test purposes only, there is a generic network ID that the COMPEL system may transmit which is always considered to be "valid" by all IRDs.
NTSC	National Television System Committee. The composite color video standard used domestically (and in a few countries outside US) based on 525-line 59.97 Hz field rate (with 2:1 interlace).
PAL	Phase-Alternating-Line. A set of composite color video standards used worldwide (outside US) which implements a line-by-line reversal of phase of one of the orthogonal color components. For our use, all PAL signals are assumed to be 625-line 50 Hz field-rate systems with varying chroma and luma bandwidths and color subcarrier frequencies.
PAT	Program Allocation Table. A PSI table within an MPEG transport stream which cross-references all available programs to a PID for its PMT. This table is always present in legal transport streams and must always be in the clear (not scrambled) even when Conditional Access scrambling is used.
PCR	Program Clock Reference. A time-base signal used to synchronize the IRDs internal timing to the same timing in the MPEG encoder for the received program. Multiple programs may share a PCR, depending on the multiplexer used to create the final transport stream.
PES Stream	Packetized Elementary Stream. The MPEG designation for a compressed component of a Program (such as audio or video) which includes the timing information necessary for synchronization (e.g. - synchronizing audio to video).
PID (or Packet ID)	The unique transport stream packet identifier assigned to each constituent data stream within the transport stream. Also, in this document, "PID" is used to designate the stream itself.

Term	Definition
PMT	Program Map Table. A PSI table within an MPEG transport stream which cross-references a program (or programs) against all the PIDs that bear its component streams (such as audios, video, DPI, PCR, etc.). IRDs need this table to decode the compressed components of that program.
Presets Table	A non-volatile table of unit presets. This table is used for either automatic recoveries or as a shorthand method to quickly reconfigure the unit. The presets table may be programmed at the factory and edited by the customer, either locally or via network control.
Program	A single media stream (combination of audio, video, data, etc.) tied to a common time base.
Program Number	A numerical code representing a program.
PSI Tables	A group of information-bearing tables, each borne by well-known PIDs, regularly transmitted in the transport stream. See also "PAT" and "PMT". Also, ISO 13818-1 gives a thorough description of these and other Tables.
PTS	Presentation Time Stamp. A marker signal associated with audio and video streams within a program conveyed in MPEG transport stream. This signal allows the audio and video to be presented in synchronism to each other.
RAM	Random access memory. A general term for all volatile memory types out of which application software executes and into which its variables, state information, and messages are stored. RAM is also used to designate the volatile storage used by the Transport Demux and decompression devices.
RF	Radio frequency
Service Descriptor	Service Descriptors are text entries in the Service Descriptor table (SDT, defined per a DVB standard). Service Descriptors are used to give text names to the Programs within transport streams.
Service settings	That part of the Unit Settings which allow for the local detection, decompression, and output (or "display") of a program's services.
Setting, Last Commanded	The most recent Unit Setting requested by a user (local or network) command. This value is non-volatile.
Setting, Last Successful	The most recent Unit Setting, which is NOT a Temporary Setting, at which the IRD was able to deliver services while free of alarms. This may also be the Last Commanded setting or it may be the attempted (Transient) setting at which auto-recovery was successful. This value is non-volatile.
Setting, Permanent	That non-volatile Unit Setting which the IRD will attempt, if in Normal Operation, after a unit reset. This will be the Last Commanded setting unless, since that command was issued, the IRD had executed an Auto-Recovery and successfully acquired at one of the Preset settings. In other words, the Permanent Setting is the most recent of the Last Commanded and Last Successful Settings.
Setting, Temporary	A special volatile unit setting with a timed expiration period. The command to invoke this special setting and the subsequent success of the IRD to find services at this setting does not affect the non-volatile value of the Last Commanded or Last Successful Settings. Also, if the compliant IRD receives a command to change its Permanent Setting while in a Temporary Setting, the Temporary Setting will <i>not</i> be aborted, but the new Permanent Setting will be recorded in NVRAM as the Last Commanded setting and the Permanent Setting pointer will refer to that.
Setting, Transient	A volatile Unit Setting used for immediate acquisition of services. Transient settings are either Temporary settings (see above) or Presets used for attempted acquisition during Auto-Recovery. If, in the case of Presets, the attempt is successful, those settings become Permanent Settings.

Term	Definition
T <sub>MRA</sub>	Maximum Recommended Ambient Temperature, the highest operating temperature for which the unit is rated
Transport Stream (or MPEG Transport Stream)	A multiplex of several data streams, each of which is borne in transport packets, 188-byte blocks containing a sync word, header information (including a PID), and payload data. This multiplex includes PSI data tables, programs, padding, and floating PIDs such as those used by COMPEL <sup>®</sup> network control.
Warning	A condition or notification of (1) a condition that may compromise the proper performance of your <b>Unity 4600</b> ; or (2) any non-alarm condition that should be brought to local user's attention.

This page intentionally left blank

# CHAPTER 2 INSTALLATION

This chapter provides instructions on unpacking, mounting, and connecting your **Unity 4600** as well as connector information including detailed pinouts.

## 2.1 Unpacking and Inspection

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

**Note:** Please save the packing materials and original shipping containers in case you must later return the unit for repair. Packing these units in other containers in such a way that they are damaged will void your warranty.

## 2.2 Location and Mounting

The **Unity 4600** may be mounted in a standard 19-inch equipment rack or set up for desktop operation. In either location, maintain a clean, dry environment for your **Unity 4600**.

### FCC-mandated suppression of radiated emissions

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

### WARNING

This is a Class A product. In a domestic environment this product may cause radio interference for which the user may need to take mitigating action.

### DANGER

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

### Elevated Operating Ambient

When equipment is installed in a closed or multi-unit rack assembly, the operating ambient of the rack environment may be greater than the room ambient. Therefore, consideration should be given to the ambient air temperature within the rack, and not just inside the room, when deciding if the maximum recommended ambient operating temperature ( $T_{MRA}$ ) is being met.

### Reduced Air Flow

Equipment should be installed such that airflow required for safe operation of the equipment is not compromised. The Unity 4600 may be arranged in a rack without empty spaces between units if heat rise is prevented by ensuring its side vents remain unblocked with adequate clearance around the vent holes.

### Mechanical Loading

Mounting of the equipment in a rack should be such that a hazardous condition is not produced by uneven loading. This unit is not very heavy, but total rack loading must be considered. Also, do not rest any unsupported equipment on your Unity 4600.

### Circuit Overloading

Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits could have on overcurrent protection and supply wiring. Ensure that the total rack or breaker power consumption does not exceed the limits of the AC branch circuit. Appropriate consideration of equipment ratings should be used when addressing this concern.

### Reliable Earthing

Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (use of power strips, chassis ground lugs, etc.).

#### Rack Mounting

Your **Unity 4600** is sized at a single RU and will fit an EIA-standard, 19-inch-wide equipment rack.

1. First install angle brackets or cross-supports capable of supporting both the unit and its connecting cables. Screw or bolt the supports securely to the equipment rack.
2. Place the **Unity 4600** on its supports and use four anchor screws or bolts and nuts to secure the **Unity 4600** front brackets to the rack.

#### WARNING

The front brackets must be secured to the rack. If front brackets are left unsecured, the unit may shift forward and fall from the rack during installation or operation. Failure to secure the front brackets may result in personal injury and/or damage to the equipment.

#### Desktop Installation

To set up the **Unity 4600** in a desktop environment, place the **Unity 4600** on a flat surface where it will not be subject to spills or impacts. Also route cables to the unit so that they will not be hit or pulled causing damage to the connectors or to the unit itself. Ensure a sufficient flow of cool air (See **Reduced Air Flow** on page 17.) so that the unit's operating ambient temperature range is not exceeded.

#### WARNING

Locate the Unity 4600 and its cables to avoid impacts, spills, and pulling cables and to ensure sufficient air flow. Failure to locate the Unity 4600 in a proper environment may result in damage to the equipment.



## 2.3 Unity 4600 Connections

### Rear panel views

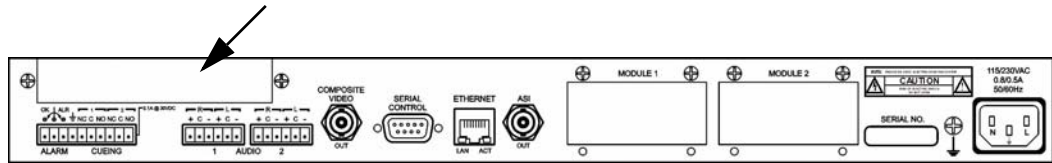
Figure 2.1 and Figure 2.3 illustrate the rear panel views for the Unity 4600 connections.

**Note:** DTMF is not available for units manufactured after 10/22/2007.

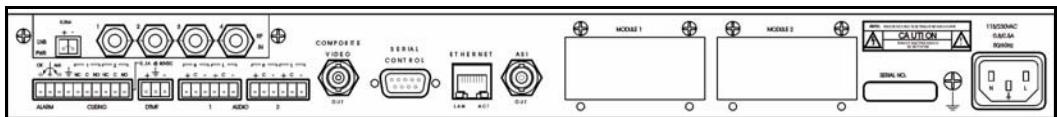
Figure 2.1 shows the connector locations on the Unity 4600 rear panel.

**Figure 2.1: Unity 4600 rear panel without DTMF**

See Figure 2.3 for Transport In Options for this slot.



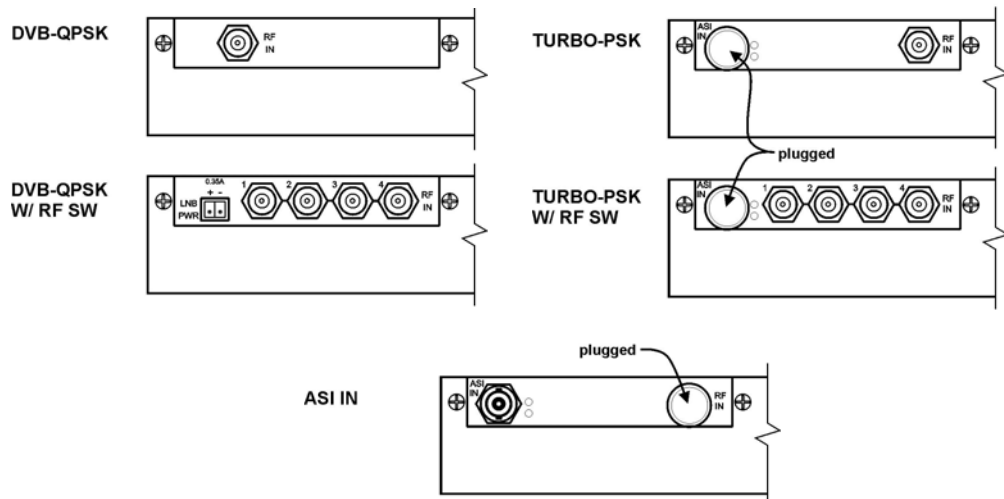
**Figure 2.2: Unity 4600 rear panel with DTMF**



### Transport In Options

Figure 2.3 below shows rear panel views of the five available receiver modules.

**Figure 2.3: Unity 4600 Transport In Options**



### Rear panel Connectors

Table 2.1: **Rear panel Connectors** below lists the Unity 4600 rear panel connectors, their types and pinout information. See **Interpreting LEDs** on page 33 for descriptions of rear panel indicators.

Table 2.1: Rear panel Connectors

Connector Designation	Type	Pin	Signal Name
ALARM/CUEING	10-pin male header (mates to removable terminal-strip)	1 (on left as viewed from rear of unit)	OK (COM closes here when OK)
		2	COM:
		3	Alarm (COM closes here on alarm or if power is off)
		4	GND
		5	Cue Relay #1: N.C. contact
		6	Cue Relay #1: Common contact
		7	Cue Relay #1: N.O. contact
		8	Cue Relay #2: N.C. contact
		9	Cue Relay #2: Common contact
		10	Cue Relay #2: N.O. contact
DTMF (where available)	3-pin male header (mates to removable terminal-strip)	1 (on left as viewed from rear of unit)	DTMF tone, non-inverted output
		2	GND
		3	DTMF tone, inverted output
AUDIO (same for both ports 1 and 2)	6-pin male header (mates to removable term strip)	1 (on left as viewed from rear of unit)	Right '+'
		2	Right GND
		3	Right '-'
		4	Left '+'
		5	Left GND
		6	Left '-'
COMPOSITE VIDEO OUT	BNC Jack		Composite Video Out
SERIAL CONTROL	RS232, 9-pin D female jacks	1	DCD (internally pulled to +5V)
		2	RxD (data output)
		3	TxD (data input)
		4	DTR (not connected)
		5	GND
		6	DSR (internally pulled to +5V)

Connector Designation	Type	Pin	Signal Name
		7	RTS (internally pulled to +5V, may be upgraded for handshaking)
		8	CTS (not used presently, may be upgraded for handshaking)
		9	RI (internally pulled to +5V, with weak current limiting)
ETHERNET	RJ45 Jack	1 (on left as viewed from rear of unit)	TXDO +
		2	TXDO -
		3	RXDI +
		4	Shorted together, then terminated into an AC ground.
		5	
		6	RXDI -
		7	Shorted together, then terminated into an AC ground.
		8	
ASI OUT	BNC Jack		DVB-ASI Transport Output
115/230 VAC	Std. IEC Receptacle		AC line in
DVB-QPSK Transport In Option			
RF IN	Type F coax jack		L-band RF Input from external LNB (with LNB DC on center pin)
DVB-QPSK with 4-way RF Switch Transport In Option			
RF IN – 1 through 4	Type F coax jacks		4-way RF Switch Inputs (with DC block)
LNB PWR*	2-pin male header (mates to removable terminal-strip)	1 (on left as viewed from rear of unit)	LNB DC Output positive leg
		2	LNB DC Output return leg
Turbo-PSK Transport In Option			
ASI IN	<plugged>		Not used
RF IN	Type F coax jack		L-band RF Input from external LNB (with LNB DC on center pin)
Turbo-PSK with 4-way RF Switch Transport In Option			
ASI IN	<plugged>		Not used
RF IN – 1 through 3	Type F coax jacks		4-way RF Switch Inputs (with DC block)
RF IN 4	Type F coax jack		4-way RF Switch Input (with LNB DC on center pin)
ASI Transport In Option			

Connector Designation	Type	Pin	Signal Name
ASI IN	BNC Jack		DVB-ASI Input
RF IN	<plugged>		Not used

\* LNB DC power may be locked to OFF by network.

Table 2.2 below lists the Unity 4600 front-panel connectors, their types and pinout information.

