EPC-780
USER'S MANUAL

EPC-780

Electronic Power Convertor
High Efficiency Audio Power

USER'S MANUAL

INTRODUCTION

This manual is published with the aim of assisting sound engineers, installers and consultants to fully understand the EPC-780, and to obtain its maximum capability.

As opposed to most manuals, the contents can be read like a book.

At the same time, the information is structured under a series of broad headings for easy access. So within each section:

* The most immediate information appears at the head of each section under the main title.
* As you read further into each subsequent section, more detailed, specific information is given.

Should you have any comments or questions about applying the EPC-780, please write to us at the address in the warranty section.

TABLE OF CONTENTS

FEATURES & FACILITIES

The EPC-780 is a highly efficient, ultra-compact, rugged high power amplifier, packed with many original features that anticipate the requirements of professional sound reinforcement in the 1990's, for both touring and fixed installations. Being designed with audio quality ranking equal first alongside utility and ruggedness, the EPC-780 is equally suited to recording studio monitoring.

* Two independently controlled and powered channels in a compact 2U enclosure weighing only 24kg

* High Continuous[1] power, in excess of 1000w per channel into 4 ohms or 1200 w per channel into 2 ohms[2]

* A 10kΩ transformer balanced, fully floating input is fitted as standard.

* Choice of 8 calibrated input sensitivities, sited on the rear panel for security. Continuous front panel level control for convenience.

* Bargraph meter displays real-time output headroom.

* Bargraph meter displays real-time temperature headroom.

* High slew limit output section with feedforward error correction offers reduced intermodulation at the amp-speaker interface and improved sonics at all frequencies.

* Very high damping factor, >1500 below 1kHz

* Class A operation up to 20 watts output

* Auto/slow fan-speed switching.

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[1]FTC rating in USA
[2]With Load switch set for 2 ohms.

* Automatic selection of supply voltage setting: 100 - 120v; 220 - 240v AC for full power output, plus wide safety margins, coupled with under/over-voltage protection.

* Low power mains switching, with intelligent start-up and shut-down routines and fault diagnostics.

* Front-panel accessible electret filter for improved dust collection.

* Super efficient Class ESA solid copper heat-exchangers.

* High efficiency output stage, typically over 80% with hard driven music programme.

* All-round reduced dissipation in the amplifier and power supply alike offers greatly reduced stress on the output transistors, and all other components increasing their average lifespan.

* Consistent reliability and easy serviceability through solid, lightweight construction and modular packaging.

UNPACKING

As part of BSS AUDIO LTD's system of quality control, this product is carefully checked before packing, to ensure flawless appearance.

After unpacking the unit, please inspect for any physical damage and retain the shipping carton and all relevant packing materials for use, should the unit need returning.

With the EPC-780 will be a small packet of spare parts which includes replacement fuses and filter media. Please keep them in a safe place.

If any damage has occurred, please notify your dealer immediately, so that a written claim for damages can be initiated. See the Warranty section of this manual.

MECHANICAL INSTALLATION

A vertical rack space of 2U (3 1/2") = 89mm is required. The enclosure must be fixed at all four corners. **Failure to do so will impare reliability and invalidate the Warranty.** Figure 1 details the relevant dimensions and fixing centers. The weight is evenly distributed within the amplifier and the centre of gravity is therefore central.

Adequate ventilation is essential, both at the rear of the rack, and also at the front if enclosed by a cover or door. If the venting is inadequate, the EPC-780's temperature metering will display this.

If other makes of fan-cooled amplifier are installed in the same rack or cabinet, ensure that their airflow is front-to-rear, ie. in the same direction. Equipment with rear-to-front airflow should always be mounted in a separate rack if possible. Should this not be feasible, the EPC-780(s) should be kept apart and mounted below. Operating temperatures should be initially monitored, to check for adequate cooling.

CAUTION: Air emerging from the EPC-780's high efficiency heat-exchangers can reach 60·C to 70·C. To prevent personal injury or fire, please ensure that people and combustible or flammable materials (eg.newspaper, clothing, costumes, solvents) are kept at least 2'/0.6m from the amplifier's exhaust outlets. If venting is inadequate, the hot air can adversely affect other equipment, and may soften some thermoplastic enclosures. If using plastic coated cables, take care to dress the leads away from the airflow. Professional-grade rubber cables are not affected.

MAINS POWER

The EPC-780 operates from any international 50/60Hz AC mains supply between 108v and 240v [1] without adjustment. Setting is automatic. Simply plug the unit in.

The EPC-780's rated power output is achieved at any nominal international supply voltage. However, if the supply voltage falls or rises to a significantly different voltage after powering-up, the EPC-780 will experience exactly the same voltage/power variation as a conventional amplifier with hard-wired taps.

Powering Up

Each channel can be switched on or off independently of the other. When either one or both channels are switched on by depressing the grey 'POWER' button(s), four or five LEDs will light up. These are 'Mute' (Ch.1 + 2); 'Load Ohms' '2' (or '4'); 'Fan' if switch is set to 'slow'.

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[1] 108 to 121v (USA, Canada, Japan)
214 to 240v (UK, Europe, Australia)

