VTX-WM1

Web Monitor Card

Installation and User Manual

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Introduction

Thank you for purchasing this Cloud product.

The VTX-WM1 Web Monitor Card is an option for Cloud VTX Series power amplifiers. Once correctly fitted and configured, it will allow the performance and settings of the amplifier in which it is installed to be monitored at a remote location using standard Internet browsers on any PC, Mac, PDA or smartphone, without the necessity for either dedicated software or hardware.

Topics in this manual include:

- how to install the VTX-WM1 in a VTX amplifier
- how to make the necessary internal connections and internal jumper changes
- how to perform the initial card configuration via an Internet browser
- how to customise the card to suit the installation
- how to use the GUI

NOTE: a short video giving an overview of the installation of the VTX-WM1 is available on the Cloud website www.cloud.co.uk. If fitting a VTX-WM1 for the first time, you may find it helpful to view this before commencing the installation.

Applicability

The VTX-WM1 card may be fitted to the following amplifier models:

- Cloud VTX4120 4-channel amplifier – 4 x 120 W
- Cloud VTX4240 4-channel amplifier – 4 x 240 W
- Cloud VTX4400 4-channel amplifier – 4 x 400 W

Note that the VTX-WM1 is not suitable for older VTX models, such as the VTX 750, VTX 1200 or VTX 1500.

What's in the box

Check that the box contains all of the following, and notify your Cloud dealer immediately in the case of any absences or evidence of damage:

- VTX-WM1 PCB card
- Rear plate (with RJ45 connector slot)
- 2 x self-tapping screws
- Quick Installation Guide

Preamble:

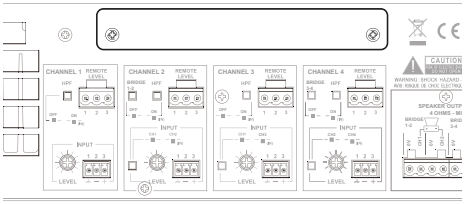
The process of installing web monitor cards into VTX amplifiers is straightforward. If cards are being fitted to multiple amplifiers installed in one or more equipment racks, each rack will need to be provided with internal CAT5 wiring and an Ethernet switch. The Installation section of the manual describes in turn: i) fitting and testing cards in the amplifiers; ii) networking principles and iii) overall configuration.

Installing the VTX-WM1 card

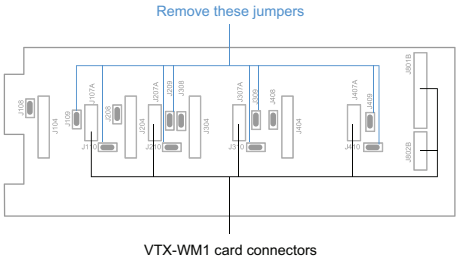
1. Turn off the VTX amplifiers into which the cards are to be fitted and unplug their power cables. If the amplifiers are fitted in a rack enclosure, disconnect all rear cables from one amplifier at a time, and remove it from the rack. Place the amplifier on a flat surface.

2. Remove the amplifier's top panel. Retain the screws (eleven) and the transformer bolt.

3. Locate the rear panel blanking plate, undo the two screws securing it and remove the plate. Retain the screws.



4. On the amplifier's upper rear PCB (Remote Vol PCB, PC331012), locate the jumpers J109, J209, J309, J409, J110, J210, J310 and J410. All of these (total 8) should be removed. (Refer to pages 12 &13 of the amplifier manual for full details of amplifier jumper locations.)

