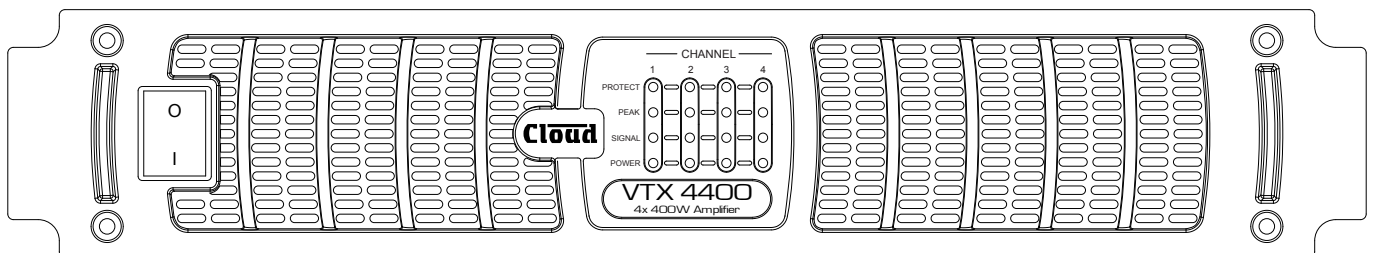
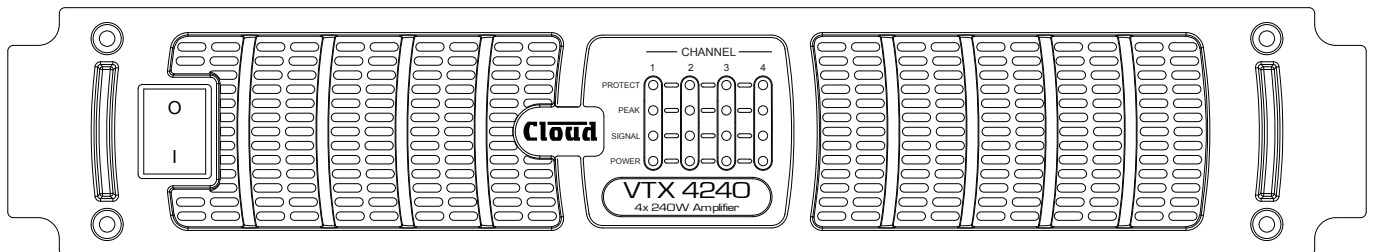
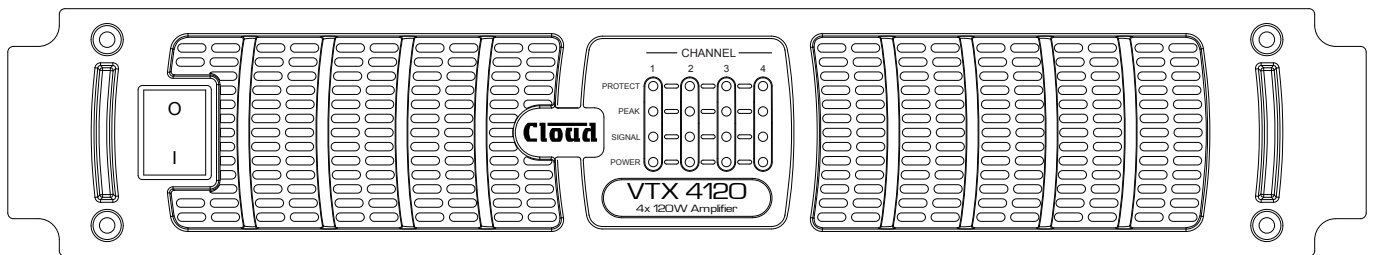


# VTX SERIES POWER AMPLIFIERS

VTX 4120, VTX 4240, VTX 4400



## Installation and User Guide



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## Safety Information

### Safety Notes regarding Installation

- Do not expose the unit to water or moisture.
- Do not expose the unit to naked flames.
- Do not block or restrict any air vent.
- Do not operate the unit in ambient temperatures above 35°C.
- Do not touch any part or terminal carrying the hazardous live symbol ( ⚡ ) while power is supplied to the unit.
- Do not perform any internal adjustments unless you are qualified to do so and fully understand the hazards associated with mains-operated equipment.
- The unit has no user-serviceable parts. Refer servicing to qualified service personnel.
- If the moulded plug is cut off the AC power lead for any reason, the discarded plug is a potential hazard and should be disposed of in a responsible manner.

## Conformities

This product conforms to the following European EMC Standards:

**BS EN 55103-1:2009**

**BS EN 55103-2:2009**



This product has been tested for use in commercial and light industrial environments. If the equipment is used in controlled EMC environments, the urban outdoors, heavy industrial environments or close to railways, transmitters, overhead power lines etc. the performance of the unit may be degraded.

The product conforms to the following European electrical safety standard:

**BS EN 60065:2002**

The VTX Series was developed and manufactured with high quality materials and components, which can be recycled and/or reused.

## Safety Considerations and Information

The unit must be earthed. Ensure that the mains power supply provides an effective earth connection using a three-wire termination.