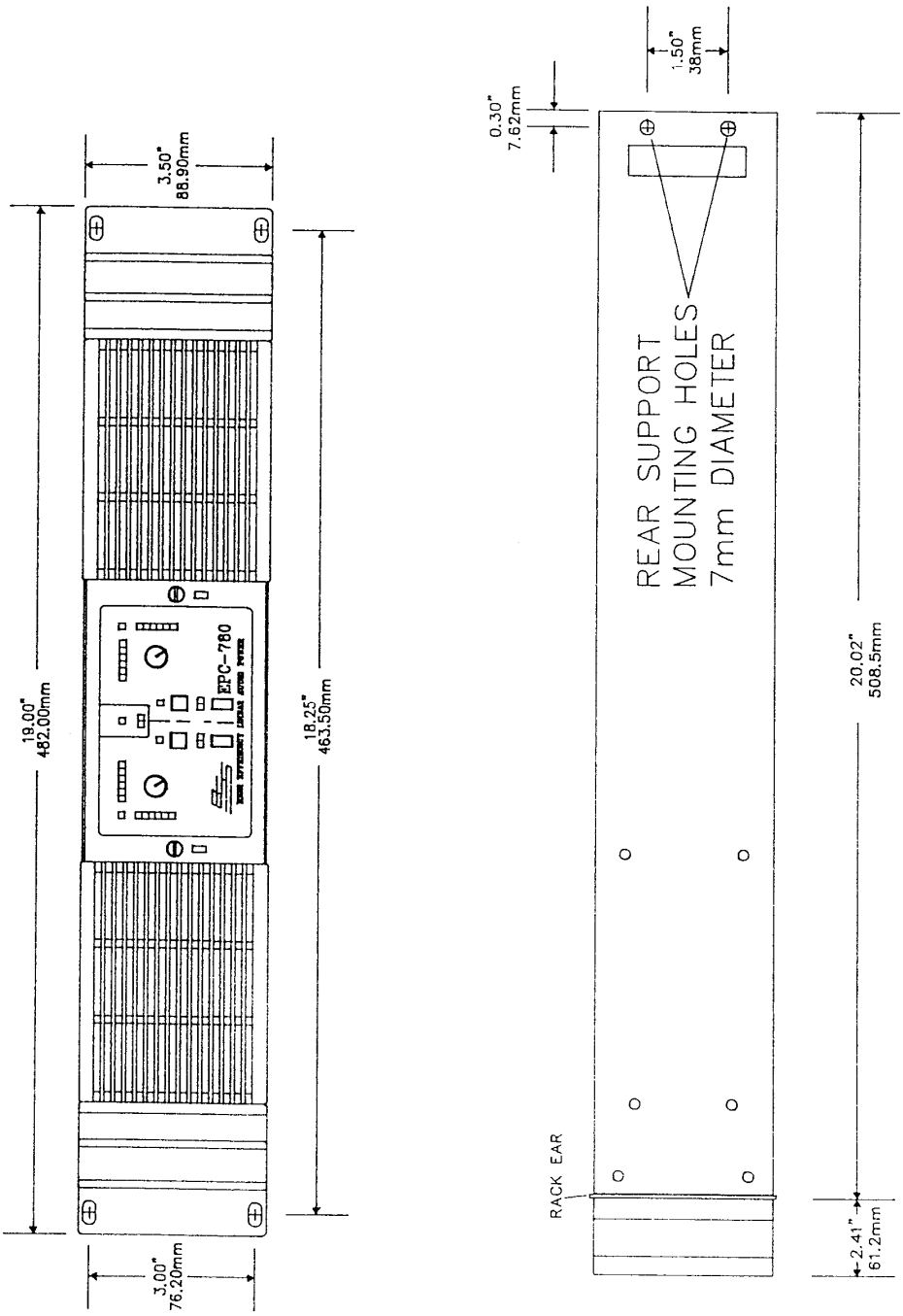


FIGURE 1. MECHANICAL MOUNTING DIMENSIONS

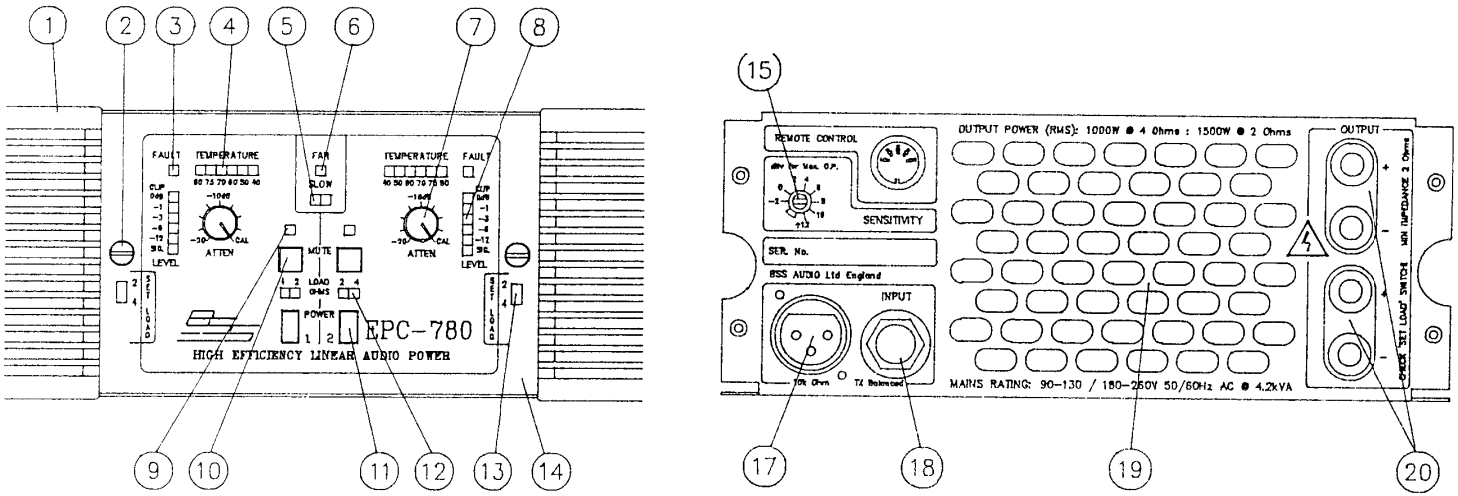


FIGURE 2. FRONT AND REAR PANEL FACILITIES

(1). REMOVABLE FAN LOUVRES

(2). THUMB SCREWS

(3). FAULT INDICATOR

(4). TEMPERATURE METER

(5). FAN SLOW SWITCH

(6). FAN SLOW INDICATOR

(7). SIGNAL ATTENUATION CONTROL

(8). SIGNAL OUTPUT LEVEL METER

(9). MUTE INDICATOR

(10). MUTE SWITCH

(11). MAINS POWER SWITCH

(12). LOAD SETTING INDICATOR

(13). LOAD SETTING SWITCH

(14). ESCUTCHEON PLATE

(15). SENSITIVITY SELECTOR SWITCH

(17). SIGNAL INPUT XLR

(18). SIGNAL INPUT RTS JACK

(19). HOT AIR EXHAUST VENT

(20). SPEAKER CONNECTION TERMINALS.

After 15 to 30 seconds, the channel's mute LED will extinguish. At the same time, the amplifier partially un-mutes, ie. passes a low level signal. This low level lasts for 2 to 4 seconds, after which the output level rises to it's full level, dependent on the input attenuator and sensitivity control settings, in the normal way. The pause allows time to (re) mute the channel to silence the outputs if desired.

Safety Earthing

The Green/Yellow wire on the EPC-780's mains cord must always be connected to the electrical installation's safety Earth (or 'Ground'). It's essential for personal safety. The rack framework is assumed to be connected to the same grounding circuit. Because the EPC-780's inputs are balanced and fully floating, disconnection of the safety earth is unnecessary.

AC Power Fusing

The incoming mains power feeds three separate power supplies with fuses located under the top cover plates as shown in figure 7. They are fused as follows:

Auxiliary. 250mA, 20mm; type T, or antisurge slow blow.

Main Ch.1+2. 20A 1¼"; Ceramic 250v AC type F, Non time delay.

Should one or more fuses blow, make a single replacement after checking for and eliminating any obvious causes. If the replacement fuse should blow, please contact BSS AUDIO LTD or your local dealer.

It is most important that the high current 20A fuses are replaced with the correct specification fuses such as those supplied with your amplifier.

Voltage Setting

At switch-on, the EPC-780 pauses to 'read' the average mains voltage and sets itself accordingly. Thus strain on the amplifier's components are reduced, as are variations in power output.

In use, should the AC supply voltage exceed safe limits, the amplifier powers down instantly. The over-voltage needed to trigger shut-down is at least 18% above the nominal.

Technician's note:
Unlike many conventional amplifiers, the EPC-780's maximum safe mains voltage is not limited by the power supply. Instead, it is determined solely by the output stage's Safe Operating Area. The S.O.A depends in turn on audio drive level, temperature and speaker impedance, so the safety margin will vary intelligently, to reflect this.
To summarise, you can be confident that the amplifier will only shut-down when the alternative is destruction or blown fuses.

Touring Sound System Users please note:
If the sound system supply is derived from a variac (variable transformer), the EPC-780 should be switched on after the variac has been set to the desired voltage, ie. do not 'wind-up' the voltage with the EPC-780 switched on. Connection to self-adjusting ('constant voltage') variac supplies is unnecessary and may cause malfunction.

Voltage Range
The minimum supply voltage for which the amplifier will operate is: 180v for 220/240v range, and 90v for the 108/120v range. However power output will be reduced accordingly from the minimum full-power values.

The maximum supply voltage which exceeds safe limits and causes the EPC-780 to switch-off is in excess of 260v for 220/240v range, and 130v for the 108/120v range. This is however dependent on load impedance and program drive level as mentioned above. Obviously, the mains voltage will reach these limits only in exceptional circumstances and the FAULT LED will then flash.

When the FAULT LED flashes, the EPC-780 is powered down and latched off. If the amplifier is switched OFF, then ON again, it will work normally if the fault was only temporary (a 'glitch'). Should the fault persist, it will power down again.

Current Consumption and Mains Cabling
In common with other high power amplifiers, the EPC-780 can demand high peak currents off the AC supply. Due to it's high efficiency and advanced power supply design, peak current draw is small considering it can produce 3kW of audio power. Even so, should the cable's resistance be too high, the supply voltage's peak value at the amplifier(s) can easily be 5 to 30 volts low, even though the cables are running cool. To minimise supply resistance, and for electrical safety, a heavy gauge 2.5mm^2 cable is fitted.

It is essential to use the correct gauge of cabling for the incoming mains supply.

Where a single EPC-780 is used, it should be directly connected to an adjacent 13 Amp or equivalent ring main outlet (If in doubt, users should consult a qualified electrician).

For optimum performance in multiple amplifier installations, each EPC-780 should be connected individually to a local riser (high current AC feeder buss). The current depends on the local mains voltage and speaker load impedance, however:

Allow 15 Amperes per amplifier (220/240v)
Allow 30 Amperes per amplifier (108/120v)

These are repetitive sinewave values referred to full drive. The average current draw for typical music is always lower, typically half as much.

Should a single power cable be used to connect racks containing two or more amplifiers it should be rated in proportion.
To illustrate this, table 1 gives the conductor's minimum recommended cross-sectional area for a fixed installation, with cable bunched in conduit. We recommend that cable size is increased substantially for lengths over 20 feet/7m.