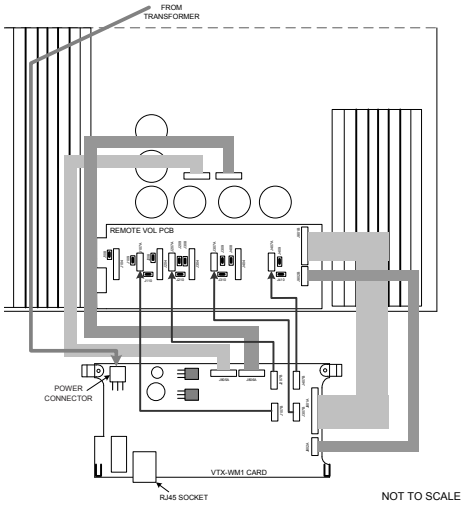


5. Plug in the four screened cables terminating in 4-pin connectors as follows:

VTX-WM1 CARD CONNECTOR	UPPER REAR PCB CONNECTOR
J107B	J107A
J207B	J207A
J307B	J307A
J407B	J407A

6. Connect all the flying leads before locating the card in place. First, plug the two 7-way ribbon cables (from J805A and J806A on the VTX-WM1 card) to J805B and J806B respectively on the amplifier's main (lower) PCB. These are located just in front of the four large capacitors; the ribbon from J805A should be plugged into J805B (the left of the pair, looking from the rear) and that from J806A to J806B.

7. The remainder of the VTX-WM1 card's flying leads connect to the amplifier's upper rear PCB. Plug the 14-way and 6-way ribbon cables at the right-hand end of the VTX-WM1 card (from J801A and J802A respectively) into Molex headers J801B and J802B on the upper rear PCB.



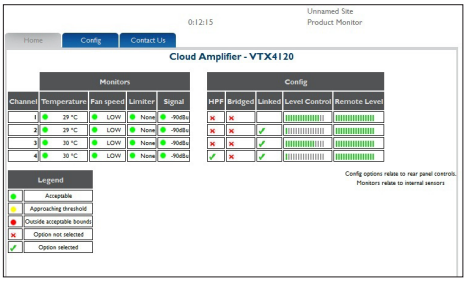
8. The VTX-WM1 card can now be fitted in place; the two rear supports should engage with the edge of the heatsinks, and the RJ-45 Ethernet connector should protrude through the rear panel slot. The two previously empty holes in the amplifier rear panel should align with the tapped holes in the card's rear brackets; secure the card using the two screws supplied.

9. Locate the spare internal AC cable coming from the amplifier power transformer. This will have one red and two yellow wires and will terminate in a 3-pin Molex plug. It may be cable-tied; if so, cut the tie. Plug the connector into the large 3-pin Molex header on the front left corner of the VTX-WM1 card.

10. Fix the new rear plate (supplied) over the card slot using the two screws removed in Step 3, so that the RJ-45 connector is engaged with the square hole in the plate. Replace the top cover.

11. We recommend that the amplifier is connected to a computer at this stage to check communications. Connect the VTX-WM1 card's Ethernet port to the network port on a computer using a standard CAT5 (or CAT5-e) network cable, terminated with RJ45 plugs. Either a "straight" or a "crossed" cable may be used, as the VTX-WM1 auto-detects the data lines. Power the amplifier on; it is not necessary at this stage to connect any audio inputs or outputs. Turn the computer on and check that it has a static IP address of the form 192.168.0.xxx, where xxx can be any value between 1 and 254 except 127. Launch the Internet browser normally used (e.g., Microsoft Internet Explorer, Mozilla Firefox, Safari, etc.)

12. Type the card's default IP address - 192.168.0.127 - into the URL field of the browser, and the screen shown below should appear:



The amplifier type listed in the title should be that of the amplifier in use. This confirms that the data communications section of the card is operating correctly. The card's IP address can be changed subsequently, and this procedure is discussed in "Entering site and amplifier information" on page 8.

13. Close the browser application. The amplifier may now be disconnected from the computer and powered off. Reinstall in the rack and reconnect all rear cables.

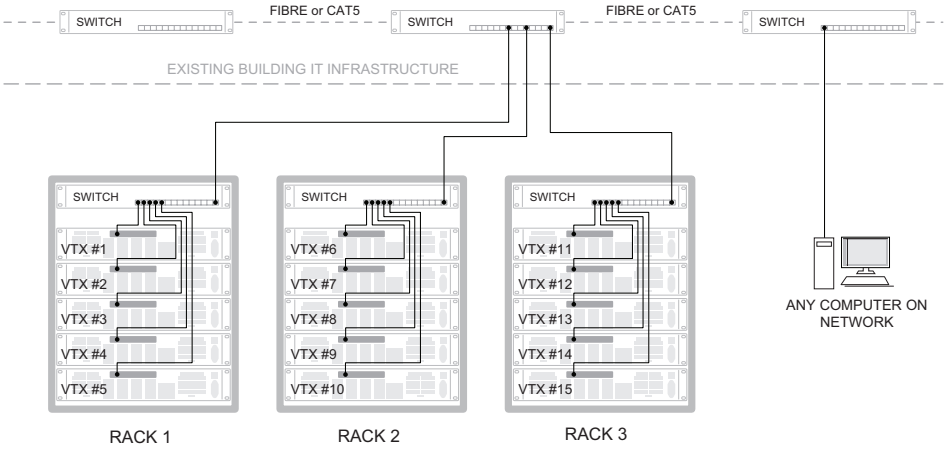
14. Repeat the above procedure for the remaining VTX amplifiers.

