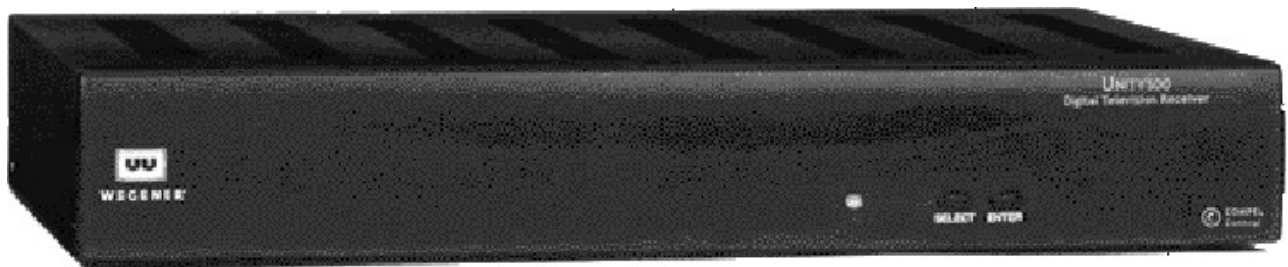# UNITY 500

Enterprise Media Receiver

User's Manual

WEGENER®

A proven world leader in digital video, audio & broadcast data systems, **WEGENER**'s management system is certified to **ISO 9001:2000**.

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The Wegener **Unity 500** is approved under **FCC Part 15B Class A**, **UL/C-UL1950 3rd Edition**, and **CE** [**EN60950**, **EN55022(94)**, and **EN55024(98)**].

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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 500**, referred to throughout the manual as the **U500**.

The manual is divided into the following chapters:

1. **General Information** – A description of the **Unity 500**, its functions and specifications, and a glossary of terms

2. **Installation** – Procedures and information for the correct and safe installation of the **Unity 5000**

3. **Operation** – Instructions on starting and operating the **Unity 500**

4. **Maintenance** – Information on maintaining the **Unity 500** and resolving potential operating difficulties

5. **Customer Service** – Our warranty and information about obtaining help.

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

Please email any suggestions or comments concerning this manual to **manuals@wegener.com**. If you prefer to post 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.

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   11350 Technology Circle
   Duluth, GA 30097-1502

Our Fax Number: (770) 497-0411

1.1. Unity 500 Product Overview

1.1.1. The Unity 500 digital Television Receiver

The **Unity 500 Digital Television Receiver** is a high-performance satellite **Integrated Receiver-Decoder (IRD)** designed to meet the needs of the private television market-place. Supporting both the PAL and NTSC video standards, the **Unity 500** is uniquely positioned to provide high-quality video, audio, and data to demanding customers. The **Unity 500** supports DVB World Standard Teletext and Line 21 Closed Captioning and Extended Data for enhanced video functionality.

Multiple data features are standard to provide additional ways to use spare digital spectrum for revenue and operational control. A 38.4-kbps asynchronous output provides constant streaming of control and user information. This data port is used for local and remote diagnostics, **COMPEL**™ data delivery services, and auxiliary data. Using **COMPEL**, the data output can control external devices, such as collection encoding systems and video switching equipment. **COMPEL** is able to command the serial number to be displayed on screen for asset protection.

1.1.2. Unity 500 Features and Options

The **Unity 500** utilizes and supports the following standards:

- MPEG-2/DVB Compliant.

- 1.5Mb – 50 Mbps Transport Rate.

- 1.08 – 45 Msps Symbol Rate.

- SCPC and MCPC.

- RS-232 Asynch Data up to 38.4 Kbps.

- Line 21 Closed Captioning and Extended Data.

- World Standard Teletext.

- On-Screen Control.

The **Unity 500** has integral support for the following **COMPEL**™ features:

- **COMPEL**™ Network Control.

- **COMPEL**™ **CA** and **Wegener** PIN Scrambling.

- **COMPEL**™ On-Screen E-Mail.

The **Unity 500** also provides the following options:

- Optional Rack Mounting brackets.

- Optional Four-Port RF Switch

1.1.3. COMPEL™ Network Control

COMPEL gives you the power to manage a network of **Unity 500**s and other **Unity** IRDs with unparalleled functionality. With its unique network management features, such as grouping, receiver control and scheduling, the operator can command individual groups of receivers to switch, tune, or "output" video or data targeted specifically for that one receiver or group of receivers. In addition, **COMPEL** is able to switch the **Unity 500** between satellite transponders — even to a different satellite — for unequalled disaster recovery.

1.2. Unity 500 Product Specifications

Table 1.1: Unity 500 Technical Specifications

Characteristic	Specification
RF Input	
Input Frequency Range	950.00 – 2150.00 MHz
Input Level Range	-25 dBm total signal power down to –135 dBm/Hz signal power spectral density (-25 to –65dBm)

Characteristic	Specification
Maximum Aggregate Input Power	-5 dBm at max input signal
Input Impedance	75 ohms, unbalanced
Input VSWR	<2.5:1
Input Noise Figure	8 dBm MAX at minimum input level
L.O. Leakage at Input	[- 55 dBm
Demodulator/FEC	Convert Symbol rate Fs to Transport Rate Ft by: $(2R*Fs)*(188/204)=Ft$, where 'R' is the inner FEC code ratio, either R = $^1/_2$, $^2/_3$, $^3/_4$, $^5/_6$, or $^7/_8$.
Max Symbol-rate	30 Msps
Aggregate MPEG Transport Rate	2.500 to 50.000 Mbps (limited by max symbol-rate and inner FEC chosen), defined for 188-byte MPEG transport packets.
Max Eb/No @ Video Threshold	Depends on inner FEC: $^1/_2$: 4.5 dB; $^2/_3$: 5.0 dB; $^3/_4$: 5.5 dB; $^5/_6$: 6.0 dB; $^7/_8$: 6.4 dB.
Compression System	MPEG-2
Analog Output Formats	NTSC or PAL
Supported Digital Video Resolutions	NTSC: 720Hx480V, 544Hx480V, 480Hx480V, 352Hx480V, 352Hx240V PAL: 704Hx576V, 544Hx576V, 480Hx576V, 352Hx576V, 352Hx288V
Supported Chrominance Sampling	4:2:0
Video Output	All Video Output specs are for NTSC and PAL
Output Level	1.0 Vp-p, < +/- 5.5 %
Output Impedance	75 ohms
Multiburst	From 0.5 to 4.2 MHz, < +0/-3dB
Differential Gain	< 3%
Differential Phase	< 3 Degrees
Line Time and Field Time W-form Distortion	< 2% p-p
Audio Decoder	
Compression System	MPEG-1 Layer 2
Sample Rates Supported	44.1 and 48 kHz
Unbalanced Audio Output	Measured at 256 kbps audio PES rate, dual mono mode
Output Level Adjust Range	0 to –14 dB attenuation from above output level.
Output Level – MAX PPL	+9.0 +/- 0.5 dBu, 0 dB level, RCA Phono Jack
Impedance	Unbalanced: < 1000 ohms

Characteristic	Specification
Audio Parameters	
Frequency Response	20 Hz to 20 kHz, +0.5/-2.0 dB
Harmonic Distortion (1 kHz test tone, 1 dB below PPL)	< 0.5%
S/N Ratio	< 68 dB (22 Hz to 20 KHz) unweighted
Dynamic Range	16 Bits
A/V Sync	< +/- 50 ms error
Serial Ports	
RS-232	RJ12
Selectable Services	Auxiliary character-based async output E-mail character-based async output Terminal monitoring and control
Baud Rates	9.6 kbps and 19.2 kbps
Formatting	8 data bits; 1 start, 1 stop; half-duplex.
Input Power Rating	115/230 VAC, 0.8/0.5A, 50/60Hz
LNB DC Power	Universal LNB supported
Voltage	14 or 19 VDC, for LNB polarity selection
22 kHz tone	22 kHz control tone, for LNB DRO selection
Current	250 mA max
Short-circuit protection	Foldback regulator
AC Power Input	
Voltage	115/230 VAC auto-detect/selected
Frequency	50 or 60 Hz +/- 2%
Power Consumption	30 watts with full LNB load
Operating Environment	
Operating Temperature Range	+10° to +40° C in still air with unblocked vents
Storage Temperature Range	-20° to + 60° C
Operating Humidity	Maximum relative humidity 80% for temperatures up to 31° C, decreasing linearly to 50% relative humidity at 40° C.
Maximum Operating Elevation	6560 Ft (2000M) above sea level

1.3. Safety Summary

The **Unity 500** 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 the **Unity 500** unit:

Do not open the **Unity 500**'s chassis cover.

AVIS:	RISQUE DE CHOC ELECTRIQUE NE PAS OUVRIR	
⚡	**CAUTION** RISK OF ELECTRIC SHOCK DO NOT OPEN	⚠

The **Unity 500** incorporates security labels over some of the screws. There are no user-serviceable components within the IRD. Tampering with the security labels, or opening the unit, will void your warranty. If you have questions, contact the **Wegener Customer Support Department** at the address or phone (fax) numbers listed in **Chapter 5, Customer Service,** of this manual.

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Chapter 2. INSTALLATION

This chapter provides instructions on unpacking, mounting, and connecting your **U500** 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 **U500** 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 the **U500**.

2.2.1. FCC-Mandated Suppression of Radio Frequency Emissions

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.

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

DANGER

To avoid damage to the **U500** unit and other equipment, or personal injury, the following items should be strictly observed.

2.2.1.1. Elevated Ambient Operating Temperatures in Rack-Mounted Units

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

2.2.1.2. Reduced Air Flow

Equipment should be installed such that the airflow required for safe operation of the equipment is not compromised. The **U500** may be arranged in a rack without empty spaces between units, if heat buildup is prevented by ensuring that the side vents remain unblocked, and that there is adequate clearance around the vent holes.

2.2.1.3. Mechanical Loading

Rack-mounted equipment should be installed in such a way that a hazardous condition is not produced by uneven loading. The **U500** unit is not very heavy, but total rack loading must be considered. Also, do not rest any unsupported equipment on a rack-mounted **U500** unit.

2.2.1.4. Circuit Overloading

Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of circuits could have on overcurrent protection and supply wiring. 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.

2.2.1.5. 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.).

2.2.2. Rack Mounting

The **U500** is sized as a single RU and will fit an EIA-standard, 19-inch-wide equipment rack.

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.

Place the **U500** on its supports and use four anchor screws or bolts and nuts to secure the **U500** front brackets to the rack.