Table 1.

No EPC-780[1]	Cable size in mm²	
	108/120v	220/240v
1	6mm	2.5mm
2	10mm	6mm
3	16mm	10mm
4	25mm	16mm
5	use 2x25mm	25mm
Above five, use parallel cables to increase current rating pro rata. Consult a qualified electrician,		

The table presumes worst case conditions, ie. hard drive with compressed or band-limited programme. For more information on current draw, see the specification.

AUDIO CONNECTIONS & CONTROLS

The EPC-780's transformer balanced, fully-floating input connections are 'fuss free', regardless of the installation's complexity.

Balanced and unbalanced sources can be connected either via the 3 pin XLR, or the 1/4" 'A' gauge jack (RTS phone) sockets. As factory supplied, both inputs are wired directly in parallel, giving a choice of connector and offering a link output for daisy-chaining.

It is possible to reconfigure the 1/4" RTS socket as a buffered output. See Options, section 12.
The incoming XLR plug should be connected as follows and as shown in figure 4.

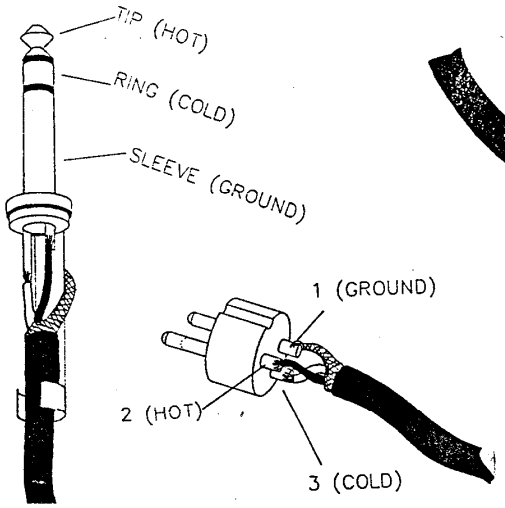
Pin 1: Connect to shield. Pin 2: Connect to hot, in-phase, '+'.
Pin 3: Connect to cold, anti-phase, '- '.

If pin 3 is normally 'hot' elsewhere in the system, refer to Polarity, section 6.

If the source is unbalanced, we recommend you still use a 'balanced' (ie. 2 core shielded) cable. Connect the source's 0v (normally output pin 1) to the '-' conductor going to pin 3 at the EPC-780's input. The live or hot output should be connected to the '+'conductor going to pin 2 at the EPC-780's input. Ensure

[1]Or other amplifiers of similar power rating and efficiency.

that the cable shield is insulated at the source end. Figure 5.



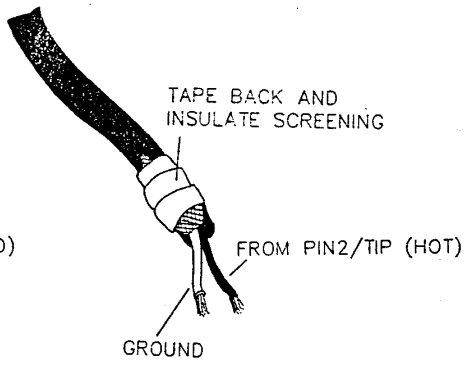


FIG 4. BALANCED CONNECTIONS. EPC-780 INPUT & SOURCE

FIG 5. UNBALANCED CONNECTIONS AT SOURCE END OF CABLE

The shield connection to pin 1 [1] at each EPC-780 input must be maintained under all circumstances, as BSS AUDIO LTD will not be responsible for consequential damage arising to loudspeakers, etc. should this connection not be made.

Daisy-Chaining

If both channels of the EPC-780 are required to be driven by the same input signal, use the spare input socket (either XLR or RTS) on the driven channel to link across to the other channel. Link leads can be XLR(M)-to-XLR(M); or RTS plug-to-plug, whichever is most convenient. On more complex installations it is preferable to arrange daisy-chaining (linking) externally on a patch-panel, where space allows for better access.

Each amplifier input has an input impedance of 10k-ohm, seen between pins 2 & 3 of the XLR[2]. This allows a maximum of sixteen amplifier channels to be daisy-chained (parallel connected) at their inputs, when driven from a standard pro-audio output, ie. one capable of driving 600 ohms, usually up to +18dBu (6v) or greater. All BSS AUDIO LTD products meet this specification.

When a long cable is used (eg. above 10m/30'), the maximum number of channels should be reduced on HF and FULL-RANGE feeds - as the cable's capacitance will also load the source at high frequencies. The number of daisy-chained LF and MF sources is not affected by cable length.

For very large installations where it is necessary to daisy-chain more than sixteen (16) amplifier channels, local distribution

[1]Or the sleeve, if using an RTS ('A' gauge jack) plug.
[2]Or between Ring and Tip of the RTS Jack socket.

amplifiers should be used, such as the BSS AUDIO LTD MCS Line Drivers (see section 18).

It is possible to reconfigure the 1/4" RTS jack socket of the amplifier to provide a buffered output for daisy-chaining. With this approach, there is no limit to the number of amplifier inputs that can be driven, as each interconnection sees only one input load (see the Options section).

Notes for Touring Systems & Large Instal

Each channel's input is floating and fully isolated via a transformer. For large scale systems where the amplifiers are distant from the line-level equipment &/or are run from a separate mains supply, it is recommended that the shield connection to pin 1 at the source end is left unconnected and insulated.

The shield connection to pin 1 [1] at each EPC-780 input should be maintained under all circumstances, as BSS AUDIO LTD will not be responsible for consequential damage arising to speakers, etc. if this connection is not made.

Notes for Studio Installers

Electronically balanced input connections can be arranged if transformer coupling is not required; see Options section 12.

Notes for Permanent Installations

Quarter inch RTS (jack) plugs are not recommended for permanent service, especially in corrosive, damp or humid environments. In particular, we recommend you avoid 'military' style plugs, because their solid brass construction can accelerate corrosion and lead to bad contacts, particulary to the cable shield.

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[1] or the sleeve, if using an RTS ('A' gauge jack) plug.

CONTROLS

Muting

Simply depress the mute button to instantly 'kill' the output. Depress again to un-mute. The signal will be reinstated at a reduced level. After 2 to 4 seconds, the drive level will revert to normal as governed by the sensitivity and attenuator setting. The pause gives you 'thinking time'.

Muting is automatic at power-up and -down and also if a fault is detected (For Fault Modes, see section 9).

Polarity

When EPC 780s are used in conjunction with other types of power amplifier, make sure the output polarity is consistent by verifying the connections, or by testing for uniformity with a given polarity of input signal[1]. Remember, in multiple speaker stacks, clusters or arrays, incorrect loudspeaker polarity can upset coverage and create spurious imbalance, 'phasiness' and colouration.

Incorrect polarity can be put right by one of the following, whichever is most expedient. Before you start, make sure that the polarity error is caused by incompatibility between amplifiers being driven in the same frequency band. If the polarity problem is solely between different frequency bands, it is much easier to correct the problem at the (active) crossover, using the polarity ('Phase Reversal') switch. Be sure to mark any ad hoc connections or reversals to avoid future confusion:

i) Change round the connections to the amplifier's input pins. For an XLR, transpose the connections to pins 2+3. This procedure only applies to balanced inputs, as fitted to the EPC-780 and many other (but by no means all) makes of amplifier.

ii) Change round the + & - output connections at the amplifier. This approach assumes the speaker load is floating, ie. not connected to anything else, eg. earth or ground. This is usually the case.

iii) Change round the + & - connections at the speaker(s).

In accordance with international standards [2], EPC-780's are supplied with Pin 2 hot (+), so a positive (+v) input gives a positive (+v) output from the red (+) output terminals.

The EPC-780 can be converted to become 'pin 3 hot' if desired, although this convention is now generally obsolescent. This is sensible however if the EPC-780 forms part of a system or installation where the 'pin 3 hot' convention has already been adopted.

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[1] See section 18, for suitable phase check set.
[2] IEC Doc.427 (XLRs)

Sensitivity

The EPC-780's nominal input drive for full power can be varied between -2dBv and + 12dBv by the rear panel sensitivity switch. A front panel attenuator control is provided to allow the maximum output power to be backed-off.