Networking principles

The VTX-WM1 card communicates with a computer – or the building's IT system - using standard IP protocols over Ethernet. Physically, connections are made using CAT-5 cabling (4-pair UTP) terminated with RJ-45 connectors.

If only one amplifier is to be used, it may be connected directly to a computer (as in Step 11 of the Installation Procedure), or connected to the IT infrastructure once it has been assigned a compatible IP address.

In systems where more than one VTX amplifier is being installed in a rack (or racks), each rack should ideally* contain an Ethernet switch (10/100baseT or 10/100/1000baseT). This should have a minimum of (N+2) ports, where N is the number of amplifiers the rack contains. Each amplifier's VTX-WM1 card should be connected to a port on the switch, using a standard CAT-5 network cable. The switch should then be connected into the building's IT infrastructure at the nearest convenient point via structured cabling.



As many amplifiers and racks as required can be networked in this way, and these may, of course, be anywhere in the building. The only requirement is that each rack switch is connected to the same building network, so that all amplifiers in the system are accessible from a computer elsewhere on the network.

* Amplifiers in multiple racks may be wired to a single Ethernet switch in one (adjacent) rack if wished, though this will necessitate a significant amount of additional CAT5 cabling.

IP addresses and address allocation

Every amplifier to be connected to the computer network must be given a unique IP (Internet Protocol) address. If the amplifiers are to be connected to a building's IT infrastructure, the installer MUST check with the IT administrator to determine which addresses are available for use BEFORE configuring the amplifiers' VTX-WM1 cards.

IMPORTANT: Do not connect any amplifiers to the Ethernet network until the addresses of their VTX-WM1 cards have been individually set. Connecting more than one device with the same IP address onto a network will have anomalous and unpredictable results and may produce havoc for the other network users!

The VTX-WM1 card's default IP address is 192.168.0.127. If only one amplifier is to be connected for monitoring, you may leave this address unchanged and ignore much of the following procedure, provided that this specific address will be available on the network.

If multiple amplifiers are to be monitored, one (but only one) amplifier may retain this default address, again subject to its availability.

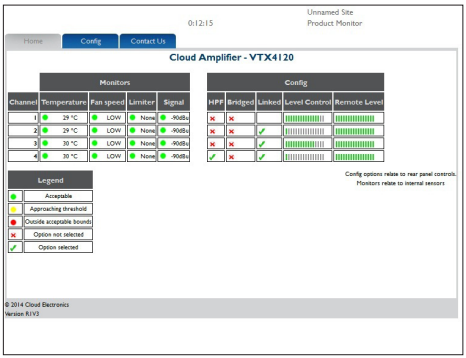
Entering site and amplifier information

Once all the amplifiers have been reinstalled in the rack together with the Ethernet switch and network cabling, each amplifier comprising the system may be individually configured:

1. Disconnect all the amplifiers except one from the Ethernet switch. Also disconnect the switch from the building's IT network. Turn all the amplifiers on.

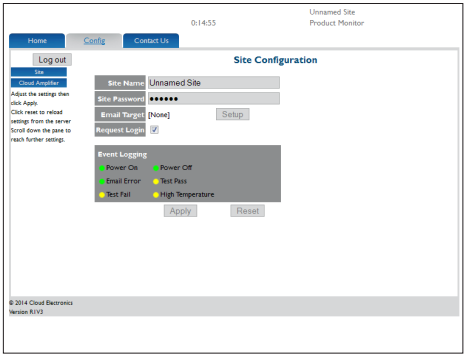
2. Connect a computer to the Ethernet switch and launch its normal Internet browser.