When the mains switch is in the off ('O') position the live and neutral conductors of the mains transformer are disconnected.

### Caution - High Voltages

Do not touch any part or terminal carrying the hazardous live symbol ( ⚡ ) while power is supplied to the unit.

Terminals to which the hazardous live symbol refers require installation by a qualified person.

### Caution - Mains Breaker

VTX Series amplifiers are fitted with a resettable mains circuit breaker instead of a replaceable fuse. This is located on the rear panel above the AC mains input connector. The circuit breaker may be reset by pressing it in; however, its operation may indicate an internal fault. If the circuit breaker operates immediately the power is restored, no further attempt should be made to use the amplifier, and it should be returned to your Cloud service centre or other qualified person for repair.

### Caution - Servicing

The unit contains no user serviceable parts. Refer servicing to qualified service personnel. Do not perform servicing unless you are qualified to do so.

Disconnect the power cable from the unit before removing the top panel and do not make any internal adjustments with the unit switched on.

Only reassemble the unit using bolts/screws identical to the original parts.

## What's in the Box

Please check the shipping carton for damage; if there is any, please contact your Cloud agent and the shippers.

The packing carton should contain the following items:

- VTX amplifier
- IEC mains lead
- Set of mating screw-terminal connectors
- Set of four push-in feet (for free-standing use)
- This manual

## General Description

Cloud VTX amplifiers are a range of high power multi-channel audio amplifiers intended for use with high quality PA and music systems in locations where unquestionable long-term reliability is the primary consideration. As well as theatres, leisure centres and other major venues, they are also ideal for airport terminals, railways stations and similar large public spaces.

VTX amplifiers deliver excellent audio quality at all rated powers and have all the facilities and features that installers have come to expect from Cloud products. The VTX range are the first Cloud products to offer a plug-in surveillance card option, permitting the operating parameters and settings of all networked amplifiers to be monitored anywhere, using any computer's standard web browser.

### Applicable Models:

This manual describes the installation and operation of the following models:

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

All models are 2U, 19" rack-mounting units. Apart from the output power rating, the three models are identical for the practical purposes of installation and operation. Unless specifically stated otherwise, the information in this manual may be taken to apply to all models.

### VTX range main features:

- High power multichannel amplifiers for “install-and-forget” applications
- 120 W, 240 W or 400 W per channel into 4 ohms (model-dependent)
- Extensive protection against short-circuit and reactive loads, clipping, DC and overheating
- Chs 1 & 2 and/or 3 & 4 may be operated in Bridge Mode
- Per-channel, front-panel LEDs for power status, signal presence, peak level and protection
- Balanced line level inputs with gain trim
- Configurable for 4 channel, dual stereo or mono use
- Per-channel switched hi-pass filter (18 dB/oct below 65 Hz)
- Optional VTX-WMI card allows amplifier monitoring from a standard web browser
- Optional remote volume control (per-channel)
- Optional Bose® EQ cards (per-channel)
- 2U 19" rackmounting unit
- Forced-air cooling
- Five year warranty