In common with other high power amplifiers, the EPC-780's sensitivity is defined as the drive level needed to produce an output that is just below clip (overload or 0dB) - where maximum power is developed. The exact input sensitivity varies depending on operating conditions, because the overload point to which it is referred hinges on drive level, programme density, the speaker impedance and supply voltage. (For example, during loud passages, and especially when driving low impedances, a multi-kilowatt array of amplifiers can demand high enough currents to cause the supply voltage to sag, thus changing the point at which maximum power is developed).

To overcome the uncertainty caused by these variations, the EPC-780's signal metering is referred to the output, giving a true indication of output headroom in real-time.

Attenuation & Gain Setting

Each channel's sensitivity can be adjusted with the stepped attenuators, located on the rear panel. The eight preset positions marked -2 to +12dB in steps of 2dB, ensure accurate ganging between units. The settings generally correspond with sensitivity in dBv provided the front panel attenuators are set at CAL, ie. the +12dB setting yields a +12dBv sensitivity.

When setting up a system, always make sure that the front-panel atten controls are set at CAL before adjusting the rear-panel attenuators.

The front-panel atten controls have a different function. They reduce the output drive, but have no effect on input headroom.

When they are backed off, do not try driving the EPC-780 harder in order to compensate. This is misuse !

The front panel atten controls are useful when you need to bring a level up slowly (as required for tentative testing). They may also be used to restrict the power output to a specific channel (say), provided the input drive is already fixed at a suitable level, ie. not overloading when the front panel controls were set at CAL. When set at -10 and -20dB, the EPC-780's power output is reduced by ten and a hundred times respectively.

Installer's Notes

In fixed installations, it is always preferable to leave the front panel controls at CAL. This obviates the risk of damage to loudspeakers in the event of unauthorised tampering with the system settings, and speeds-up realignment.

In studio monitoring systems with high headroom, power amplifier attenuators are often backed-off to reduce hiss. The EPC-780's gain structure is configured so the residual output hiss is practically inaudible, even with high efficiency PA speakers. If the incoming lines from the (active) crossover are noisy, we recommend you first try adjusting the system's gain structure. If hiss remains obtrusive, then reduce the stepped attenuators on the EPC-780's rear panel. If you attempt to drive the amplifier at full power with significant front-panel attenuation applied, distortion may result !

Signal Metering

Each channel's drive level is displayed on a LED bargraph. The bottom (green) LED confirms the presence of an input signal, provided it's above -25dBv / 50 mV.

The top (red) LED illuminates 0.5dB below true clip, ie. irrespective of the load impedance or AC supply - both of which can influence the output clip threshold.

The metering responds in 5mS and holds for about half a second, so every audibly significant peak is visible.

As the metering is referred to output headroom instead of the absolute input level, take care when interpreting the readings.

Do not use the meters to align or calibrate external equipment. For example, if two adjacent channels are fed from the same line but are driving different speaker impedances, the meter readings will differ to reflect the extra loading on one channel, even if the input attenuator settings are identical. Meter readings will also differ if on one channel, the 2 ohm output setting is selected (see below).

OUTPUT CONNECTIONS

Two pairs of 4mm terminals are provided on each channel. Each terminal accepts a 4mm plug at the rear. Alternatively, bared *conductors can be threaded. Even better, we recommend you crimp a* Spade Lug or 'Bootlace' Ferrule to the conductor's end as shown in figure 6. For firm clamping, the conductors' cross-sectional area should range between 1.5mm² and 6mm².

For most installations, the minimum recommended conductor size is 2.5mm². But for optimum performance, see below.

In permanent installations, we recommend you tighten the plastic clamp with a broad screwdriver or coin, to prevent conductor tarnishing and preserve a reliable, low resistance connection. Installers should include checks on terminal tightness in periodic maintenance schedules.

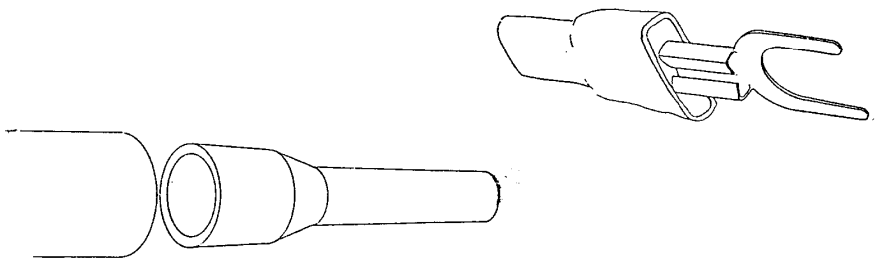


FIGURE 6. OUTPUT CONNECTORS

Damping Factor

The EPC-780's outputs provide an unusually high damping factor, typically 1500 times at low audio frequencies. The damping can help the amplifier control the loudspeaker driver-units, providing the resistance of the intervening cable(s) and connectors is very low. The sonic benefits of high damping factor are most pronounced at bass and low-midrange frequencies (ie. 10 to 600Hz).

Amplifier damping factor is degraded by thin conductors &/or long output cable runs; by tarnished, corroded or loose connections, and by the resistance of passive crossover networks. Amplifier damping factor is not meaningful if two drive-units are connected in series.

Damping Factor is preserved by installing cables containing conductors with large cross-sectional areas, by specifying connectors with gas-tight contacts, and by using active systems (so an active crossover replaces passive networks). To avoid unnecessary loss of damping factor, avoid daisy-chained outputs, particulary to LF and MF drivers. When several cabinets or drivers are connected to one output, we recommend you make separate connections, to maximise damping factor with any given gauge of cable.

The EPC-780 accepts conductors up to 8mm^2. Larger conductors (10 & 16mm^2) may be required for critical recording monitoring. They can be terminated by tinning and paring, or by soldering to a 'Bootlace' (reducing) Ferrule such as shown in figure 6.

To summarise, the sonic benefits of the EPC-780's high damping factor will not be fully realised if the output cable is too thin relative to its length and the impedance of the drive-units connected to it. The longer the cable, the thicker it needs to be to maintain a reasonably low resistance. Poor damping factor can impair bass depth and midrange resolution, and exacerbate dynamic interactions between the room and the drive units. For further advice, consult the loudspeaker maker.

4/2 Ohm Impedance Setting

The EPC-780 is shipped with the switch set to 4 ohms. The 2 ohm setting adjusts the amplifier to maintain it's rated power and cool-running high efficiency when driving loudspeaker arrays of 2

ohms or below. Selection needs to be made before switching on.

Adjustment is desirable because driving loads below the 4 ohm rating requires less voltage and more current - for the same power. The EPC-780's '4/2 ohm' switch reconfigures the power supply accordingly.

By contrast, in conventional amplifiers, the power output into impedances below 4 ohms is commonly either progressively limited (which can sound inferior), or else it attempts to double each time the load impedance is halved. Either way, low impedance loads pull high currents and can exert a great strain on the amplifier's output devices, the heat-exchangers and the power supply - particulary if the amplifier has been designed to drive high power into 8 or 16 ohm systems (ie. high voltage/low current).

The decision to use the 2 ohm setting need not be complicated.
In practice, if the EPC-780 is driving less than 4 ohms, or is driving a nominal 4 ohms, but the temperature metering reads high, simply select the 2 ohm setting.

If a 2 ohm load is driven with the 4 ohm setting, no harm will be caused, but you can expect high dissipation at high power levels, which may ultimately lead to amplifier shutdown.

Access & Setting
The 4/2 ohm switches are reached by undoing the two thumb screws and removing the escutcheon plate and filter covers. Take care not to fold or crush the white filter pads which are held inside the recess of the filter covers.

For load impedances below 4 ohms, set to '2'. If the speaker impedance later reverts to 4 ohms or above, switch off the relevant amplifier channel, and reset the switch to '4' to avoid unnecessary loss of output power.

If you alter the 4/2 ohm setting when the amplifier is switched on, it will have no immediate effect. However, the EPC-780 will reset to the indicated range when next powered-up.

Which speaker impedance?
In most active speaker systems, the nominal speaker impedance is close to the minimum value (with continuous signals) and rarely more than half the minimum under transient dynamic conditions. The EPC-780's normal 4 ohm rating refers to nominal impedance ratings, and already allows for short term worst case dips to around 2 ohms.