The front brackets must be secured to the rack. If the 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.

2.2.3. Desktop Installation

To set up the **U500** in a desktop environment, place the **U500** 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 so that the unit's operating ambient temperaturerange is not exceeded. (See **2.2.1.2, Reduced Air Flow**, on page 11.)

Locate the **U500** and its cables to avoid impacts, spills, and pulling cables and to ensure sufficient air flow. Failure to locate the **U500** in a proper environment may result in damage to the equipment.

2.3. Rear Panel Connections

The **UNITY 500** rear panel connections are shown in **Figures 2.1** and **2.2**, and described in **Table 2.1** below.

Figure 2.1: UNITY 500 Rear Panel
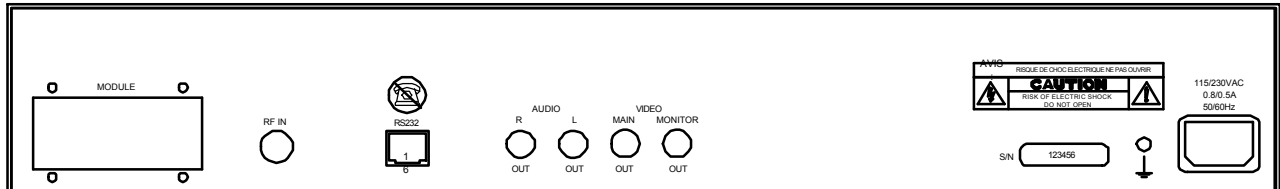
Figure 2.2: U500 Rear Panel with Smart Card Slot and Ethernet Connector
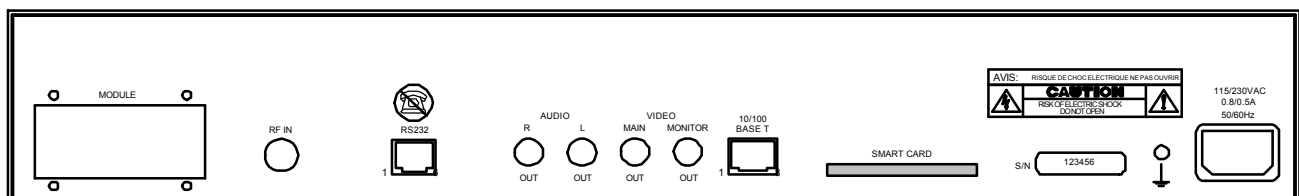
2.3.1. Smart Card

The **UNITY 500** may be equipped with a smart card slot and an Ethernet connector. The slot for the smart card is installed for future encryption updating. It conforms to the **ISO 7816** standard. It is not necessary to have the smart card installed for proper operation of the **UNITY 500**, including **COMPEL CA** operation.

Table 2.1: UNITY 500 Interconnect Descriptions

Signal	Connector	Description
RF IN	F	950 to 2150 MHz signal accepted. LNB power available.
RF SWITCH IN	F (4 Inputs)	950 to 2150 MHz signal accepted. NO LNB power available.
RF SWITCH OUT	F	1-of-4 RF inputs selected.
MAIN VIDEO OUT	Phono Jack	NTSC or PAL , Composite video at 1Vp-p
MONITOR-VIDEO OUT	Phono Jack	NTSC or PAL , Composite video at 1Vp-p
AUDIO OUT (R & L)	Two phono jacks	Audio stereo
RS232 PORT	RJ-12	Serial Asynchronous Data. May be used for terminal, printer, or modem (to remote terminal).

Table 2.2: UNITY 500 Serial Cables to Terminal or Printer

Unity 500: RJ-12		Computer: DB-9 (Female)		ASCII Terminal or Serial Printer: DB-25 (Male)	
Pin	**Signal**	**Pin**	**Signal**	**Pin**	**Signal**
1	No Connection				
2	TX Data	2	RX Data	3	RX Data
3	RX Data	3	TX Data	2	TX Data
4	No Connection				
5	Ground	5	Ground	7	Ground
6	RI	9	RI	22	RI

Chapter 3. OPERATION

3.1. General

This section provides information and procedures for powering up and operating the unit.

The IRD can be controlled via **COMPEL**, local terminal, modem (remote terminal), and On-Screen-Display push buttons. Normally, **COMPEL** is the primary method of controlling the IRD, while the other control methods are supplemental. See **Section 2.7.1. COMPEL Control** on page 19 for more information, and the **COMPEL Manual** for a complete explanation of **COMPEL** controls.

3.2. Front Panel Controls and Indicators

The front panel indicators and controls are shown in **Figure 3.1** and described in **Table 3.1**.

Figure 3.1: Unity 500 Front Panel
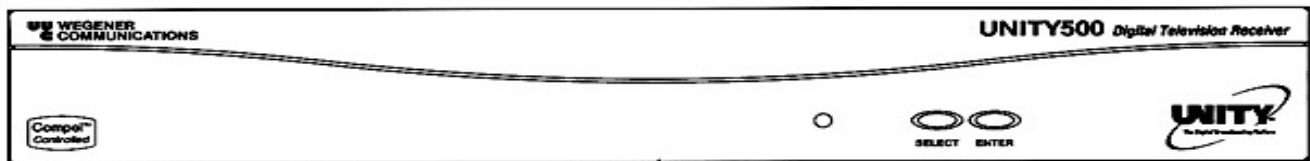
Table 3.1: Unity 500 Front Panel Controls and Indicator LED

Item	Description
IRD Status	See **Table 3.3** (Page 12) for a description of the **Status** LED.
On-Screen- Display	On-Screen-Display (OSD) of IRD may be activated by pressing the **SELECT** push-button switch on the front panel. It is also automatically activated by certain IRD status conditions, such as loss of signal.
SELECT	Push button activates (OSD) and selects options displayed.
ENTER	Push button enters options selected on OSD.

3.3. LED Status and Alarm/Warning Conditions

The **Unity 500** unit's only LED is Red/Green, located on the front panel, and labeled **Status**. **Table 3.2**, lists the behavior of the **Status** LED during **Power Up** and **Normal** operation, as well as the color and blink/flutter pattern shown during various **Warning** and **Alarm** conditions.

The conditions are listed in the order of their display priority with highest priority at the top.

NOTE: The alarm conditions are those conditions preventing the delivery of video.

The following definitions of **Amber**, **Flash**, **Blink**, and **Flutter** explain the terms used in The **Status LED Display** column of **Table 3.2**.

- **Amber**   Red and Green turned ON at the same time.
- **Flash**   ON for 100 ms, OFF for 100 ms.

- **Flutter**   ON for 50 ms, OFF for 50 ms.
- **Blink**   LED is OFF for 1 second, then blinks ON for 250 ms and OFF for 250 ms between 1 and 12 times, according to the Alarm/Warning Code. Is then OFF for 1 second, and blinks 1-12 times again. This pattern continues until the alarm/warning condition is cleared. (For example, if the unit is displaying a "header search mode" alarm, the LED will be OFF for 1 sec., then will blink (RED) ON for 250 ms and OFF for 250 ms five times. It will then be OFF for 1 sec, followed by blinking 5 times, etc. The LED blinking RED indicates an alarm, while AMBER indicates a warning.

Note: **ms = 1/1000 second**.

Table 3.2: Unity 500 Status LED Indications

Mode	Condition	Status LED Display
Power Up	IRD is in process of powering up	**Amber** flutter
Alarm	*Not Defined*	**Red** Blink w/ Count = 1
	In Fade Mode < 5 seconds	**Red** Blink w/ Count = 2
	Installation Mode > 5 seconds	**Red** Blink w/ Count = 3
	Carrier Table Search Mode	**Red** Blink w/ Count = 4
	Header Search Mode	**Red** Blink w/ Count = 5
	Eb/No below alarm level (and locked on carrier)	**Red** Blink w/ Count = 7
	No MPEG Data (but locked on carrier) > 5 seconds	**Red** Blink w/ Count = 8
	Not Defined	**Red** Blink w/ Count = 9
	PID conflict on power up	**Red** Blink w/ Count = 10
	Not authorized for current program	**Red** Blink w/ Count = 11
	Selected program not available	**Red** Blink w/ Count = 12
Warning	*Not Defined*	**Amber** Blink w/ Count = 1
	Marginal Eb/No (and locked on carrier)	**Amber** Blink w/ Count = 2
	COMPEL Required and No **COMPEL** within last 2 minutes	**Amber** Blink w/ Count = 3
	Selected audio program not available	**Amber** Blink w/ Count = 4
	RF Level too LOW	**Amber** Blink w/ Count = 5
	RF Level too HIGH	**Amber** Blink w/ Count = 6
	Corrupt Code	**Amber** Blink w/ Count = 7
	No MPEG data < 5 seconds and locked on carrier	**Amber** Blink w/ Count = 8
	Fade or Installation Mode < 10 seconds	**Amber** Blink w/ Count = 9
	PID conflict due to PID change during normal operation	Continuous **Amber** flutter
Normal	Normal Mode for a **COMPEL**-not-Required Unit	**Green**
	Addressed **COMPEL** within last 5 seconds	**Green** Flutter
	COMPEL within last 2 minutes	**Green**

3.4. Power-On Procedure

Apply power to the IRD. The unit initializes various devices and configures itself according to the **EEPROM** settings. It then waits for the receiver section to complete its power up test, which takes about 10 seconds.

When the receiver section passes its test, the IRD sends a tune command and the **Welcome Banner** screen to the serial port.(An example is shown in **Figure 3.2** below.) If the unit is in **Terminal** mode, the banner displays on the terminal screen. The IRD then enters **Alarm** mode until all of the alarm conditions are cleared.

Figure 3.2: Unity 500 Terminal Welcome Banner Screen

```
Wegener Communications Copyright 2000
Unity 500 Integrated Receiver Decoder
Application    : V106
Boot           : V102
Xilinx         : CA600048-01  100
Secure         : 600041  1.1
Tuner          : L64724D
Type H for a list of terminal commands
```
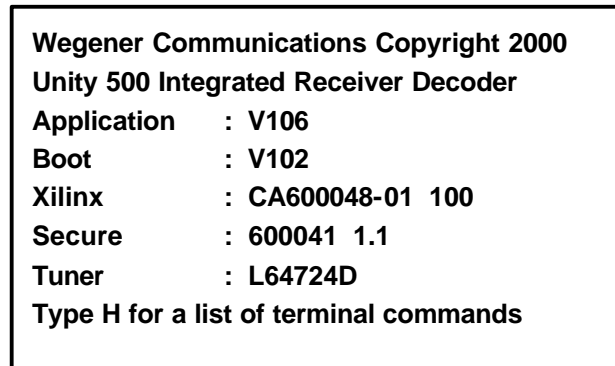
Your banner may be different from this example depending on the options purchased.