## Block Diagram

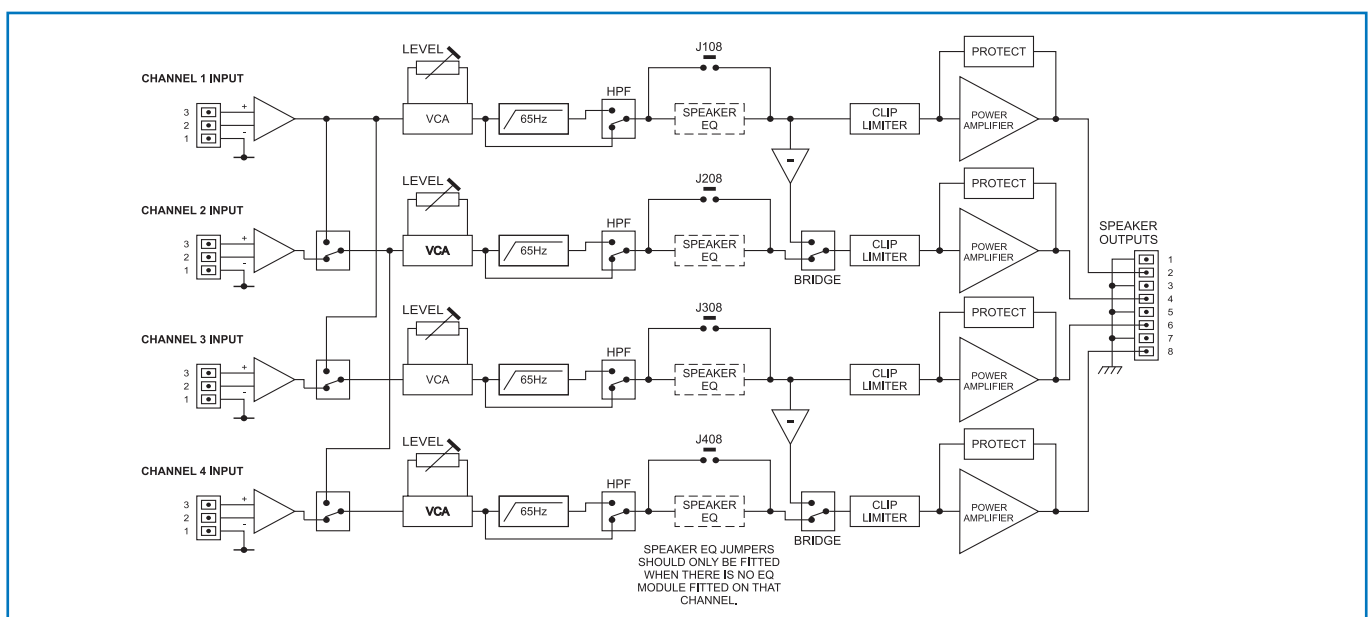


fig. 1: VTX Series Block Diagram

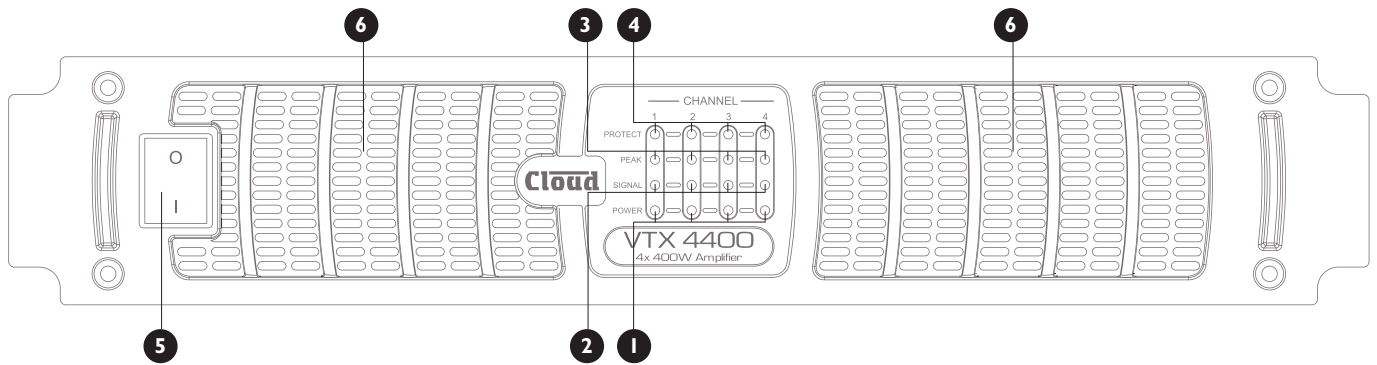


fig.2: VTX Front Panel (NOTE: VTX4120 shown – other models are identical)

## Front Panel Description

- 1 **POWER LEDs** - (one per channel) – illuminate after power-up sequence to confirm normal power supply operation
- 2 **SIGNAL LEDs** – (one per channel) – illuminate when the input signal level exceeds -26dBu
- 3 **PEAK LEDs** – (one per channel) - illuminate if amplifier clipping is detected
- 4 **PROTECT LEDs** – (one per channel) – illuminate if the internal heatsink temperature exceeds 90 °C
- 5 **AC Power switch**
- 6 **Air intake grilles**

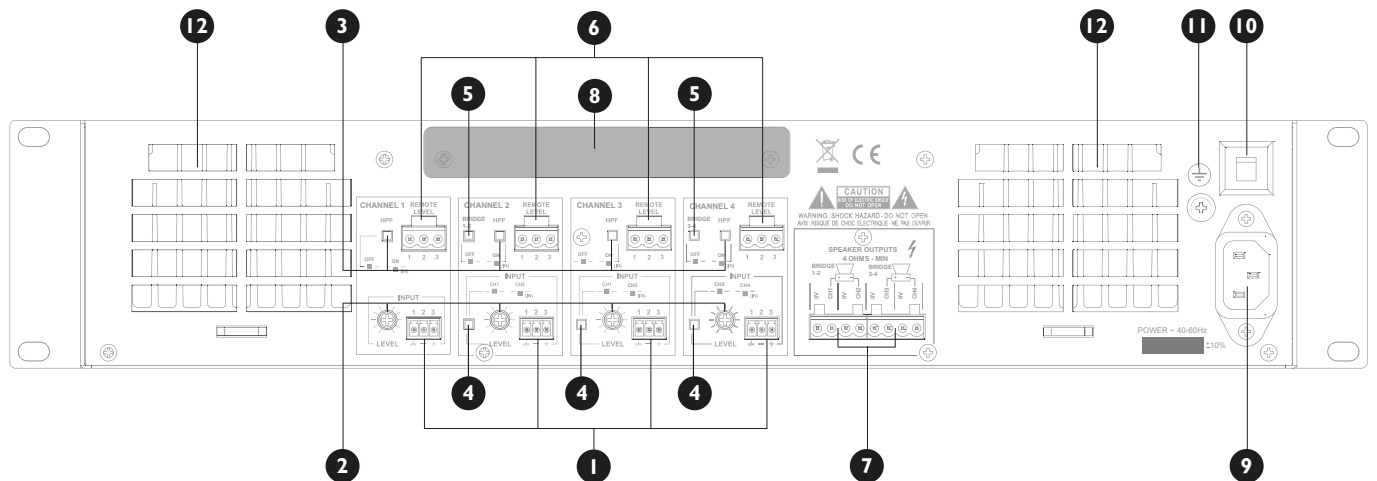


fig.3: VTX Rear Panel (NOTE: rear panel is identical for all models)

