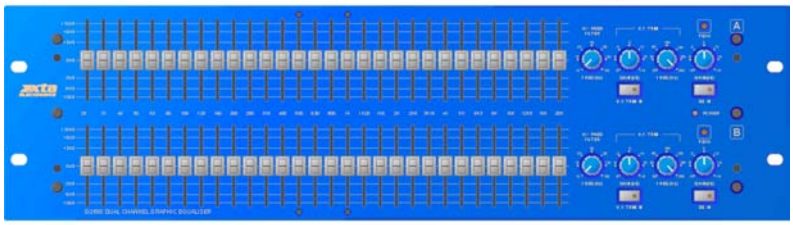
GQ600 Dual Channel Graphic Equaliser



Operators Manual

XTA Electronics Ltd.
The Design House,
Vale Business Park,
Worcester Road,
Stourport-on-Severn,
Worcs. DY13 9BZ.
England
Tel: 01299 879977 (Intl. +44 1299 879977)
Fax: 01299 879969 (Intl. +44 1299 879969)
Web: http://www.xta.co.uk

If you have any comments or suggestions about this manual, please contact XTA at the address above, or email manuals@xta.co.uk

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Thanks

Thank you for choosing the XTA GQ600 for your application. Please spare a little time to digest the contents of this manual (figuratively speaking), so that you obtain the best possible performance from this unit.

All XTA products are carefully engineered for world class performance and reliability.

If you would like further information on this or any other XTA product, please call us.

We look forward to helping in the near future.

XTA Electronics Ltd.

Safety Warnings

Please note the following information which is provided for your safety:

- Check correct operating voltage is set on the power supply before connecting mains power.
- Do not expose this unit to rain or moisture.
- Do not expose this unit to excessive heat.
- Replace all fuses with correct type only.
- Do not remove the covers from this unit. No user serviceable parts inside - refer all servicing to qualified personnel.

The mains power cord is fitted with a safety earth (ground) connection. Do not operate this unit with this connection removed.

Unpacking the GQ600

After unpacking the unit please check carefully for damage. If damage is found, please notify the carrier concerned at once. Any claim must be instigated by you, the consignee. Please retain all packaging in case of future reshipment.

Introduction

The GQ600 combines innovative features with impressive specification, to produce a new level of performance in professional equalisation.

The GQ600 is a precision dual channel 1/3 octave graphic equaliser which provides up to 10dB of boost or cut at 30 centre frequencies between 25Hz and 20kHz. Filter design has been carefully optimised for good interpolation and improved narrow band performance, whilst high quality long-throw 45mm sliders are used for better resolution. The GQ600 also provides excellent noise and distortion performance, with a flat noise figure of better than -98dBm.

A shelving H.F. Trim section is provided, with adjustable gain and frequency allowing fast adjustments to be made to overall high frequency response. This obviates the need for system re-voicing when, for example, changes in humidity or audience size occur.

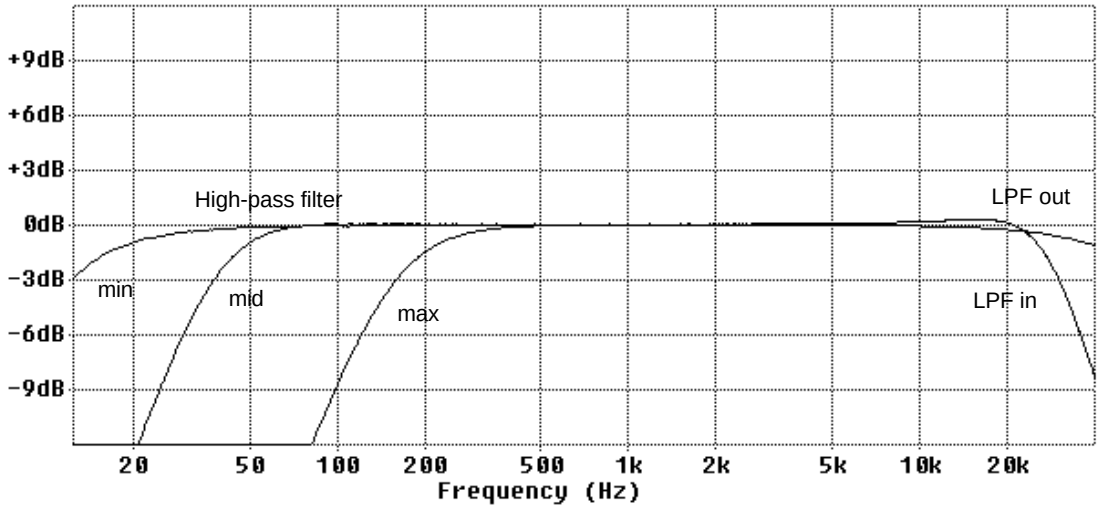
A sweepable high-pass filter offers turnover frequencies of 10Hz to 150Hz and a fixed frequency low-pass filter is also provided for increased H.F. driver protection. This filter is selectable in or out of circuit via jumper links on the main circuit board.