NOTE: The "**Type H…**" text at the bottom of the screen is shown only if the serial device is set to **Terminal** mode.

3.5. On-Screen Network E-mail

The network may, through the **COMPEL** network control system, send e-mail messages to the video (OSD) screen. The content, location, and duration of the messages are essentially under the control of the network. The local user may neither move nor scroll through the messages. If necessary, a message may be cleared by the local user by:

1. Either power-cycling the unit,

2. Or pressing the **SELECT** button on the front panel to get a local control menu and then exiting out of that menu.

[See Section **3.7.2 On-Screen Display (OSD) Settings** on page 21.]

3.6. On-Screen Display (OSD)

The OSD information is contained in a 14-line x 40-character display in the video output from the receiver. This output is viewed on a monitor connected to the video monitor output of the receiver. Turn it on by pressing either the **SELECT** or **ENTER** push-button on the front panel. Remove the display by selecting **EXIT** from the **Main Menu**. When a menu is first shown, the cursor is always placed on its first **action** field (or **action-with-edit** field, whichever is first).

The OSD provides the following:

1. Carrier Status,

2. Signal Strength Monitoring,

3. Serial Port device selection,

4. Software Version, and

5. The ability to make changes to unit settings. See Section 3.7 (Page 14).

All menus are white text with a solid blue background. When highlighted, they show as blue text on a white background. The cursor can be moved only to the fields listed below. The function of each push button for each field type is described below.

Table 3.3: Unity 500 On-Screen Display (OSD) Fields

Field Type	SELECT Button	ENTER Button
Action Field	Moves the cursor to the next **Action Field** (or **Action w/ Edit Field**, whichever is next). Wraps at end.	Takes action on the current field.
Action w/ Edit Field	Same as for **Action Field**.	Moves cursor to corresponding **Edit Field**.
Edit Field	If the cursor is not on last digit within the **Edit Field**, it moves the cursor to the next digit. If the cursor is on the last digit, it moves the cursor to the next **Action Field** (or **Action w/ Edit Field**, whichever is next)	Increments current digit within **Edit Field**. Wraps back to beginning after 9.
Edit Field w/ Choices	Moves cursor to next **Action Field** (or **Action w/ Edit Field**, whichever is next).	Scrolls through list of choices. Wraps back to beginning after the last item.

3.7. Customizing and Viewing Settings for Your System

Though the **Unity 500** is set up at the factory, you can customize its settings to fit your system using the OSD and front-panel push buttons. You may also view those settings and various status and version fields from the front panel, viewing on a monitor.

Note: The screens shown in **Section 3.7** contain only sample data. The actual data for normal operation will differ due to settings differences for each network or unit.

3.7.1. COMPEL™ System Control

The **Unity 500** IRD is most often controlled via the **Wegener COMPEL Control System**. This system is managed at the uplink site, sending a control stream with the usual audio and video data streams. The **COMPEL System** addresses units, and commands them to perform various functions.

Among its functions is the ability to enable or limit aspects of local control. (See the following section for more on this capability.) Also, **COMPEL** has the ability to mute the audio and video of an IRD if it is inadvertently tuned to a frequency it is not authorized to receive.

If an **RF Switch** option module is installed, **COMPEL** will control which of the four RF feeds is being processed. For more information on this, see the **COMPEL Manual**, or contact your service provider.

3.7.2. On-Screen Display (OSD) Settings

Several of the seven screens, which may be viewed on the OSD, have control functions, which may be limited by the **COMPEL™** system.

The **Main Menu**, **Carrier Status**, **Software Versions / Serial #,** and **Signal Strength** screens have no control over unit settings. Because of that, they are not included in this discussion.

However, the amount of control the on-site user has over the **Carrier Select**, **Serial Port Select**, and **Audio Settings** screens may vary, depending on **COMPEL** settings. There are four levels of control via **COMPEL**. These levels are:

- **No Local Control –** Pushbuttons disabled.

- **Read Only –** No changes permitted.

- **Limited –** Changes may be made to Carrier Presets only. For instance, on the **Carrier Select** screen, you may change the **From Table** setting, which will change the other settings on that screen according to the pre-loaded values.

- **Full –** Full Local Control.

3.7.3. Edit Settings

To edit settings, follow these steps:

1. Power up the unit.
2. Access the **Main Menu** by pressing either the **SELECT** or the **ENTER** button on the front panel.

Figure 3.3: Unity 500 Terminal Main Menu Screen

```
Main Menu
Carrier Status
Carrier Select
Software Version/Serial No.
Signal Strength
Serial Port Select
Audio Settings
Data PIDS Settings
Exit
```
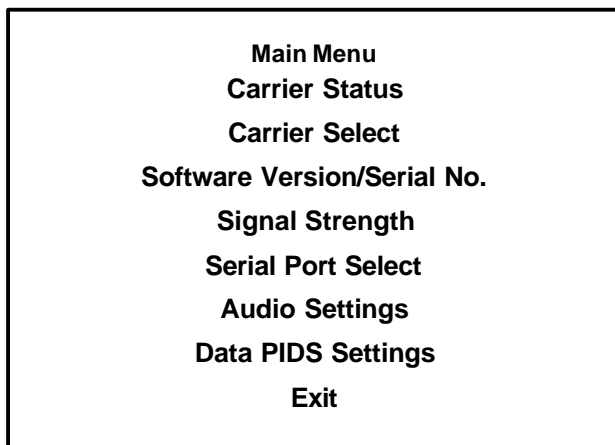
3. Using the **SELECT** button, select the item you wish to view or edit.
4. Press **ENTER** to display that screen.

3.7.4. Carrier Status

Carrier Status is a read-only screen. (No changes can be made here.)

While on the **Main Menu** page:

1. Press the **SELECT** button until **Carrier Status** is highlighted.

2. Press **ENTER**.

3. You may review the details as shown in **Figure 3.4**, below.

Figure 3.4: Unity 500 Terminal Carrier Status Screen

```
                    CARRIER STATUS
    Acquisition Mode:        TRACKING
    RF Feed                  1 (or 2, 3, or 4)
    Carrier (MHz):           03906.75
    Data Rate (Mbps):        04.250
    FEC Inner Rate:          3/4
    Tag Site:                1
    Program #:               3
    Avg. Eb/No:              10.7 dB
    Current Eb/No:           10.8 dB
    RF Level:                Good

              Return To Main Menu
```
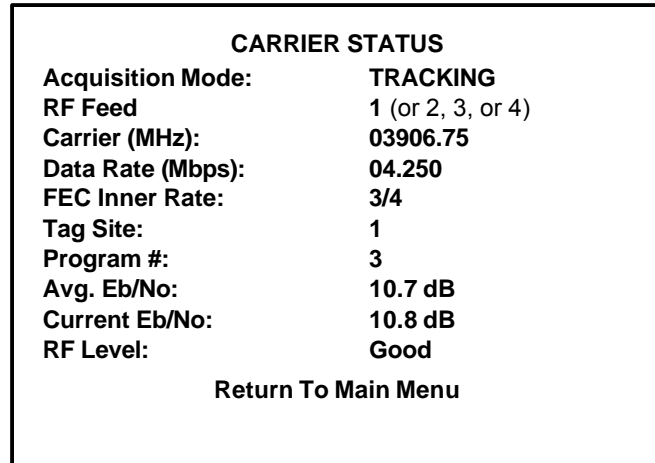
4. Press **ENTER** again to exit the **Carrier Status** screen.

3.7.5. Carrier Select

While on the **Main Menu** screen,

1. Press **SELECT** until **Carrier Select** is highlighted

2. Press **ENTER** to enter the highlighted menu.

Figure 3.5: Unity 500 Terminal Carrier Select Screen

```
                    CARRIER SELECT
    From Table:              REQ (or Table Entries)
    RF Feed                  1 (or 2, 3, or 4)
    Carrier (MHz):           03906.75
    Data Rate (Mbps)         04.250
    FEC Inner Rate:          3/4
    Tag Site:                1
    Program #:               3
    LNB LO (MHz)             05150
    RF Polarization          "Horizontal (19V)"
              Activate Selection and Exit
              Return To Main Menu
```

Shown only if **Universal LNB** is installed. May show '**RF Polarization "Vertical (14V)."**'
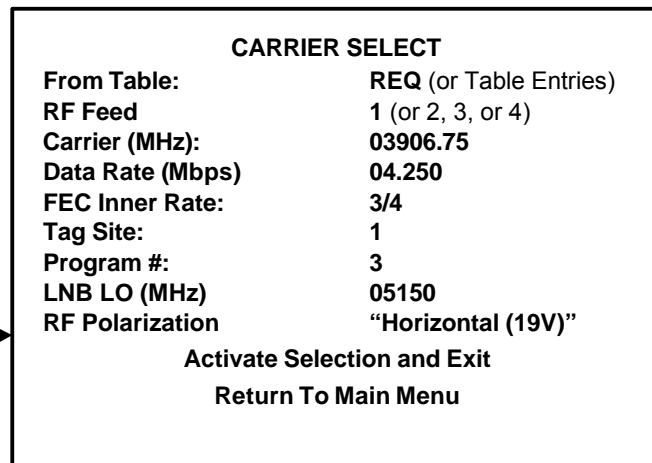
3. Press **SELECT** to place the cursor on the field you wish to edit.

4. Press **ENTER** to enter the highlighted field.

5. If a single digit is highlighted, press **SELECT** to move to the digit you want to change.

6. Press **ENTER** to cycle the digit or field item. (For example, most numeric values cycle from **0** through **9** and back to **0.** The **From Table** field scrolls through **REQ** and any other completed **Search Table Entries**, and back to **REQ**.

7. Press **SELECT** to move to the next item or digit to be changed.

NOTE: The **Carrier** must be set before setting the **LNB LO** frequency.

8. After completing all changes, press **SELECT** to select **Activate Selection**.

9. Press **ENTER** to save the new settings in memory. This activates any changes you have made.

NOTE: If you **Exit** without moving to **Activate Selection** and pressing **ENTER**, the unit will not retain the changes.

NOTE: **LNB LO** Frequency will change with the **RF Input** selected by the optional RF Switch, if that option is installed.