Table 2.2: Front-panel Connectors

	Type	Pin	Signal Name
Video Monitor	BNC jack		Composite Video monitor
Audio Monitor	¼" stereo phone jack		Stereo audio headphone monitor, selectable between audio ports 1 or 2

## 2.4 Serial Port Configuration

### Device assignments

The Unity 4600 has one external serial port. A "device" must be assigned once to the serial port, but no "device" may be assigned more than once. In addition, more than one device may be assigned at one time but only one device which accepts input may be assigned. (If multiple devices are assigned to the serial port, the port's settings are controlled by the device with higher priority according to the list below.) Device port assignment and device configuration (see below) may be controlled only from the unit front panel and the network may disable this capability. The possible devices are:

1. Terminal
2. Modem ("modem" being remote terminal via modem)
3. Local COMPEL<sup>®</sup>
4. Auxiliary Data
5. Printer (including COMPEL<sup>®</sup> e-mail and reports)

### Device configurations

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

Table 2.3: Device Configurations

Device	Serial Port Behavior ( <i>Italics are Programmable, Bold are Fixed</i> )
Terminal	Configured to <b>19.2k</b> , <b>N</b> , <b>8</b> , <b>1</b> . The unit responds to the terminal commands as described in <b>3.4 Operation from Local/Remote Terminal</b> on page 59.
Modem	Configured to <i>B</i> , <i>P</i> , <b>8</b> , <b>1</b> . The unit responds to the commands as described in <b>3.4 Operation from Local/Remote Terminal</b> on page 59.

Device	Serial Port Behavior ( <i>Italics are Programmable, Bold are Fixed</i> )
Aux Data	Configured to <i>B</i> , <i>P</i> , <b>8</b> , <b>1</b> . This is an output only (all inputs ignored).
Local COMPEL	Configured to <i>B</i> , <i>P</i> , <b>8</b> , <b>1</b> . This is an input for testing only.
Printer	Configured to <i>B</i> , <i>P</i> , <b>8</b> , <b>1</b> . This is an output only.
The legal values for <i>B</i> are: 1200, 2400, 4800, 9600, 19.2k, or 38.4 kilobaud. The legal values for <i>P</i> are: 'O', 'E', or 'N' for Odd, Even, or No parity.	

## Device handling

**Terminal I/O** - The Terminal device is used for command and control of the **Unity 4600**. This I/O is a basic VT100-like emulation. All I/O is prompted by user-input text strings terminated in carriage-returns. The terminal, whether local or remote (via modem or telnet over TCP/IP), should be set to local echo ON. The unit only echoes a carriage-return/linefeed and then a '>' prompt after user entry.

**Modem I/O** - The Modem device operates in a similar manner to the Terminal device. Whereas the Terminal device was limited to a specific configuration, the modem device may be set to one of several. The Modem device does not use special handshaking or special control characters, and only supports auto-answer modems. To access the modem command interface, the serial-port device must first be set to Modem. The "Terminal/IO" discussion above on emulation and echoing would then apply. The user would send the unit a carriage return and then the unit would return a prompt to enter the "modem password". If the correct password is entered, then modem access is enabled. Upon enabling modem access, the **Unity 4600** will output a welcome banner. After that, I/O is indistinguishable from normal terminal access, with the same restriction on local user access as set by the Network. Modem access is disabled when either (1) a new input serial-port device is selected, (2) when there is no user input for 10 minutes, (3) the OH command is received, or (4) the unit is reset.

**Aux Data** - The Aux Data device is defined to allow for async data streams to be carried within the transport stream and their raw payload output on an IRD serial port. The PID of these streams may or may not be assigned to a program number within a PMT. To recover the data, the IRD need only be given the PID and baud rate. The range of legal PIDs is established by the ISO 13818 standard as 20 to 1ffe (hex). This may be performed either by COMPEL<sup>®</sup> command or by the local user (if local control is enabled).

**COMPEL<sup>®</sup>** - This device is defined to allow for input of the COMPEL control stream (for testing only). There is no output.

**PRINTER OUTPUT** - This is an output-only device. For the Printer device, there are three legal types: COMPEL-requested Reports, COMPEL E-mail, and Raw COMPEL (binary) Data. The first output type are IRD status reports identical to those that the local user may request. These are always available for the Printer device. The second output type must be enabled by a non-volatile control. The last type, Raw COMPEL, must also be enabled by a non-volatile control (actually a factory setting that can only be modified with debug access). It is exclusive of the other outputs (the others are not allowed if dumping Raw COMPEL). For this type, the COMPEL data stream, while being processed normally by the IRD host processor, is also output as-is to the Printer device. This data is binary and includes non-printing characters.

## 2.5 Installation Testing

The **Unity 4600** has a number of installation tests that may be performed from the front panel. From the Home screen, press the right arrow until the Installation Testing screen is displayed.

### RF input check

This test is used to verify an RF connection to a properly functioning LNB at any RF port. Perform the check as follows:

1. Press **ENT** from the Installation Testing screen to bring up the RF Input Check screen.
2. Press **ENT** again to display the input level estimate at RF Port 1. This will be an average of the estimated levels at each of the twenty-four domestic transponder center frequencies.
3. Press the right-arrow button repeatedly to display the input levels at RF Ports 2, 3, and 4 as well.
4. Press **ESC** to return to the RF Input Check screen.

### Audio/video check

This test puts out a video test pattern and audio test tones to allow verification of video and audio connections. The video pattern is vertical color bars. On Port 1, the audio is a slowly pulsing (triangle-wave) tone with a higher frequency on Right than on Left. On Port 2, the audio is a slowly pulsing (sine-wave) tone also with higher frequency on Right than on Left. On each port, the audio tones alternately pulse (~1 second) left then right, then repeat. Use the following steps to enable or disable this audio/video test mode:

1. From the RF Input Check screen, press the right-arrow button to bring up the Audio/Video Check screen.
2. The Audio/Video Check screen will indicate that the test mode is either "Enabled" or "Disabled".
3. Press **ENT** to switch the test mode between "Enabled" and "Disabled".
4. Press the left-arrow button to return to the RF Input Check screen or **ESC** to return to the Installation Testing screen.

### DTMF Setup

This test allows the setup of DTMF tone levels and verification of connections to cue equipment.

**Note:** DTMF output capability not offered on equipment manufactured after 10/22/07.

Use the following steps to set the DTMF level:

1. From the **Audio/Video Check** screen, press the right-arrow button to display the **DTMF Setup** screen.
2. Press **ENT** to display the **DTMF Test Tone** screen and begin output of the DTMF test tones. The tones (actually tone-pairs) are played out at about one-second intervals from 1 through 9, 0, \*, #, A, B, C, D, and then repeating.



3. Press the arrow buttons to adjust the volume. Up-arrow or right-arrow to increase volume, down-arrow or left-arrow to decrease volume. The number of black squares on the LCD indicates the current volume.

4. Press **ESC** to return to the **DTMF Setup** screen or **ESC** to return to the **Installation Testing** screen.

### **Relay Pulse Check**

This test may be used to verify connections to the alarm or cue relays. Each relay, as it is tested, will energize and de-energize about once per second. Use the following steps to check these connections:

1. First, verify that each relay is set either to ON or OFF. Relays placed in the nonvolatile "Follow Warning" setting will not respond to the Pulse command used in this test.
2. From the DTMF Level Set screen, press the right-arrow button to display the Relay Pulse Check screen.
3. Press **ENT** to display the Relay 1 Check screen.
4. The Relay Check screen will indicate that the relay is On or Off as it switches on and off about once per second. At the same time, a user should see the ohm-meter reading between the output contacts alternate between zero and (virtually) infinite.
5. Press the right-arrow button to test the remaining cue relays and the alarm relay.
6. Press **ESC** to return to the Relay Check screen.

This page intentionally left blank



# CHAPTER 3 OPERATION

This chapter provides an overview of **Unity 4600** operation, details of controls and indicators, the alarm/warning system, and user interface details.

## 3.1 Theory of Operation

### Functional summary

From one selected RF input feed, the **Unity 4600** receives an L-band RF carrier from an external antenna LNB. It then demodulates the carrier and extracts the transmitted MPEG transport stream. If the stream is scrambled and the unit is properly authorized, it applies the descrambling algorithm to re-generate that transport stream as it appeared at the multiplexer in the uplink compression system. (Alternately, if using per-program viewing access, only the authorized programs will be descrambled.) This transport stream is then supplied to the ASI transport output, perhaps with program re-mapping or conditional DPI filtering (under network control). The **Unity 4600** also decompresses the components of a selected program and provides the audio, video, and/or data services for output.

**Note:** The user or network may wish to have a null program assignment if no attempt at local decompression is desired. This is required for the new HD programming.

As needed, auxiliary functions are also provided, such as re-insertion of vertical blanking interval data (closed captioning for example) in the video output. 3.1 presents a logical block diagram of **Unity 4600** operation.

Available outputs from the **Unity 4600** include:

- DVB-ASI transport output with program (number and descriptor) mapping
- Decompressed MPEG video as composite video output (NTSC or PAL)
- Two independent, decompressed audio streams (MPEG or Dolby AC-3 downmix) to balanced analog audio outputs
- Re-insertion of VBI line data from various proprietary and ATSC protocols
- Alarm relay
- User control relays for cueing
- DTMF cueing tones
- Front-panel audio (one stereo pair) and composite video monitor outputs

### Automated recovery

If unable to deliver required services to predetermined standards, or if unable to detect a required network control stream (COMPEL<sup>®</sup>), the **Unity 4600** attempts to resume normal operation through a process called Automated Recovery. Referring to an internal, non-volatile list of "presets", the **Unity 4600** will attempt to restore either services or network control, depending on what caused the recovery. A "preset" is a list of unit settings, and the list of these presets is called the Preset Table. Automated Recovery will attempt to restore the unit according to each preset (one at a time) in the order in which they are listed in the table. The process continues (repeating attempts if necessary) until the unit successfully resumes normal operation or is halted by local user command. If successful with a preset, the settings in that preset become the permanent unit settings. Later, the local user (or the network, if available) may abort the results of the Automated Recovery and force the unit back to its last commanded setting.

Several user- or network-programmable objects control the Automated Recovery. In addition to the contents of the Preset Table, these objects include the Services Recovery Timeout, the Network Recovery Timeout, the Recovery Iteration Time, and the Local Control Re-enable Timeout. The first two timeouts control how long the unit will wait after loss of services or network control, respectively, before entering Automated Recovery. The Recovery Iteration Time sets the maximum time the unit will spend attempting recovery at each preset. The last is a special timeout for disaster recovery, such as loss of a satellite, where units whose local control was previously disabled by the network are re-enabled so that local users may implement more complex recovery plans.

**Monitoring and control**

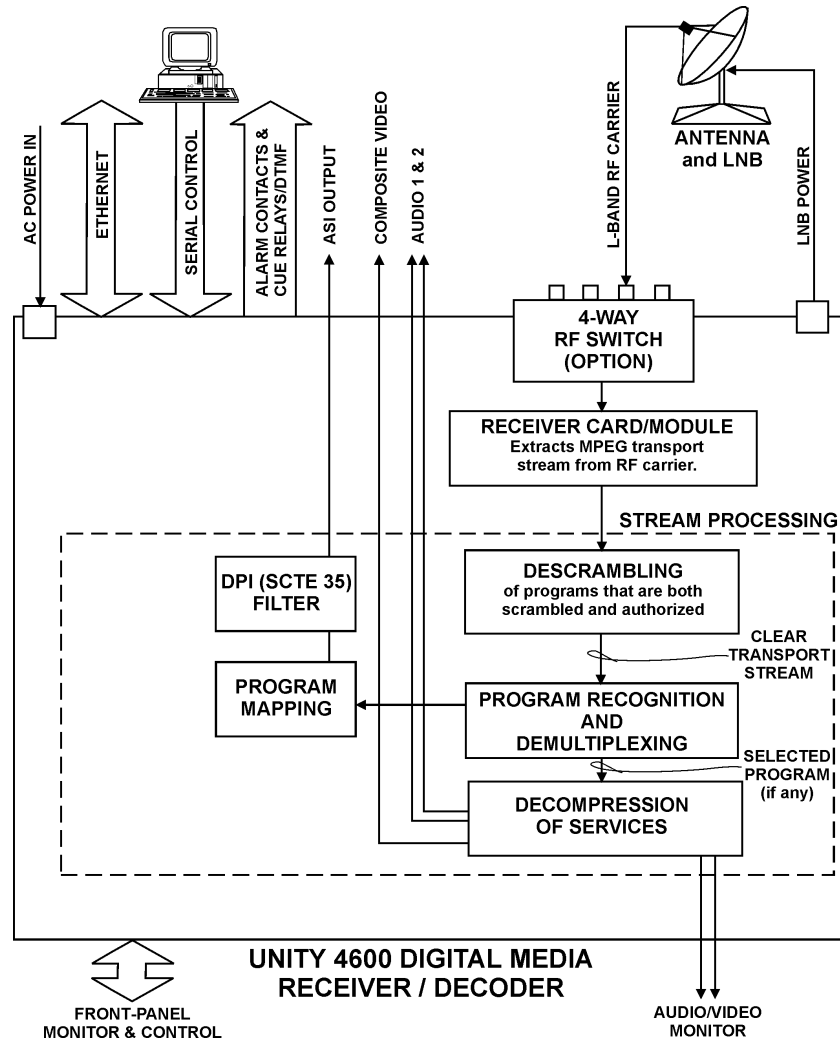
Most routine **Unity 4600** operations can be performed over Wegener's COMPEL<sup>®</sup> Network Control System. Control is "broadcast" to individual units through a "ghost-PID" data component of the incoming transport stream. The **Unity 4600** is considered disconnected from the network at any time this special stream is not being received.

In addition to the remote COMPEL network control, three methods are provided for "local" monitoring and control of the **Unity 4600**: a web browser interface (later release), a terminal interface (direct serial or via telnet over TCP/IP), and a front-panel interface.

**Note:** Local control may be limited by COMPEL command.

The remainder of this chapter details these local monitor and control interfaces.

**Figure 3.1: Unity 4600 Functional Block Diagram**



### 3.2 Operation from Front Panel

#### Front-panel layout

The **Unity 4600** front panel (3.2) includes the following four main parts: a liquid crystal display (LCD), six pushbuttons, eight LED indicators, and the front-panel audio and video monitor ports. Essentially all control available through the network or terminal is also available from the front panel.

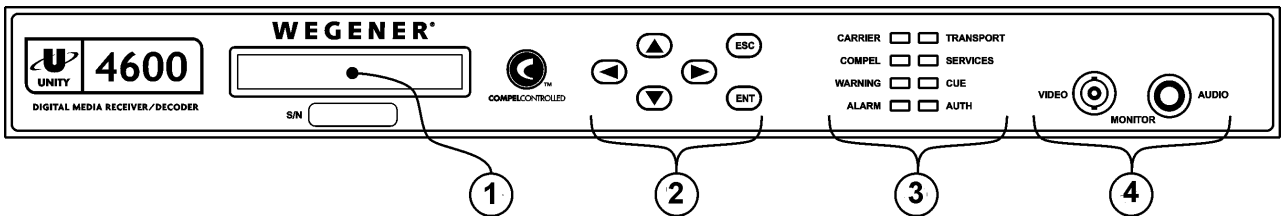
The front-panel LCD (1, see **LCD screen relationships** on page 29) supports unit monitoring and control by displaying screens containing status information, menu navigation pointers, and parameter input fields. Each LCD screen has a label or heading on the first row and information, parameters, or prompts on the second row which may cycle through multiple messages depending on the context.