3. Type the default address http://192.168.0.127 into the URL field of the browser, and the **Home** page shown below should appear:



The amplifier type in the page title should be that of the amplifier being addressed.

4. Next, click the **Config** tab, which will give the screen shown below:

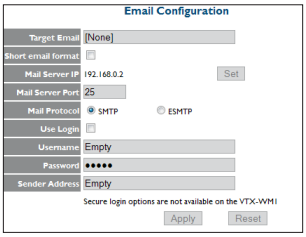


* IT Network terminology

5. Enter a suitable name for the installation in the **Site Name** field (e.g., name of the customer and/or building or location, etc.)

6. Use of a password is recommended as it will prevent unauthorised access to the network configuration pages - monitoring of amplifier performance and settings is always possible. Enter a password in the **Site Password** field. A password may be up to 64 characters in length and will be case sensitive.

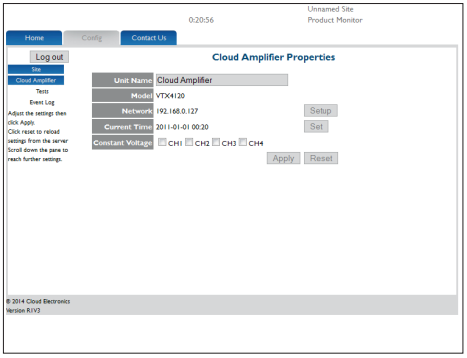
7. If the network has a SMTP mail server, you may set the VTX-WM1 to send email alerts. Clicking Setup next to the Email Target field opens the Email Configuration page. Enter the email address To (Target Email), From (Sender Address), Server IP Address and Port.



8. Click **Apply** to close the dialogue box.

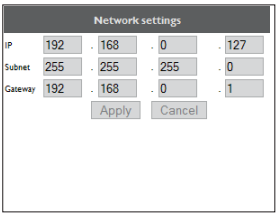
9. Click **Apply** (on the **Config** page) to confirm the data entered.

   Click the blue **Cloud Amplifier** button in the left-hand pane. This opens the **Amplifier Properties** page:



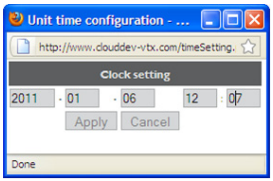
10. The first field, **Unit Name**, permits the amplifier itself to be named. This is extremely useful with large systems employing multiple amplifiers. The name may, for example, be the area of the building where the speakers that the amplifier is driving are located. (The Unit Name may be up to 100 characters in length, but note it will be truncated to 16 characters for the amplifier button label.)

11. If the amplifier is to have an IP address other than the default, click the **Setup** button adjacent to the network field, which will open the **Network settings** dialogue box:



12. Enter the IP address for the amplifier, the corresponding subnet mask and gateway IP for the network in the numeric fields. We strongly recommend that you keep a careful record of all IP addresses used, and also write the address in the IP space on the VTX-WM1's rear panel (or print a label for this purpose).

13. The VTX-WM1 card has an on-board clock/calendar, which needs to be set for the Event Log to be meaningful. The default **`Current Time`** will be midnight on Jan. 1st. 2000; click the adjacent **`Set`** button to open the **`Clock setting`** window.



Enter the current date and time in the five fields in the format yyyy-mm-dd hh:mm and click **`Apply`**.

14. Click **`Apply`** on the **`Amplifier Properties`** page to confirm the data entered.

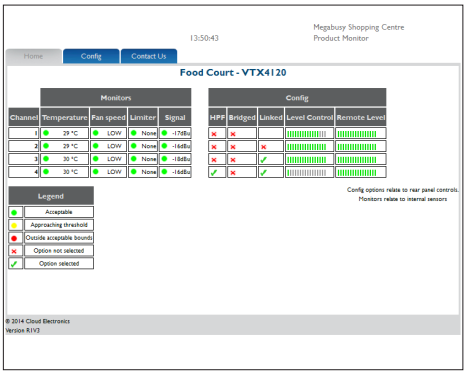
15. Enter the amplifier's new IP address into the browser's URL field to re-establish communication with the card. The **`Home`** page will now confirm the Site and Amplifier Names which were entered.