Audio inputs and outputs are provided on lockable XLR 's and 'quick-wire' Klippon connectors and are fully electronically balanced as standard. Optional transformer balancing is also available for both inputs and outputs.

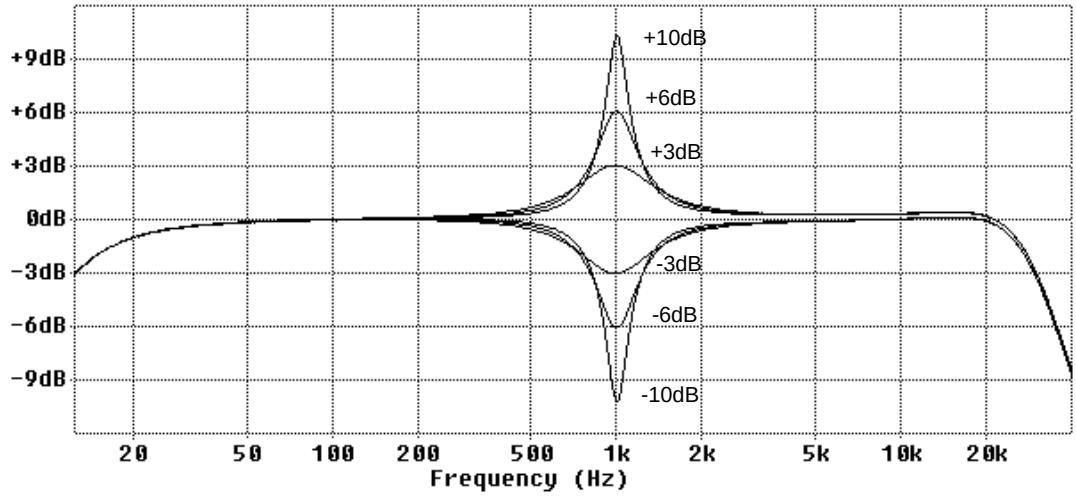
Additional features include; relay fail-safe bypass, peak level indicators and optional perspex security cover.

The GQ600 is sturdily constructed from high quality components and undergoes extensive testing and quality control procedures including a minimum 48 hours burn-in period prior to despatch.

