Meridian Audio Limited
Latham Road, Huntingdon
Cambridgeshire PE29 6YE
United Kingdom

T +44(0)1480 445678
F +44(0)1480 445686
E info@meridian.co.uk
www.meridian-audio.com

Service Guide 861V4 Surround Controller

SG006, Issue 1, 11th June 2012

This document is intended to be used in conjunction with the product's User Guide.

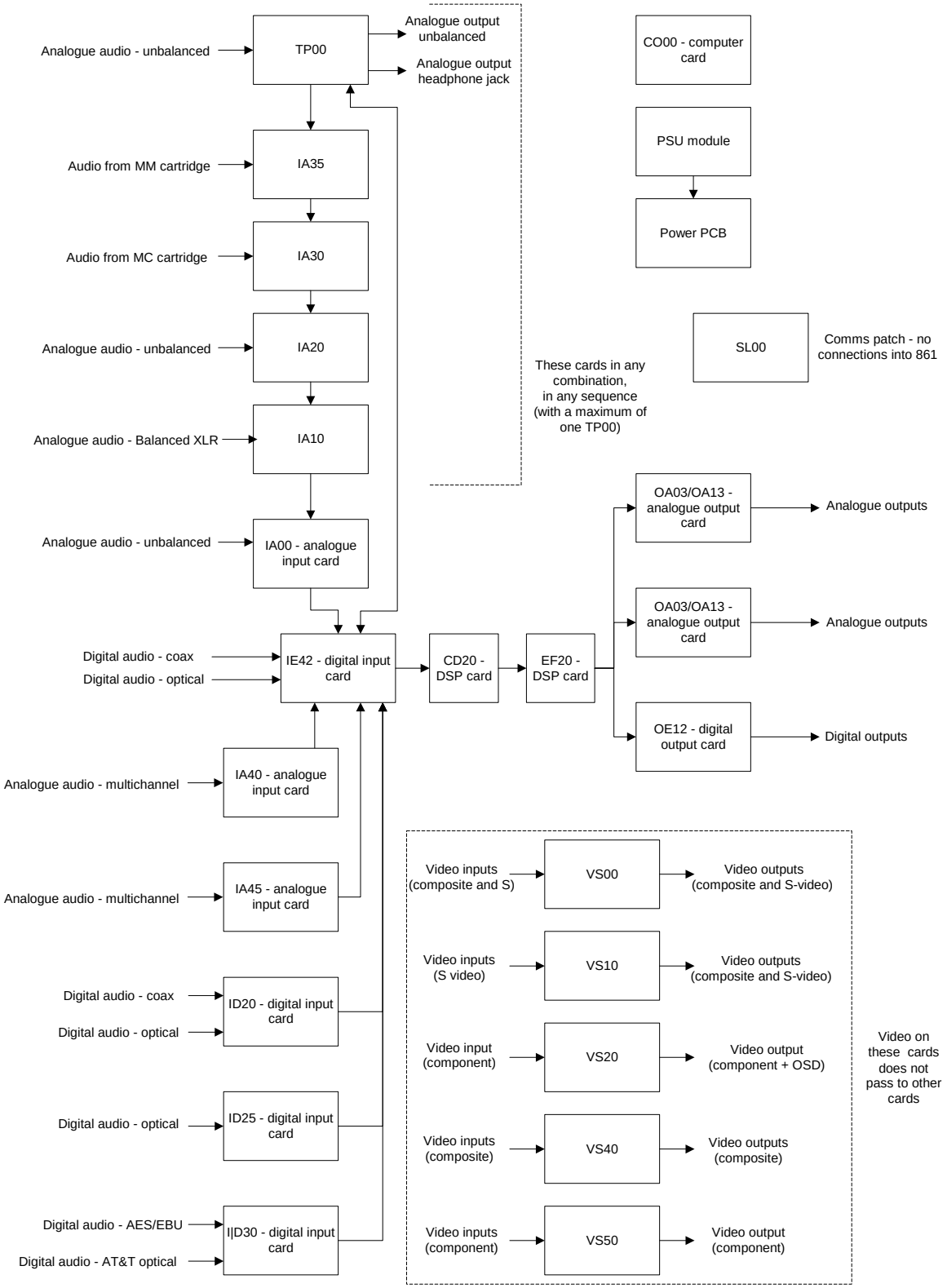
This document shows how to repair the product using the technique of substitution of sub-assemblies, such as complete circuit boards. Spare parts for this purpose are available from Meridian. Repairs to circuit-component level are not covered in this document, but circuit diagrams are available from Meridian (subject to the terms of a non-disclosure agreement - NDA).