16. Repeat the procedure for each amplifier to be connected. Note each time, that the PC may take a few moments to recognise that a VTX-WM1 card has had its address changed; this is normal.

17. When all the amplifiers have been configured, the Ethernet switch may be reconnected to the building's IT network. It is recommended that access to the amplifiers is re-checked by entering each IP address on a computer elsewhere on the network.

Amplifier data – using the GUI

Once the amplifiers have been configured, amplifier performance and settings can be monitored from the web browser of any computer on the network. To access an amplifier, enter the IP address of the amplifier to be viewed into the URL field of the web browser. This will show the **`Home`** Page, an example of which is shown below:



The **`Home`** Page gives a overview of the amplifier.

Each channel of the amplifier reports its status as follows:

Monitors:

- Internal heatsink temperature
- Fan speed
- Clip limiter circuitry status
- Input signal level (in dBu)

Configuration:

- High-pass filter – rear panel switch setting
- Bridge mode – rear panel switch setting
- Input linking – rear panel switch setting
- Current level control – rear panel rotary control setting
- Current external level control – RL-1 remote control plate setting (if fitted)

Colours are used to indicate amplifier conditions:

- Green: Normal operation
- Yellow: Becoming marginal
- Red: Outside acceptable limits

In the **Config** area, a green tick indicates that a function activated by one of the rear panel switches is ON, a red cross indicates that it is OFF. The settings of the local and remote level controls are shown as horizontal bargraphs, with the "segments" changing from grey to green as the level controls are advanced.

This page can be closed by clicking on any other tab, or your browser's "Back" button.

Site Configuration

Clicking the **Config** tab opens the Site Configuration page. Some of the fields on this page – **Site Name**, **Site Password** and **Email target** - will have been completed during initial site and amplifier configuration.

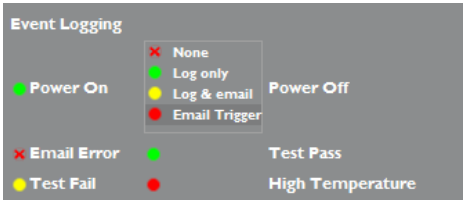
Login

Access to the site and amplifier configuration pages may be password-protected to prevent unauthorised changes to IP addresses, etc. If a password has been defined and the **Request login** box checked, the password will be requested before the **Config** tab is opened. **Request login** is active by default. After logging in with the password, remember to log out by clicking the **Log out** button at the top of this page.

The Home page is available at all times to all users, without a password being required.

Event Log and log configuration

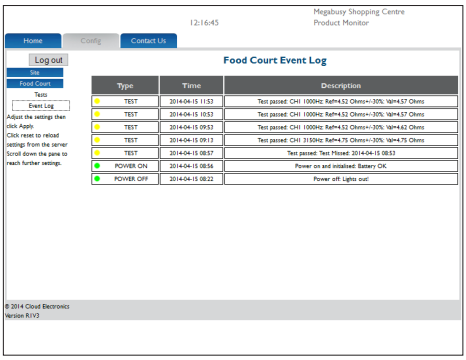
A log is maintained for the amplifier. The log records power-on and power-off, over-temperature, impedance test pass/fail and email alert failures, all against the on-board clock/calendar. The Event logging pane on the Site Configuration page lets you define which of these events are to be recorded and whether any (or all) of them should generate email alerts.



For each of the six event types, one of the following options may be set:

- **`None`** – events of this type are ignored
- **`Log only`** – events of this type are recorded in the log
- **`Log & email`** – events are recorded in the log and also entered in an alert email, but the email is not sent at this time.
- **`Email Trigger`** – events are recorded in the log, and the alert email is sent; this will contain the current event and any events recorded via the **`Log & email`** option above.