3.7.6. Signal Strength

The **SIGNAL STRENGTH** screen (**Figure 3.6**) displays the relative received signal level *while the IRD is locked onto a carrier*. This is useful for fine-tuning antenna pointing. (Because signal lock is a first requirement, coarse antenna pointing must be done using other tools.)

Figure 3.6: Unity 500 Terminal Signal Strength Screen
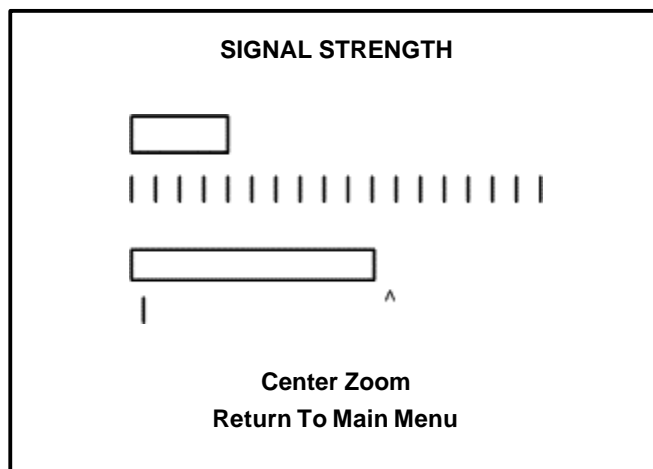
Two bars are displayed. The upper bar is a coarse indicator, and the lower, a finer indicator. The **Center Zoom** feature moves the cursor to the middle of the lower graph to ensure resolution on both sides of the current level.

3.7.7. Serial Port Select

On the **Main Menu** screen:

1. Press the **SELECT** button to scroll through the menu until **Serial Port Select** is highlighted.

2. Press the **ENTER** button to open the **Serial Port Select** screen (**Figure 3.7**).

Figure 3.7: Unity 500 Terminal Serial Port Select Screen

```
┌─────────────────────────────────────────┐
│                                           │
│            SERIAL PORT SELECT             │
│                                           │
│                                           │
│                                           │
│      Device:              Terminal        │
│                                           │
│                                           │
│               Activate Settings           │
│                                           │
│               Return to Main Menu         │
│                                           │
│                                           │
└─────────────────────────────────────────┘
```
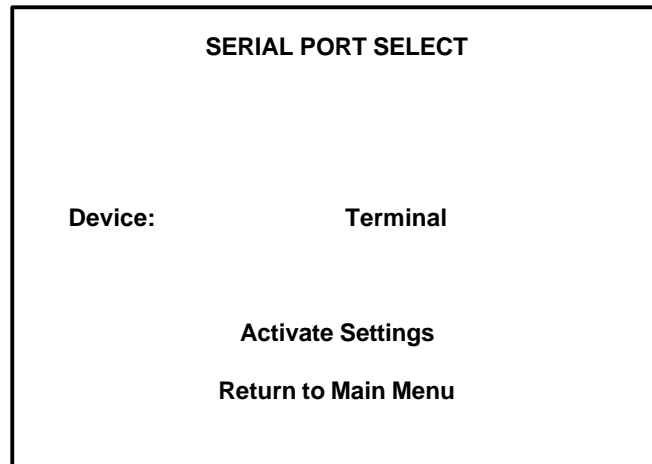
3. Press the **ENTER** button to move to the available device options for the serial port (**Terminal**, **Modem**, **Printer**, or **Aux Data**).

4. Press **SELECT** to move through the options until the desired one is highlighted.

5. Press **ENTER** to edit the selected option.

6. Press **ENTER** until the desired value is displayed.

7. Press **SELECT** to move to **Activate Selection**.

8. Press **ENTER** to save your selections to memory.

9. Press **SELECT** to move to **Return To Main Menu**.

10. Press **ENTER** to return to the **Main Menu** screen.

3.7.8. Audio Settings

While on the **Main Menu** page,

1. Press **SELECT** until **Audio Settings** is highlighted

2. Press **ENTER** to enter the selected **Audio Settings** menu (**Figure 3.8**, below).

3. Press **SELECT** to place the cursor on the field you wish to edit.

4. Press **ENTER** to enter the highlighted field.

5. Press **ENTER** to cycle the digit or field item.

6. Press **SELECT** to move to the next item or digit to be changed.

7. After completing all changes, Press **SELECT** to select **Activate Selection**.

8. Press **ENTER** to place the new settings in memory. This activates any changes you have made.

Figure 3.8: Unity 500 Terminal Audio Settings Screen
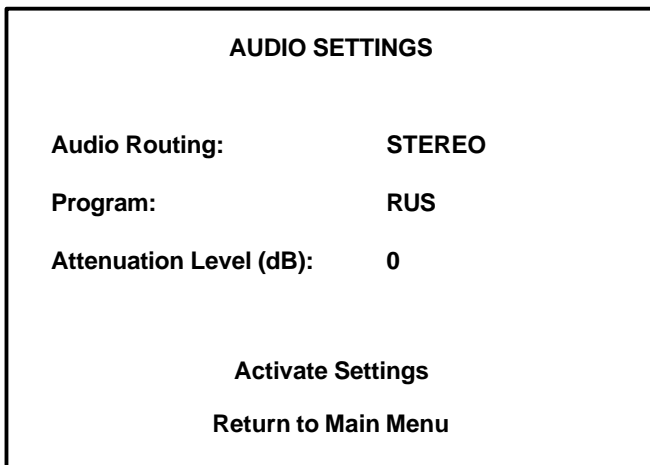
```
┌─────────────────────────────────────────────────┐
│               AUDIO SETTINGS                     │
│                                                  │
│                                                  │
│  Audio Routing:              STEREO              │
│                                                  │
│  Program:                    RUS                 │
│                                                  │
│  Attenuation Level (dB):     0                   │
│                                                  │
│                                                  │
│                                                  │
│              Activate Settings                   │
│                                                  │
│              Return to Main Menu                 │
│                                                  │
└─────────────────────────────────────────────────┘
```

NOTE: If you exit without moving to the **Activate Selection** option and pressing **ENTER**, the unit will not retain the changes.

9.   Press **SELECT** to move to **Return To Main Menu**.

10. Press **ENTER** to return to the **Main Menu** screen.

3.7.9. Software Versions

From the **Main Menu** screen:

1.   Press the **SELECT** button until **Software Version/Serial No.** is highlighted.

NOTE: The **Software Version/Serial No.** screen is a **Read Only** screen.

2.   Press the **ENTER** button to move to the **S-WARE VERSIONS/SERIAL #** screen. You may review the version identification fields on the simulated screen shown in **Figure 3.9** below.

Figure 3.9: Unity 500 Terminal Software Version/Serial No. Screen

```
┌─────────────────────────────────────────────────┐
│          S-WARE VERSIONS/SERIAL #                │
│                                                  │
│  Application          V 206                      │
│  Boot                 V 1.01                     │
│  Xilinx               CA600048-01   200          │
│  Secure               600041        1.1          │
│  Tuner                L64724 D                    │
│  Serial NO.           84339                      │
│                                                  │
│              Return to Main Menu                 │
│                                                  │
└─────────────────────────────────────────────────┘
```
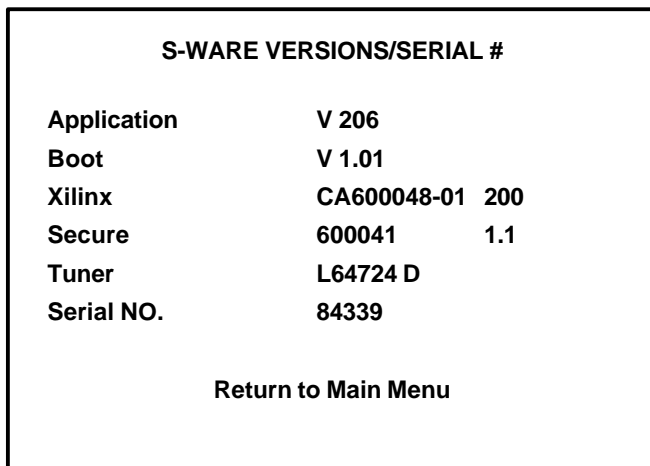
3.   Press **ENTER** to return to the **Main Menu** screen.

3.7.10. Data PIDS Settings

From the **Main Menu** screen:

1. Press the **SELECT** button until **Data PIDS Settings** is highlighted.

2. Press the **ENTER** button to move to the **DATA PIDS SETTINGS** screen. shown in **Figure 3.10** below.

Figure 3.10: Unity 500 Data PIDS Settings Screen
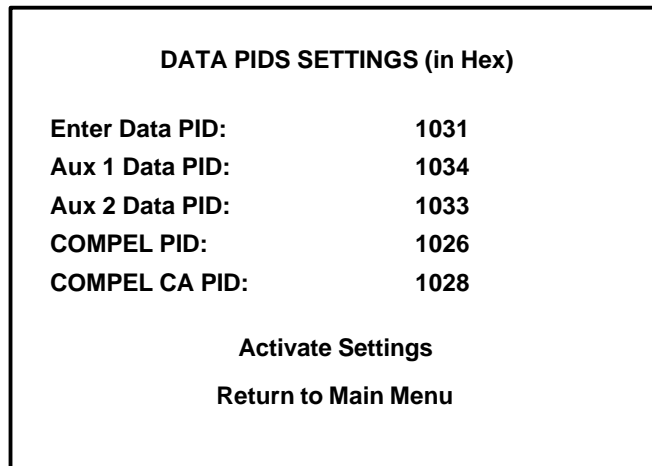
```
┌─────────────────────────────────────────────┐
│                                             │
│          DATA PIDS SETTINGS (in Hex)        │
│                                             │
│   Enter Data PID:              1031         │
│   Aux 1 Data PID:              1034         │
│   Aux 2 Data PID:              1033         │
│   COMPEL PID:                  1026         │
│   COMPEL CA PID:               1028         │
│                                             │
│               Activate Settings             │
│                                             │
│             Return to Main Menu             │
│                                             │
│                                             │
└─────────────────────────────────────────────┘
```

3. Press **SELECT** to place the cursor on the field you wish to edit.

4. Press **ENTER** to enter the highlighted field.

5. Press **ENTER** to cycle the digit or field item.

6. Press **SELECT** to move to the next item or digit to be changed.

7. After completing all changes, Press **SELECT** to select **Activate Selection**.

8. Press **ENTER** to place the new settings in memory. This activates any changes you have made.

NOTE: If you exit without moving to the **Activate Selection** option and pressing **ENTER**, the unit will not retain the changes.