The six pushbuttons (2) are your means of commanding the **Unity 4600** from the front panel. Use the four arrow buttons to navigate through menu screens and parameter selections and to scroll through available choices or characters when editing an input field. Press the **ENT** (Enter) button to select menus (downward navigation), to open editable input fields, or to commit edited parameters to the **Unity 4600**. Press **ESC** (Escape) to exit an input field without saving the entry or selection. **ESC** also provides upward navigation through the menu structure to the home screen.

The eight front-panel LEDs (3) provide status information about your **Unity 4600** and its processes. See **Table 3.2: Front-panel LED Indicator Descriptions** on page 33 for complete details. (Two additional LEDs are located on the rear panel and provide Ethernet status indications.)

At far right are the video port and audio port (4) included for monitoring from the front panel.

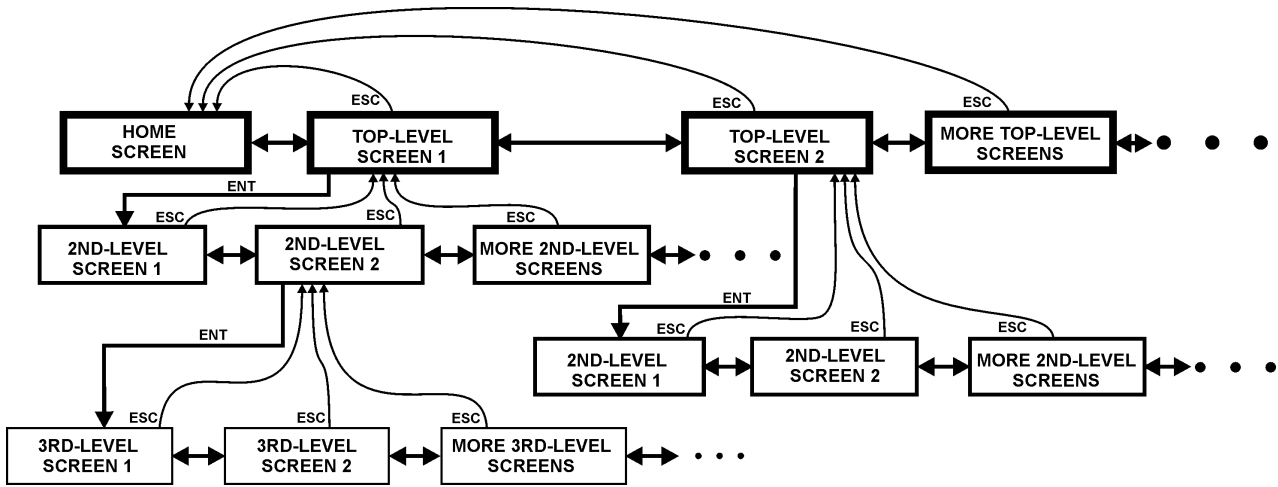
**Figure 3.2: Unity 4600 Front-panel Layout**



#### LCD screen relationships

**Figure 3.3** shows LCD screen relationships from the top level downward. These screens are structured in two dimensions, reflecting their relationships as peers, as parents, and as children of other screens. The up-and-down dimension represents the parent-child screen relationships (navigated with the **ESC** and **ENT** buttons). The side-to-side dimension is the peer relationship (navigated with the right- and left-arrow buttons). A parent screen is usually a menu screen covering some category of **Unity 4600** operation or status. Its child screens are opened by pressing **ENT** at the parent screen. These child screens then provide access to finer details of unit monitoring and control. Multiple child screens of a parent menu screen are all peers to each other. However, the most significant set of peer screens are the top-level screens that have no parent and that include the home screen. The home screen may be reached by pressing and holding **ESC** (or pressing it repeatedly) from any other LCD screen. **Appendix A Monitoring and Control Details** gives more details on screen types and using front-panel push buttons to navigate and control the **Unity 4600**.

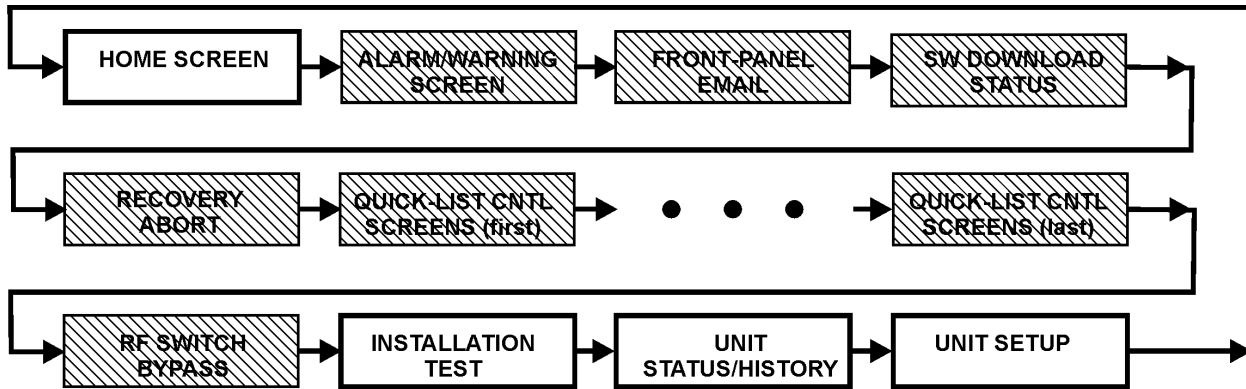
Figure 3.3: LCD Screen Relationships



**LCD screen content**

Available top-level screens are shown in order in **Figure 3.4: Unity 4600 Top-level Screens** on page 30. Some screens are only available under certain unit conditions or when certain optional hardware is installed. These optional screens are represented by hatched boxes.

Figure 3.4: Unity 4600 Top-level Screens



- White boxes indicate standard screens.
- Hatched boxes indicate optional screens that may or may not appear depending on installed hardware, selected options, or unit state.
- Arrows indicate the order of appearance as the right-arrow key is pressed.

## Top-Level LCD Screens

Table 3.1 lists the top-level screens and their functions.

**Table 3.1: Summary of Top-Level LCD Screens and Their Functions**

Screen Name	Functions/Applications
<b>Home Screen</b>	Shows basic receive settings and indications about special unit conditions
<b>Unit Info (Shortcut) Screen</b>	<ul style="list-style-type: none"> <li>■ Shows unit's serial number, label, and model number</li> <li>■ Shows unit's application software version number</li> <li>■ Shows other key unit information.</li> </ul>
<b>Alarm/Warning Screens</b> (when applicable)	<ul style="list-style-type: none"> <li>■ Shows current alarms and warnings (if any)</li> <li>■ Shows historic alarms</li> <li>■ Allows user to clear historic alarm records</li> <li>■ Allows user to acknowledge/clear certain warnings.</li> </ul>
<b>Recovery Abort</b> (when applicable)	<ul style="list-style-type: none"> <li>■ Allows user to abort a recovery in progress or abort the result of an automated recovery - <i>or</i> -</li> <li>■ Allows user to adopt a recovered setting as a new permanent setting</li> </ul>
<b>Front-Panel Email</b> (when applicable)	Allows user to read and clear unread email sent by network control
<b>SW Download Status</b> (when applicable)	Allows user to monitor the progress of a software download over satellite
<b>Quick-List Control Screens (Multiple)</b>	A variable number of commonly-used control screens duplicated at the top level for easy access
<b>RF Switch Bypass</b> (when RF switch option is installed)	Allows the user to force the receiver to accept a carrier only at a designated feed port at all times
<b>Installation Test</b>	Allows user to implement special test modes useful at initial unit installation

Screen Name	Functions/Applications
<b>Unit Status/History</b>	Allows user to access unit status and diagnostics. <i>Typical</i> items located under this menu include: <ul style="list-style-type: none"> <li>■ Current unit state</li> <li>■ Signal Quality</li> <li>■ Last commanded and last successful unit settings</li> <li>■ Program Analysis</li> <li>■ Local audio/video decompression history</li> <li>■ Network control status/history</li> <li>■ Current LAN settings</li> <li>■ Encryption settings</li> <li>■ Unit internal temperature</li> <li>■ Option module presence/status</li> <li>■ Unit information screen (including software version)</li> <li>■ Control to clear diagnostics</li> </ul>
<b>Unit Setup</b>	Allows user to control unit. <i>Typical</i> controls located under this menu include: <ul style="list-style-type: none"> <li>■ Set permanent unit settings (tuning, program, audio selection)</li> <li>■ Add/edit/move/delete Presets</li> <li>■ NTSC Pedestal</li> <li>■ Buffer control (PCR offset)</li> <li>■ Audio attenuation</li> <li>■ Audio front-panel monitor select</li> <li>■ Muting</li> <li>■ VBI line re-insertion enable</li> <li>■ Recovery mode timeouts</li> <li>■ Serial port setup</li> <li>■ LNB LO frequency set</li> <li>■ LNB DC power set</li> <li>■ User cue relays</li> <li>■ Signal quality indicator thresholds</li> <li>■ Minimum alarm/warning indication times</li> <li>■ LAN settings</li> <li>■ NVRAM operations</li> <li>■ Alarm (history) latching enable</li> <li>■ Program Mapping Ghost PID pass list</li> <li>■ Current unit software selection</li> <li>■ Unit label edit</li> <li>■ Unit reset</li> </ul>

**Home and default screens**

The home screen appears on the LCD by default at boot up. During operation, the user may return to the home screen at any time, from any location in the menu hierarchy, by pressing the Escape (**ESC**) button repeatedly (or pressing and holding it). Regardless of the current location within the LCD menu hierarchy, if no front-panel keypress is made for more than 5 minutes, the LCD reverts to the default screen. Usually, this is the home screen. However, under some conditions (two are described below), another screen becomes the default. If more than one of these conditions exist simultaneously, priority is given in the order listed.

**Note:** Regardless of which screen is the current default, the user may still access all available screens using the left- and right-arrow, **ENT** and **ESC** buttons.)

**Download Screen as default**

If the **Unity 4600** is in an ACCEPT PACKETS Download state, then the Download screen becomes default.

**Audio FP Monitor Selection Screen as default**

For two minutes, or until **ESC** is pressed, the Level 2 Audio FP Monitor Selection screen is the default if the unit features a front-panel audio monitor jack and the user plugs in a ¼” stereo phone plug. Note that this is NOT usually a first-level screen, unlike other default examples.

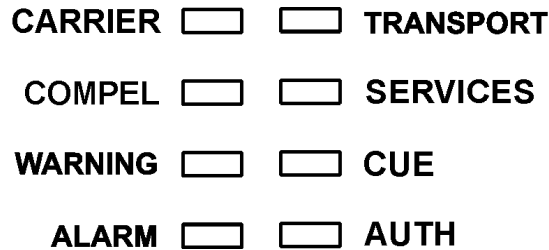
On the home screen, the ➤ (right-pointing arrow) field will quickly flash (a half-second ON and a half-second OFF) to signal the user that the right arrow button is active for user control. Pressing either the left or right arrow buttons will cause the **Unity 4600** to display the other top-level screens in succession. If there are current alarm and warning indications, the text "See alarms" or "See Warnings" will appear before the arrow and pressing the right arrow will display the applicable alarm or warning message(s).

**Interpreting LEDs**

**Front panel LEDs**

Figure 3.5 provides the meaning of the color and state of each LED.

**Figure 3.5: LED Indicators**



**Table 3.2: Front-panel LED Indicator Descriptions**

Indicator Label	Color and State*	Meaning
<b>CARRIER</b>	GREEN constant	Unit has demod and FEC lock on the RF carrier
	Off	Unit does not have demod and FEC lock on the RF carrier
<b>TRANSPORT</b>	GREEN constant	Unit recognizes a valid transport stream
	Off	Unit does not recognize a valid transport stream
<b>COMPEL®</b>	GREEN constant	COMPEL control stream received within last two minutes (including keep-alives) while locked continuously on the current transport stream for >2 minutes
	GREEN flash	Unit has had a verified transport stream for >2 minutes and COMPEL is required but no valid COMPEL
	GREEN flutter	COMPEL has been addressed to unit within last 5 seconds (excluding keep-alives)
	Off	Otherwise. Note that this LED must be OFF when there is no valid Transport stream OR COMPEL

Indicator Label	Color and State*	Meaning
<b>SERVICES</b>	GREEN constant	Unit is processing services for delivery
	Off	Unit is not processing services
<b>WARNING</b>	YELLOW constant	One or more warning indications exist, usually the failure of a non-essential item, or to warn of an impending failure of an essential item
	Off	No warning conditions
<b>CUE</b>	GREEN constant	A user cue relay is closed (energized).
	GREEN flutter	During a user relay "pulse" activation on any relay.
	Off	All user cue relays are open (de-energized).
<b>ALARM</b>	RED constant	One or more current alarm indications.
	RED blink	An alarm event has occurred in the past and has not been acknowledged and cleared by the user. Note that this state may exist together with a current alarm (RED constant). In that case, the blink state is defined as quickly cycling OFF-ON-OFF (~100ms each) approximately every 2 seconds.
	Off	No alarm condition currently exists.
<b>AUTH</b>	GREEN constant	Unit has transport MPEG sync and the stream is not scrambled (in the clear). Streams that are "clear" are always presumed to be "authorized".
		OR
	GREEN flutter	Unit is authorized for current scrambled transport stream (or selected program) and has transport MPEG sync. When using Wegener CA ('97 Version), being "authorized" means being addressed with current and valid ciphered keystream messages. In a PIN system, if the transport stream is scrambled, and the unit has been programmed with any key other than the null '00000', then it presumes that it is "authorized".
	Off	Unit has successfully deciphered a valid descrambling seed in the last five seconds. Normal behavior in functioning CA system.
		Unit has transport sync, the transport stream is scrambled, and the unit is NOT authorized. Also OFF if no transport sync.

\* LED states are defined as follows: Blink - alternating ON for ~100ms and OFF for ~2 seconds; Flash - alternating ON for ~500ms and OFF for ~500ms. Flutter - like flash but with shorter ~100ms ON and OFF times.