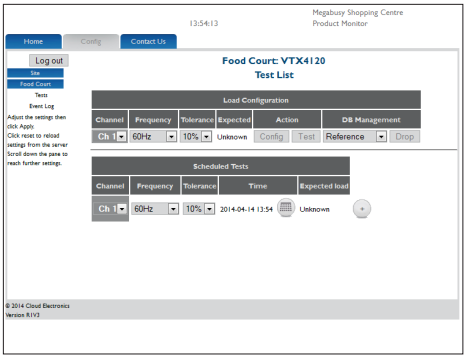
The Event log for the amplifier may be inspected by clicking on the amplifier's button (opens the **`Amplifier Properties`** page), and then clicking on **`Event Log`** below the button.



Impedance Tests

The VTX-WM1 card includes a variable frequency test oscillator which may be programmed to apply a test tone (at 40 dB below the amplifier's maximum output level) to the amplifier output at a future date and time, and, if desired, at regular intervals thereafter. (It is recommended that tests are scheduled for the hours of building non-occupation). The amplifier output voltage and current are monitored during the test and hence the load impedance checked. This gives the engineer a first-line confirmation that all the speakers connected to each amplifier channel are present, connected and functional.

Clicking **`Tests`** (click the amplifier button first) opens the **`Test List`** page for the amplifier:



In order for the impedance tests to be meaningful, an initial Load Configuration

test must be run, to establish a reference impedance at the frequency to be used. The upper pane of the Test List page is concerned with this initialisation.

Configuring the Load

The amplifier must be powered on and each channel connected correctly to its normal speaker(s). Select each channel in use from the drop-down list under **Channel**. (If any channels are in Bridge Mode, select the lower-numbered channel of the pair.) Select the frequency to be used for the test from the drop-down list under **Frequency**. If using a bi-amped (or tri-amped, etc.) speaker system, the frequency for each channel will need to chosen to match the relevant driver type. The frequency selected should be approximately in the middle of the frequency response range of the speakers/drivers connected to the channel. Consideration should be also be taken of any loudspeaker enclosure resonant frequencies – these may be particularly evident at low frequencies, and should be avoided, as their use will give misleading results.

Click the **Config** button. This will generate a dialogue box warning that a test tone is about to be fed through the audio system. Click **OK** if you are happy for this to occur. A progress bar is displayed, and when the test is complete an impedance value will be displayed in the **Expected** field. To re-check the expected value, set a **Tolerance** value (30% is recommended initially) and click the **Test** button. A second test will be run, and the results displayed.

The DB Management controls allow the reference database to be cleared. Select an action from the list and click Drop to perform that action over the database.

- Reference – drops the currently selected reference
- Unused Refs – drops all references not used in scheduled tests
- All Tests – Clears all scheduled tests and references from the database.

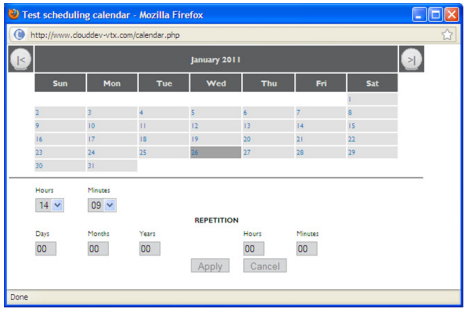
The test database for a single module will hold up to 32 entries including references and scheduled tests. If this limit is exceeded, clear any unused references from the database.

Scheduling the tests

The test scheduler lets you set the date and time at which the next impedance test will be executed, and whether it is to be repeated at regular intervals thereafter. It also lets you set the schedule independently for each amplifier channel, together with the frequency to be used and the tolerance to be applied. An impedance measurement outside the prescribed tolerance will be classified as a Test Failure, be recorded in the amplifier log and/or generate an email alert (if set up in Event Logging).

It is not possible to run tests on more than one channel within each amplifier simultaneously, so test times for the channels in any one amplifier should be carefully staggered.

To add a test to the scheduler, select a channel from the drop-down list under **`Scheduled Tests`**, select the frequency to be used (see remarks above), and select a tolerance; 30% is recommended initially. Click the calendar symbol to open the test scheduling calendar window.



Select the date on which the next test is to be run by clicking on it. The months can be scrolled through with the '**|<**' and '**>|**' buttons at the top. Next select the time at which the test is to be run using the **`Hours`** and **`Minutes`** spin boxes.

If the test is to be repeated on a regular basis, select the repetition rate using the lower set of date/time spin boxes. Note that test intervals can be set in increments of one minute up to several years.