9. Press **SELECT** to move to **Return To Main Menu**.

10. Press **ENTER** to return to the **Main Menu** screen.

NOTE: The screens in **Section 3.7** are samples only. The information on the actual screens will differ.

3.8. Universal European Single User LNB

Support for a **Universal European LNB** is a user-enabled feature. When this feature is enabled, and the IRD operator selects the **Carrier Select OSD** screen, the **RF Polarization** line will be present as a controlled menu item. (See **Section 3.7.5** on page 22, and the screen in **Figure 3.5**.)

RF Polarization provides for two modes of operation:

1. If you select the **Vertical (14 V)** mode, 14 Volts is supplied to the Universal LNB and Vertically polarized signals are processed by the LNB.

2. If you select the **Horizontal (19 V)** mode, 19 Volts is supplied to the Universal LNB and Horizontally polarized signals are processed by the LNB.

NOTE: The default mode of operation is **Vertical (14 V**.

The second feature of a Universal LNB is the reception of **Low Band (10.70 to 11.70 GHz)**, and **High Band (11.70 to 12.75 GHz)** frequency bands. When the IRD is tuned to **High Band**, a 22 KHz signal is applied to the LNB. When the IRD is tuned to **Low Band**, the 22 KHz signal is removed from the LNB. For **Low Band** signals the LNB output frequency range is **950 to 1950 MHz**, while for **High Band** signals the LNB output frequency range is **1100 to 2150 MHz**.

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Chapter 4. SEARCH FUNCTIONS

4.1. Perms/Temps/Searching & Settings

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

Table 4.1. Settings Parameters for the UNITY500

Setting	Description
Carrier	The **downlink frequency** specified in MHz with up to two decimal places. This value's absolute difference with the **LNB LO** frequency must be as specified in main body of the **Product Spec**.
Data_rate	**Data rate** is specified in Mbps with up to three decimal places. See the main body of the **Product Spec** for the allowable range.
Fec_rate	The **inner FEC code ratio** can have one of the values specified in the main body of **Product Spec**.
Tag_site	The **Carrier ID** "**tag**" with a value range of **0** through **15**. The **tag** is text representing the **downlink carrier frequency in MHz**. For multi-hop links, multiple tags are embedded in the control stream and the selected value must correspond to the *particular* downlink being received. **Note:** Tag site **15** is a special entry. It means "**receive this carrier without requiring a matching carrier ID**".
[program]	This is the **Program number**, the identifier for a Program within the received Transport stream. It must be a ∗ wildcard or a number between **1** and **65535** inclusive. If the ∗ wildcard is entered, the unit will select the first available program in a program table contained with the Transport stream.

The IRD is acting on one of three groups of settings at any given time, each of which is described in **Table 4.2**:

Table 4.2. UNITY500 Settings Groups

Settings Group	Description
Temp	These settings are entered via **COMPEL** or the **TEMP / TEMPCH** terminal commands. The unit is said to be inserting when it is configured to the temp settings. The maximum length of an insert is approximately 18 hours (65535 seconds). An insert terminates when 1. It times out, 3. Power is cycled, or 2. An **ABORT** command is received, 4. An invalid header is seen. Any Temp commands received while the receiver is currently inserting are ignored. If a Perm command is received while inserting, the perm settings are updated but not acted on until the insert is terminated.
Perm	The perm settings are entered via **COMPEL**, the **PERM / PERMCH** terminal, or **OSD Carrier Select** screen, or automatically from within a search mode. (See below.) The perm settings are the only settings group that are stored in NVRAM.
Search	The search settings are active while in **Carrier Search** or **Header Search** modes. When the unit finds what it is looking for in the search mode, it copies the search settings to the perm settings. These are then considered to be the active settings. See **Section 4.2, Settings Table (or Search Table)** below.

4.2. Settings Table (or Search Table)

This is an internal database retained in non-volatile memory (unaffected by loss of power). It contains a list of alternate carrier settings. Each valid entry is a complete description of a carrier/program setting (as used in a **Perm** command). This list is entered at customer request at the factory, and may be edited using **COMPEL** commands or **ADDS** and **DELS** terminal commands. The entries are referred to as "**Table Entries**" or "**Search Settings Entries**", etc.

The **Settings Table** is typically used for one of two possible operations. The first is for local users to quickly pre-program carrier/program combinations and tune the IRD to one of them. The second is as a source of alternate fallback carriers for times when the "normal" carrier is lost or has a failure in its **COMPEL** stream. The **Carrier** and **Header Search IRD** modes are examples of this second operation.

4.3. Acquisition Modes

The state diagram in **Figure 4.1** shows the transitions for each of the acquisition modes: [! means "not"].

Figure 4.1: Acquisition Modes

WEGENER®
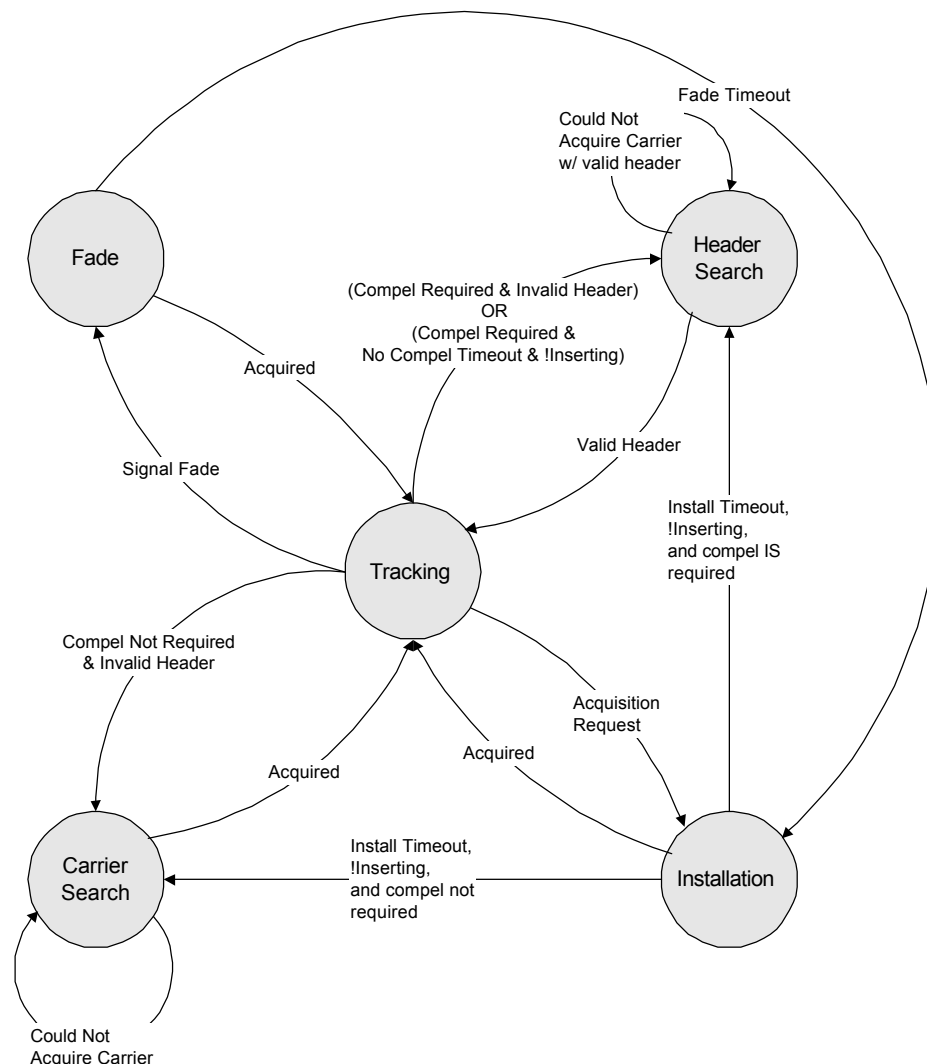
Table 4.3 describes the IRD's behavior for each of the acquisition modes and the defined timeouts. (See the **SETTIMEOUT** terminal command.)

Table 4.3. Acquisition Mode Behavior

Acquisition Mode	Description
Tracking	In **Tracking Mode**, the unit tracks (monitors) an acquired carrier. This is the only mode in which the unit can provide video, audio, and/or aux data. The unit will move to the **Header Search** mode if, (1) an invalid network header is detected in the **COMPEL** network stream, or (2) the time since the last valid network header was detected exceeds the **No COMPEL Timeout** (**#4 in SETTIMEOUT** command).
Fade	The purpose for this mode is to reacquire a *faded* carrier (caused by rain, sun-outs, etc). The unit allows the receiver daughter-card to automatically re-acquire the carrier on its own using a restricted search algorithm. This mode is vacated for the Installation mode after the **Fade Timeout** (**#1** in **SETTIMEOUT** command).
Installation	While in **Installation** mode, the unit continually performs an installation-type acquisition on the requested carrier. Installation-type acquisitions cover a **~+/-2 MHz** range, and should occur in under 30 seconds. This mode is generally used at power up and for all user-requested acquisitions. This mode is vacated for the **Carrier Search** mode after the **Installation Timeout** (**#2** in the **SETTIMEOUT** command).
Carrier Search	While in **Carrier Search** mode, the IRD resorts to the **Settings Table** for finding a carrier. The IRD continually moves down the table performing one complete installation-type acquisition on each valid entry in the table, including the last-acquired and last-requested entries. Each individual search lasts one minute. After the last entry is searched, the unit repeats the search from the top of the table. This mode is vacated only if a carrier is successfully acquired, OR if a local user issues a tuning command. However, after expiration of the **Carrier Search Timeout** (**#3** in the **SETTIMEOUT** command), if **Local Control** had been previously disabled, then it is re-enabled.
Header Search	The **Header Search** mode is identical to **Carrier Search** mode, except that the unit is looking for a carrier with valid **COMPEL** network headers present. If a carrier is encountered, the unit will wait the amount of time given by the **Header Seek Timout** (**#5** in the **SETTIMOUT** command) before moving on to try other carriers in the **Settings Table**. This mode is vacated only if a carrier is successfully acquired *and* a valid header is received, OR if a local user issues a tuning command. However, after expiration of the **Header Search Timeout** (**#6** in the **SETTIMEOUT** command), if **Local Control** had been previously disabled, then it is re-enabled.