In systems employing passive crossovers, transient impedance dips can be one quarter of the rated nominal, possibly 1 ohm for a nominal 4 ohm system. In such instances, ie. when driving a loudspeaker model that is reputed to be 'hard to drive', the 2 ohm setting may give better sonic results and cooler running.

It should certainly be evaluated if the amplifier overheats and cuts out, or appears to run hotter than anticipated.

Long Speaker Lines

Whenever loudspeakers are connected to power amplifiers by long cables (above 20'/6m), there is invariably an increased risk of high frequency instability. It is aggravated by the combination of RF pickup in unshielded cables (aerials !) and multiple, complex reactances in the cable and loudspeaker(s) and passive crossovers (where fitted).

High frequency instability can be avoided by adopting these common sense rules:

i) Ensure the input wires are shielded and that the shield is connected to the EPC-780's input XLR pin 1.

ii) Do not run output cables next to input signal lines. Keep apart, and preferably cross at right angles. If cables have to follow a similar route or path, keep them separated by at least 24"/0.6m.

iii) Conventional speaker interconnections rely on flexible cables principally made for AC mains, in which the conductors lie parallel, ie. side-by-side. Superior interconnections can be made by using cables with twisted conductors. Twisting reduces the signal strength radiated from the cable, reduces noise and RF pickup from other adjacent high current conductors (eg. lighting power cables), and also reduces inductance per unit length, which enhances stability.

70/100 volt lines

The EPC-780 drives 70 and 100 volt lines directly. The nominal output voltage is 70v rms. The amplifier's built-in DC servo and protection circuitry means that DC blocking capacitors are not necessary, although these may be desirable to roll off low frequencies.

THE COOLING SYSTEM

The EPC-780 employs novel, highly efficient solid-copper heat exchangers. Each channel is independently fan-cooled and thermally protected.

Operating temperatures are monitored close to the power device junctions and are displayed on twin bargraph meters, scaled in degC. Audio power drive is muted if the temperature rise exceeds the bargraph's scale, ie. above 80.C. Reset is automatic.

The incoming air is drawn through the filter louvres visible on

the front panel. The filter pads behind the louvres work on the electret principle. The fibres are permanently charged, giving much more efficient dust extraction, for a given flow rate. For this reason, do not replace them with conventional filter media - or the warranty may be invalidated. A spare set of filters is supplied with each EPC-780 and they are also available separately (see Spares, section 13).

Filter Inspection & Maintenance

The filter pads are easily inspected by unscrewing the prominent thumb screws and removing the plastic louvres. The electret filter media is located on the inside of the louvre.

Caution: To avoid risk of shock when inspecting or changing the filter pads, switch the amplifier off. If this can not be done, please remove jewellery, and never poke metal objects into the air inlet aperture.

Keep the filters clean and do not operate the amplifier without the filters in place, except in an emergency. In common with ordinary heatsinks, heat dissipation can be seriously impaired by a covering of dust. If the dust build-up inside is substantial, it may prove impossible to remove except with specialist cleaning equipment. See section 10.

Inspect the filter pads periodically, or whenever the amplifier's temperature metering indicates a higher than normal operating temperature.

Whether inspecting, cleaning or fitting, note that crushing or creasing can degrade the electret's properties, reducing it's filtering, and to avoid deterioration of the fibrous material, do not wash them. The electret charge makes it very difficult to clean them properly, even by using a vacuum cleaner hose, so we recommend that if the filter becomes substantially clogged (hold it up to a bright light, to check for this), you replace with a new one. See Spares, section 13 .

If the air supply is unusually dusty (eg. Outdoors &/or industrial environments), you may decide to pre-filter it to prevent the individual pads clogging prematurely. Pre-filtering is normally fitted to a sealed rack system into which the EPC-780s would be installed. Suitable high-capacity filters and racking systems are available from a variety of industrial sources.

Temperature Metering & Protection

The twin bargraphs monitor the 'real' temperature of the output devices close to their junctions. Each channel's output is muted if the temperature exceeds 86 degC. If this happens, you will notice that the FAULT LED is flashing. But unlike other fault modes, the MUTE LED will also be lit and latched, ie. pressing the mute button has no effect.

Reset is automatic once the temperature has fallen to around 60 degC.

During this time the fan continues running at full speed to reduce the temperature as quickly as possible. However owing to the heatsink's very high thermal capacity, it is normal for the cooling-down (hence reset) to take a few minutes.

If over-heating occurs, it is worthwhile checking:

i) The load impedance. If you are driving a speaker with an impedance of 4 ohms or below, see Output Connections, section 6.

ii) The drive level. Is the amplifier regulary being driven into hard clip ?

iii) The filter(s), see the above section.

iv) The rack airflow.

v) For system stability. Check grounding and shielding. Check for RF and noise on the incoming lines. Use an oscilloscope with a bandwidth of 100MHz.

Once the 'top' LED marked 80 degC has lit, there is no further warning that thermal cutout is imminent, although it will happen at a slightly higher temperature. For this reason, when operating a 'live' system, we recommend you take immediate steps to reduce or slow the temperature rise (eg. back-off the drive level by a few dB), before the 80 degC LED lights.

If just one channel is in use, and temperatures are running high, switching on the unused channel can help cooling, by augmenting the airflow.

Fan Speed Setting

There are two options: Auto and Slow. For Auto, move the slide switch to the right. The fan idles at switch-on. If the heat-exchanger's temperature rises enough (and this may take some time), it will speed up to provide the required extra cooling.

For studio monitoring and related environments, where noise levels must be kept to a minimum, and where the amplifier's rated power is only required to handle transient passages, the SLOW setting inhibits the fan from speeding up with increasing temperature. To set the fan speed to LOW, move the slide switch to the left. The green LED above lights.

Of course, if the EPC-780 is driven hard with the SLOW fan setting, early thermal shutdown will ensue.

FAULT MODES

The EPC-780 has been designed to respond 'intelligently' to fault conditions which can arise within the amplifier from four main areas: Thermal, Voltage, Current, IOC.

* THERMAL. Excess temperature causes the amplifier channel to mute. The FAULT LED lights. Re-cycling is automatic, once the temperature has fallen to below 60.C. Over-Temperature cutout is distinguished from other faults by the fact the MUTE LED is latched on (see Temperature Metering, section 7.

* VOLTAGE and CURRENT. Certain life-threatening faults cause the amplifier power supply to immediately latch off ('Latched Kill'). The FAULT LED then flashes. Should this occur, check for the following:

(i) Mains voltage outside limits.
(ii) Internal amplifier fault or failure.

If excess current draw is sensed either within the power supply or within the amplifier module, the fault mode will be triggered. The FAULT LED will flash, and the amplifier will switch off, but not latch. The power supply will immediately commence the power up cycle again and continue working, if the fault was momentary. Should the fault persist however, the channel will latch off as it powers-up, leaving the FAULT LED flashing. If this happens, check the speaker lines for shorts.

* IOC. Should the internal circuitry not be able to maintain a low DC voltage at the output terminals, detect high level ultrasonic signal drive or hard clip in excess of 15dB overdrive, then the fault mode will be triggered and the power supply will be latched off ('Latched Kill').
NOTE: Should the EPC-780 be switched on with no output load connected, the IOC FAULT mode can be triggered during power up. Should this happen you should switch off and then switch on again.

Although the EPC-780 will not be harmed if it is repeatedly switched on while the fault that caused it to power-down still persists, we recommend you investigate the system set-up and make one or more changes before powering-up again. By doing this, you will minimise long-term stress on the amplifier.

TROUBLESHOOTING

Spontaneous Powering-down

Symptom 1: Amplifier powers-up normally. Later on, it latches off (FAULT LED flashes).
Check the mains voltage. If the voltage was low at the time of switching-on, and has subsequently risen (or it has been increased with a variac), an over-voltage has possibly been detected. Assuming the supply voltage is now back to normal, simply switch the channel off, then on again, so the amplifier sets itself to the correct AC voltage.

Symptom 2: Fan dead, LEDs not responding on one or both channels. Check the Auxiliary supply fuse, located under the centre of the top cover plates (250mA, 20mm)

Symptom 3: Fan dead, but 4/2 ohm & Channel Mute LEDs light up. Check the mains supply fuse (one per channel), located under the centre of the top cover plates (20A, 1 ¼")

Repeated Power up/down cycling.