Contents:

1. Main sub-assemblies

Short-form name	Meridian System Name	Part no.
PSU	800 SERIES PSU	PA10140
Display board	800 SERIES DISPLAY BOARD	PA10579
Switch board	800 SERIES SWITCH BOARD	PA10580
Cap board	800 SERIES CAP BOARD	PA10532
Motherboard	861/818/808.3 MOTHERBOARD	PA10583
Com board	861 COM BOARD	PA10563
IE42 board	ASSY IE42 PCB	SU2612
IA00 board	ASSY IA00 PCB	SU1672
OE12 board	ASSY OE12 PCB (OE22H)	SU0039
CD20 board	ASSY CD20 PCB	SU2602
EF20 board	ASSY EF20 PCB	SU3197
OA03 board	ASSY OA03 PCB	SU2756
OA13 board	ASSY OA13 PCB	SU2763
IA10 board	ASSY IA10 PCB	SU1652
IA20 board	ASSY IA20 PCB	SU1680
IA30 board	ASSY IA30 PCB	SU1688
IA35 board	ASSY IA35 PCB	SU1684
IA40 board	ASSY IA40 PCB	SU2136
IA45 board	ASSY IA45 PCB	SU2622
TP00 board	ASSY TP00 PCB	SU1660
ID20 board	ASSY ID20 PCB	SU1664
ID25 board	ASSY ID25 PCB	SU2925
ID30 board	ASSY ID30 PCB	SU1668
VS00 board	ASSY VS00 PCB	SU1676
VS10 board	ASSY VS10 PCB	SU2143
VS20 board	ASSY VS20 PCB	SU1692
VS40 board	ASSY VS40 PCB	SU2150
VS50 board	ASSY VS50 PCB	SU2930
Slave patch	ASSY SL00 PCB	SU1656
RF00 board	ASSY RF00 PCB	SU1975
Terminator card	ASSY TM00 PCB	SU2713

2. Basic signal routing through product



3. Basic functionality explained

All 861V4 units have three cards which must be fitted in order for the unit to function correctly:

IE16 digital input
CD20 DSP card
EF20 DSP card

In addition, at least one audio output card from the following list must be fitted in order for the unit to product sound:

OE12 digital output card
OA02M unbalanced analogue output card
OA12M balanced analogue output card
OA03 unbalanced analogue output card
OA13 balanced analogue output card

Most analogue output cards fitted to 861V4 are either OA03 (unbalanced) or OA13 (balanced. However, it is possible to fit the earlier OA02 and OA12 cards if the card is modified appropriately (details are available from Meridian). Such modified cards are designated OA02M and OA12M respectively. However, these designation is not shown on the back panel of the card. Hence, if cards marked should be taken if cards are

For troubleshooting purposes, the analogue output cards can be considered the same and will be referred to as “OA” cards

The following combinations are possible:

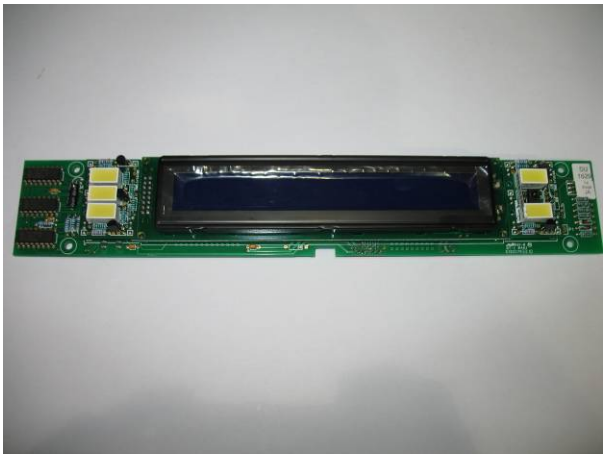
1 x OE12 - for systems with only DSP speakers
2 x OA card - for systems with only analogue amps and speakers
1 x OE12, 1 x OA card - for systems with a combinations of speaker types.
1 x OE12, 2 x OA card - for demo units which may be connected to various speaker systems.

In theory, 1 x OA card without OE12 can be used, but such a set up will support speaker systems up to only “4.0” channels, so it is unlikely to be found in practice.

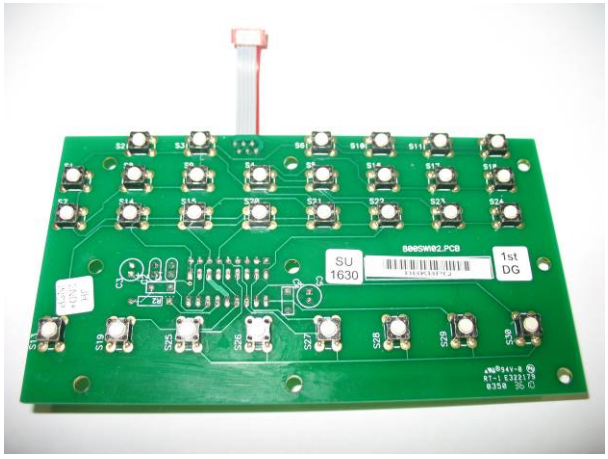
Up to two terminator cards may be fitted to the Motherboard. The position and number of these are explained in Section 9 of this document.