## Rear Panel Description

- 1 **Input connectors** (one per channel)
- 2 **Input level controls** (one per channel)
- 3 **High Pass Filter controls** (one per channel)
- 4 **Input routing switches**
- 5 **Bridged mode switches**
- 6 **Remote volume control connectors** (one per channel)
- 7 **Output connector**
- 8 **Bay for optional WM-I surveillance card\*** (cover plate fitted when no card present)
- 9 **AC mains connector**
- 10 **Resettable mains circuit breaker**
- 11 **Earth safety tag**
- 12 **Air exhaust grilles**

\*The optional WM-I surveillance card allows remote monitoring of the amplifier's performance and settings from any computer via a standard web browser. Full instructions regarding the installation, configuration and use of the WM-I are contained in the WM-I Installation and User Guide, supplied separately with the card.

## Installation

### Mechanical

VTX amplifiers are designed to be mounted in a standard 19" equipment rack. The front panel is fitted with rackmount ears for this purpose. Each amplifier requires 2U of vertical rack space. See notes below regarding spacing and ventilation.

Due to the units' weight, the use of additional rear supports is strongly recommended.

### Ventilation

VTX amplifiers are force cooled by two thermostatically-controlled fans mounted internally on the main PCB. The fans are always operational, and run at a higher speed when required.

Always allow adequate space around the amplifier(s) to allow a free flow of air through the unit(s). Ensure that cable bundles or other items do not obstruct any grilles.

In 19" rack applications we recommend leaving 1U of rack space above and below each unit. Plain 1U blank panels, not slotted ventilation panels should be used, as the latter reduce the effect of forced-air cooling. The direction of airflow in VTX amplifiers is front-to-rear; it is recommended not to mix these amplifiers with other equipment employing forced-air cooling which acts in the opposite direction within the same rack.

If using the amplifier free standing, we recommend fitting the feet supplied and placing the unit on a flat surface, leaving the ventilation grilles free from any obstructions.

## Connections and adjustments

### Inputs

Each amplifier channel has an electronically-balanced input on a 3-pin, 3.5 mm-pitch screw terminal connector. The mating connector is supplied. Twin-core screened cable should be used when driving the amplifier inputs from a device with a balanced output. Single-core screened cable can be used when connecting to an unbalanced source. Wire the inputs to the source devices using the convention shown below:

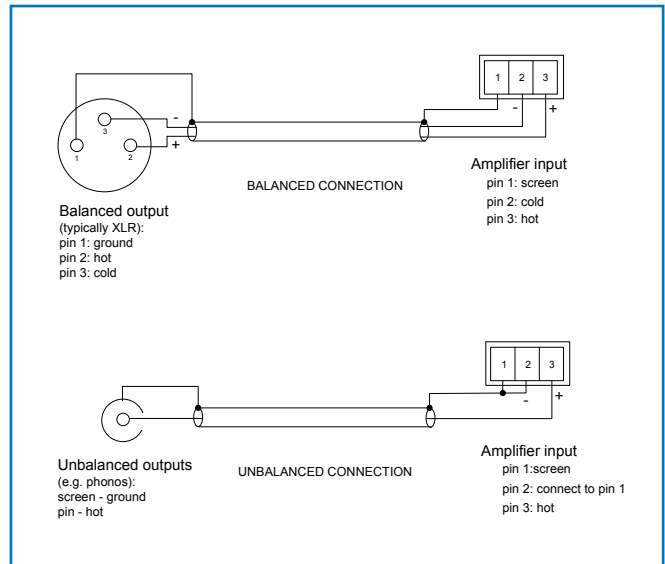


fig.4: Input Wiring

### Sensitivity and Gain Control

Control of input level is provided by a preset rotary control adjacent to each input connector. The control should be adjusted using a trimtool or small screwdriver. Full attenuation of the input signal – i.e., zero output – is obtained with the control fully anti-clockwise. Maximum sensitivity is with the control fully clockwise; at this setting the maximum output level will be produced for an input signal level of 0.775 V<sub>rms</sub> (0 dBu).

We recommend that the level for each channel should be adjusted after installation is complete to ensure adequate, but not excessive sound levels are achieved with the programme material that will be used in practice.

### Input Routing

To facilitate the use of the amplifiers in a variety of different multi-channel applications, input selection switches are provided on all channels except Ch 1. This gives the installer an easy method of paralleling channels from a single input. Refer also to fig. 1 on page 5.