Symptom 1: The amplifier powers down as soon as it powers up. Check the drive level. It is almost certainly driving the amplifier into hard clip (>0dB). For immediate powering-up, temporarily reduce the input signal (the front panel controls are fine for this). You can trim the level once powering-up is successfully accomplished.

The faults listed above are governed by the EPC-780's protective features. The following are more basic sound system faults:

Weak but clear sound

The signal level bargraph is probably reading low. If so, check attenuator and gain control settings. Check the signal source's drive level. Likely causes include shorted input lines and erroneous connections. If the bargraph is responding up to 0dB, check the output connections and the drive-units.

Weak and distorted sound

If amplifier powers-down and the FAULT mode LED flashes as soon as this happens, check for a short across the output cable, eg. slivers of wire touching inside an XLR plug. If not, check input and output connections for mis-wiring.

Intermittent Sound

This is caused by a mechanically loose connection somewhere. Try exchanging cables or shaking them to see if this triggers or changes the intermittency. Components inside the amplifier are very unlikely to come loose. Still, you should test for this if substitute cables and speakers do not cure the problem. To test for intermittency, switch the amplifier off, withdraw it from the rack and shake it, listening for loose or rattling parts. If none can be heard, remove the cover plates and make a visual inspection, with good lighting. If you find a loose component or connection, contact your local BSS AUDIO LTD agent for advice.

Coloured sound

The EPC-780 is unlikely to develop a frequency response problem, at least without more serious effects. So a weird frequency response must be traced to either (i) blown or mis-connected drive-units, or, (ii), misuse of preceding active crossovers &/ or equalisers.

Noise, hum, and buzzes

If there is excess hiss, consider the output of the preceding source. When set-up to real-world requirements, many active crossovers and graphic equalisers produce substantial hiss. See Attenuation and Gain Setting (section 6) for details on optimising

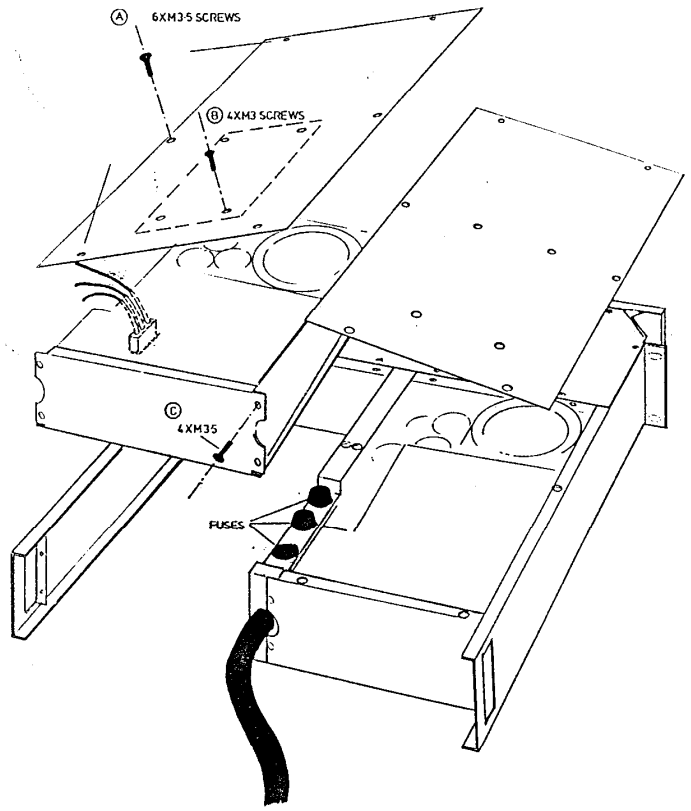
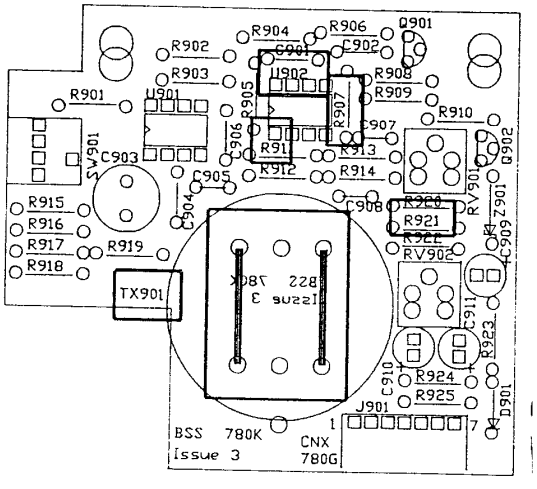


FIGURE 7. FUSE LOCATION AND MODULE REMOVAL.



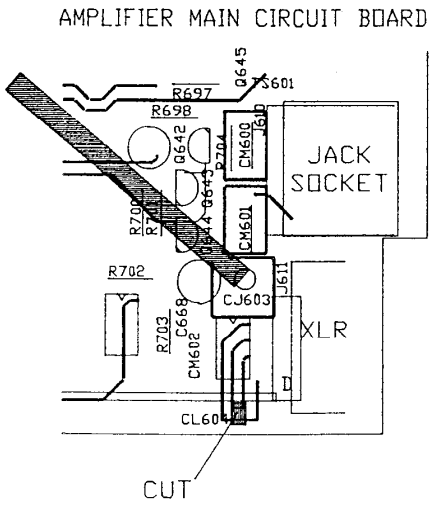


FIGURE 8. TRANSFORMER REMOVAL BUFFERED OUTPUT

the EPC-780's gain structure. If a loud hiss persists when the input cables are disconnected, contact your BSS AUDIO LTD dealer for advice.

Hum is nearly always caused by grounding faults, errors and peculiarities. Because the EPC-780's input is 100% floating, the search must be directed at other amplifiers, or the preceding equipment. Check cable shield, signal ground and mains earth connections are intact. Then check for loops: the resistance between mains earth (chassis ground) and signal ground in the system should be above 20 ohms. Some makes of amplifiers link signal ground to chassis, causing an earth loop even if their mains earth wire is left disconnected (a risky practice). We suggest you consult a qualified stage electrician for advice if this proves necessary in an emergency.

MAINTENANCE

Gaining Access

To adjust the 4/2 ohm switch, or check or replace the fan filter, undo the two 'thumb screws' (2), then remove the escutcheon (14) and louvres (1), figure 2.

To reach the supply fuses it is necessary to remove both the amplifier top cover plates. Figure 7, A and B screw sets. Do not remove the front power supply cover plates. The fuse holder caps are clearly visible at the rear of the central bulkhead, figure 7.

To withdraw one of the amplifier modules:
Remove the A M3.5 screws surrounding the module's edges on the top and the base, and the C M3.5 screws at the rear, figure 7.
Remove the top cover plate completely by removing the B M3 screws in the centre of the plates.
Carefully unplug the Molex connector from the side of the amplifier printed circuit board and unplug the ribbon cable connector from the fan board. Whilst supporting the whole unit on a level surface withdraw the module from the rear taking care not to allow the weight of the module to twist the rear mounted edge connector.

Cleaning

The EPC-780's faceplate can be cleaned with a soft cloth and any non-abrasive cleaning solution. **We recommend you unplug the unit before cleaning.**

Routine Checks.

Aside from ensuring the filter pads are not clogged (see Filter Inspection, section 7), there are no periodic 'tune-up' adjustments. The EPC-780 will go on providing its rated performance until the parts fail from old age. If a fault develops, servicing should be referred to BSS AUDIO LTD or your local, authorised dealer.

INSTALLER's NOTE:
You may find it helpful to photocopy the following and mount it close to fixed installations frequented by DJ's. You may also find it handy in your own workshop, for trainees and non-technical staff.

BSS AUDIO LTD. EPC-780 OPERATOR's GUIDE

BEGINNER's RULES

1. Never connect an amplifier's output to a power source or to another amplifier's output.

2. Do not expose the amplifier to rain or moisture, and do not touch the output terminals when the amplifier is driven hard - you could get a severe shock.
Mute the input before making, changing or adjusting speaker and output connections. BSS AUDIO LTD can not be liable for personal injury caused by careless operation.