When all the scheduling data has been entered, click **`Apply`** to close the window. The date and time at which this particular test will be next run is displayed. To add the test item to the schedule, click the '**+**' button at the end of the test item line.

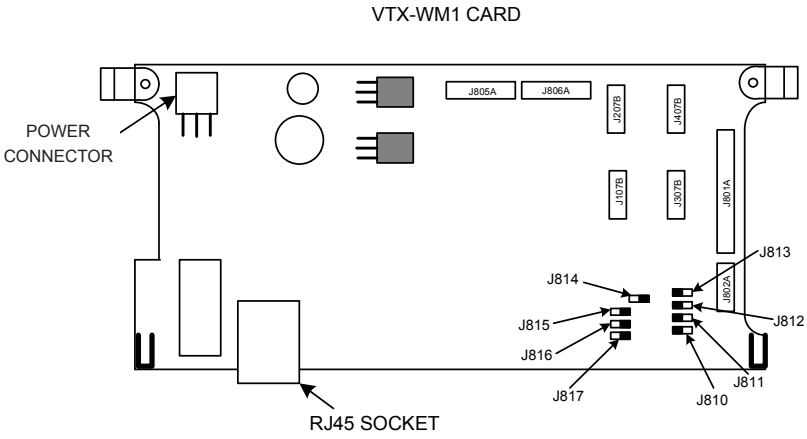
Further tests may be added using the same procedure. Tests may be added with any or all of the same settings, or different settings may be used. A test item may be deleted from the schedule by clicking its '**x**' button. When the test schedule for the amplifier is complete, the process should be repeated for the other amplifiers comprising the system.

Contact Page

Clicking the **`Contact Us`** tab links directly to the contact page of the Cloud website. This includes all company contact details, including a query form. Please make use of this facility if there are any technical points arising from your VTX-WM1 installation on which you need assistance.

Appendix A

Location of PCB jumpers and connectors



2-POSITION JUMPER: BLACK END INDICATES DEFAULT SETTING

Factory default jumper settings table

JUMPER	PURPOSE	FUNCTION	DEFAULT
J810	Reserved		
J811			
J812			
J813			
J814	Force defaults	Restores all factory default settings*	Off
J815	Force config	Disables password protection	Off
J816	Force IP 192.168.0.126	Fixes IP address	Off
J817	Force bootload	Only required for firmware updates	Off

*** Default IP address, subnet mask, mail server IP and default gateway addresses.**

Specifications

Tone Generator		
Test Signal Level	40 dB below max amp output	Injected post level controls, other channels muted.
Frequency range	60 Hz to 20 kHz in 1/3-octave steps	
Sensitivity	1 to 100 Ohm detection	
Signal detector		
Sensitivity	-30 dBu to +10 dBu	20 Hz to 20 kHz
Networking		
DHCP	Not supported	
Data rates	10 BaseT or 100 Base T (automatic selection)	
Connector	RJ45; Auto MDI/MDIX	
eMail protocols	SMTP (no encryption)	
Supported Amplifiers		
VTX4120, VTX4240, VTX4400		
Recordable Events		
Over temperature (90°C), Power on/off, Email error, Load Test pass/fail		

Appendix B

API Overview

The VTX-WM1 may be used in conjunction with third party equipment to monitor the status of the amplifier and each of it's channels. Information can be retrieved from the monitor card and interpreted at the third-party control equipment. To achieve this, the control equipment must be capable of sending HTTP POST requests with URL encoded fields in the body and receiving and interpreting XML responses from the server.

The VTX-WM1 is a monitoring solution only, it is not possible to control or manipulate audio signals using this module. Data provided by the module is representative of the amplifier state, but is not real-time; this module cannot be used for live-sound monitoring applications. The module can serve to one client device at a given time.

This documentation is provided as an overview, not the complete API specification. Check our website www.cloud.co.uk or contact us for more complete specification of this API.

Interaction basics

Example POST request body

```
obj-type=unit&unit-id=0&req=update&doc-format=xml
```

All enquiries are made to the same target destination: `/hwtest.htm`

Requests are URL-encoded, HTTP Posts.