The options are summarised in the table below:

| SOURCE FOR Chs. 2-4 |       |      |
|---------------------|-------|------|
| Button position:    | OUT   | IN   |
| Channel 2           | In 1  | In 2 |
| Channel 3           | In 1  | In 3 |
| Channel 4           | In 2* | In 4 |

\*post Ch 2 switch

The three switches on the rear of VTX amplifiers allow a total of 8 routing possibilities, including 4-channel, dual stereo and mono operation with 4 channels paralleled. The table below clarifies the options:

| AMPLIFIER CONFIGURATION | BUTTON POSITION |      |      | INPUT ROUTING:<br>AMPLIFIER CHANNELS FED BY EACH INPUT |           |      |      |
|-------------------------|-----------------|------|------|--|-----------|------|------|
|                         | CH 2            | CH 3 | CH 4 | IN 1   | IN 2      | IN 3 | IN 4 |
| 4-channel               | IN              | IN   | IN   | CH 1   | CH 2      | CH 3 | CH 4 |
| Dual mono + stereo      | OUT             | IN   | IN   | CHS 1 & 2  |           | CH 3 | CH 4 |
| Dual mono + stereo      | IN              | OUT  | IN   | CHS 1 & 3  | CH 2      |      | CH 4 |
| Treble mono + l         | OUT             | OUT  | IN   | CHS 1, 2 & 3   |           |      | CH 4 |
| Dual mono + stereo      | IN              | IN   | OUT  | CH 1   | CHS 2 & 4 | CH 3 |      |
| Treble mono + l         | OUT             | IN   | OUT  | CHS 1, 2 & 4   |           | CH 3 |      |
| Dual stereo             | IN              | OUT  | OUT  | CHS 1 & 3  | CHS 2 & 4 |      |      |
| Quad mono               | OUT             | OUT  | OUT  | CHS 1, 2, 3 & 4  |           |      |      |

### Remote Control of Level

VTX amplifiers are compatible with standard Cloud remote control plates Type RL-1, allowing control of level from a remote position. RL-1s may be connected at the rear 3-pin, 5 mm-pitch screw terminal connectors (REMOTE LEVEL), using the wiring shown below.

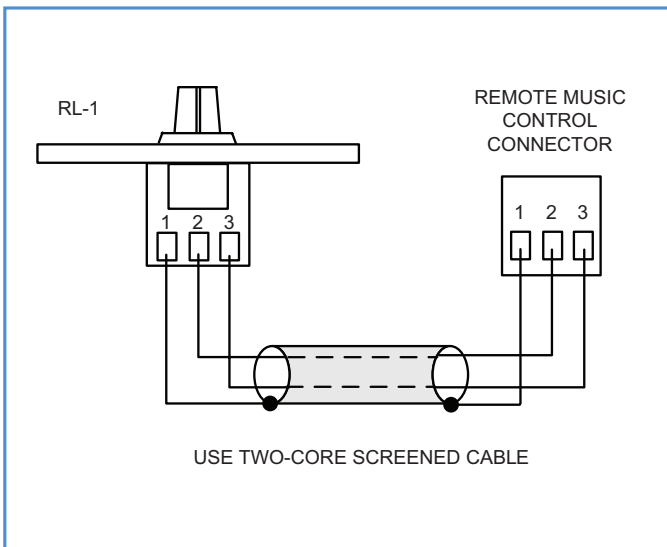


fig.5: RL-1 Wiring

Use two-core screened cable to connect the remote level plate (maximum length 100 metres).

### High Pass Filters

Each channel of the VTX is fitted with a switchable hi-pass filter, which may be switched in as required to reject low-frequency signals below 65 Hz. The filter has a slope of 18 dB/octave, to provide a high degree of low frequency rejection.

The primary purpose of the filter is to avoid loudspeaker transformer saturation when driving 100V/70V-line speaker systems. (The VTX amplifiers' outputs are designed to drive low-impedances only, so an external transformer will be necessary for amplifier channels to drive such systems. The

Cloud CXL-100T is suitable for use with the VTX4120; transformers with higher ratings will be necessary for use with the VTX4240 and VTX4400). Transformer saturation creates unpleasant distortion and stresses the system, and the high pass filter should always be switched in when driving 100V/70V-line systems.

Use of the filter with low-impedance loudspeaker systems is optional and at the discretion of the installer; switching it in may help to enhance the clarity of speech, reduce microphone handling noise and breath blasts.

### Outputs

The VTX amplifiers' speaker output connections are on two adjacent 4-pin, 5 mm-pitch screw-terminal connectors (mating connectors are supplied).

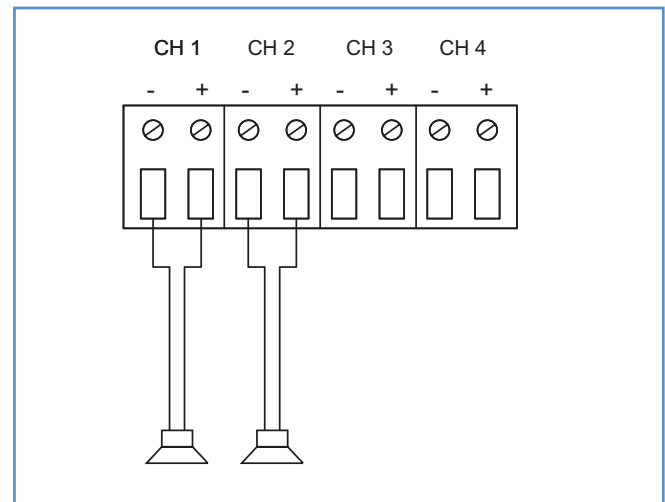


fig.6: Output Wiring

Each channel's output stage is designed to drive into an impedance of not less than 4 ohms. Check the impedance of the loudspeaker(s) in use and, taking into account any series and/or parallel wiring, ensure that the total load on each channel is not less than 4 ohms.