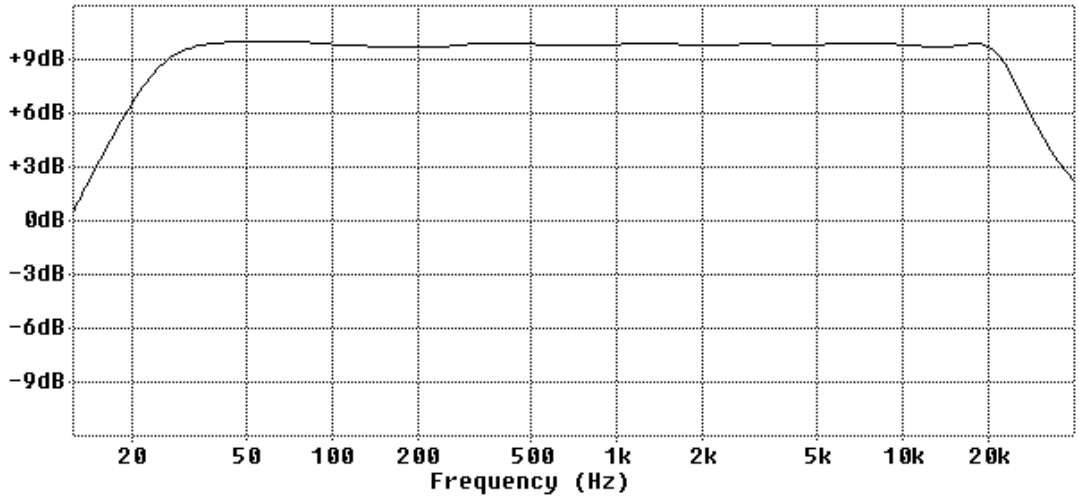
GQ600 Filter Characteristics



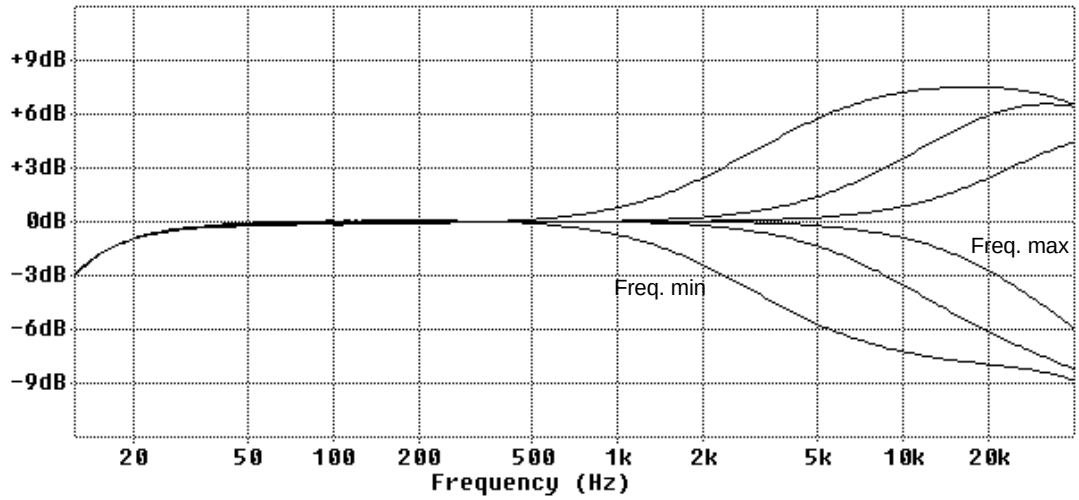
Frequency response of GQ600 with sliders set "flat" and EQ "in", showing effect of high-pass and low-pass filters.



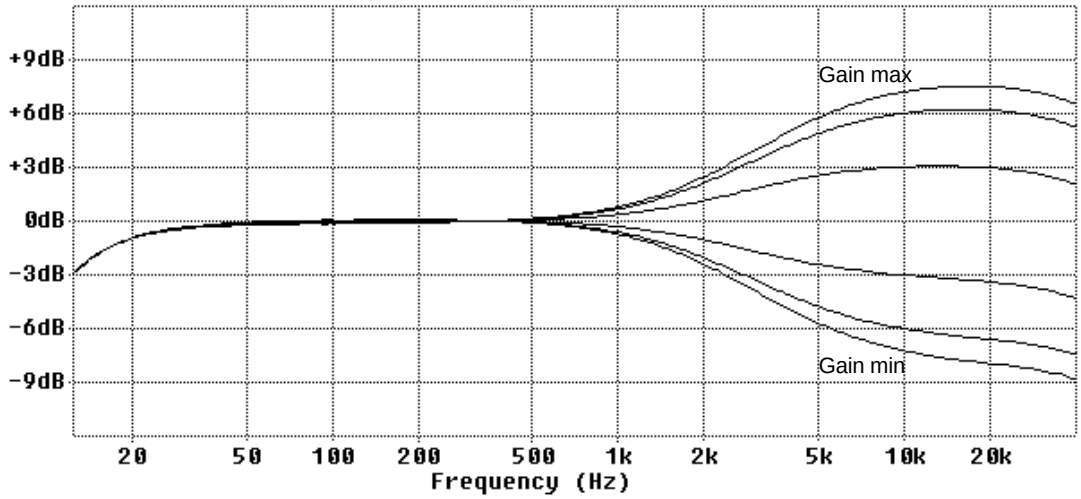
Response of a single 1/3 octave filter section.



Combining effect with sliders set to achieve +10dB overall gain. Note lack of amplitude ripple.



Response of H.F. Trim frequency control. At maximum and minimum gain.



Effect of H.F. trim gain control, with frequency set at minimum.