**Rear panel LEDs**

The **Unity 4600** also has two LED (light-emitting diode) indicators on the rear panel. They provide the following indications:

**LAN** – Green LED: On if active LAN connection detected. OFF otherwise.

**ACT** – Yellow LED: Flashing ON if ethernet packets are output or addressed packets are input. OFF otherwise.



**Front-panel audio monitor** To monitor audio output from the front panel, insert a 1/4-inch stereo phone plug into the audio monitor port. The **Unity 4600** will detect the phone plug and immediately display the Audio FP (front-panel) Monitor Selection screen. This second-level menu screen allows the user to select and monitor the desired audio stream. After two minutes without a keypress from the front panel, the **Unity 4600** will revert to the default LCD screen.

### 3.3 Operation from Local/Remote Terminal

**Overview and syntax** This section applies to control by both the Terminal and Modem devices. Once a user has fulfilled the password requirement for Modem access, the communication is identical to Terminal control.

Approved clients for Terminal monitoring and control via telnet include Tera Term, Windows® 2000 telnet, and Windows® XP telnet and no special login is required. VT100 and ANSI terminals are approved. To exit, use the client's exit/escape sequence or get debug access in the IRD to use the QUIT or EXIT command.

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

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

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

**User commands** **Note:** Any commands controlling carriers, programs, or services may be disabled from COMPEL®.

**Table 3.3: Command directory for Unity 4600 terminal commands**

<b>ABORT</b>	
Insert is terminated. See <b>TEMP</b> command.	
<b>ABORTREC x</b>	
<b>x:</b>	<b>C</b> - make the unit's permanent setting equal to the last commanded setting <b>S</b> - make the unit's permanent setting equal to the last successful setting
Command either 1) aborts an ongoing automated recovery; 2) aborts the successful results of an automated recovery; or 3) accepts the successful results of an automated recovery. With either value for <b>x</b> , this command is interpreted as a direct local user command to establish/confirm the unit's permanent settings.	
<b>ADDE location COMPEL-req [tags-req] [aud1] [aud1_rt] [aud2] [aud2_rt] [margin]</b>	
<b>location:</b>	Value from 1 up to <b>max</b> (highest entry #) indicating location in Preset table.

<p><b>COMPEL-req:</b> Values are <b>REQ</b>, <b>NR</b>, or <b>GL</b>.                  Forces COMPEL<sup>®</sup> to be temporarily required, not required, or left as normal global unit setting (respectively) when attempting this Preset during Recovery.</p>	
<p><b>tags-req:</b> Values are <b>REQ</b>, <b>NR</b>, or <b>GL</b>.                  Forces Carrier ID Tags to be temporarily required, not required, or left as normal global unit setting (respectively) when attempting this Preset during Recovery.</p>	
<p><b>aud1:</b> Language descriptor (or wildcard '*') for audio stream to be assigned to Audio port 1.</p>	
<p><b>aud1_rt:</b> <b>S</b> - Stereo (left and right components routed as connected at original MPEG encoder)  <b>1</b> - Original left component to both L and R outputs  <b>2</b> - Original right component to both L and R outputs  <b>M</b> - Sum of left and right components to both L and R outputs  <b>R</b> - Reverse of "Stereo" above (if allowed by hardware)</p>	
<p><b>aud2:</b> Language descriptor (or wildcard '*') for audio stream to be assigned to Audio port 2.</p>	
<p><b>aud1_rt:</b> Same as <b>aud1_rt</b> above</p>	
<p><b>margin:</b> Margin offset in dB. Ranges between <b>0</b> and <b>N dB</b>. (See <b>MARGIN</b> command for <b>N</b>.)</p>	
<p>This command augments the <b>ADDS</b> command to populate the extended Preset Entry. Note that if this Preset is used to acquire services (through Recovery or user command), these temporary COMPEL and Tags-required parameters, if used, will be adopted as the permanent global unit parameters.</p>	
<p><b>ADDS location [format] [feed #] [carrier freq] [data rate] [FEC] [Tag Site] program# [label]</b></p>	
<p><b>location:</b> Value from <b>1</b> up to <b>max</b> (highest entry #) indicating location in settings table.</p>	
<p>For <b>format</b>, <b>feed #</b>, <b>carrier freq</b>, <b>data rate</b>, <b>FEC</b>, <b>tag site</b>, <b>program #</b>, and <b>label</b> see <b>PERM</b> command.</p>	
<p>This command adds entries to the <b>U5000</b>-style preset table at the entry number given. If entry at location was already in use, it will be overwritten.</p>	
<p><b>APPSTAT</b></p>	
<p>Forces IRD to report the status of the two application storage spaces, showing current and backup application software (if any). A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	
<p><b>APPSWITCH</b></p>	
<p>Unloads the currently executing application software and, instead, loads and runs the backup software.</p>	
<p><b>AUDATTEN port# atten</b></p>	
<p><b>port#:</b> Either <b>1</b> or <b>2</b> for audio ports 1 or 2.</p>	
<p><b>atten:</b> Must be a numeric value for attenuation in dB. Legal values are given in individual IRD specifications.</p>	

<p>This command sets audio attenuation, where <b>0</b> gives <b>0dB</b> attenuation (maximum level). A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	
<b>AUDIOMODES</b>	
<p>Lists all the supported audio decompression or pass-through modes (e.g., MPEG1 Layer 2, Dolby AC-3, MP3, SMPTE302, etc.)</p>	
<b>AUDMON <i>port#</i></b>	
<b><i>port#:</i></b>	Either <b>1</b> or <b>2</b> for audio ports 1 or 2.
<p>Connects a sample of audio port <i>port#</i> to the single audio monitor jack (where available). A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	
<b>AUXPID [<i>PID</i>]</b>	
<b><i>PID:</i></b>	Selects the PID (in hex) for the transport packets carrying the desired data stream. Must be <b>20</b> to <b>1FFE</b> inclusive. If <b><i>PID</i></b> is omitted, the current value is displayed.
<p>Sets the PID used for Aux Data extraction.</p>	
<b>CLRDIAG</b>	
<p>Clears all the volatile counts and statistics, as if the unit was reset. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	
<b>CLRIND</b>	
<p>Clears both current "Acknowledged" Alarm and Warning indications and (past) Latched Alarm indications. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	
<b>DELS <i>entry</i></b>	
<b><i>entry:</i></b>	Value from <b>1</b> up to <b><i>max</i></b> (given in section 2.1) indicating entry number in settings table.
<p>Deletes an entry in the Preset Table.</p>	
<b>DPAT</b>	
<p>Command reports current Program Allocation Table (PAT) from incoming transport stream.</p>	
<b>DPSI</b>	
<p>Command reports complete PSI information tracing all programs and their components to MPEG PIDs. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	
<b>DTMFTST [<i>level</i>] [<i>tone</i>]</b>	
<b><i>level:</i></b>	Integer between <b>0</b> and <b>100</b> inclusive.

<b>tone:</b>	Tone code ( <b>0-15</b> signifying digits 1-9,0,*,#,A-C).
<p>Volatile test command for DTMF output, if supplied. Tones will be output at the percentage of full-scale voltage indicated by level. If tone is supplied, then that tone is output continuously. If tone is omitted, then the IRD cycles endlessly through all tones, 1 second per tone. Disable with TESTOFF command. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	
<b>DTMFVOL percent</b>	
<b>percent:</b>	Integer between <b>0</b> and <b>100</b> inclusive.
<p>Command to set DTMF output tone levels. Immediately after entry of the command, the IRD will play out all 16 tones (at a rate where they are individually identifiable) at the commanded level. If <i>percent</i> is '0', output is essentially OFF. If <i>percent</i> is '100', level is maximum spec level. Entering command without parameters still plays out the tone sequence and then reports current level setting. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	
<b>EMAIL x</b>	
<b>x:</b>	Either <b>E</b> for Enabled, or <b>D</b> for Disabled.
<p>Command to enable COMPEL<sup>®</sup> printed email. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	
<b>ERRORS type threshold</b>	
<b>type:</b>	Either <b>E</b> for Error'd Seconds or <b>C</b> for Continuity-count errors.
<b>threshold:</b>	Integer between <b>1</b> and <b>255</b> .
<p>Command to set either Error'd-seconds-rate or Continuity-count Alarm threshold. Unit will show an alarm if, over any previous 60 second interval, the number of type events which are detected exceeds threshold. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	
<b>EXIT</b>	
<p>Command ends telnet sessions. Same as <b>QUIT</b> command.</p>	
<b>FORCERF port</b>	
<b>port:</b>	Either <b>OFF</b> or the numbers <b>1, 2, 3, or 4</b> .
<p>Command to either disable or enable effective RF switch bypassing. If <i>port</i> is a number, then all subsequent carrier reception is sought at that RF feed port, regardless of the current Unit Setting. If <i>port</i> is <b>OFF</b>, then normal RF switch function is restored. Entering the command without parameters gives current status, either <b>Normal RF Switch</b>, or <b>Forced RF Feed Port n</b> where <b>n</b> is either <b>1, 2, 3, or 4</b>. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	
<b>GHOSTLIST action PID</b>	
<b>action:</b>	<b>A</b> for Add or <b>D</b> for Delete.

<b>PID:</b>	Hex number between 1 and 1FFE (except 11, reserved for SDT).
Command to add or delete entries in the list of ghost PIDs to pass to the ASI transport output (while Program Mapping is enabled). Entering command without the <b>action</b> or <b>pid</b> parameter dumps the current list.	
<b>H [command]</b>	
<b>command:</b>	Any of the terminal command names (PC, R, PORT, etc.).
If an H or any invalid command beginning with an H is entered and <b>command</b> is omitted, the whole help screen will be displayed, consisting of a list of all currently available commands and a brief description of each listing. If an H or any invalid command beginning with an H is entered and <b>command</b> is a valid User Command Name, then detailed help for <b>command</b> is displayed. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).	
<b>INDPERS indication time</b>	
<b>indication:</b>	A or Alarm or W for Warning.
<b>time:</b>	Time in seconds.
Command to set the minimum indication-time persistence for either Alarms or Warnings, per the value of indication, for the time period given by time. Entering command without parameters shows the current settings. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).	
<b>IPCONFIG</b>	
Command requests report of all current IP parameters (IP address, Gateway address, subnet mask) and assignment mode (static or DHCP). A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).	
<b>LAN GATEWAY addr</b>	
<b>addr:</b>	IP address formatted as n1:n2:n3:n4 where n1, n2, n3, and n4 are integers between 0 and 255.
Command sets the IRD's static internet Gateway IP address. No protection is offered against entry of non-standard addresses (e.g. 0:0:0:0). Omitting the <b>addr</b> parameter shows the current static Gateway IP. This will not be the current Gateway IP address if dynamically assigned. Use the <b>IPCONFIG</b> command for that. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).	
<b>LAN IP addr</b>	
<b>addr:</b>	IP address formatted as n1:n2:n3:n4 where n1, n2, n3, and n4 are integers between 0 and 255.
Command sets the IRD's static IP address. No protection is offered against entry of non-standard addresses (e.g., 0:0:0:0). Omitting the <b>addr</b> parameter shows the current static IP. This will not be the current IP address if dynamically assigned. Use the <b>IPCONFIG</b> command for that. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).	

<b>LAN MODE <i>mode</i></b>	
<b><i>mode:</i></b>	<b>DHCP, WEG, or STATIC.</b>
<p>Command sets the IP configuration to either dynamic DHCP, "Wegener" mode, or static IP addresses. If static, see <b>LAN IP</b>, <b>LAN GATEWAY</b>, and <b>LAN SUBNET</b> commands. Omitting the <b><i>mode</i></b> parameter shows the current mode. This is a Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p> <p>Assigning "Wegener" mode IP address forces the assignment of a static IP address for testing. This address is of the form: 172.16.xy.yy. The x is the one- or two-decimal-digit Product ID (also called the COMPEL download ID). 'yyy' are the last (least significant) digits of the unit serial number (most significant to left). The presumed subnet mask is 255.255.0.0 but the gateway is not defined. As an example, if a <b>Unity 4600</b> with product ID=9 and SN=260050 is set to "Wegener" IP address mode, it's new static IP address becomes 172.16.90.50.</p> <p>To fix possible address contention, the IRD, when the application initializes, attempts to detect an IP address conflict (using ARP). If a conflict is detected, the unit adds one hundred (decimal) to the last field of the attempted IP address and tries again. Using the above example, if 172.16.90.50 has already been assigned on that LAN, then the IRD re-attempts with an IP address equal to 172.16.90.150.</p>	
<b>LAN SUBNET <i>addr</i></b>	
<b><i>addr:</i></b>	IP address formatted as <b>n1:n2:n3:n4</b> where <b>n1</b> , <b>n2</b> , <b>n3</b> , and <b>n4</b> are integers between <b>0</b> and <b>255</b> . Note that not all values can be legal.
<p>Command sets the IRD's static subnet mask address. Command entries that do not assert legal IP address masks will be rejected. Omitting the <b><i>addr</i></b> parameter shows the current static subnet mask. This will not be the current subnet mask if dynamically assigned. Use <b>IPCONFIG</b> command for that. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	
<b>LATCHALARMS <i>x</i></b>	
<b><i>x:</i></b>	Either <b>E</b> for Enable, or <b>D</b> for Disable.
<p>Command enables or disables the latching of unit alarms.</p>	
<b>LNBPWR <i>output</i></b>	
<b><i>output:</i></b>	Either <b>ON</b> or <b>OFF</b> .
<p>Non-volatile command enables or disables LNB DC power independently of any other settings. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	
<b>LNBTST <i>voltage_range tone</i></b>	
<b><i>voltage_range:</i></b>	Either <b>H</b> or <b>L</b> (for High and Low).
<b><i>tone:</i></b>	Either <b>ON</b> or <b>OFF</b> .
<p>Volatile test command to force use of the ASTRA Universal LNB functions. Disable with <b>TESTOFF</b> command. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	