### 100V/70V-line operation

VTX amplifiers may be used to drive 100V-line or 70V-line speaker systems with the addition of appropriate external transformers. The Cloud CXL-100T is suitable for use with the Model VTX4120, and one transformer will be required per channel. A 2U rack-mounting tray (CXL-800) is also available to facilitate the installation of up to eight CXL-100Ts. Models VTX4240 and VTX4400 require transformers with a higher rating.

### Bridged Mode

VTX amplifiers may be operated in Bridged Mode to achieve higher power outputs. Channels 2 and 4 are fitted with rear panel mode switches; Channels 1 and 2 may be operated as a bridged pair by setting the BRIDGE 1-2 switch on Channel 2 on; similarly Channels 3 and 4 may be bridged with Channel 4's BRIDGE 3-4 switch.

The principle of Bridged Mode is to feed the same input signal to two amplifier channels, but with one input phase-inverted. The "high" output terminals of the two channels will therefore assume the same instantaneous voltage, but of opposite polarity. In Bridged Mode, the load is connected across the two "high" terminals, thus doubling the effective voltage swing.

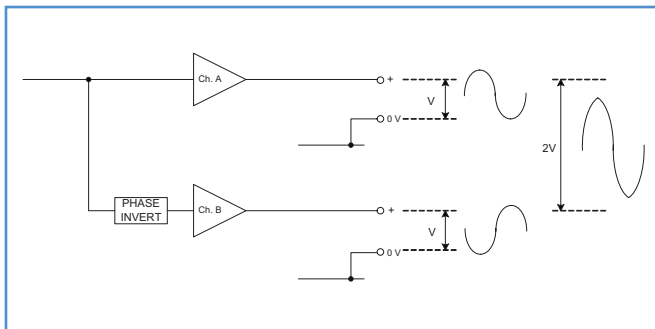


fig.7: Bridged Mode Principle

When using pairs of channels in Bridged Mode, wire the outputs in accordance with the diagram below:

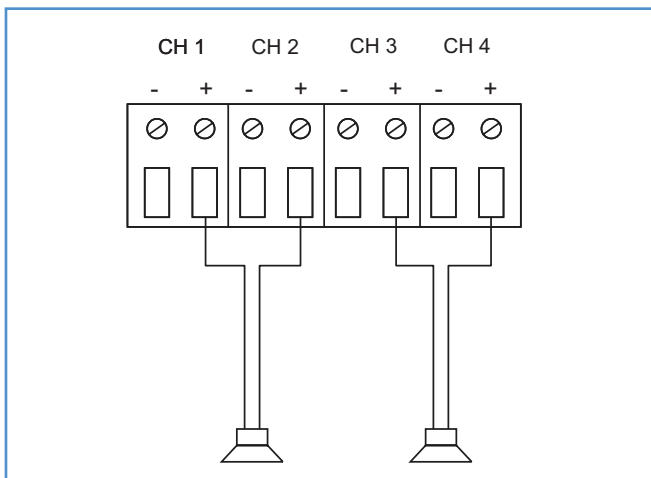


fig.8: Output Wiring - Bridged Mode

Note that no connection is made to the '0V' terminal of either channel in the bridged pair. Note also that Channels 1 and 2 may be operated in Bridged Mode while 3 and 4 are in Normal Mode – and vice versa.

## Protection

The amplifiers include comprehensive protection circuitry to prevent damage to loudspeakers, the output devices and other components in the event of a fault condition.

### Thermal Protection

The output device heatsink temperatures are monitored and the protection circuitry activated if any should exceed 90°C. The red front panel PROTECT LED for the appropriate channel illuminates to indicate the fault condition.

### DC Protection

Crowbar protection is provided to safeguard the loudspeakers in the event of DC being present at the output terminals. This is an emergency protection system, and its operation is liable to blow internal DC rail fuses. The amplifier must be serviced before any attempt is made to use it further.

### Short-circuit/reactive load protection

VI limiting is implemented in the amplifiers to protect the output stage from excessive voltage or current at the output. This condition can arise from a short-circuit (or near-short-circuit) across the output terminals, or from an excessively inductive or capacitive load.

### Switch-on protection

The protection circuitry is also activated immediately after the amplifier is switched on. This is to prevent any voltage spikes due to start-up conditions from damaging the loudspeakers. The duration of the protection period is approx. two seconds. When the amplifier is powered on, all PROTECT LEDs flash briefly; the POWER LEDs do not illuminate until after the protection period (assuming no amplifier faults exist).