3. Before switching on, it is a good idea to always mute a power amplifier; or connect the input cables after switching on. Either way prevents loud blasts and prevents damage to ears and loudspeakers should there be a fault. The EPC-780 is self-muting at turn off. At switch on, the EPC automatically un-mutes in two steps, giving you time to react (and hit the mute switch) if the output sounds as if it may be too loud.

4. If an amplifier cuts-out repeatedly, check the cooling inlets and outlets are free from obstruction. Check for short circuits - especially along lengthy speaker cable runs. Check the nett impedance of the speakers connected to each channel is no lower than the amplifier's ratings (4 or 2 ohms). Driving the outputs into higher impedances or open circuits does not matter at all. But make sure you're not 'clipping' or overdriving the amplifier. This is happening whenever the ''0dB' on the bargraph lights up. Avoid it at all costs.

5. Clipping (overdrive) damages loudspeakers. At high sound levels, it fatigues (tires) audiences and performers alike, aggravates threshold shift (temporary deafness) and could be a health hazard.

6. The frequency response of any reputable, modern power amplifier is very nearly flat over the whole audio bandwidth. Equalisation is not required and steals system headroom, as the equaliser cannot increase the total power available.

OPTIONS

Transformerless (Active) balanced input
The input transformer can be removed for applications where this is desirable. Removing it and replacing with two wire links provides an input that is not floating and which does not have such a good CMR specification. However, it may be perfectly

adequate in a studio control room or similar installation, where distances between equipment are slight, and system grounding is well defined. Figure 8.
PROCEDURE: Remove transformer TX901. Remove resistor R907 and R921
Add two wire links in place of transformer as shown.

Buffered Jack (RTS) Output
The 1/4" RTS ('A' gauge jack) socket can be reconfigured as an electronically buffered, 200 ohm output. The output is unity gain and is suitable for directly connecting to another channel input. When daisy-chaining a large number of channels, remember that noise will be added at each connection. In some instances therefore it might be advantageous to drive each buffered output into a number of parallel inputs (maximum 10). Figure 8.
PROCEDURE: Cut two circuit tracks on the component side of the amplifier main board.
Add 390 ohm res. at CM600; 470 ohm res. at CM601
Add insulated 80mm long wire link at CJ603 and solder other end to Pin 1 of U902 on the input pre-amp circuit board 780K.

Polarity ('Phase') Reversal
Rather than try to re-wire the input XLR, which is pcb mounted, it is easier to remove the amplifier module and reverse the wiring on the output terminals. These are wired on spades connectors, so no soldering is required. Ensure neither side of the loudspeaker wiring is taken to ground/earth.

Cleaning heatsinks
To clean the copper heat-exchanger elements, either use an airline to blast the dust out, or an ultrasonic cleaning bath filled with a suitable solvent (refer to BSS AUDIO LTD for advice, as an incorrect solvent could cause irreparable damage to the electronics).

SPARE PARTS & ACCESSORIES

Should you require to order replacement parts for your EPC-780, please use the following order codes. This will greatly assist our sales staff and ensure you receive the correct parts.

ORDER CODE	DESCRIPTION.	
X02-0020	Fan filter media.	Pack of 10.
M03-0012	Main supply fuse 20A 250v.	Pack of 5.
M01-0027	Aux supply fuse 250mA T.	Pack of 5.
W03-0072	Thumb Screw for escutcheon.	Pack of 2
W03-0017	M3.5 Cover plate/module screw.	Pack of 25.
W02-0032	M3 Cover plate screw.	Pack of 25.

TECHNICAL DESCRIPTION

The BSS EPC-780 high efficiency power amplifier embodies a number of new technological advances which makes it possible to achieve such large audio powers from a comparatively small and lightweight unit, yet retain the quality and reliability normally associated with BSS AUDIO products.

The EPC-780 houses two identical channels, which each have their own independent power supply. The two channels can therefore be run independently from each other, and maximum output power is not restricted by the drive level of the other channel.

The following is an overall general description rather than an indepth analysis of the circuit details. This is reserved for the comprehensive technical service manual made available to authorised service centres only.

Before attempting to remove any of the outer cover plates, please ensure that the amplifier has been switched off for at least ten minutes to ensure all internal high voltages have discharged. You must be reminded that there are potentially lethal DC voltages within this unit and great care must be exercised.

INPUT The input is applied via a floating, balanced transformer winding with a 1:1 ratio. The load impedance into the input is essentially the 10k resistive load of the succeeding input buffer stage. The front panel attenuator control attenuates the output of the balanced input buffer which together with the transformer provide a very high value for common mode rejection. The following stages provide the sensitivity adjusting rear mounted 2dB step switch and also the two stage muting circuitry. Bandwidth and RFI are controlled at the input to prevent RF demodulation and intermodulation products.

POWER When the power switch on the front panel is depressed, mains power is applied to the low voltage auxiliary supply. This powers the displays, the monitoring and diagnostic circuits. When AC power is first applied, the supply monitor measures and averages the AC line voltage. Assuming this measured voltage is within the operating limits, it sets the appropriate taps on the power transformer and soft-starts the main high power supply. After the main supply rails are established, the diagnostic circuitry checks for normal and safe operating conditions before un-muting the amplifier's audio drive, in two steps.

The main power supply is unconventional in its use of transformers and is electronic in operation. It uses sinusoidal switching techniques and sophisticated 'housekeeping' to achieve low weight, high efficiency, compactness and intelligent protection. Unlike conventional switching supplies, it does not generate high energy interference, so radiated RFI is extremely low without cost or weight penalty.
Energy is stored in two reservoir banks. The secondary bank

comprises over 100,000uF of ultra-low impedance reservoir capacitance available for immediate use within each amplifier module and closely coupled to the output stage. The primary bank can be much smaller, as it 'tops up' the secondary bank 80,000 times a second. As a result, the EPC-780's transient power is considerably greater than amplifiers using conventional supplies which can exhibit high 100Hz (or 120Hz) modulation effects when delivering full power. Equally, the peak current drawn off the mains is considerably less making it less critical on the integrity of the supply itself. The difference shows most in large-scale systems, or wherever the mains supply impedance is poor.

The main supply's protection block senses excess current draw and shuts down the power conversion process within 2 micro seconds, if the current demanded by the amplifier (and the load) threatens its continued existence. If instantaneous current draw exceeds 40 Amperes within the power supply, or 90 amperes within the amplifier module, the main supply will shut-down. This tremendously fast response ensures effective and safe control of the high powers available within the EPC-780. Having shut down once, it will automatically begin it's restart cycle. If the excess current was momentary (eg. caused by the outputs being shorted for an instant), the supply (and the amplifier) will continue to work normally. Thus the EPC-780 is forgiving of glitches in practical sound systems. But, if the fault recurs during the subsequent powering-up sequence, the main supply will be latched off, indicated by the flashing FAULT LED.

The Amplifier

The amplifier's output stage comprises an asymmetric bridge. Two-step commutating power rails allow 2A quiescent current yet 70% efficiency at full power.
For studio monitoring, Class A distortion characteristics are achieved at normal programme levels (up to 20 watts), while for PA work, hard-drive dissipation is under 300w, when each of the output MOSFET power devices dissipate well under 25 watts each.

A non-switching commutation driver maintains good linearity at intermediate levels because there is no abrupt switching. Overall, it reduces demands on the feedback loop, helping to maintain low output impedance (typically 10 milliohms) and low interface distortion at the output, with all combinations of level, load and programme.

GLOSSARY OF TECHNICAL TERMS.

Active. Active electronic circuits are those capable of voltage and power gain by using transistors and integrated circuits. Passive circuits are those which use on resistors, capacitors, transformers, etc.

Active Crossover. An active crossover utilises ICs and transistors, and divides the frequency spectrum at line levels, immediately ahead of the amplifiers.

Balanced. Refers to a 3-wire connection in which two of the wires carry the signal, and the third acts as a shield, tied to chassis ground. The two signal lines are of opposite polarity at any instant, but are at the same (numeric) voltage with respect to ground. Balanced connections are used to reject noise and hum pickup in system inter-connections.

BURST POWER. Another name for dynamic headroom; see below.

CLIP. Another name for overload; when a signal reaches an amplifier's output voltage or current limits. Clipping is not harmful in itself, but produces severe distortion and exacerbates heat-dissipation in the amplifier, its power supply and the speaker(s).

