mPOWER

Console Power Supply

Operating instructions

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Section 1.

General Description:

Mpower console power supplies utilise the latest switch mode power modules coupled with proprietary filtering circuits that result in a very compact 3U unit that is cool running and highly energy efficient.

As a consequence, one unit will replace two SSL CF616E power supplies and the CF663 changeover unit.

It no longer needs to be housed in a separate air conditioned room as it does not need assisted cooling and furthermore, because of its very low ambient noise (much quieter than a computer for example), it can be sited in the control room. This results in the ability to use much shorter power supply cables which significantly reduces the voltage losses incurred by long cables. (See Section 4. Initial Setup).

Not only is there a saving made in electricity usage by not needing a dedicated air conditioner, significant savings in the main electrical supply can also be made owing to their much superior energy conversion, (typically 85 percent as opposed to only 35 percent from the original linear supplies).

Tests have shown that on a 64 channel SSL 4000G Series console, the electricity consumption was reduced from 1.8kW to just 0.8kW. So apart from the increased reliability and low ambient noise, electricity bills can be more than halved. Effectively therefore, the price of the Mpower unit can be paid for in around a year or so!

Mpower console supplies have been designed by Professor Malcolm Toft, whose career has spanned more than fifty years in the recording industry. As recording engineer he worked with The Beatles, David Bowie, James Taylor, Joe Cocker and T-Rex among many others. He then went on to found Trident Audio developments, a major manufacturer of recording consoles during his ownership from the early 1970's to the late 1980's. He still has the same passion for designing equipment that has driven him throughout his illustrious career. In 2010 he was made a Visiting Professor at Leeds College of Music in recognition of his contribution to the recording industry.

He is well aware how important reliability is to studio owners and for this reason he has spent a considerable time researching the design of the Mpower supplies to ensure that reliability is a key factor.

Section 2.

Key Features:

The design incorporates a number of unique features not typically found in any other console power supplies.

Red digital displays show the voltage on all of the d.c. outputs feeding the console and blue displays next to them show the amount of current being drawn on the main audio and logic rails.

The current displays are particularly useful in showing that the current drawn by the +/- audio rails is equal.

A standby switch, separate to the mains power switch isolates the d.c. outputs from the console (apart from phantom power). This provides a quick and easy way to disconnect the console from the power supply while setting up voltages etc. It also allows the power modules to achieve full voltage without the console load. This means that if required, the SSL bucket switches can all be left in the ‘on’ position.

Cross coupling of the +/- audio voltages is also provided whereby, if one supply rail should drop out for any reason, the other supply rail will automatically be disconnected.

The supplies have been designed in a modular fashion whereby in the likely event of a power module failing, it can easily be replaced with all connections being made by screwdriver terminals.

The rest of the circuitry is incorporated into a single printed circuit board which is again connected by screw terminals and can be removed for servicing or replaced if necessary.

A key emphasis in the design has been to make sure that the supplies run as cool as possible yet produce the minimum amount of ambient noise. This has been achieved by making sure that the power modules run well within their maximum capabilities and the inclusion of specially selected ultra low noise fans.

The unit will run on mains a.c. voltages ranging from 85-260volts without any selector switches being necessary. This means that it will operate in all countries worldwide.

Section 3.

Installation:

In most instances the unit will be mounted into an equipment rack and will occupy three standard units of rack space.

It is essential to provide adequate air circulation and as a consequence it is essential that at least 1U of clear space is left above and below the unit.

The power supply is quite deep (40cm plus connector depth) and whilst it does not require additional support at the back, four suitable screws (either M5 or M6) should be used to secure it into the rack at the front.

In some instances where it might be desirable to locate it next to or under the console, it is again essential that proper air flow is maintained and in this situation the supply should be raised from the floor by wooden blocks or a similar support that will provide at least 50mm of clearance from the floor. Nothing should be placed on top of the supply and the ventilation holes in the cover should be kept completely clear.

The supply connects to the a.c. mains supply via a standard 3 pin I.E.C. connector, which is widely used around the world.

The earth pin of the I.E.C. connector is connected to chassis earth of the supply and also the earth pins of the power supply modules and ground pin(s) of the console connector. As a consequence, the power supply can be used as the central earth reference point for the system.

On all supplies built for SSL consoles, there are two 19 pin circular connectors that mate with cables that then connect to the console. Both of these connectors are wired identically, so if the console is only fitted with one connector, either can be used.

Section 4.

Initial Setup:

Before connecting the unit to the console, it is essential to set the voltages so that they are correct for the particular configuration and length of d.c. power cable(s) to the console being used.

For an SSL console, the supply is factory set for a voltage of around 19 volts for the +/- audio rails and 7 volts for the logic. The phantom power is a fixed and non adjustable voltage of typically 48volts.

For a Neve VR console, the +/- audio rails will be factory set for around 17 volts and the logic for around –15 volts.