## Bose® equalisation modules (optional)

VTX amplifiers are compatible with Bose® Series II loudspeakers; a single-channel Bose® equalisation module may be fitted to as many channels as necessary. Equalisation modules for the following Bose® models are available:

- Panaray MA12
- Panaray 402-II, 502B and 502BEX
- Panaray LT Series: Models 3302, 4402, 9402 and 9702

Other modules are available to provide the correct equalisation for loudspeakers from other manufacturers as well as for other Bose® models; please contact Cloud for more details.

### Installation

- With the power turned off and the mains cable removed, remove the top panel.
- Refer to the PCB layout diagrams at fig.9 on page 12. The modules plug into the white 12-pin connectors (J104 to J404) on the upper PCB adjacent to the rear panel. Note the header connectors on the PCB have two notches on one side only; these engage with lugs on the equalisation module's mating connector to ensure correct orientation.
- After fitting equalisation modules to any channel(s), the corresponding module bypass jumper(s) (J108 to J408) must be removed in order for the module to function. Refer to the PCB layout diagrams for full details.
- Replace the top cover with the original screws after fitting.

## General Notes

### EMC Considerations

Cloud VTX amplifiers fully conform to the relevant electromagnetic compatibility (EMC) standards and are technically well behaved. You should experience no problems interfacing units to other items of equipment and under normal circumstances, no special precautions need to be taken. If the unit is to be used in close proximity to potential sources of HF disturbance such as high power communication transmitters, radar stations and the like, it is suggested that input signal leads be kept as short as possible. Always use balanced interconnections wherever possible.

### Earthing

When several mains powered units are connected together via their signal cables, there is a risk of one or more earth loops which may cause an audible hum on the system even with the gain controls set to minimum. The 0V rail of a VTX amplifier is directly coupled to the chassis ground. No interconnection problems should be encountered, but if there is any hum or other extraneous noise when source equipment is connected, the situation can generally be remedied by observing the following guidelines:

- Always connect sources using balanced connections wherever possible, with the cable screen only connected at the receiving end (amplifier input).
- Use audio isolating transformers (readily available from trade suppliers) at the inputs if necessary. These will ensure that the amplifier is electrically isolated from the source equipment.

The signal source units should be located as close as possible to the amplifiers and the metal housing of the various units should not be electrically connected together through the equipment rack. If this is a problem, rack isolating kits are available from specialist hardware suppliers. If the problem persists, try to connect all interconnected units, including power amplifiers, to a common power source to ensure a common ground is provided.

## Appendix

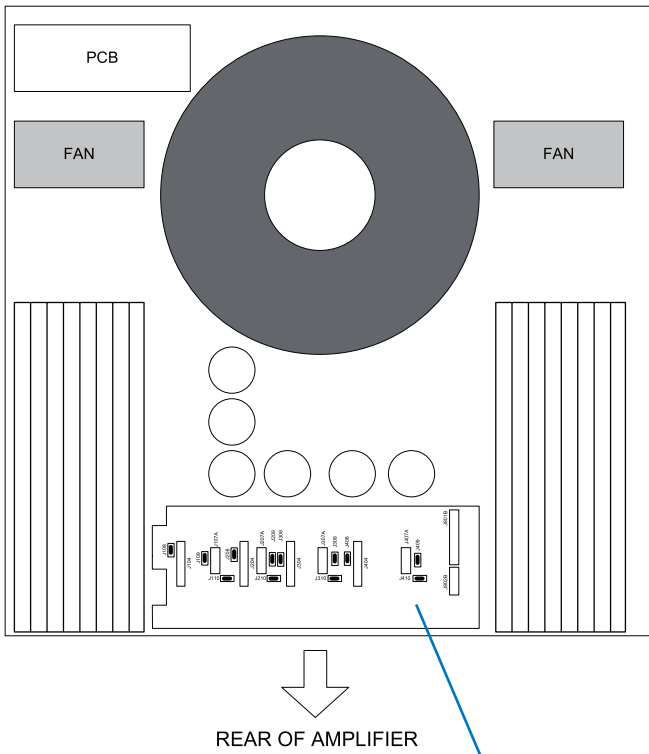
### Technical Specifications

|                       | VTX4120  | VTX4240    | VTX4400    |
|-----------------------|--|------------|------------|
| Output (Normal Mode)  | 120 W (4Ω)                                       | 240 W (4Ω) | 400 W (4Ω) |
| Output (Bridged Mode) | 240 W (8Ω)                                       | 480 W (8Ω) | 800 W (8Ω) |
| Frequency Response    | 20 kHz to 20 kHz, +0/-1 dB; (HPF bypassed)       |            |            |
| High Pass Filter      | -3 dB @ 65 Hz, slope 18 dB/octave (switchable)   |            |            |
| Distortion            | THD + N <0.03% @ 1 kHz, 1 W output, 4 Ω load     |            |            |
| Crosstalk             | < -90 dB @ 1 kHz, -70 dB @ 10 kHz                |            |            |
| Sensitivity           | 0.775 Vrms (0 dBu)                               |            |            |
| Input Impedance       | 10 kΩ, balanced                                  |            |            |
| Noise (rms)           | <100 dB below full output power, 20 Hz to 20 kHz |            |            |