4. Identification of main sub-assemblies

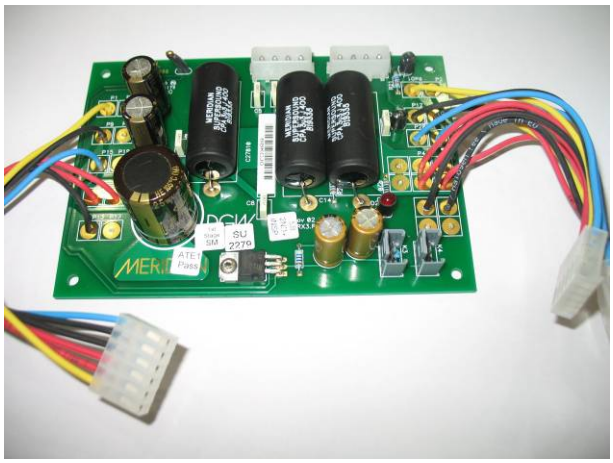
PA10140: 800 SERIES PSU



PA10579: 800 SERIES DISPLAY BOARD



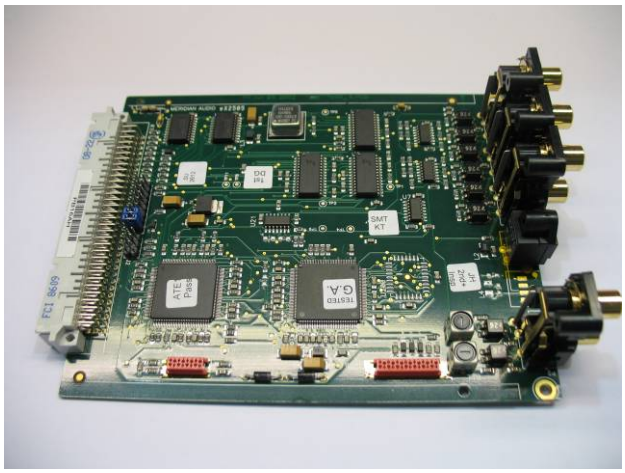
PA10580: 800 SERIES SWITCH BOARD



PA10532: 800 SERIES CAP BOARD

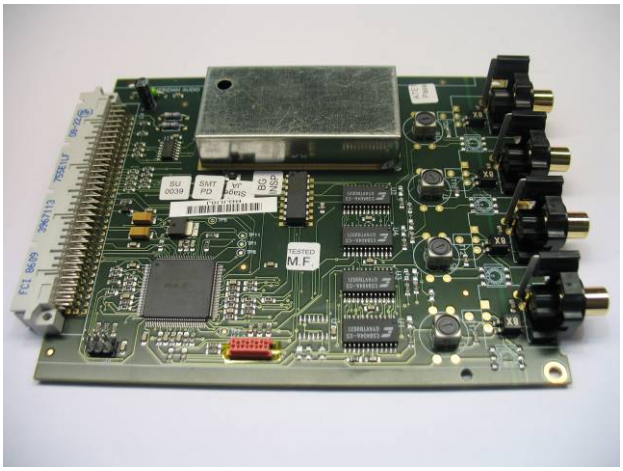
PA10583: 861/818/808.3 MOTHERBOARD

PA10563: 861 COM BOARD

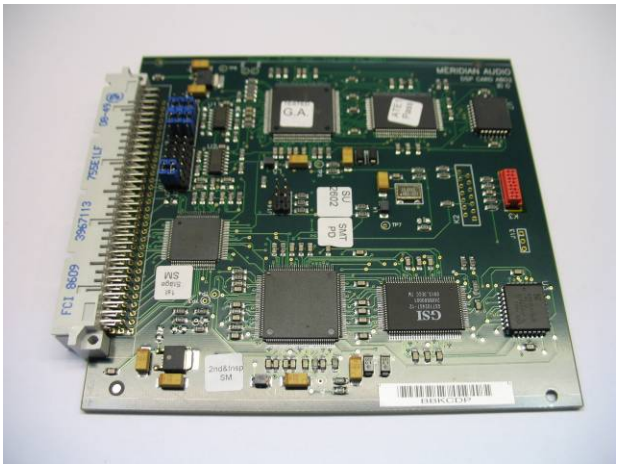


SU2612: IE42 PCB

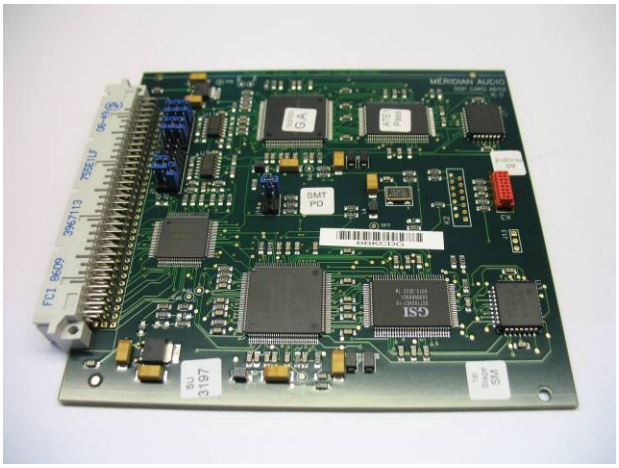
SU1672: IA00 PCB



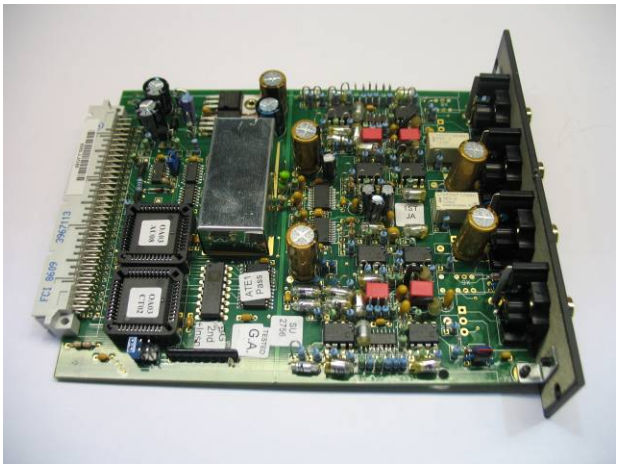
SU0039: OE12 PCB (OE22H)