4.4. Acquisition Sub-Modes

The state diagram in **Figure 4.2** shows the transitions for each of the acquisition sub-modes within the acquisition modes. [! means "not"].

NOTE: "**Satellite Searching**" is obsolete and should be considered always **true** in the logic shown.

Figure 4.2: Acquisition Sub-Modes
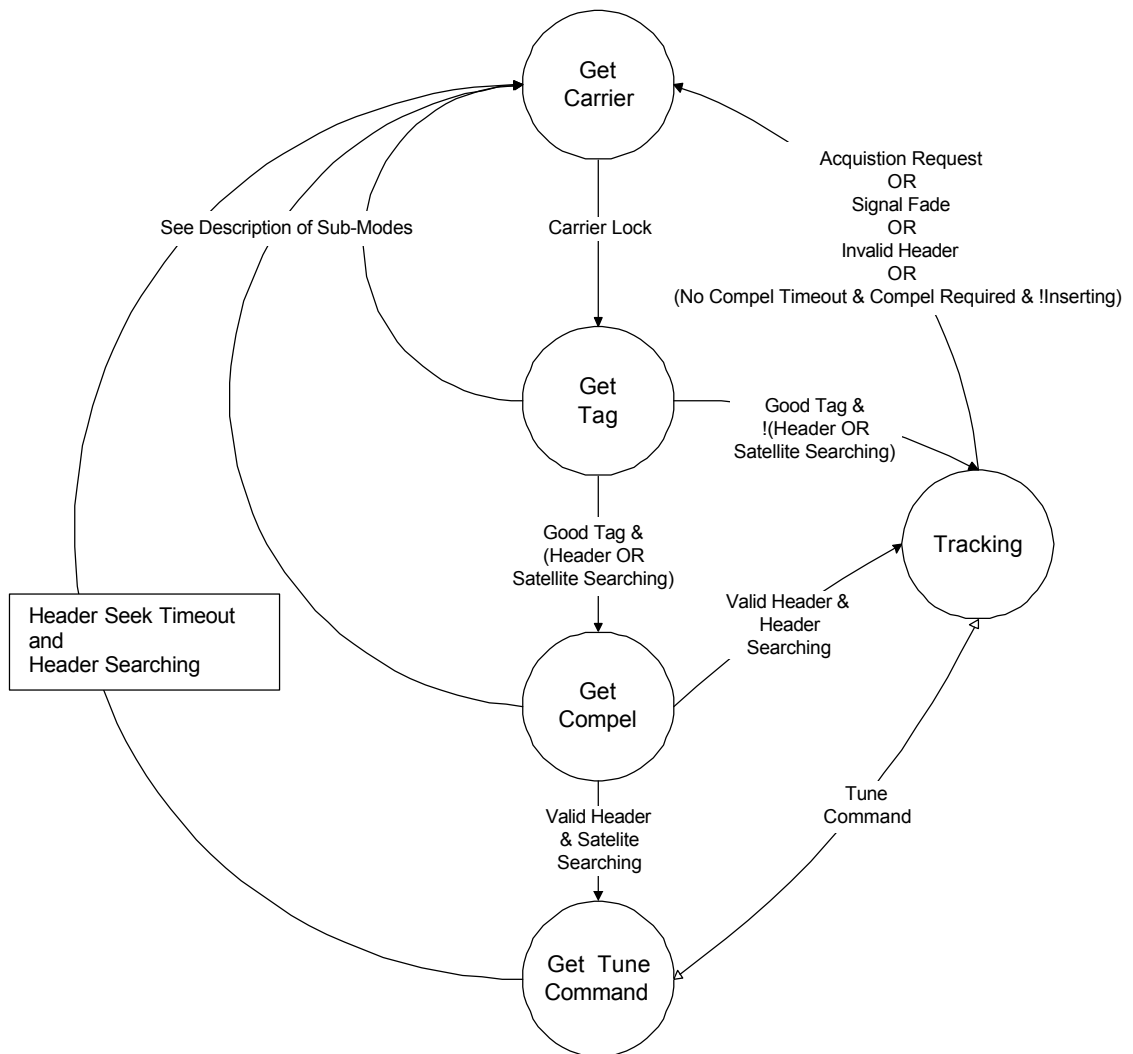
4.5. Signal Quality Monitoring

The IRD provides the following signal quality information *while tracking a carrier only*:

Table 4.4: Signal Quality Information

Parameter	Description
Eb/No	These are internal estimates* of normalized received signal-to-noise ratio. The "quick" Eb/No is updated approximately every 500 mS, and the average is a running 10-second average of these quick estimates. The Eb/No alarm is generated when the average Eb/No is found to be lower than the SNR Alarm Level. A Margin warning is generated when the average Eb/No is not yet low enough to be in full alarm, but it fails to exceed that alarm threshold by the Margin Offset (in dB). * The accuracy of these estimates is affected by any of a number of cumulative link imperfections, such as converter-LO phase jitter, amplitude/group delay distortion, and external impedance mismatches. Also, at high signal-to-noise ratios, the accuracy of the estimate is reduced. [This is why the estimate will "top out" as > xx dB at a high enough ratio.] Because of differing sensitivities to these imperfections, the user may expect different IRDs to show diverging estimates, especially as the Eb/No gets higher.
RF Level	Unit will show **WARNING** if the RF level is detected to be **above –20 dBm** or **below –60 dBm**. **Note:** This is not to be confused with the **Signal Strength OSD** screen. (See **Section 3.7.6** and **Figure 3.6** on page 23.)
Signal Fades	A counter is maintained for the transitions from **Tracking** mode to **Fade** mode.
RF Glitches	A counter is maintained for carrier "**hits**". A "**hit**" is when the receiver board detects one or more uncorrectable **Reed-Solomon** frames, yet small enough not to cause a transition from **Tracking** to **Fade** mode. Note that an RF hit will induce a hit on the unit's video/audio.
Availability	Shows the percentage of time that the unit has been locked on a carrier since that carrier was first acquired (**timer.locked / timer.since_first_acquired**).

4.6. Frequency Tagging

4.6.1. General Rules

Under normal operation, the IRD can only acquire carriers that contain frequency tags. These tags are inserted in the **COMPEL** control stream at the uplink and identify the carrier's frequency. Tagging was mandated so IRDs will not lock on an adjacent carrier while looking for the intended one. Traditionally, these tags have been sent at a rate of every 100 or 125 mS. The IRD supports both single and multiple tags. The "**tag site**", which is part of the settings, tells the receiver which of the possible tags to use (for multi-hop carriers). This IRD allows for **Tag Site** designations from **0** to **15** inclusive, with **15** specially reserved to mean "**do not require a valid ID tag to lock on this carrier**". To reduce processing overhead, the unit only looks for tags while it in the **Get Tag** sub-mode.

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Chapter 5. CUSTOMER SERVICE

5.1. Warranty

The following warranty applies to all **Wegener Communications** products including the **Unity 500**:

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 **UMX 5010**, or for questions about obtaining service for your **UMX 5010**, contact **Wegener Communications Customer Service** at (**770**) **814-4057**, **FAX** (**678**) **624-0294**, or e-mail **service@wegener.com**.

To return a product for service:

1. Obtain a **Return Material Authorization (RMA)** number by completing and faxing a copy of the **RMA Request Form** to (**678**) **624-0294**. You may e-mail the same information instead to: **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.

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Appendix A: Terminal/Modem Mode

A.1   Terminal/Modem Commands

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 separated from others by a space. **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** responses being displayed at the terminal. Parameter errors on User commands generate **Invalid *parameter name*** responses, where *parameter name* is the name of the incorrectly entered parameter.

A.1.1   Network-Enabled Local Control Commands

These commands are allowed *only if local control is enabled* and are listed in **Table A.1** below. Commands that are always functional are discussed in **Section A.1.2**, and are listed in **Table A.2**.

Table A.1: Unity 500 Network-Enabled Local Control Commands

ABORT	
Insert is terminated. See **TEMP** command.	
ADDS *location settings*	
location:	Value from **1 - 48** indicating location in **settings_table**.
settings:	*See* **Perms/Temps/Searching & Settings Section** 4.1 .
The *settings* are added to the **settings_table** at the specified location. Will also handle data rate rounding as explained for **PERM**.	
AUXDATA *[PID] [baud] [parity]*	
PID:	Selects the **PID** (in hex) for the Transport packets carrying the desired data stream. Must be **20** to **1FFE** inclusive.
baud:	Selects the baud rate of the async data stream. Normally **19200**.
parity:	Sets the parity for the data output. Normally **None**.
Sets up the **Aux Data** serial port device.	
DELS *location*	
location:	Value from **1** to **48** indicating location in the **settings_table**.
The entry in the **settings_table** at the specified location is deleted. The command is ignored if the **settings_table** contains only one entry..	

Table A.1: Unity 500 Network-Enabled Local Control Commands (Continued)

MUTE *[source][source]*
source: If no source is specified then video and all audio outputs are selected. Source can be any of the following:
V   Indicates **Video**.
A[/string]   Indicates **Audio**. An **A** alone indicates **all audio outputs**. **/L** mutes the **left** channel and **/R** mutes the **right**.
Mutes the specified outputs. Example: **MUTE V A/1L/2/4/6R**, mutes the **Video**, **asynchronous data**, **Audio Port 1 left**, **Ports 2 and 4 left and right**, and **Audio Port 6 right**.

PERM *settings*
settings: See **Section 4.1, Perms/Temps/Searching & Settings**.
Unit sets its **Perm** settings to *settings*. See **Section 4.1** for more information.

PERMCH *location*
location: Value from **1** to **48** indicating location in the **Settings Table**.
Unit sets its **Perm** settings to those retrieved from the **Settings Table** according to *location*. See **Section 4.2, Settings Table (or Search Table)**, on page 28.

SETAUDIO *port route [program] [atten]*
port: Values of **1** to **6**, indicating an audio port.
route: **S - Stereo** (Left and Right components routed as connected at original MPEG encoder) **1 -** Original **Left** component to *both* **L** and **R** outputs **2 -** Original **Right** component to *both* **L** and **R** outputs **R - Reverse stereo** (reverse of **Stereo** above)
[program]:   Can be a three character name or an ∗. If the 3-character name is specified, the unit will route the audio program with the specified name to the port. If ∗' is specified, the unit will default to the first audio program that is not routed to another port.
[atten]   Must be a **numeric** value between **0** and **14** inclusive. This programs the net audio attenuation, where **0** gives **0dB** attenuation (**maximum** level). If field is omitted, attenuation remains unchanged on that audio port.
The audio program is routed to the **audio port's** audio switch, and its components are routed to the **Left** and **Right** outputs according to *route.* That port's attenuation is changed to *atten* if that parameter is supplied.