### General Specifications

|                            | VTX4120   | VTX4240       | VTX4400       |
|----------------------------|---|---------------|---------------|
| Inputs                     | Electronically balanced; 3-pin 3.5 mm-pitch plug-in screw terminal connectors             |               |               |
| Outputs                    | 2-pin 5 mm-pitch plug-in screw terminal connectors  |               |               |
| Main Protection            | By resettable rear-panel circuit breaker  |               |               |
| Amplifier Protection       | Clip Limiting, VI Limiting, DC Offset, Thermal & switch-on delay                          |               |               |
| Status Indicators          | LED Indicators on each channel for Power Status, Signal Presence, Peak Level & Protection |               |               |
| Cooling                    | Two mid-mounted variable speed DC fans  |               |               |
| Dimensions (mm, W x H x D) | 482.6 mm x 88.3 mm (2U) x 416 mm (exc. connectors); 450 mm (inc. connectors)              |               |               |
| Weight                     | 13.8 kg (net)   | 16.5 kg (net) | 20.0 kg (net) |

Location of jumpers and other internal components



NOTE:

The following jumpers and connectors are relevant to the optional VTX-WMI surveillance card:

J109 - J409

J110 - J410

J107 - 407A

J801B, J802B

Full details are in the VTX-WMI Installation and User Manual

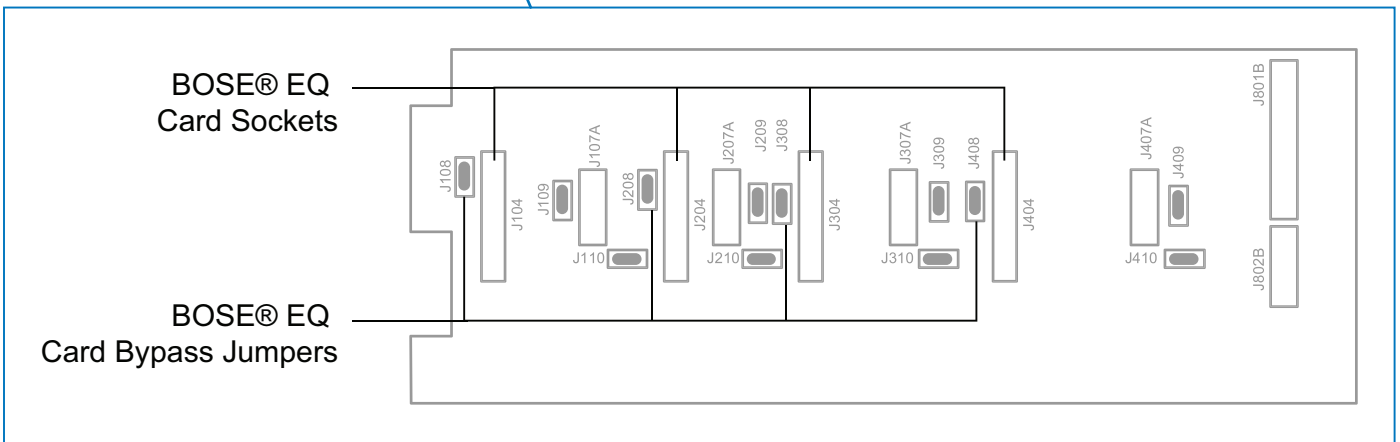


fig.9: Jumper Locations

## Factory default jumper settings table

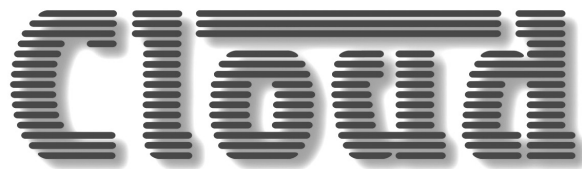
| Jumper/Connector | Function                                    | Channel No. | Default Setting |
|------------------|---|-------------|-----------------|
| J104             | Bose® EQ card sockets                       | 1           | Empty           |
| J204             |   | 2           |                 |
| J304             |   | 3           |                 |
| J404             |   | 4           |                 |
| J108             | Bose® EQ card bypass jumpers                | 1           | Present         |
| J208             |   | 2           |                 |
| J308             |   | 3           |                 |
| J408             |   | 4           |                 |
| J107A            | VTX-WMI surveillance card interface sockets | 1           | Empty           |
| J207A            |   | 2           |                 |
| J307A            |   | 3           |                 |
| J407A            |   | 4           |                 |
| J801B            |   | All         |                 |
| J802B            |   | All         |                 |
| J805B*           |   | 1&2         |                 |
| J806B*           |   | 3&4         |                 |
| J109             | VTX-WM-I card bypass jumpers                | 1           | Present         |
| J209             |   | 2           |                 |
| J309             |   | 3           |                 |
| J409             |   | 4           |                 |
| J110             |   | 1           |                 |
| J210             |   | 2           |                 |
| J310             |   | 3           |                 |
| J410             |   | 4           |                 |

\*These connectors are on the lower (main) pcb.

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In the interest of continuing improvements Cloud Electronics Limited reserves the right to alter specifications without prior notice.





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