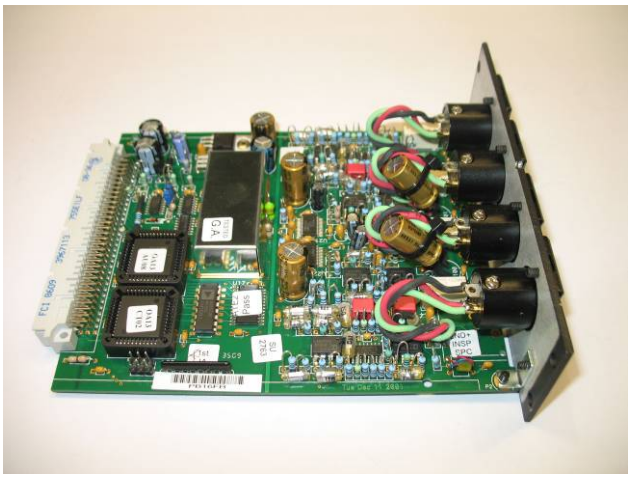
SU2602: CD20 PCB



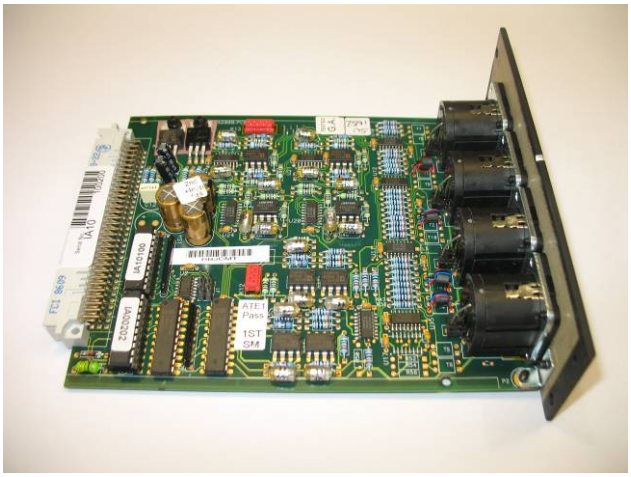
SU3197: EF20 PCB



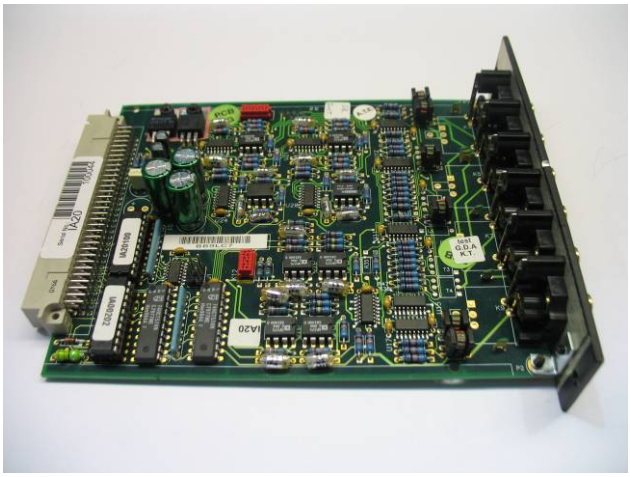
SU2756: OA03 PCB



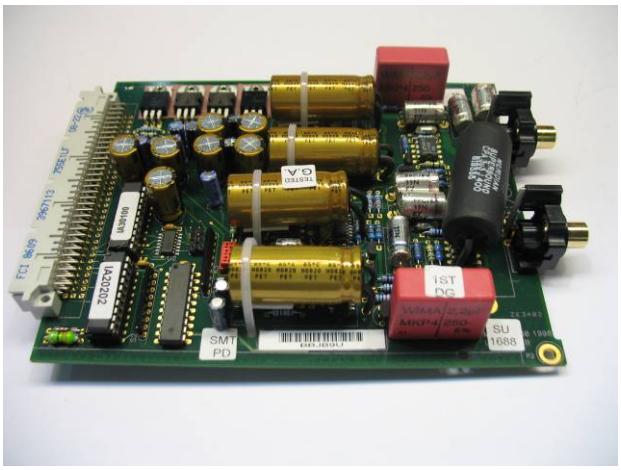