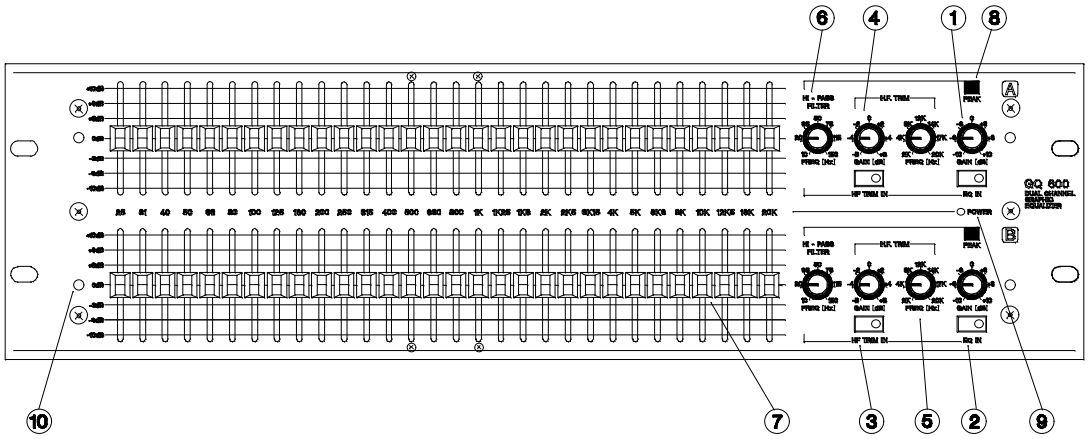
1/3 Octave Centre Frequencies

The 1/3 octave ISO centre frequencies used on most graphic equalisers are normally 'rounded off' to whole numbers. This leads to unequal spacing of filters if these marked frequencies are used to calculate filter values.

The GQ600 uses true 1/3 octave frequencies based on 1kHz as a reference, and each filter is automatically tested and adjusted when required, to achieve a centre frequency accuracy of within ±3% of these true 1/3 octave frequencies. These are as follows:-

Marked	True	Marked	True	Marked	True
25	24.80	250	250	2k5	2k52
31	31.25	315	315	3k15	3k175
40	39.38	400	396.7	4k	4k
50	49.61	500	500	5k	5k04
63	62.5	630	630	6k3	6k35
80	78.75	800	793.7	8k	8k
100	99.21	1k	1k	10k	10k08
125	125	1k25	1k26	12k5	12k70
160	157.5	1k6	1k587	16k	16k
200	198.4	2k	2k	20k	20k16

Front Panel Functions



1. **Output Gain Control** - allows ±10dB of gain to be applied. This control features a centre detent for 0dB gain.

2. **E.Q. In/Out Switch** - selects graphic equaliser filter section in or out of circuit.

3. **H.F. Trim Switch.** - selects H.F. Trim section in or out of circuit.

4. **Trim Gain** - provides up to ±8dB of gain at 20kHz.

5. **Trim Frequency** - sets the +3dB frequency for the shelving 'Trim' filter anywhere between 2kHz and 20kHz (with Trim gain set for maximum).

6. **Hi-Pass Filter Frequency** - sets the -3dB frequency anywhere between 10Hz and 150Hz.

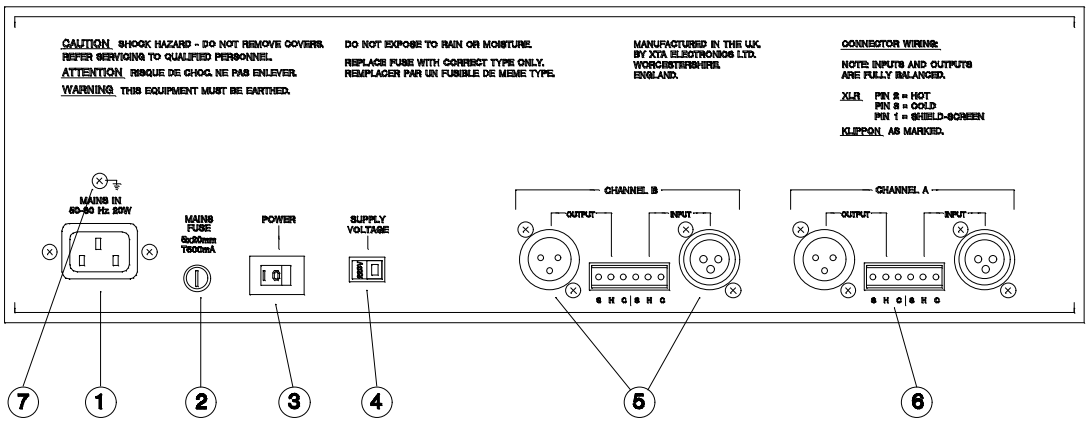
7. **Graphic Controls** - gain of up to ±10dB is provided at each centre frequency. High quality slider controls feature centre detent for accurate 'flat' position.