<b>LOADNV</b> <i>source</i>
<p><b>source:</b> B for Backup (by user), C for Original Customer-configuration, or P for Production-default settings. Key security parameters (e.g., serial number) are not affected by the C or P loads.</p> <p>Command reloads NVRAM memory from Flash memory defaults.  <b>Note:</b> The unit must reset after execution of this command.</p>
<b>MARGIN</b> <i>margin_offset</i>
<p><b>margin_offset:</b> Integer values between 0 and N in the form of x.x, representing dB (to tenths of a dB). N is defined by individual IRD specifications for every modulation/FEC combination.</p> <p>Command sets the Margin Warning point. This provides warning to local users that their Eb/No's are approaching the error-threshold where system performance will collapse. (Supersedes SNR command.) A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>
<b>MOVEP</b> <i>source destination</i>
<p><b>source:</b> Preset Table entry number which will source Unit settings.</p> <p><b>destination:</b> Preset Table entry number to which the Unit settings will be moved.</p> <p>Command moves the Unit settings at the <b>source</b> entry to the <b>destination</b> entry. The setting data at the original <b>source</b> entry is deleted and that entry position is now considered unused. The setting data at the original <b>destination</b> entry is then moved to the next lower unused Preset position. (One will always be available because the entry that held the original <b>source</b> settings was made "unused".)</p>
<b>MUTE</b> [ <i>source</i> ][ <i>source</i> ][ <i>source</i> ] [...]
<p><b>source:</b> Source can be any of the following:</p> <p><b>ASI</b> - to indicate the DVB-ASI transport output.</p> <p><b>V</b> - to indicate Video.</p> <p><b>A[specifier]</b> - to indicate Audio.</p> <p>An A without the specifier indicates all audio outputs.          If present, The specifier consists of one or two characters. The first character specifies the audio port number and the second character specifies either the right or left channel, as in <b>A1L</b> (audio 1, left channel) or <b>A2R</b> (audio 2, right channel).          If the second character is omitted, this indicates both stereo channels are included.</p> <p><b>Example:</b> <b>MUTE V A1L A4 A3R</b> mutes the video, audio Port 1 left channel, audio port 4 (both channels), and audio port 3 right channel</p> <p><b>Note:</b> If no <b>source</b> is specified then video and all audios are selected.</p> <p>Mutes the specified outputs.  <b>Note:</b> The <b>MUTE</b> command is only allowed when local control is enabled by the network..</p>
<b>OH</b>
<p>On hook. Disables modem access. Modem access is only re-enabled by successful modem password entry. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>

PARTPID <i>pid</i>	
<b>pid:</b>	Hex value between <b>20</b> and <b>1FFE</b> to set a value, and <b>0</b> to disable.
Command sets the borderline (or "partition") PID at, and above which, the IRD may expect compatible scrambling against which it may apply the proper descrambler. PIDs below this point may be scrambled with an alien, 3rd party system. See individual IRD specs for more detail on unit behavior. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).	
PC device baud parity	
<b>device:</b>	One of <b>MODEM</b> , <b>TERMINAL</b> , <b>AUXDATA</b> , <b>CA</b> , or <b>COMPEL</b> ®.
<b>baud:</b>	<b>1200</b> , <b>2400</b> , <b>4800</b> , <b>9600</b> , <b>19200</b> , or <b>38400</b> .
<b>parity:</b>	<b>N</b> , <b>E</b> , or <b>O</b> .
Configures communication parameters for any serial device. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).	
PERM [ <i>format</i> ] [ <i>pol/feed#</i> ] [ <i>carrier freq</i> ] [ <i>data rate</i> ] [ <i>FEC</i> ] [ <i>Tag Site</i> ] [ <i>program#</i> ] [ <i>label</i> ]	
<b>format:</b>	If an <b>RF</b> input, one of the legal modulation formats: <b>QPSK</b> for <b>DVB-QPSK</b> ; <b>8PSK</b> for <b>DVB-8PSK</b> ; <b>TQPSK</b> for <b>Turbo-QPSK</b> ; <b>T8PSK</b> for <b>Turbo-8PSK</b> ; <b>T16QAM</b> for <b>Turbo-16-QAM</b> ; or <b>16QAM</b> for <b>DVB 16QAM</b> . May be omitted if <b>DVB-QPSK</b> . For an <b>ASI Transport</b> input, specify <b>ASI</b> . If this parameter is set to <b>OK</b> , then the current setting, if a Transient setting, becomes the new Permanent setting.
<b>pol/feed#:</b>	If an <b>RF</b> input, one of four possible RF feeds, <b>1</b> , <b>2</b> , <b>3</b> or <b>4</b> . If an <b>ASI</b> input, one of two possible ASI feeds, <b>1</b> or <b>2</b> . If no RF option, this field may be used for <b>ASTRA</b> polarization, <b>H</b> or <b>V</b> . This field may be omitted if no RF switch option is installed.
<b>carrier freq:</b>	If an <b>RF</b> input, the downlink carrier frequency in MHz (precision to two decimal places OK). Field is omitted for an <b>ASI</b> input only.
<b>data rate:</b>	If an <b>RF</b> input, the Transport data rate in Mbps (precision to two decimal places OK). Field is omitted for an <b>ASI</b> input only.
<b>FEC:</b>	If an <b>RF</b> input, the inner FEC ratio. Field is omitted for an <b>ASI</b> input only. The legal options are: for <b>QPSK</b> - <b>1/2</b> , <b>2/3</b> , <b>3/4</b> , <b>5/6</b> , and <b>7/8</b> ; for <b>8PSK</b> - <b>2/3</b> , <b>5/6</b> , <b>8/9</b> ; and for <b>16 QAM</b> - <b>3/4</b> , and <b>7/8</b> . Other legal values may be defined for new modulation formats.
<b>tag site:</b>	If an <b>RF</b> input, the tag site for Carrier ID tag. Field is omitted for an <b>ASI</b> input only.
<b>program#:</b>	Program number, '*' for wildcard, or null (for no program assigned).
<b>label:</b>	Channel Label (optional, may be omitted).
Command to establish new Permanent Unit Setting with the parameter values given. If the format is set to <b>OK</b> , no other parameters are accepted or required.	
PERMCH <i>value</i>	



<b>value:</b>	Either the value of a settings table entry number OR the Channel Label of an entry, priority given to Label if any ambiguity. If an entry number, legal values range from 1 up to N (where N is number of Preset support this product).
Unit Settings set to equal those in the Preset Table entry specified by <i>value</i> .	
<b>PING [-t] [-n count] [-l size] [-w timeout] addr</b>	
<b>-t:</b>	If supplied as shown, <b>PING</b> specified host until interrupted by console-entry of 'control-C'.
<b>-n count:</b>	Integer substituted for <b>count</b> is number of echo requests to send.
<b>-l size:</b>	Send buffer specified as <b>size</b> bytes.
<b>-w timeout:</b>	Wait for each reply the number of milliseconds specified by <b>timeout</b> .
<b>addr:</b>	IP address formatted as n1:n2:n3:n4 where n1, n2, n3, and n4 are integers between 0 and 255.
Traditional Unix <b>PING</b> command with verbatim Unix syntax. Response from IRD will indicate success or failure. User will be warned if <b>PING</b> cannot be attempted because no local IP address has been set. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).	
<b>PORT device</b>	
<b>device:</b>	Device assigned to the Aux/Term port, either <b>TERMINAL</b> , <b>MODEM</b> or <b>AUXDATA</b> .
Assigns the given device to the Aux/Term port. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).	
<b>PW password</b>	
<b>password:</b>	One to six alphanumeric characters.
Changes the modem password to the designated password. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).	
<b>QUIT</b>	
Command ends telnet sessions. Same as <b>EXIT</b> command.	
<b>R type [page]</b>	

<p><b>type:</b> Indicates the type of report as follows:</p> <ul style="list-style-type: none"> <li><b>C</b> - Carrier Status</li> <li><b>P</b> - Parameters</li> <li><b>G</b> - Group Status</li> <li><b>GL</b> - Genlock system (if installed and applicable)</li> <li><b>M</b> - MPEG PSI Status</li> <li><b>NC</b> - Network Controller Status</li> <li><b>R</b> - Relay Status</li> <li><b>RTLOG</b> - non-volatile log of last 10 "tuning" type commands</li> <li><b>S</b> - Settings Status</li> <li><b>ST</b> - Settings Table</li> <li><b>SP</b> - Serial Port Configuration</li> </ul> <p>See also parameters for <b>RP</b> and <b>RD</b> commands</p>
<p><b>[page]:</b> This option can have a value of <b>1</b> to <b>40</b> 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.</p>
<p>With the <b>R</b> command, the user gets a combined report of unit non-volatile settings and status and diagnostics for each item grouping (e.g., <b>RF</b> for all unit settings and all status diagnostics for carrier acq/tracking). A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>
<p><b>RD group</b></p>
<p><b>group:</b> Indicates group of status/diagnostic information to report, as follows:</p> <ul style="list-style-type: none"> <li><b>AUD</b> - Audio service diagnos.</li> <li><b>AW</b> - Alarm/Warning status</li> <li><b>CA</b> - Conditional Access diagnostics</li> <li><b>DPI</b> - Conditional Digital Program Insertion (DPI)</li> <li><b>GL</b> - Genlock system (if installed and applicable)</li> <li><b>LAN</b> - IP/Ethernet diagnostics</li> <li><b>NTW</b> - COMPEL<sup>®</sup> network control diagnostics</li> <li><b>PRGMP</b> - Program mapping at ASI output</li> <li><b>MSC</b> - Miscellaneous diagnostics</li> <li><b>REC</b> - Automated Recovery status</li> <li><b>RF</b> - Carrier Acquisition/Tracking diagnostics</li> <li><b>RPA</b> - Return Path diagnostics</li> <li><b>SW</b> - Software download/self-test status</li> <li><b>TS</b> - Transport Stream diagnostics</li> <li><b>VID</b> - Video service diagnostics</li> </ul>
<p>Expanded report on unit volatile diagnostic and status information. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>
<p><b>RE state [number]</b></p>
<p><b>state:</b> <b>ON, OFF, or W</b></p>
<p><b>number:</b> <b>1</b> or <b>2</b>, or <b>E1</b> thru <b>En</b> (for <b>n</b>-relay expansion option module, if installed) indicating the affected user relay.</p>

This non-volatile command sets the user (or expansion) relay addressed by number to the **ON/OFF** or "Follow-Warn" (if **W**) state specified.

**Note:** The **W** value for the state parameter is only accepted for the native relays (1 or 2).  
 If state is specified, but number is omitted, then the command is applied to ALL installed relays, with one exception. The exception is that the command to ALL relays will not be accepted by a native user cue relay already set in the logical "Follow-warn" state. (It **MUST** be individually addressed to return it to the **ON** or **OFF** non-volatile state. Entering this command without parameters shows the state of installed relays.

**RP group**

**group:** Indicates group of parameters to report, as follows:

- AUD** - Audio service diagnos.
- AW** - Alarm/Warning status
- CA** - Conditional Access diagnostics
- DPI** - Conditional Digital Program Insertion (DPI)
- GL** - Genlock system (if installed and applicable)
- LAN** - IP/Ethernet diagnostics
- NTW** - COMPEL® network control diagnostics
- PRGMP** - Program mapping at ASI output
- MSC** - Miscellaneous diagnostics
- REC** - Automated Recovery status
- RF** - Carrier Acquisition/Tracking diagnostics
- RPA** - Return Path diagnostics
- SW** - Software download/self-test status
- TS** - Transport Stream diagnostics

**VID** - Video service diagnostics

Expanded report on unit NV operating parameters. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).

**RESET**

Resets unit. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).

**RPATH**

Command to display all return path non-volatile settings. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network). A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).

**RPATH FROM domain**

**domain:** Legal string of keyboard characters in proper domain-name format (e.g., string1.string2.string3...)

Domain name portion of "from" email address in Return Path reporting. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).

**RPATH RELAY addr**

<b>addr:</b>	IP address formatted as <b>n1:n2:n3:n4</b> where <b>nn1</b> , <b>n2</b> , <b>n3</b> , and <b>n4</b> are integers between <b>0</b> and <b>255</b> .
	IP address of local Mail Relay server, if any. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).
<b>RPATH SEND</b>	
	Command ordering IRD to immediately send a Return Path report. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).

<b>RPATH TO <i>username@addr</i></b>	
<b>username:</b>	Legal string of keyboard characters without white space.
<b>addr:</b>	IP address formatted as <b>n1:n2:n3:n4</b> where <b>nn1</b> , <b>n2</b> , <b>n3</b> , and <b>n4</b> are integers between <b>0</b> and <b>255</b> .
	Email address destination for Return Path reporting. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).
<b>SAVENV</b>	
	Saves all the current global and Unit Setting NV parameters (in NVRAM) to the Flash memory space designated as <b>BACKUP</b> . <b>Note:</b> Some unit-set parameters, which would not make sense to "back up", may not be saved. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).
<b>SAVEP [<i>entry#</i>] [<i>channel_label</i>]</b>	
<b>entry#:</b>	A Preset Table Entry number or the text, <b>PERM</b> . If a preset entry, must be equal to a number between <b>1</b> and <b>N</b> inclusive, where <b>N</b> is the highest entry number.
<b>channel_label:</b>	Channel Label associated with a unit setting or a Preset Table entry. If attempting to supply the <b>channel_label</b> parameter alone, a value of <b>PERM</b> is not legal. Parameter must be a string of continuous non-white-space keyboard characters. Unit will truncate user input to 10 characters.
	Command saves current Unit Settings to a Preset Table entry, or if <b>entry#</b> is <b>PERM</b> , a current Transient Setting is loaded into the unit's Permanent unit setting. Those metadata fields in the extended Preset Entry that have no analog in the current Unit setting will be populated with spec defaults. User must use <b>ADDE</b> command to set those fields. If <b>entry#</b> is supplied alone, current unit settings are written to that entry, overwriting existing data if it had been in use. If <b>channel_label</b> is supplied alone, and if that same Label already appears at a used Preset Table entry, then the current unit settings overwrite that old Preset data. If <b>channel_label</b> is supplied alone and no used Preset has that Label, then the current settings are written to the lowest empty Preset Table entry and then given that same Label. If both <b>entry#</b> and <b>channel_label</b> parameters are supplied, then the current unit settings are written at that Entry (overwriting existing data if any) and that entry is supplied that same Label (equal to <b>channel_label</b> ).