DAISY CHAINING. A colloquialism for connecting two or more amplifier inputs in parallel (shunt) in large-scale installations. The name comes from the 'daisy-chain' appearance or leads strung between successive amplifiers.

dB. A unit for expressing the ratio between two signal levels, for comparison purposes. On its own, it has no absolute value. Rather, it's a logarithmic ratio used to express the differences between two amounts or levels. Positive numbers indicate an increase, and negative ones a decrease. Some useful ratios are:

+3dB = double power or 1.5x voltage
+6dB = 4x power; or 2x voltage
+10dB = 10x power; or 3x voltage
+20dB = 100x power; or 10x voltage

dBm. The addition of 'm' after dB indicates an absolute scaling for the dB ratio. Instead of a ratio, the dB then becomes a measure of power. 0dBm = a power level of 1 milliwatt into a load of 600 ohms. The corresponding voltage is 778mV (0.778v). In modern audio, the dBm is loosely used to describe voltage levels, although strictly it only applies to 600 ohm circuits. We recommend you use dBv instead.

dBu or dBv. The addition of 'u' or 'v' after dB indicates an absolute scaling for the dB ratio. 0dBu (or 0dBv) = 778mV or 0.778 volts, and it has no regard to power or impedance. dBu and dBv are widely used for expressing signal voltages in modern audio

equipment, where output impedances are low, and input (load) impedances are much higher.

dBV. The same as for dBu above, except 0dBV = 1.0 volts. To convert dBV to dBu, simply subtract 2.2dB.

DISTORTION. Refers to any modification of a signal which produces new frequency components not present in the original. Harmonic distortion refers to added components that are overtones to the fundamental frequency. Intermodulation distortion creates sum and difference frequencies which are highly objectionable, because they are not harmonically related to the original.

DYNAMIC HEADROOM. A kind of headroom (see below) which is 'time sensitive'. It arises in power amplifiers, where the power source is able to supply voltages and/or currents in excess of its continuous rating for short time periods, typically between 20mS and a few seconds. The extra headroom is meaningful as it enables the amplifier to reproduce short bursts, characteristic of music. In the past, the IHF (Institute of High Fidelity, USA) has acknowledged 'burst power' ratings lasting 20mS. However, it is now recognised that most musical transients last for 200 to 300mS, so dynamic headroom has to extend for periods of 1/4 second or more, to be meaningful.

FREQUENCY. The repetition rate of a waveform. The unit of frequency is Hz, and 1 cycle per second is equal to 1Hz. The audio band is generally regarded as spanning the frequencies between 20Hz and 20,000Hz (20kHz).

FREQUENCY RESPONSE. Refers to the equipment's relative gain, compared to frequency. Generally expressed as +/- a certain number of dB's from 20Hz to 20kHz.

HEADROOM. The amount in dBs, above the normal operating level that can be used before serious distortion commences.

HF. High Frequencies, generally 800Hz or 3500Hz up to 20,000Hz.

IMPEDANCE. The AC equivalent of resistance. It is measured in ohms, and indicates the amount of drive current required for an input, or the drive capability of an output, at a given signal level.

LEVEL. The amplitude of a signal, measured in volts or decibels.

LINE LEVEL. Generally indicates signals between -10 and +10dBu, or -12 to +8dBV. Mic level refers to levels around -40dBu. Speaker levels are typically +10 to +40dBu.

LF. Low frequencies, or Bass, generally between 10Hz and 200 to 800Hz.

mm². This refers to the conductor's individual cross-sectional area, excluding the insulation. A cable's diameter is a different measurement altogether.

OCTAVE. A logarithmic unit for expressing frequency ratios. Positive values indicate an increase in frequency, and negative ones a decrease. One octave 'up' the scale is a doubling in frequency. One octave 'down' is half the frequency.

PHASE CHANGE or **INVERT:** See **Polarity Reversal**

PHASINESS. An expression for unpleasant variations in tonal colouration when two or more sound sources are mutually counteracting.

POLARITY REVERSAL. A reversal of instantaneous signal polarity, equivalent to a phase shift of 180. Same as polarity inversion.

rms. A measurement that gives an accurate point of cross-referral for AC voltages and currents when they're not sinusoidal. Rms readings are commonly used for mains voltage measurements, as the supply is often distorted &/or clipped. However, few AC power meters read the peak voltage, which has an even greater influence on power supply performance.

TRANSIENT. A sudden burst of energy in an audio signal, which only lasts for a small period of time, relative to the rest of the signal. The level of these transients can often reach 10 times (+20dB) or so above the normal operating level of the equipment, and may cause distortion if the headroom is inadequate.

TRI-AMPED. Jargon for a 3-way active system.

UNITY GAIN. Where output signal level is equal to input signal level.

WATTS. Unit of power. To be meaningful, comparisons of amplifier power should compare like for like, normally the 'rms' or average rating in watts.

SPECIFICATIONS

Continuous sinewave power output[1] per channel:

8 ohm load:	>550w.
4 ohm load:	>1000w.
2 ohm load:	>1200w.[2]

Distortion (THD), 20Hz-20kHz, at any level 0.5dB below clip:

< 0.1%
Typically 0.01%

Output DC offset voltage:

<100mV
typically 15mV

Noise, relative to full output, on 20Hz to 20kHz bandwidth:

<-115dB

Input : 10k ohm transformer balanced.

Input sensitivity for full output power: selectable -2 to +12 dBv.

Common mode rejection (CMR), 20Hz-20kHz: >100dB

Crosstalk, 20Hz to 20kHz, re. max output: Unmeasurable

Slew rate limit (input filters removed): >80v/uS

Damping Factor, 30 Hz to 1kHz: >1500

Power Requirements per complete EPC-780:
Under no signal conditions the EPC-780 takes less than 2 amp at 240v or under 4 amps on 120v mains supplies. The full drive current requirements are:

nominal 240 v	continuous sinewave full power	4Ω	12 amps
	average music at full power	4Ω	6 amps
	continuous sinewave full power	2Ω	18 amps
	average music at full power	2Ω	9 amps

nominal 120v The current will be approximately double that noted for 240v above.

Mounting dimensions from rack flanges: (w x ht x d)

432 x 89 x 510 mm
19" x 3½" x 20"

Nett Weight (unboxed): 11 lbs/ 24 kg

Gross Weight (includes carton): 14lbs/31kg

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[1]FTC continuous rating, ie for a minimum of 5 minutes before thermal shut-off.
[2]When set for 4 ohm load, short term transient power will increase to 1700w rms.

WARRANTY

This unit is warranted by BSS Audio Ltd to the original end-user purchaser against defects in workmanship and materials used in its manufacture, for a period of one year from the date of shipment to the end user.

Faults arising from misuse, unauthorised modifications or accidents are not covered by this warranty. No other warranty is expressed or implied.

If the unit is faulty, it should be sent shipping pre-paid to the original supplier or your local, authorised BSS AUDIO LTD dealer.

You must include a statement listing the faults found - and the unit's serial number should be quoted in all correspondence relating to warranty claim(s).

IMPORTANT: We recommend you record your purchase information here for future reference.

Dealer's name:.....
Address:.....
Phone No.: .....
Invoice/Receipt No.: .....

In keeping with our policy of continued improvement, BSS Audio Ltd reserve the right to alter specifications without prior notice.

The EPC-780 was designed, developed and produced by BSS Audio Ltd, Hertfordshire, England.

If you have any questions or comments on the quality and utility of the EPC-780, or wish to receive information on our complete range Pro-Audio products (listed below), please contact your local dealer.

OUR CURRENT RANGE OF PRODUCTS IS:

DPR-402	2 CH. Compressor, de-esser and peak limiter.
DPR-502	2 CH. Noise gate with MIDI interface.
DPR-504	4 CH. Noise gate.
FDS-360	Programmable electronic crossover with limiters and variable phase correction.
MSR-604	4 CH. Active microphone signal distribution and splitting system.
MCS-200	Modular rack mount crossover system.
MCS-LDA	Modular rack mount line distribution system.
AR-116	Active DI (Direct Injection) box.
AR-117	Phantom powering accessory for AR-116.
AR-125	Lead and Fuse checker.
AR-130	System polarity checker.
AR-204	Transformer line balancing unit.
AR-416	4 CH. rack mount mains powered active DI.

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