8. **Peak LED** - illuminates as clipping point is approached anywhere within the equaliser circuitry. Threshold is +20dB.

9. **Power LED** - indicates unit is powered on.

10. **Fixing Holes** - for security cover.

Rear Panel Functions



1. **Mains Power** - is connected via a standard IEC socket. A compatible power cord is supplied with the unit.

2. **Mains Fuse** - is located in a finger-proof fuseholder adjacent to the mains inlet. Always replace this fuse with the correct type as shown on the rear panel legend.

3. **Power Switch** - a double pole rocker switch isolates both live and neutral connections.

4. **Voltage Selector** - switches between two nominal operating voltages. Please ensure this is set for the correct voltage before operating the unit. Disconnect power to the unit before resetting this selector.

5. **XLR Inputs and Outputs** - separate 3 pin XLR connectors are provided for each audio input and output. All terminations are fully balanced where pin 2 = Hot, pin 3 = Cold and pin 1 = Screen (shield). See page 8 "Grounding" for more information.

6. **Klippon Inputs and Outputs** - a six pin Klippon socket is also provided for each channel. The corresponding plug features screw terminals allowing quick termination of system wiring, giving the advantages of barrier strip plus the bonus of easier servicing and the ability to pre-wire. Each connector carries input and output connections with all terminations fully balanced, where H = Hot, C = Cold, S = Screen (shield).

7. **Safety Ground Screw** - Do Not Remove.

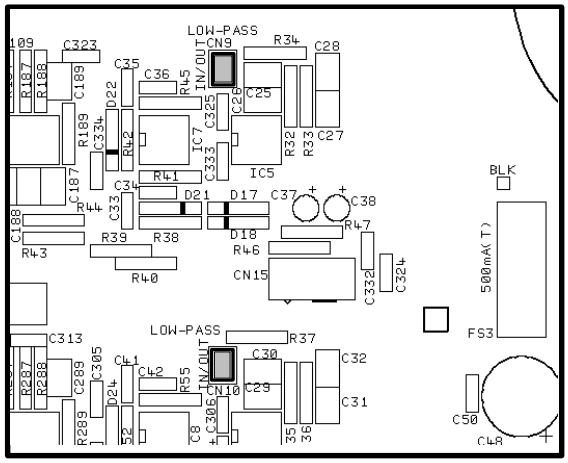
Specifications

Inputs	Two, electronically balanced.–
Impedance	> 10k ohms.
CMRR	> 65dB 50Hz - 10kHz.
Outputs	Two, electronically balanced.–
Source Imp.	< 60 ohms.
Min. Load	600 ohms.
Max. Level	+23dBm into 600 ohm load.
Gain	± 10dB via rotary control.
Frequency Response	± 0.5dB 20Hz - 20kHz with controls "flat".
Equivalent Input Noise	< -98dBm (20-20kHz unweighted) with controls '"flat".
Distortion @ +18dBm	< 0.01% @ 1kHz.
Peak Indicator	Threshold: +20dBu.
H.F. Trim	
Filter Type	2nd order, optimum phase, shelving.
Frequency	2kHz - 20kHz.
Gain	± 8dB max. @ 20kHz.
H.F. Trim In/Out	Front panel switch with LED indicator.
High-pass Filter	
Filter Type	12dB/octave H.P.
Frequency	10Hz - 150Hz.
Low-pass Filter	
Filter Type	18dB/octave -3dB @ 27kHz.
LPF In/Out	Link selectable on PCB.
Equaliser Section	
Filters	2 x 30, 1/3 octave, 25Hz- 20kHz.
Filter Type	High performance simulated LCR network.
Freq. Tolerance	± 3%.
Range	± 10dB.
Connectors	
Inputs	3 pin female XLR.
Outputs	3 pin male XLR.
Input/Output	6 pin Klippon.
Power	3 pin IEC.
Power Consumption	110VAC / 220VAC ± 15% @ 50/60Hz. < 20W
Weight	5kg. Nett (6.7kg. shipping)
Size	5.25"(3U) x 19" x 9.3" (133 x 482 x 237mm) excluding connectors.
Options	– = Optional transformers available. Perspex security cover. Klippon BL6 mating plugs.

Operating Notes

Generally, operating the GQ600 is very straight forward, however certain functions may not be immediately obvious and these are discussed here.