Access to the voltage adjustment points for the audio rails are on the left hand side of the unit (looking from the front) and on the right hand side (looking from the front) for the logic rail.

Since they are on the side of the unit, unless access is available in the rack, it is a good idea to set the voltages while the unit is not finally fixed into the rack. They can be set while the unit is on the floor as it can operate for enough time for the voltages to be set without additional airflow.

The supply should be located at a similar distance from the console to where it will be finally located in the rack, so that the voltages do not vary once set.

Figure 1. below shows the location of the audio rail voltage adjustment points.

Fig.1

Below the arrows there is a small potentiometer on the side of the power supply module that can be adjusted via a small flat bladed screwdriver through the appropriate slot in the chassis of the power supply. The –VE is towards the front of the unit and the +VE towards the back of the unit. A green led which will be illuminated when the power is switched on, shows the location of the adjustment potentiometer.

Figure 2. below shows the location of the logic adjustment point.

Fig.2

This can be adjusted via the same manner as the audio rails and a green led indicates the location.

When adjusting the voltages, it is very important to measure the voltage at the console as well as via the meter on the front of the power supply. This is because there can often be a significant voltage drop due to the length of the cable connecting the console to the power supply. When connecting to an SSL console it may not always be possible to obtain the recommended ± 18.5V at the console. This is often the case when a long cable is used between the power supply and the console. Long cables were used with the original supply because they generated a lot of heat and were incorporated very noisy fans. Consequently it was recommended that they be sited in an air conditioned room some way from the console. This often resulted in cable lengths approaching 100ft! The connectors used meant that low resistance high copper cables could not be used. As a consequence, there was often a considerable voltage drop through the cable(s).

Since your new Mpower supply generates very little heat and is also virtually silent in operation, it does not need to be housed in an air conditioned room or some distance from the console. It is therefore highly recommended that the power supply cables are shortened to

the minimum length necessary and that it be sited as close to the console as possible.

If the original cables are used and not shortened, it is possible that the voltage at the console does not reach the specified ±18.5, but maybe around ±17 to ±17.5V. If this is the case, the adverse effect on the console will be minimum and the only affect will be to reduce the maximum headroom of the console by around 1db. It might also be worth noting that some of the integrated circuits used in the SSL input modules have a manufacturers recommended maximum voltage of ±18V. So running them at a slightly lower voltage might in fact result in a longer operating life.

A trained technician familiar with the console being used will know where to locate suitable points to take the voltage readings and they are usually located in the master section of the console. The voltages should always be adjusted so that the correct reading is made at the console, irrespective of the meter reading on the power supply.

Once the voltages have been set, the power supply should be switched off and mounted in the rack with all cables reconnected.

If the plasma display option is fitted, this will be set for the correct voltage at the factory.

A question that is also sometimes asked is whether the SSL ‘bucket’ switches still need to be used. These were needed because the original ‘linear’ supplies were unable to start up when presented with the highly capacitive load which the console presented when completely powered up. There was a danger that it would look like a short circuit to the power supply when it was first switched on and this could result in the supply shutting down as if there was a short circuit across it. So to prevent this, the console was switched on in sections which allowed the power supply to fully charge it’s own capacitors before a full load was presented to it.

Not only does the Mpower not suffer the same problems with the highly capacitive load presented by a full console, but it is also provided with a ‘standby’ mode which is designed to exactly combat any possible problem that a full load could present to it.

When the ‘standby’ mode is activated, the power supply audio and logic rails are physically disconnected from the console (the load). This allows the power supply to come up to full voltage and stabilise its maximum current output capability. Consequently the console will

not look like a short circuit to the power supply. It should therefore not be necessary to switch each of the 'buckets' on individually. This standby mode is unique to the Mpower supply.

We also get asked if it is necessary to leave the power supply switched on all the time as was often the case with the original supplies. Opinions are divided on this subject. Some maintenance engineers are of the opinion that switching the console on and off regularly can shorten the life of some of the console's components. Others think there is minimal danger of that and of course there is a significant saving of energy if the console is not actually in use for some time. It is our opinion that the standby mode greatly reduces the amount of possible component degradation and it is always better to turn of the supply if the console is unattended for any length of time.

Note:

All the above procedures should be carried out by fully qualified personnel as high voltages are present within the unit.

Section 5.

Specifications:

Mechanical

Dimensions: 3U high (132.5 mm) Width: 19” (483 mm) Depth: 400mm (plus connector depth). For SSL consoles add 30mm (plus mating cable). For Neve VR consoles add 50mm (plus mating cable).

Weight: 11kgs.

Electrical

A.C. power rating: 240volts: 10A
A.C. power rating: 110volts: 20A

D.C. Power audio +: 15-19.5V @ 30A
D.C. Power audio -: 15-19.5V @ 30A
D.C. Power logic: +6-7.5V @ 10A (SSL). –15V @ 10A (Neve VR).

Errors and omissions excepted. Mpower reserves the right to change specifications without prior notice.