<b>SERVICE <i>video_pid</i> [<i>pcr_pid</i>] [<i>audio1_pid</i>] [<i>audio2_pid</i>]</b>
<b><i>video_pid</i>:</b> Hex value between <b>20</b> and <b>1FFE</b> .
<b><i>audio1_pid</i>:</b> Hex value between <b>20</b> and <b>1FFE</b> .
<b><i>audio2_pid</i>:</b> Hex value between <b>20</b> and <b>1FFE</b> .
<b><i>pcr_pid</i>:</b> Hex value between <b>20</b> and <b>1FFE</b> .
Command selects A/V services directly by PID number only. This changes Unit Setting #11 to "By PID" if not already set that way.
<b>SET <i>parameter value</i></b>
<b>SET TO <i>destination</i> [<i>time</i>]</b>
<b>SET FROM <i>source</i></b>
<b><i>parameter</i>:</b> One of <b><i>format</i></b> , <b><i>feed</i></b> , <b><i>freq</i></b> [for "carrier freq"], <b><i>rate</i></b> [for "data rate"], <b><i>FEC</i></b> , <b><i>tag</i></b> [for "tag site"], <b><i>prog</i></b> [for "program"], <b><i>margin</i></b> [for "Eb/No margin warning zone"], <b><i>aud1</i></b> , or <b><i>aud2</i></b> [for "descriptors assigned to audio ports 1 and 2"]. See <b>PERM</b> and <b>ADDE</b> commands for definitions and limits.
<b><i>value</i>:</b> Value of the parameter as in any settings command ( <b>PERM</b> , <b>TEMP</b> , <b>ADDS</b> , etc.)
<b><i>destination</i>:</b> <b>PERM</b> , <b>TEMP</b> , number or <b><i>label</i></b> of a Preset table entry.
<b><i>time</i>:</b> Length of insert in either <b>HH:MM:SS</b> format (valid range is <b>0:00:00</b> to <b>18:00:00</b> , leading zeros OK to omit on hours) OR in number of seconds. (A one-hour <b>TEMP</b> could have a parameters: of <b>1:00:00</b> or <b>3600</b> .)
<b><i>source</i>:</b> <b>PERM</b> , <b>CURR</b> , number or <b><i>label</i></b> of a Preset table entry.
<b>SET</b> sets the value of individual parameters in a 'scratch pad' settings group. <b>SET TO</b> will store the scratch pad settings to a search table entry or to the permanent or temporary settings (requires an insert time as a second parameter). <b>SET FROM</b> loads the scratch pad settings from a search table entry or from the current or permanent settings.
<b>SETAUDIO <i>port route</i> [<i>program</i>] [<i>atten</i>]</b>
<b><i>port</i>:</b> Value of <b>1</b> to <b>6</b> indicating an audio port
<b><i>route</i>:</b> <b>S</b> - Stereo (Left and Right components routed as connected at original MPEG encoder) <b>1</b> - Original Left component to both L and R outputs <b>2</b> - Original Right component to both L and R outputs <b>M</b> - Sum of Left and Right components to both L and R outputs <b>R</b> - Reverse of "Stereo" above (if allowed by hardware)
<b><i>program</i>:</b> Can be a three character name or an '*'. If the 3-character name is specified, the unit will route the audio PES stream with the specified name to the port. If "*" is specified, the unit will default to the first audio program in the PMT that is not routed to another port.

<b>atten:</b>	Must be a numeric value for attenuation in dB. Legal values are given in <b>Table 1.1</b> on page 3. This programs the net audio attenuation, where '0' gives 0dB attenuation (maximum level). If field omitted, attenuation remains unchanged on that audio port.
The audio PES stream, with the language descriptor <b>program</b> , is decompressed in the <b>port</b> audio port, and then its components are routed to the Left and Right outputs according to <b>route</b> . That ports attenuation is changed to <b>atten</b> , if supplied.	
<b>SETLABEL label</b>	
<b>label:</b>	Unit label. Field entry is truncated at 10 characters.
Sets Unit Label displayed on IRD home LCD screen (and Terminal Welcome Banners), if supported in this IRD.	
<b>SETLNB {Rf_feed} LO_freq</b>	
<b>Rf_feed:</b>	If the RF Switch expansion option is installed, this is one input to that switch (1 through 4). If no RF Switch option is installed, then it is an error to enter data here!
<b>LO_freq:</b>	Either a number or mnemonic. If a number, this value represents the <b>LNB LO</b> frequency in MHz. It can have up to two decimal places and its valid range is from <b>0</b> to <b>14000.00</b> . The legal mnemonics are <b>C</b> (for Standard C-band, 5150 MHz default), <b>KU</b> (for US Ku-band, 10750 MHz default), <b>EHKU</b> (for European Hi Ku-band, 10600 MHz default), or <b>ELKU</b> (for European Low Ku-band, 9750 MHz default).
<p>(1) If the current LNB mode selected is <b>Universal</b>: This command is legal only when entered without parameters. In this case, the IRD returns the current calculated setting command sent to the LNB (either "9.75 GHz" or "10.60 GHz").</p> <p>(2) If the current LNB mode selected is <b>LO</b>: This command sets the assumed LNB LO frequency to the value entered in MHz OR the MHz value represented by the mnemonic. If there is an optional RF switch installed, then the <b>rf_feed</b> field data must be entered. Entering the command without parameters returns the current setting.</p> <p>A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	
<b>SETPEDEST xxx</b>	
<b>xxx:</b>	<b>E</b> for enable or <b>D</b> for disable.
Enables or disables the "pedestal" setup, the addition of +7.5 IRE to the luminance level of active NTSC video, if NTSC is in use. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).	
<b>SETPIN value</b>	
<b>value:</b>	Decimal representation of PIN key, between <b>0</b> and <b>16777215</b> .
Command sets the PIN scrambling key number.	
<b>SETTIMEOUT source time</b>	

<p><b>source:</b> 1 - Not used. (In legacy IRDs, this was Fade timeout.)                  2 - Services Recovery Timeout. (In legacy IRDs, this was Installation timeout.)                  3 - Network Recovery Timeout. (In legacy IRDs, this was No COMPEL<sup>®</sup> timeout.)                  4 - Recovery Iteration Time. (In legacy IRDs, this was Header Seek timeout.)                  5 - Local Control Re-enable Timeout. (In legacy IRDs this was Local (Control) Recovery timeout.)</p>
<p><b>time:</b> Time-out value in seconds or <b>HHH:MM:SS</b> format. Minimum value is 1, and maximum value <b>35999999 (9999:59:59 hms)</b> for all others.</p>
<p>Command sets Automated Recovery timeout specified by <i>source</i> to the value specified by <i>time</i>.</p>
<p><b>SETUID [id]</b></p>
<p><b>id:</b> Unit ID number between <b>00</b> and <b>99</b> inclusive.</p>
<p>Command for assigning the unit ID number for gaining "talker" access on a shared serial bus. The factory default setting for id is '00', which also disables terminal daisy-chain capability. If the parameter is omitted, then this command returns the current unit ID setting. Command is only applicable to products that feature serial "daisy-chain".</p>
<p><b>SP program</b></p>
<p><b>program:</b> Either an integer between 1 and <b>65,535</b> (representing a number) or an alphanumeric string (representing a name), preference being on a number to resolve ambiguity.</p>
<p>Command changes selected <b>program</b> by Program Number (from PAT) or SDT descriptor. This command works similarly to a <b>PERM</b> command.</p>
<p><b>TEMP [format] [feed #] [carrier freq] [data rate] [FEC] [Tag Site] program# time</b></p>
<p>For <b>format</b>, <b>feed #</b>, <b>carrier freq</b>, <b>data rate</b>, <b>FEC</b>, <b>tag site</b>, and <b>program #</b>, see <b>PERM</b> command.</p>
<p><b>time:</b> Length of insert in either <b>HH:MM:SS</b> format (valid range is <b>0:00:00</b> to <b>18:00:00</b>, leading zeros OK to omit on hours) OR in number of seconds. (A one-hour <b>TEMP</b> could have a parameters: of <b>1:00:00</b> or <b>3600</b>.)</p>
<p>Command which performs a volatile temporary insert for an amount of time given by <i>time</i>. Unit sets its temporary Unit Settings to the values given.</p>
<p><b>Note:</b> No label may be applied using this terminal command.</p>
<p><b>TEMPCH value time</b></p>
<p><b>value:</b> Either the value of a Preset table entry number OR the Channel Label of an entry, priority given to Label if any ambiguity. If an entry number, legal values range from 1 up to <b>N</b> (where <b>N</b> is number of Preset support this product).</p>
<p><b>time:</b> Same as for <b>TEMP</b>.</p>
<p>Volatile command which sets volatile temporary Unit Settings to those retrieved from the Preset table according to <i>value</i> for time given by <i>time</i>. Similar to <b>TEMP</b> command.</p>
<p><b>TEMPSENS</b></p>
<p>Command displays internal unit temperature if available.</p>

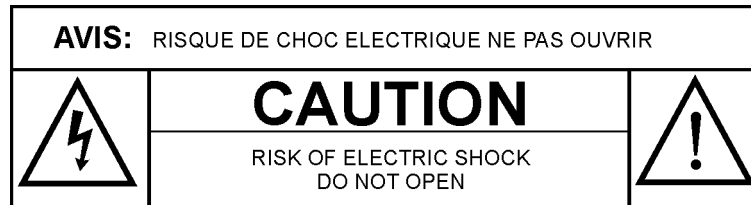
<b>TEST <i>group value</i></b>	
<b>group:</b>	Mnemonic for a test group: Either <b>RF</b> , <b>AV</b> , <b>DTMF</b> , or <b>REL</b> .
<b>value:</b>	Parametric value which has meaning depending on the test <b>group</b> selected.
<p>Command to activate Installation Test Modes. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p> <p>If <b>group</b> is <b>RF</b>, the legal <i>values</i> are <b>1</b>, <b>2</b>, <b>3</b>, <b>4</b>, and <b>OFF</b>. Entering numbers for value cause the IRD to report the RF level (not locked to carrier) at that RF Feed Port every few seconds. Entering <b>OFF</b> stops the measurement.</p> <p>If <b>group</b> is <b>AV</b>, the legal <i>values</i> are <b>ON</b> and <b>OFF</b>. If <b>ON</b>, a test pattern is activated on the video output and test tones activated on the audio output, the same as the generic <b>TESTMODE</b> command.</p> <p>If <b>group</b> is <b>DTMF</b>, the legal <i>values</i> are <b>ON</b> and <b>OFF</b>. If <b>ON</b>, the command behaves like the <b>DTMFVOL</b> command entered with no parameters</p> <p>If <b>group</b> is <b>REL</b>, the legal <i>values</i> are <b>ON</b> and <b>OFF</b>. If <b>ON</b>, both user cue relays are alternately energized and de-energized.</p>	
<b>TESTOFF</b>	
<p>Command stops all volatile test functions as if unit were reset. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	
<b>UNMUTE [<i>source</i>][<i>source</i>][<i>source</i>][...]</b>	
<b>source:</b>	Same as the <b>MUTE</b> command.
Identical to <b>MUTE</b> except specified services are unmuted.	
<b>VER</b>	
<p>Displays the boot-up Welcome banner and the versions of hardware and software components within the IRD. Should include the unit serial number, model number, and customer ID. A Local Control Command (available from the terminal regardless of "Local Control Enable/Disable" commands from the network).</p>	
<b>VBI <i>enable line field</i></b>	
<b>enable:</b>	<b>E</b> for Enable or <b>D</b> for Disable.
<b>line:</b>	Line # where VBI data is normally to be re-inserted. Values <i>below 7</i> or <i>above 22</i> are illegal.
<b>field:</b>	Field # where VBI data is normally to be re-inserted. Values are <b>1</b> or <b>2</b> for upper and lower.
<p>Command enables or disables VBI data re-insertion on the line and field indicated for those IRDs that support that function.</p>	



# CHAPTER 4 MAINTENANCE AND TROUBLESHOOTING

## 4.1 Maintenance

Maintenance of the **Unity 4600** is limited to keeping the chassis clean and ensuring that cables remain firmly connected. Occasionally wipe the exterior with a soft, damp cloth to remove any accumulated dust and dirt and check that cables are securely attached.



The **Unity 4600** incorporates security labels over some of the screws. There are no user-serviceable components within the **Unity 4600**. Tampering with the security labels or opening the unit will void your warranty. If you have any questions, contact Wegener's Customer Service Department at the address or numbers listed under Customer Service.

## 4.2 General Troubleshooting

This section is not intended as an exhaustive list of all possible situations, but a list of the most common installation problems. Please contact us (see Chapter 5, Customer Service), with any problems you cannot resolve independently.

If you are experiencing any difficulties, first check the LED indicators on the **Unity 4600** front panel. See **Table 3.2: Front-panel LED Indicator Descriptions** on page 33 for details about the LED indicators. Note that during typical operation, the green **CARRIER, TRANSPORT, COMPEL, SERVICES,** and **AUTH** LEDs should be on.

### No output or indications

If the unit provides no output and neither the LCD nor any LEDs are lit, there is likely a loss of AC power or the internal power supply has failed. Do the following:

1. Check that AC power cord is firmly connected at both ends.
2. Check that your AC power source is supplying AC power.
3. If both checks a) and b) are okay, contact Customer Service (see Chapter 5) before returning the unit for service.

### No audio, video, or ASI output

#### LEDS: ALARM ON and CARRIER OFF

The **Unity 4600** is unable to lock to an RF carrier at the selected RF port:

1. If the first front-panel alarm message is "No RF Signal", then: (1) either the outdoor antenna LNB is not operating or is not connected to the IRD at the selected RF port; or (2) the selected IRD RF port has failed; or (3) the IRD receiver card has failed. To rule out (1), verify that the LNB (and any intermediate line amplifiers) has DC power and trace the connection from the LNB to the IRD or try replacing the LNB. If a spectrum analyzer is available, look for the carrier at the L-band intermediate

frequency (for domestic C-band satellites, this is 5150 minus the downlink frequency in MHz). To rule out (2), try connecting the RF cable to another RF port and select that port (or use RF Switch Bypass to force that other port). To rule out (3), try using another IRD.

2. If the first alarm message is “No Carrier Lock”, verify the RF Feed Port, Carrier Frequency, Data Rate, FEC Ratio, and ID Tag (if Tags are in use) settings. Also verify that the LNB LO frequency setting (in the IRD) is correct for the selected RF feed port.
3. If the alarm message is “RF signal overload”, then reduce the carrier power entering the **Unity 4600**. Either add in-line attenuation (a splitter will do) or remove line amplification in the RF circuit between the LNB and the IRD.

#### LEDS: ALARM ON and CARRIER ON

The **Unity 4600** may not be authorized for the network’s Conditional Access. If the **AUTH** LED is OFF and the alarm message, “Unauthorized for CA” appears, contact your network provider to gain authorization in its Conditional Access database.

#### Missing an audio, video, or ASI output while others are okay

##### LEDS: ALARM or WARNING ON

Check the front-panel display for alarm or warning messages. **Table 4.1: Alarm and Warning Descriptions** on page 53 describes **Unity 4600** alarm and warning messages. If the message definitions are too technical to help debug the problem, report the messages to your network provider.

##### LEDS: ALARM and WARNING OFF

If no alarms or warnings are shown, suspect a bad connection or mis-programming of the **Unity 4600**:

1. If audio or video are missing, check at the front-panel monitor jacks. If okay on the front monitors, check the signal connections from the rear of the unit to the destination. If an audio is missing from the rear panel outputs and cannot be detected at the front-panel monitors, check that a valid audio stream is selected for that port and that the network provider has supplied non-quiet programming on that audio.
2. If the ASI output is missing, check the signal connections from the rear of the unit to the destination. If okay, check with the network provider to verify what Program Mapping (Release 2 or later) may be in effect.

## 4.3 Alarms and Warnings

The alarm and warning system is intended to alert the local user of a present or impending loss of services. **Table 4.1** below lists many (but not all) of the possible alarm and warning messages that the **Unity 4600** may display. For problems you cannot resolve on your own, please contact Wegener Customer Service (see Chapter 5), and be prepared to describe your signal setup, **Unity 4600** configuration, and any displayed alarm and warning messages.

### Alarms

An alarm is asserted when the unit is unable (or presumed to be unable) to perform a required function or deliver required services.