Table A.1: Unity 500 Network-Enabled Local Control Commands (Continued)

SETTIMEOUT *source time*		
source:	1 – Fade 2 - Installation 3 - Carrier Search 4 - No COMPEL 5 – (No COMPEL) Header Seek 6 – (No COMPEL) Header Search	
time:	**Time-out** value in **HH:MM:SS** format. **Minimum value** is **00:00:00** and **maximum value** is **00:00:30** for **Fade** and **4660:20:15** for **all others**.	
Timeout.source is set to *time*. See Section 4.3 (Page 24) for an explanation of timeouts.		
SNR alarm_level margin_offset		
alarm_level:	Units in **dB** with range from **2.0** to **7.0**, with one decimal place.	
margin_offset:	Units in **dB** with range from **1.0** (with one decimal place) to difference between **12.0** and **alarm_level**. **NOTE:** The sum of **alarm_level** and **margin_level** cannot exceed **12.0**.	
Sets **SNR Alarm Level** and **Margin Offset** accordingly.		
TEMP *settings time*		
settings:	See **Section 4.1, Perms/Temps/Searching & Settings**.	
time:	Length of insert in **HH:MM:SS** format. Valid range is **00:00:00** to **18:00:00**.	
Does **temporary insert** as described in **Table 4.2. UNITY 500 Settings Groups** on page 27. Unit sets its **Temp** settings to *settings.*		
TEMPCH *location time*		
location:	Values from **1** to 48, indicating location in the settings table.	
time:	Same as for **TEMP** command.	
Unit sets its **Temp** settings to those retrieved from the settings table according to *location*. See the **TEMP** command.		
UNMUTE *[source][source]*		
source:	Same as the **MUTE** command.	
Identical to **MUTE** command, except that specified services are **unmuted**.		

A.1.2   Local Control Commands

Local control commands that are always functional at the **Unity 500** Terminal are listed in **Table A.2**. (Commands allowed *only if local control is enabled* by the **COMPEL** network and are listed in **Table A.1** above.)

Table A.2: Unity 500 Local Control Commands

H *[command]*	
command:	Any of the terminal command names (**H**, **R**, **TEMP**, etc.).
If an **H** or any invalid command beginning with an **H** is entered and the *command* parameter *is omitted*, the whole **Help** screen will be displayed, displaying the list of all currently available commands and a brief description of each one. If an **H** or any invalid command beginning with an ' **H** is entered and the *command* parameter is a valid **User Command Name**, then detailed help for the specified command is displayed.	
PC *device baud*	
device:	**P** for **Printer** or **M** for **Modem**.
baud:	**9600** or **19200** for **Modem**; **1200**, **2400**, **4800**, **9600**, or **19200** for **Printer**; **1200**, **2400**, **4800**, **9600**, or **19200** for **Aux Data**
parity:	**O**, **E**, or **N**, configurable for **Printer** or **Aux Data** devices *ONLY*. **Modem** is always **N**.
Configures any device other than the **Terminal**. See **Section 3.7.7**, **Serial Port Select** on page 25 for details.	
PW *(password):*	
password:	One to six alpha-numeric characters.
Changes the **Modem** password to the specified *password*.	
R *type [page]*	
type:	Indicates the type of report as follows: **C** - **Carrier Status** **P** - **Parameters** **G** - **Group Status** **NC** - **Network Controller Status** **M** - **MPEG** **S** - **Settings Status** **S** - **Settings Table** **SP** - **Serial Port Configuration**
[page]:	This option can have a value of **1** to **8** and is only applicable for the **Group Status Report**. Indicates the page to be reported. If omitted, all eight pages are reported and scroll off the terminal screen.
SETLNB *port LO_freq*	
port:	The number of the **port** can be from **1** to **4**. **NOTE:** If no RF Switch is installed, **1** must be used as the **port** number.)
LO_freq:	This value represents the **LNB LO** frequency in MHz. It can have up to two decimal places and its valid range is from **0** to **14000.00**.
Sets the assumed **LNB LO** frequency to the value entered in MHz.	

A.2   Reports

This section lists the reports generated by the terminal commands, shows the options or origins of the reports, and gives examples of each report.

A.2.1   Carrier Status (Tracking)

Figure A.1: Sample Unity 500 Carrier Status (Tracking) Report

```
CARRIER STATUS
Acquisition Mode:              TRACKING
Carrier:                       12000.11 MHz
Data Rate:                     1.536 Mbps
FEC Rate:                      1/2
RF Level:                      OK
Eb/No Level:                   GOOD
Status in Last 10 Seconds
  Average Margin:              2 dB
  Average Eb/No:               4 dB
Status Since Last Acquired
  Time:                        08
45:                            22
  Best Eb/No:                  5 dB
  Worst Eb/No:                 2 dB
Status Since First Acquired
  Time Since First Acquired:   899:35:15
  Availability:                100.00%
Fades:                         3
Glitches:                      1
```

Table A.3: Terms Used in U500 Carrier Status (Tracking) Reports

Term	Definition/Description
Acquisition Mode	Always shows **TRACKING**.
Carrier	**freq_string** (**active_settings.carrier**)
Data Rate	**data_rate_string** (**active_settings.data_rate**)
FEC Rate	**active_settings.fec_rate**
Tag Site	Current **Tag Site**
Program #	Current **Program Number**
RF Status	(Level) **HIGH**, **LOW**, or **OK**.
Eb/No Level	**GOOD**, **MARGINAL**, or **ALARMING**., showing state of r**x.ebno_level**
Status In Last 10 Seconds	**10-second** history. History is cleared when **active_settings.carrier** is changed.
Average Margin	Average **Eb/No** margin. See **Section 4.5**, **Signal Quality Monitoring**.
Average Eb/No	Average**ebno_level** over last 10 seconds. See **Section 4.5**.
Status Since Last Acquired	Status since carrier was last acquired.
Time Since Last Acquired	**time_string** (**timer.acq_mode**)
Best Eb/No	Best **Eb/No** level since last acquisition. See **Section 4.5**.
Worst Eb/No	Worst **Eb/No** level since last acquisition. See **Section 4.5**.
Status Since First Acquired	Status history since tracking mode first entered for **active_settings.carrier**.
Time Since First Acquired	**time_string** (**timer.first_acquired**).
Availability	**0.00 %** to **100.00%**. **timer.tracking_current** divided by **timer.first_acquired**.

A.2.2   Carrier Status (Not Tracking)

Figure A.2: Sample Unity 500 Carrier Status (Not Tracking) Report

```
CARRIER STATUS

Acquisition Mode                           FADE
RF In: (Shown if RF Switch is installed)   2
Carrier                                    12000.11 MHz
Data Rate                                  1.536 Mbps
FEC Rate                                   1/2
Tag Site                                   3
Program:                                   2
Time in Current Mode:                      00:00:30
Acquisition Submode:                       GET CARRIER
Time in Current Submode:                   00:00:30
Acquisition Difficulties                   2 dB
   No Tag                                  12
   Wrong Tag:                              3 / 12000.00 MHz
   Wrong Header                            23
Bypassing Tag
```

Table A.4: Terms Used in U500 Carrier Status (Not Tracking) Reports

Term	Possible Output or Register Source
Acquisition Mode	**FADE**, **INSTALLATION**, **CARRIER SEARCH**, or **HEADER SEARCH**. State of **acq.mode**
RF In	If RF Switch is installed, the current setting. Otherwise not shown.
Carrier	**freq_string** (**active_settings.carrier**)
Data Rate	**data_rate_string** (**active_settings.data_rate**)
FEC Rate	**Active_settings.fec_rate**
Tag Site	Current **Tag Site**
Program	**Active_setting** program
Time In Current Mode	**time_string** (**timer.acq_mode**)
Acquisition Sub-Mode	**GET CARRIER**, **GET MPEG**, **GET TAG**, or **GET COMPEL**. State of **acq.sub_mode**.
Acquisition Difficulties	**None** is shown if all of the following four counters are zero. If the counters are not zero, they provide the following information:
No Tag*	Number of times unit timed out in **Get Tag** sub-mode and was still tracking.
Wrong Tag*	Number of times unit has seen a wrong tag in **Get Tag** sub-mode, and the last Tag's value.
Wrong Header*	Number of times unit has seen an invalid header in **Get COMPEL** sub-mode.
Bypassing Tag*	Only shown if bypassing tags.

 * These counters are cleared each time the unit enters **Tracking** mode.

A.2.3   Parameters

Figure A.3 Sample Unity 500 Parameters Report

```
PARAMETERS

LNB LO                              10750.00 MHz

SNR
  Margin Offset                    2.0 dB
  Alarm Level                      5.0 dB
Video Mute Type                    BLACK
Time-outs
  Fade                             00:05:00
  Install                          01:00:00
  Carrier Search                   48:00:00
  No COMPEL                        01:00:00
  COMPEL Seek                      00:30:00
  Header Search                    48:00:00
Options
  Encryption:                      INSTALLED
  RF Switch:                       NOT INSTALLED
  Ethernet                         NOT INSTALLED
```

Table A.5: Terms Used in Unity 500 Parameters Reports

Term	Possible Output or Register Source
LNB LO	**freq_string (lnb_lo_freq[0])** {Blank if RF switch is installed.}
Margin Offset	Value of **snr.margin_offset** shown in **dB** with one decimal place.
Alarm Level	Value of **snr.alarm_level** shown in **dB** with one decimal place.
Video Mute Type	**Video_mute_type**
Fade	Fade timeout *
Install	Install timeout *
Carrier Search	Carrier Search timeout *
No COMPEL	No **COMPEL** timeout *
COMPEL Seek	COMPEL seek timeout *
Header Search	Header search timeout *
Encryption	**INSTALLED** or **NOT INSTALLED**.
RF Switch	**INSTALLED** or **NOT INSTALLED**.
Ethernet	**INSTALLED** or **NOT INSTALLED**.

 * See **Section 3.3, LED Status and Alarm/Warning Conditions**. for explanation.