Low Pass Filter. 18dB/octave filters are provided for each channel to provide additional H.F. driver protection against unwanted high frequency signals. These have negligible effect on frequency response at 20kHz. All units are factory set with these filters in, if not required these filters can be removed from the signal path by changing the position of two jumper links on the main circuit board, see following diagram.



Output Balancing Transformers. Outputs are fully electronically balanced as standard. If optional output transformers are required proceed as follows:-

1. Remove four "jumpers" from CN4 and CN8 on main circuit board (located near XLR outputs).

2. Fasten two output transformers type 7470 to the inside of the rear panel chassis, using the screws and washers provided, through the two mounting holes located above each Klippon connector. Plug in transformer connectors into CN4 and CN8.

3. Monitor output noise of unit and rotate appropriate transformer until noise (hum) is at a minimum. Fasten transformer in this position and repeat for other channel.

Input Balancing Transformers. Inputs are fully electronically balanced as standard. Input transformers if required, should be requested at time of purchase if possible. if it necessary to fit input transformers to existing units proceed as follows:-

On main circuit board.

1. Remove R2, R3, R4, R6, R8, R11, R15, R16, R17, R19, R21, R24.

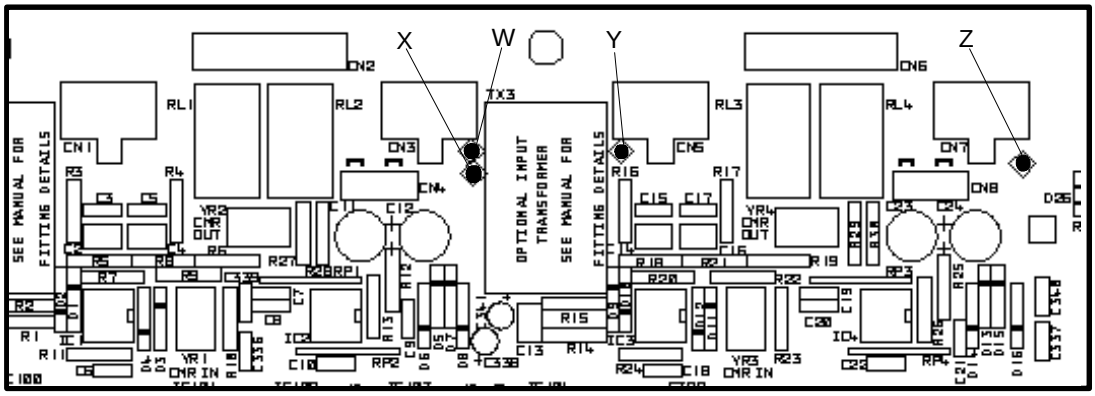
2. Fit R2 and R15 = 10k ohms, R11 and R24 = 0R0 link.

3. Solder in input transformers type LL1540 to positions TX2 and TX3 on main circuit board.

Grounding. The Screen (shield) pins on all audio connectors are normally connected directly to the ground pin of the IEC mains inlet. The chassis is also directly connected to this pin. Never operate this unit without the mains safety ground connected. Signal ground (0V) is in turn connected to the chassis ground via a 10R resistor.

To avoid ground loops, cable shields should be connected to ground at one end only. The normal convention is that the shield is only connected at the output XLR. Provision is also made for separately isolating each input and output shield pin permanently within the GQ600 by breaking the appropriate pcb track, where marked with a diamond using a small drill bit or cutter. See the following diagram for details.

W= Output channel A, X= Input channel A, Y= Input channel B, Z= Output channel B



Security Cover. A perspex security cover is available to enclose all front panel controls and so avoid accidental or unauthorised adjustment. To fit this cover proceed as follows:-

1. Fit four M4 x 17mm pillars into the four front panel bushes located in between the six panel mounting screws.

2. Position security cover over pillars and fasten with screws and washers provided.

Warranty

This product is warranted against defects in components and workmanship only, for a period of one year from the date of shipment to the end user. During the warranty period, XTA will, at it's option, either repair or replace products which prove to be defective, provided that the product is returned, shipping prepaid, to an authorised XTA service facility.

Defects caused by unauthorised modifications, misuse, negligence, act of God or accident, or any use of this product that is not in accordance with the instructions provided by XTA, are not covered by this warranty.

This warranty is exclusive and no other warranty is expressed or implied. XTA is not liable for consequential damages.