### Warnings

A warning is asserted when an alarm condition is imminent or to indicate other conditions requiring user attention.

**Table 4.1: Alarm and Warning Descriptions**

LCD Alarm or Warning Message	Meaning / Possible Cause
App Self-testing	New application software was recently promoted from the backup to primary executing position and is now performing its initial self-test. This is a Warning for normal behavior and is not a fault.
App SW d-load fail	Download of application software to backup flash space has failed. Contact network TOC and advise.
App SW switch fail	Unable to switch to backup software from network command, usually because that software image is not available or corrupted.
ASI TS muted	ASI Transport output has been muted per user or network command.
Aud <b>N</b> buff overflow ( <i>N=audio port number</i> )	Audio port <b>N</b> PES data buffer overflow. Audio PES data being delivered faster than can be decompressed. There may be a problem with the STC at uplink Mux or in the IRD.
Aud <b>N</b> data lost ( <i>N=audio port number</i> )	Audio port <b>N</b> PES data not available (buffer underflow). here may be a problem in the hardware for that audio port or in the uplink encoder. Check that PTS values in the audio stream do not grossly lead PCR.
Aud <b>N</b> LD not in PMT ( <i>N=audio port number</i> )	No audio PID found in PMT with assigned language descriptor for hard-assigned port <b>N</b> . Check that the language descriptor requested by the user or network is actually assigned to an existing audio stream.
Aud <b>N</b> PID not found ( <i>N=audio port number</i> )	Audio PID found in PMT with requested language descriptor but no PES data detected. Check uplink encoder.
Aud <b>N</b> type invalid ( <i>N=audio port number</i> )	Audio PES stream type not supported.
Auto-Recovery	Auto-recovery in progress. This may be caused by any of the following problems on a previously commanded or successfully acquired transport stream: (1) IRD unable to deliver services for time exceeding Services Recovery Timeout; (2) IRD required to maintain connection to COMPEL <sup>®</sup> and IRD has not detected COMPEL for time exceeding Network Recovery Timeout; or (3) IRD detects invalid incoming COMPEL header.
Bad audio <b>N</b> PTS ( <i>N=audio port number</i> )	Excessive jumps or jitter in Audio port <b>N</b> PTS values
Bad PMT	One or more Program Map Tables are corrupted. See "No PMT" indication.
Bad Sec Micro SN	Serial number read from secure processor does not match unit. There may be a an attempt at piracy, a defective NVRAM memory, or a defective secure processor.
Bad VBI Data <b>FN LM</b> ( <i>N=field number;</i> <i>M=line number</i> )	VBI data for field <b>N</b> , line <b>M</b> is unrecognized or in an unsupported format. Contact TOC to confirm that the version of application code in your IRD is current.

LCD Alarm or Warning Message	Meaning / Possible Cause
Bad Video data	Video PES stream appears to be invalid. Check if other IRDs see similar problem on the same program.
Bad Video PTS	Excessive jumps or jitter in video PTS values. There may be a defective uplink encoder or mux.
Content for ASI N/A	Program content requested to route to ASI output cannot be found in over-satellite transport mux. Contact network TOC and advise.
Content Routing problem	ASI transport output bears no program content because a Content Routing Table has not been loaded from the network or is corrupt. Contact network TOC.
E <sub>b</sub> /N <sub>0</sub> Margin warning	E <sub>b</sub> /N <sub>0</sub> value less than sum of Threshold + Margin—evaluated over 10 sec. intervals. Unless the margin setting is incorrect, this indicates a marginal downlink.
FP email fail	An FP Email message was received which was corrupt or invalid. User should acknowledge the warning to clear, and then notify the network TOC.
High Error Rate	High errored seconds rate, presumably useless signal—evaluated over 60 sec. intervals. Signal-to-noise ratio is insufficient or there is severe terrestrial or antenna cross-pol interference.
High RF level	There is carrier lock, but the RF signal level is too high.
ID Tag Mismatch	Carrier ID frequency text mismatch. User or network has entered carrier frequency text or tag site ID incorrectly or unit is on the wrong carrier.
ID Tags Lost	Carrier ID tags disappeared. There may be a failure at the uplink inserter (UMX5010) or loss of COMPEL <sup>®</sup> PID. See "ID Tag Mismatch" indication.
Invalid COMPEL Hdr	Invalid COMPEL header detected in incoming COMPEL messages. This will cause the unit to immediately attempt automatic recovery to a backup preset. The IRD is not set up for connection to this COMPEL system.
Invalid VBI data fmt	VBI data found in PID or video user data in unrecognized or unsupported format (protocol).
Invalid video format	Video format in requested program is not supported.
IP address conflict	LAN detected but cannot use because of IP address conflict.
KMS stream lost	KMS stream lost after initially detected in this transport stream. There could be an uplink problem. See also "No KMS stream" indication.
Lost COMPEL PID	Data traffic at designated packet ID (PID) for COMPEL has been lost for more than two minutes. See "No COMPEL" indication.
Lost VBI Data <b>FN LM</b> ( <i>N=field number;</i> <i>M=line number</i> )	VBI data for field <b>N</b> , line <b>M</b> has disappeared. If any is expected, contact network TOC.

LCD Alarm or Warning Message	Meaning / Possible Cause
Low RF level	There is carrier lock, but the RF signal level is too low.
New PAT with changes	The version number on the Program Allocation table has changed and a new program lineup has been submitted. Changes have been made on uplink transport mux.
New PMT with changes	The version number on one or more of the Program Map Tables has changed with a new PID lineup submitted. Changes have been made on uplink transport mux.
No ASI stream	Corrupt or missing input ASI stream. Only applicable if ASI input is available and selected. Check connection and source.
No audio for Port <b>N</b> ( <i>N=audio port number</i> )	No "free" otherwise-unassigned audio can be allocated to wildcard-assigned port <b>N</b> . There may be fewer audio PES streams than installed audio ports. If so, explicitly assign a desired language descriptor to this audio port.
No Carrier Lock	Carrier lock cannot (or has not) been acquired and maintained. Check that requested settings are correct. Check RF level indication and RF connection. For new installations, check antenna pointing and polarization.
No COMPEL	Data traffic is detected at designated packet ID (PID) for COMPEL <sup>®</sup> . However, no valid COMPEL messages have been detected during the last two minutes. There may be no connection to the network. If required to maintain a connection, the unit will eventually attempt an automatic recovery to a backup preset. To debug, check that the COMPEL system at the uplink is functional and that the data connection to inserter (such as UMX5010) is good. Also check for fault indications or functional problems at UMX5010.
No COMPEL PID	No traffic detected at designated packet ID (PID) for COMPEL, so no connection is made to the network. The COMPEL PID setting in the unit may be incorrect. Also see "No COMPEL indication".
No Def for mapping	ASI transport output bears no program content because an Output Definition Table has not been loaded from the network. Contact network TOC.
No DHCP server found	IRD is required to get IP settings from DHCP server but none are detected on the LAN.
No genlock sync	IRD supports and has genlock option installed and enabled, but no video reference sync is detected.
No ID Tag found	No carrier ID tags in COMPEL <sup>®</sup> stream. Set IRD not to expect ID tags or check uplink UMX5010.
No KMS stream	No KMS stream detected since transport stream acquisition. Unit will not be authorized if not connected to the KMS stream. Check that KMS PID is set correctly in unit. If okay, check the uplink.
No LAN detected	No Ethernet LAN connection. Check LEDs on rear and check other devices on the LAN.

LCD Alarm or Warning Message	Meaning / Possible Cause
No PAT	No Program Allocation Table detected in input carrier (or terrestrial interface). Check that legal ISO transport is available from uplink mux. Often, this indication may appear when the connection between the uplink transport mux and the DVB modulator is lost.
No PCR	No Program Clock Reference found, either in video or stand-alone PID. Check uplink mux or that program's encoder.
No PMT	No Program Map Table found for a program listed in PAT. This could be a fault in the uplink mux.
No RF signal	No carrier lock with low RF signal power indication. There may be a disconnected RF signal. Check connection and check that LNB has DC power.
No SDT entry	No Service Descriptor Table, or the table is corrupt or missing proper entries. Uplink mux may not support this DVB feature or may have fault.
No valid software	No valid application software available in either the primary or backup flash positions. Unit will need service.
No VBI Data <b>FN LM</b> ( <i>N=field number;</i> <i>M=line number</i> )	VBI data not found in video user data or PID for Field <b>N</b> line <b>M</b> . If any is expected, contact network TOC.
PAT disappeared	Formerly valid Program Allocation Table ceases to be received or becomes corrupt. See "No PAT" indication.
PAT version changed	Version number in Program Allocation Table has changed but no change to program lineup.
PCR disappeared	Formerly valid Program Clock Reference ceases to be received or becomes corrupt. See "No PCR" indication.
PCR jitter	Excessive jitter in Program Clock Reference values. This may degrade timing of output video signals. Check uplink encoder for that program.
PCR value jump	Unrecoverable transition in incoming Program Clock Reference values. This has forced re-initialization of services. Check uplink encoder for that program.
PMT disappeared	Formerly valid Program Map Table ceases to be received or becomes corrupt. See "No PMT" indication.
PMT version changed	Version number on one or more of the Program Map Tables has changed but no change to PID lineup.
Prog blackout on ASI	Some services available from satellite not routed to IRD ASI output per program mapping instructions from COMPEL <sup>®</sup> . This is not necessarily a fault.
Program in blackout	Selected program not available for local decompression because this program content was blocked to ASI transport output by network. Contact network TOC.

LCD Alarm or Warning Message	Meaning / Possible Cause
Program not found	Program selected for local decompression (to local audio/video outputs) not available-invalid Program number for this Transport.
Reverted to b-up app	User-requested application failed self-test and Unit reverted to Backup application. Notify your network TOC.
RF signal overload	No carrier lock with RF signal power above specification range. There may be too much line amplification in RF feed.
SDT disappeared	Formerly valid Service Descriptor Table ceases to be received or becomes corrupt. See "No SDT entry" indication.
Sec Micro no resp	Secure processor does not respond to local host or may be missing. SIM card may be mis-installed, loose, or defective.
Ser pt <b>N</b> fail ( <i>N=audio port number</i> )	Unknown or miscellaneous hardware failure on serial port <b>N</b> .
Ser pt <b>N</b> input fail ( <i>N=audio port number</i> )	Input buffer overflow on serial port <b>N</b> . Send device at uplink may be set too fast compared to IRD serial port device, especially if sending data constantly with only one stop bit. Try changing to 1.5 stop bits.
Ser pt <b>N</b> output fail ( <i>N=audio port number</i> )	Output buffer overflow on serial port <b>N</b> . Send device at uplink may be set too fast compared to IRD serial port device, especially if sending data constantly with only one stop bit. Try changing to 1.5 stop bits.
Setting out of range	Current unit setting combination is illegal for installed receiver card. Unit will be unable to acquire a carrier and transport stream until corrected by the user.
Test Mode in use	One of the installation test modes is being used. This may interfere with normal unit operation.
Unauthorized for CA	Unit unauthorized for Conditional Access in use. Contact network provider. Also see "No KMS stream" & "KMS stream lost" indications.
Unit overheating	Unit overheating. Check that unit vents are not blocked and that internal fan is connected and operating.
Unread FP email	Unread Front-Panel email message present. Warning should clear after user opens the screen containing the email.
Using backup settings	Current permanent unit settings derived from successful Auto-Recovery. User should review settings and restore to primary if desired.
Video Buff overflow	Video PES data buffer overflow. Video PES data is being delivered faster than can be decompressed. There may be a problem with the STC at uplink mux or in the IRD.
Video cmd muted	Video output muted by command from network or local user.
Video not found	Video PES data cannot be found at PID declared by PMT. There may be an uplink mux or encoder failure.
Video PES data lost	Video PES data in selected program is unavailable. There may be an uplink encoder failure.

This page intentionally left blank



# CHAPTER 5 CUSTOMER SERVICE

## 5.1 Warranty

The following warranty applies to all **Wegener Communications** products including the **Unity 4600 Professional Media Server**:

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.

## 5.2 Technical Support

If the unit should fail to perform as described, if you need help resolving problems with your **Unity 4600**, or for questions about obtaining service for your **Unity 4600**, please 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 Request Form** to **(678) 624-0294**. Or you may e-mail the same information to: [service@wegener.com](mailto:service@wegener.com).
2. To help us identify and control returned units, plainly write the RMA number on the outside of the product-shipping container. This will help us return your unit to you as quickly as possible.
3. Return the product, freight prepaid, to the address below:

**Service Department RMA# \_\_\_\_\_**  
**Wegener Communications, Inc.**  
**359 Curie Drive**  
**Alpharetta, GA 30005**

**Note:** All returned material must be shipped freight prepaid. C.O.D. shipments will not be accepted.

This page intentionally left blank

# APPENDIX A MONITORING AND CONTROL DETAILS

## A.1 Basic Navigation

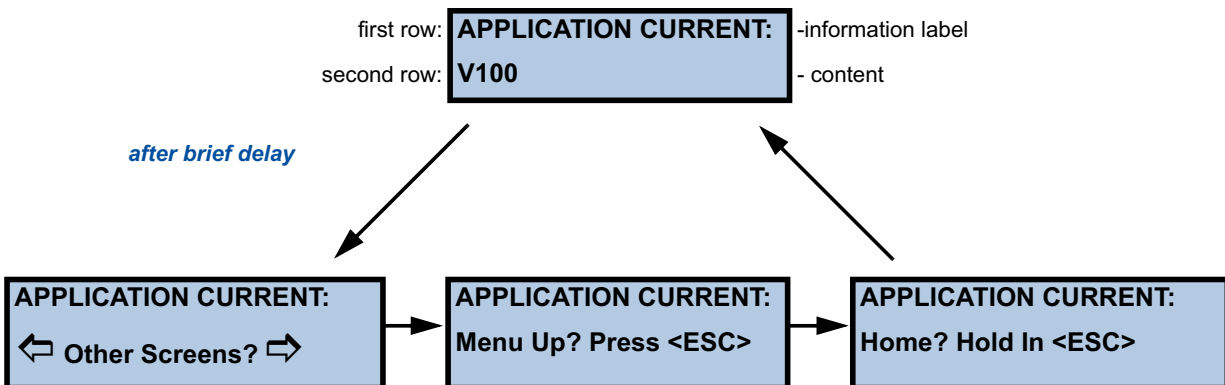
Monitoring and control of the **Unity 4600** from the front panel is accomplished by first navigating to the appropriate screen for the desired function (see **LCD screen relationships** and **LCD screen content** on page 30 for screen structure and contents). Press **ENT** to move downward through menus and screen levels and **ESC** to return upward through the screen structure. Press the right- and left-arrow buttons to move between peer screens. The home screen may always be reached by pressing and holding the **ESC** button or by pressing it repeatedly.