A.2.4   Group Status

Figure A.4: Sample Unity 500 Group Status Report

```
                         GROUP STATUS

Group Page:   2847
Group Table:


         0 1 2 3 4 5 6 7 8 9 A B C D E F


   0     X                   X
   1
   2                 X
   .
   .
   .
   F    X

                 .
                 .
                 .

         0 1 2 3 4 5 6 7 8 9 A B C D E F

   270       X
```

Table A.6: Terms Used in U500 Group Status Reports

Element	Description
Group Page	**group.page_number**
Group Table	**group.table** displayed in pages. **Page 1** shows membership for groups **0 - 0xFF**, **Page 2** for groups **0X100 – 0X1FF**, …. The last page shows groups **0x2700 - 0x270F**. The **X** indicates a bit being set in the table, reflecting membership in the group corresponding to the number of the bit.

NOTE: This report may require up to 40 pages.

A.2.5 Network Controller Status

Figure A.5: Sample Unity 500 Parameters Report

```
NETWORK CONTROLLER STATUS

Delaying                          00:00:32
Fixed
. Serial #                        000101
. COMPEL Control                  REQUIRED
Variable
. Lock                            UNLOCKED
. Local Control                   ENABLED
. Network Mode                    PROTECTED
. Last Header                     00:00:05
. Last Addr Header                00:04:48
COMPEL Processing History
. Amount of History               383:35:11
. Total Processed                 79848
. Invalid Headers                 2
. Invalid Checksum                2
. Invalid Length                  1
. Buffer Overflow                 1
. Syntax Error                    2
```

Table A.7: Terms Used in U500 Network Control Status Reports

Term	Description
Delaying	time_string (**timer.delay_remaining**) {if non-zero}
Serial #	All six digits of **Serial_number**.
COMPEL Control	**REQUIRED** or **NOT REQUIRED**. State of **COMPEL_required**.
Lock	**LOCKED** or **UNLOCKED**. State of **COMPEL.locked**.
Local Control	**ENABLED** or **DISABLED**. State of **local_control**.
Network Mode	**SHARED** or **PROTECTED**. State of **COMPEL.network_mode**.
Last header	time_string (**timer.last_header**)
Last addr header	time_string (**timer.last_addr_header**)
Amount of History	time_string (**timer.powered_up**)
Total Processed	**COMPEL_stats.processed**.
Invalid Headers	**COMPEL_stats.headers**. {if non-zero and technical version}
Invalid Checksum	**COMPEL_stats.checksum**. {if non-zero and technical version}
Invalid Length	**COMPEL_stats.length**. {if non-zero and technical version }
Buffer Overflow	**COMPEL_stats.buffer**. {if non-zero and technical version }
Syntax Error	**COMPEL_stats.syntax**. {if non-zero and technical version }

A.2.6   MPEG Status

Figure A.6: Sample Unity 500 MPEG Status Report

```
┌─────────────────────────────────────────────────────────────────┐
│ MPEG STATUS                                                       │
│                                                                   │
│ Aggregate MPEG:          Transport stream at 10.000 Mbps          │
│                                                                   │
│ Available Programs:      00001, 00002                             │
│                                                                   │
│ Video                                                             │
│   Presence:              NTSC                                     │
│   Settings:              ALARM MUTED, COMMAND MUTED               │
│                                                                   │
│ Audio Presence:          A01, ENG, SPA, FRE, . . . . . ., ITA, SP2,│
│                          E3                                       │
│                                                                   │
│ Audio Port Assignments: / Status:                                 │
│     Program  ATTEN       Routing       Left          Right        │
│     A01(PRI)             10 dB         STEREO                      │
│     ALARM/CMD MUTE    ALARM MUTE                                  │
└─────────────────────────────────────────────────────────────────┘
```

Table A.8: Terms Used in U500 MPEG Status Reports

Term	Description
Aggregate MPEG	If MPEG stream is present, shows Transport stream at **data_rate** in Mbps, obtained from **active_settings**. If MPEG stream is *NOT* present, shows **Not Available**.
Available Programs	Program numbers of available programs if MPEG stream is present
Video	
Presence	**NTSC**, **Not Authorized**, or **Not Present**.
Settings	**NORMAL** if both **video.alarm_state** and **video.cmd_state** are **unmuted**, Otherwise, any non-muted states will be shown.
Audio Presence	Shows 3-character designator for each audio program contained within the current program, if MPEG stream is present.
Audio Port	Only one audio port is possible in the..
Program	The audio program that was specified for the audio port. If the unit automatically picks the audio program, the chosen program will be shown in ( ).
Routing	The value in **audio.port.route**. Can be **STEREO**, **1 ON BOTH** (meaning **Left** to both), **2 ON BOTH** (meaning **Right** to both), or **REVERSE**.
Left/Right	The status of the port's individual audio component outputs. Can be **–**, **CMD**, **ALARM**, or **ALARM&CMD** depending on states of **audio.output.cmd_muted** and **audio.outputs.alarm_muted**.

A.2.7   Settings Status

Figure A.7: Sample Unity 500 Settings Status Report

```
SETTINGS STATUS

                TEMP            PERM            SEARCH
                (00:18:53)
Carrier:        12000.11        12000.11        -
Data Rate:      1.536           10.000          -
FEC Rate:       3//5            3/5             -
Tag Site:       0               2               -
Program:        * (EAST)        *               -

MESSAGE
```

Table A.9: Terms Used in U500 Settings Status Reports

Term	Description
TEMP	The **temp_settings**, w/ **time_string(timer.insert_remaining** is shown at top. {–s are shown and **time** is left blank when not inserting}.
PERM	The **perm_settings**.
SEARCH	The **search_settings**. {–s are shown if not searching}.
Carrier	Downlink carrier frequency in MHz.
Data Rate	Transport data rate in Mbps.
FEC Rate	Any of the supported FEC ratios (inner FEC)
Tag Site	**0-15**. See **Section 4.6, Frequency Tagging** on page 25.
Program	Selected program. If selected program is ∗, then actual program identifier is shown, if available. Otherwise, Program # is shown.
MESSAGE	If the current condition indicated on the LED is a **Boot Fail, Alarm**, or **Warning** condition, this line will contain a brief description of that condition. **Boot Fail** and **Alarm** descriptors will be identical to those used on OSD for alarm-muted video.

A.2.8   Settings Table

Screen breaks are supplied to break this report into 3 separate screens! If unit is NOT configured for search table labels it will appear as shown in **Figure A.8**:

Figure A.8: Sample Unity 500 Settings Table Report (Without Labels)

Perm	Data Carrier	FEC Rate	Tag Rate	Site	Program
		SETTINGS TABLE			
1)	12000.00	1.536	1/2	1	*
2)	12000.11	4.608	7/8	2	2
3)	-	-	2/3	1	4
4)	-	-	-	-	-
5)	-	-	-	-	-
6)	-	-	-	-	-
7)	-	-	-	-	-
8)	-	-	-	-	-
9)	-	-	-	-	-
10)	13100.00	9.984	5/6	0	1
11)	13200.00	38.000	7/8	0	*
12)	4060.00	10.400	2/3	1	*
13)	-	-	-	-	-
14)	-	-	-	-	-
15)	-	-	-	-	-
16)	12000.00	1.536	1/2	1	*
17)	12000.11	4.608	7/8	2	2
18)	10111.10	3.072	2/3	1	2
19)	-	-	-	-	-
20)	-	-	-	-	-
21)	-	-	-	-	-
22)	-	-	-	-	-
23)	-	-	-	-	-
24)	-	-	-	-	-
25)	13100.00	9.800	5/6	0	5
26)	13200.00	5.940	7/8	0	*
27)	13300.00	35.000	2/3	1	*
28)	-	-	-	-	-
29)	-	-	-	-	-
30)	-	-	-	-	-
31)	12000.11	4.608	7/8	2	7
32)	10511.10	3.072	2/3	1	1
33)	-	-	-	-	-
34)	-	-	-	-	-
35)	-	-	-	-	-
36)	-	-	-	-	-
37)	-	-	-	-	-
38)	-	-	-	-	-
39)	13200.00	25.000	5/6	0	2
40)	3800.00	41.470	3/4	0	*
41)	13300.00	9.600	2/3	1	*
42)	-	-	-	-	-
43)	-	-	-	-	-
44)	-	-	-	-	-
45)	-	-	-	-	-
46)	-	-	-	-	-
47)	-	-	-	-	-
48)	-	-	-	-	-
ACQ.	13200.00	20.000	7/8	9	*

If the unit IS configured for labels, the table will be limited to 26 entries, and the label will be shown in an additional column. (See the example in **Figure A.9**.)

Figure A.9: Sample Unity 500 Settings Table Report (With Labels)

		SETTINGS TABLE				
Perm	Label 1	Data Carrier	FEC Rate	Tag Rate	Site	Program
1)	LABEL 1	12000.00	1.536	1/2	1	*
2)		12000.11	4.608	7/8	2	2
3)		-	-	2/3	1	4
4)		-	-	-	-	-
5)		-	-	-	-	-

Table A.10: Terms Used in U500 Settings Table Reports

Term	Description
1) - 48)	Settings Table location.
PERM	Last requested settings, which is the current perm setting.
ACQ.	Last acquired settings.
Carrier	**freq_string** (**carrier**)
Data Rate	**data_rate_string** (**data_rate**)
FEC Rate	Any of the supported inner FEC rates.
Tag Site	**0-15**. See **Section 4.6, Frequency Tagging** on page 25.
Program	Number, string, or ∗.

WEGENER®

Appendix B: RMA Request Form

E-mail: service@wegener.com   **Fax: (678) 624-0294**

Company Name:

Bill-To Address:

Ship-To Address:

Contact Name:

Phone #   (   )   -

Fax #: (   )   -

Complete Model #:

Serial #:

In Warranty: Yes ☐   **No** ☐

Problem:

Additional Comments:

http://www.wegener.com/custservrma.html

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Record of Revisions				
Date of Change	**Revision Level**	**Page Nos.**	**Description of Changes**	
12/15/00	A		Initial Release	
08/07/01	B	Many - 53	Appendix Update	
10/2/01	C	Many	Various corrections. Eb/No estimates and Signal Strength indicators explained.	
12/30/03	D	1, 28	Page 1- changed Logo's / Page 28 -Section 2.7.5 Step 7 – Added Notice statement – Set Carrier Frequency before setting LNB LO frequency.	
04/30/05	E	Many	Added Product Overview & Features, Pages 2-3. Added PIDS Settings Screen and description, Page 18. Reformatted Manual cover and chapters to match current Wegener standard.	

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