The VTX-WM1 responds based on two main fields in the request body:

1. req

This specifies the type of request to be made; update fetches up-to-date information from the VTX-WM1, commit pushes new values to the VTX-WM1.

2. obj-type

This specifies the data type for the request (site, unit or channel)

Where unit or channel sensitive information is being requested, the unit-id field must be specified. For channels, the chnum field may be used to specify a specific channel [1-4], otherwise a list of all channels on the unit is returned.

Success responses use the specified obj-type as the main encapsulating element. They are of the form:

```
<root>
<obj-type>
  ...
</obj-type>
</root>
```

Error responses contain a msg element which describes the type of problem. These are of one of the two forms below:

```
<root>
<error><msg>...</msg>
</error>
</root>
```

```
<root>
<EXCEPTION>
<id>[0-9]+</id>
<msg>description of the exception</msg>
<type>[OutOfBounds|InvalidArgument]</type>
</EXCEPTION>
</root>
```

If the VTX-WM1 is returning error responses, try include a delay between requests (200 ms or so). Note that commit commands will take longer to execute than update commands.

Response data format

Unit	obj-type=unit	Amplifier level data
name	<name>MyAmplifier</name>	ASCII string (upto 32 characters)
unit-id	<unit-id>0</unit-id>	Index for this module
model	<model>VTX4120</model>	ASCII string (upto 16 characters)
time	<time>2014-02-24 16:28</time>	Current date and time (YYYY-MM-DD hh:mm)
chcount	<chcount>4</chcount>	Number of amplifier channels
cvmask	<cvmask>[0-15]</cvmask>	4-bit mask for Constant Voltage channels.
IP	<ip>192.168.1.45</ip>	Static IP address
subnet	<subnet>255.255.255.0</subnet>	Subnet mask
gate-ip	<gate-ip>192.168.1.100</gate-ip>	Gateway IP address

Channel	obj-type=channel	Channel level data
chnum	<chnum>[1-4]</chnum>	Channel index from 1 to Unit.chcount
unit-id	<unit-id>0</unit-id>	Index for this module
level	<level>[0-90]</level>	Rear panel level (dB attenuation)
remote_lev	<remote_lev>[0-90]</remote_lev>	Remote level (dB attenuation)
signal	<signal>[-90-+20]</signal>	Peak input signal level (dBu)
hstemp	<hstemp>[0-120]</hstemp>	Heatsink temperature (degrees Celsius)
link	<link>[Y|N]</link>	Link switch position (rear panel)
bridge	<bridge>[Y|N]</bridge>	Bridge switch position (rear panel)
hpf	<hpf>[Y|N]</hpf>	High Pass Filter switch position (rear panel)
clip	<clip>[Y|N]</clip>	Clip limiter operation indicator
fanspeed	<fanspeed>[Y|N]</fanspeed>	High speed fan indicator

Example

Get unit information

POST data:

```
obj-type=unit&unit-id=0&req=update&doc-format=xml
```

Response body:

```
<root>
<unit>
<unit-id>0</unit-id>
<name>Cloud Amplifier</name>
<ip>192.168.0.127</ip>
<netstatus>1</netstatus>
<model>VTX4120</model>
<chcount>4</chcount>
<power>1</power>
<time>2014-02-21  10:10</time>
<cvmask>0</cvmask>
<subnet>255.255.255.0</subnet>
<gate-ip>192.168.0.1</gate-ip>
</unit>
</root>
```

Get Channel information

POST data:

```
obj-type=channel&chnum=3&unit-id=0&req=update&doc-format=xml
```

Response body:

```
<root>
<channel>
<chnum>3</chnum>
<clip>N</clip>
<signal>-90</signal>
<hpf>N</hpf>
<bridge>N</bridge>
<link>Y</link>
<level>0</level>
<remote _ lev>0</remote _ lev>
<hstemp>32</hstemp>
<fanspeed>N</fanspeed>
</channel>
</root>
```

Set the unit name

POST data:

```
obj-type=unit&unit-id=0&req=commit&set-name=MyAmplifier&doc-format=xml
```

Response body:

```
<root>
<unit>
<unit-id>0</unit-id>
<name>MyAmplifier</name>
</unit>
</root>
```