## A.2 Info Screens

Info screens are read-only and display information that cannot be edited. The home screen is this type of screen. Other screens of this type display **Unity 4600** status or navigation helps.

For info screens like the Software Application Version screen shown below, the text on the second row will contain the current information (the software version in this example). If no key presses are made, after a brief delay, the second row begins alternating between this content and the following navigation prompts:

- ↔ Other Screens? ↔ (to move to other screens at the same level)
- Menu Up? Press <ESC> (to move to the parent menu screen)
- Home? Hold In <ESC> (to return to the Home screen)

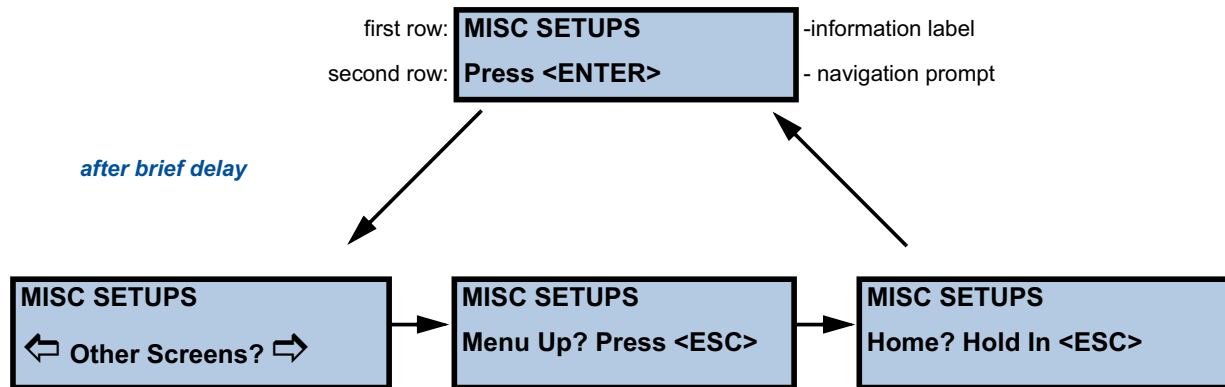


### A.3 Menu Screens

Menu screens are also read-only and display the menu name for a group of screens. For example, the Miscellaneous Setups screen is a menu screen. The child screens "beneath" a menu screen (reached by pressing **ENT**) may be any of the screen types (i.e. other menus, information screens, etc).

For menu screens like the Miscellaneous Setups screen below, the text on the second row will cycle between the following prompts:

- Press <ENTER>** (to move to the child screens)
- ↩ Other Screens? →** (to move to other screens at the same level)
- Menu Up? Press <ESC>** (to move to the parent menu screen)
- Home? Hold In <ESC>** (to return to the Home screen)

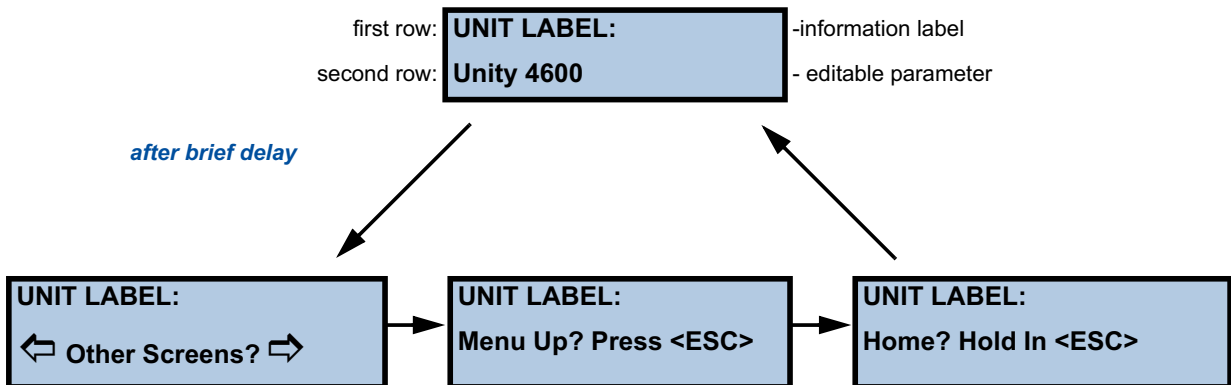


## A.4 Parameter Screens

Parameter screens display a specific parameter that *can* be edited (if the correct authority has been established). Such screens contain an alphanumeric or list-select field. There are no carries or borrows when wrapping on a numeric field (i.e. to go from 0999 to 1000, 4 digits must be edited).

For parameter screens like the Unit Label screen below, the second row contains the current value of the parameter. Upon pressing **ENT**, a blinking underscore appears under the first character to be edited (Only for editable alphanumeric fields. List-select fields will not display a cursor). Use the arrow buttons to scroll through characters or list selections. After making the desired change, press **ENT** again to commit the entry to the **Unity 4600**. Press **ESC** if you wish to cancel the change. If no key presses are made, after a brief delay, the second row begins alternating between the following prompts:

- Change? Press <ENTER> (to begin editing the parameter)
- ↔ Other Screens? ↔ (to move to other screens at the same level)
- Home? Hold In <ESC> (to return to the Home screen)



This page intentionally left blank

# INDEX

<b>A</b>			
ac power connector	21	earthing	18
ad avail	12	opening	11
address		circuit overloading	18
customer service	59	claims of damage	17
return materials	59	classification by FCC	6
agency approvals	6	cleaning the U4600	51
air flow for safe operation	17	clearance around unit	17
alarm		command syntax	35
definition	12	comments or suggestions	1
ALARM LED	34	commercials	12
alarm/cueing		COMPEL	12
connector	20	input	5
relays	5	LED	33
amperage, unit	3	components, user-serviceable	11, 51
anchor screws	18	composite video output	3
angle brackets	18	Conditional Access	12, 13
application software	12	connecting the unit	19
approvals by agency	6	connection to supply circuit	18
ASI	12	connectors, rear-panel	19
audio		consumption, power	3
connectors	20	contacting Wegener regarding	
fp monitor selection screen	33	manual	1
output	4	controlling the U4600	
tones	24	remotely	35
audio language descriptor	12	cross supports	18
audio monitor, front-panel	35	CUE LED	34
AUTH LED	34	customer service phone number	59
authorized stream	34		
automated recovery	12	<b>D</b>	
auxiliary data async input	5	damage claims	17
		decompression, audio and video	3
		default LCD screens	33
		demod and FEC lock	33
		demodulator/FEC specifications	6, 8
		description of U4600	
		functional	2, 27
		physical	2
		descriptor	
		audio language	12
		service	14
		desktop installation	18
		difficulties with the U4600	51
		digital program insert (DPI)	12
		digital video broadcast (DVB)	12
		dimensions of chassis	5
		down arrow	29
		download	
		screen	33
		DPI	12
		dual-tone multi-frequency (DTMF)	12
		connector	20
		output	4
		DVB	12
		DVB-ASI	12
		output	3
		<b>E</b>	
		earthing	18
		Eb/No, energy-per-bit noise density	
		per hertz	12
		elevated operating ambient	17
		e-mail	
		customer service	59
		return materials	59
		e-mail address	
		regarding manual	1
		environment for mounting	17
		environmental specifications for the U4600	6
		equipment	
		earthing	18
		power ratings	18
		equipment rack	17, 18
		Ethernet	13
		connector pinouts	21
		port specifications	5
		shielding of cable	17
		European certification	6
		<b>F</b>	
		fax number	
		customer service	59
		manuals	1
		return materials	59
		Wegener Communications	ii
		FCC	
		classification	6
		emissions suppression mandated	
		by	17
		FEC lock	33
		Federal Communications	
		Commission	6
		follow warning	5, 25
		formatting of serial ports	5
		frequency of supplied power	3
		front brackets	18
		front panel	

connectors . . . . .	22	manual comments or questions	1	polarity of alarm/cueing relays . . .	5
monitors . . . . .	4	maintenance . . . . .	51	port specifications	
operation from . . . . .	27	mechanical loading . . . . .	18	Ethernet . . . . .	5
front-panel		menu screens . . . . .	62	RS232 serial . . . . .	5
audio monitor . . . . .	35	modem dialing . . . . .	5	power	
functional description . . . . .	2, 27	monitors, front-panel audio and		LNB . . . . .	8
		video . . . . .	4	rating of equipment . . . . .	18
<b>G</b>		mounting		specifications . . . . .	3
grounding . . . . .	18	desktop . . . . .	18	power strips, use of . . . . .	18
		equipment rack . . . . .	18	precautions for safety . . . . .	11
<b>H</b>		location and . . . . .	17	presentation time stamp (PTS) . . . .	14
handshaking . . . . .	5	Moving Picture Experts Group		presets table . . . . .	12, 14
height of chassis . . . . .	5	(MPEG) . . . . .	13	program . . . . .	14
housing, U4600 . . . . .	2	MPEG transport stream		program allocation table (PAT) . . . .	13
		definition . . . . .	15	program clock reference (PCR) . . . .	13
<b>I</b>		multi-unit rack assembly . . . . .	17	program decompression . . . . .	3
IEC receptacle . . . . .	21			program map table (PMT) . . . . .	14
illustration		<b>N</b>		program number . . . . .	14
front-panel LEDs . . . . .	33	National Television System		protected status . . . . .	13
pushbuttons . . . . .	29	Committee (NTSC) . . . . .	13	PSI table . . . . .	14
U4600 photo . . . . .	2	network protection mode . . . . .	13	PTS . . . . .	14
info screens . . . . .	61	NTSC . . . . .	13	pulse activation . . . . .	34
inspecting the U4600 . . . . .	17			pushbuttons . . . . .	29
installation . . . . .	17	<b>O</b>		functions of . . . . .	29
desktop . . . . .	18	opening the chassis . . . . .	11	<b>R</b>	
rack . . . . .	18	operating ambient temperature . . . .	17	rack	
safety during . . . . .	11	operating temperature . . . . .	6	earthing of . . . . .	18
integrated receiver-decoder (IRD) . .	13	operation of the U4600 . . . . .	27	mounting in . . . . .	18
interference, radio . . . . .	17	output		spacing in . . . . .	17
		absence of . . . . .	51	total loading of . . . . .	18
<b>K</b>		audio . . . . .	4	rack assembly, temperature of . . . .	17
Keep-alives . . . . .	13	composite video . . . . .	3	radiated emissions, suppressing	17
key management system (KMS) . . . .	13	DTMF . . . . .	4	radio interference . . . . .	17
		DVB-ASI . . . . .	3	random access memory (RAM) . . . .	14
<b>L</b>		overcurrent protection . . . . .	18	rear-panel connections . . . . .	19
labels, security . . . . .	11, 51	overloaded circuits . . . . .	18	recovery . . . . .	12
LAN . . . . .	13	overview of U4600 . . . . .	2	reduced air flow . . . . .	17
LCD . . . . .	13			relays, alarm/cueing . . . . .	5
LED		<b>P</b>		reliable earthing . . . . .	18
definition . . . . .	13	packet ID (PID) . . . . .	13	return for repair . . . . .	17
indicators . . . . .	33	packetized elementary stream . . . .	13	Return Material Authorization	
left arrow . . . . .	29	packing materials . . . . .	17	(RMA) . . . . .	59
light-emitting diodes (LEDs) . . . .	13	PAL . . . . .	13	RF emissions . . . . .	17
liquid crystal display (LCD) . . . .	13	parameter screens . . . . .	63	RF input specifications . . . . .	6, 8
LNB		parity setting . . . . .	5	right arrow . . . . .	29
DC power . . . . .	8	PAT . . . . .	13	RJ45 Ethernet port . . . . .	5, 21
power connector . . . . .	21	PCR . . . . .	13	routine operations . . . . .	27
loading, mechanical . . . . .	18	PES stream . . . . .	13	routing cables . . . . .	18
local-area network (LAN) . . . . .	13	phase-alternating-line (PAL) . . . .	13	RS232 serial ports . . . . .	5
location and mounting . . . . .	17	phone number		pinouts of . . . . .	20
lugs, grounding . . . . .	18	customer service . . . . .	59		
		physical description of Unity 4600		<b>S</b>	
<b>M</b>		PID . . . . .	13	safety . . . . .	11
mailing address		pinouts, connector . . . . .	20		
		PMT . . . . .	14		



screen		standards, video . . . . .	13	demultiplexing . . . . .	3
default . . . . .	33	start bit . . . . .	5	sync . . . . .	34
download . . . . .	33	stop bit . . . . .	5	TRANSPORT LED . . . . .	33
home . . . . .	33	storage temperature . . . . .	6	transport stream . . . . .	15
screws, anchor . . . . .	18	stream . . . . .	14	troubleshooting . . . . .	51
SDT . . . . .	14	suggestions or comments . . . . .	1		
security labels . . . . .	11, 51	supply circuit, connection to . . . . .	18	<b>U</b>	
security of transport stream . . . . .	12	suppressing emissions . . . . .	17	Underwriter Laboratories (UL)	
selectable services . . . . .	5	synchronization . . . . .	13	listing . . . . .	6
serial port		syntax, terminal command . . . . .	35	uneven mechanical loading . . . . .	18
specifications of . . . . .	5			unpacking and inspection . . . . .	17
service descriptor . . . . .	14	<b>T</b>		up arrow . . . . .	29
SERVICES LED . . . . .	33	T(MRA) . . . . .	15, 17	user cue relay . . . . .	34
services, selectable . . . . .	5	table		user-serviceable components . . . . .	11, 51
setting up the U4600 . . . . .	17	presets . . . . .	14		
shared status . . . . .	13	program map (PMT) . . . . .	14	<b>V</b>	
shipping container . . . . .	17	PSI . . . . .	14	ventilation of unit . . . . .	17
side vents . . . . .	17	service descriptor (SDT) . . . . .	14	video standards . . . . .	13
signal, time-base . . . . .	13	tampering . . . . .	11	voiding warranty . . . . .	11, 17
signaling, DTMF . . . . .	12	telnet . . . . .	28, 35	voltage of supplied power . . . . .	3
signal-to-noise ratio . . . . .	12	temperature			
size of chassis . . . . .	5, 18	ambient operating . . . . .	17	<b>W</b>	
software		MRA . . . . .	15	warning	
application . . . . .	12	operating and storage . . . . .	6	definition . . . . .	15
boot loader . . . . .	12	terminal monitoring and control . . . . .	5	WARNING LED . . . . .	33
network control . . . . .	12	terminal operation . . . . .	35	warranty . . . . .	59
spacing the unit in rack . . . . .	17	testing . . . . .	24	voiding of . . . . .	11, 17
specifications, U4600 . . . . .	3-6	total rack loading . . . . .	18	width of chassis . . . . .	5
splice points . . . . .	12	transport			

This page intentionally left blank