SU2763: OA13 PCB



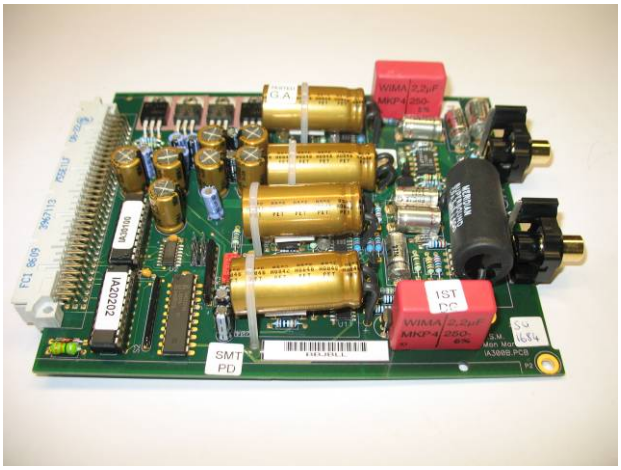
SU1652: IA10 PCB



SU1680: IA20 PCB



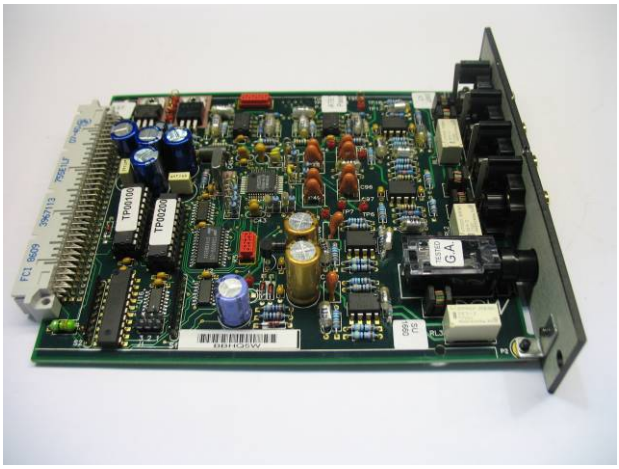
SU1688: IA30 PCB



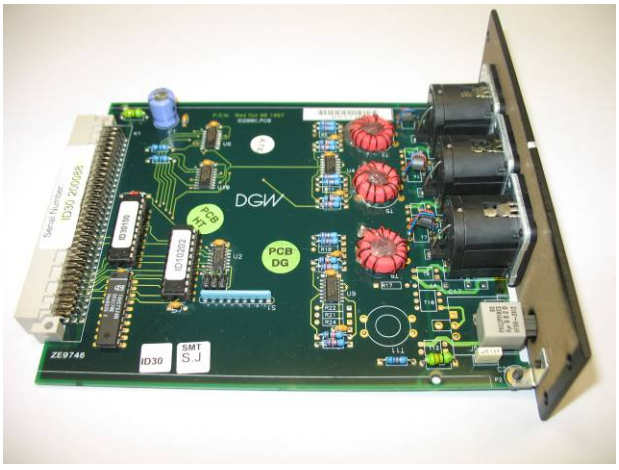
SU1684: IA35 PCB

SU2136: IA40 PCB

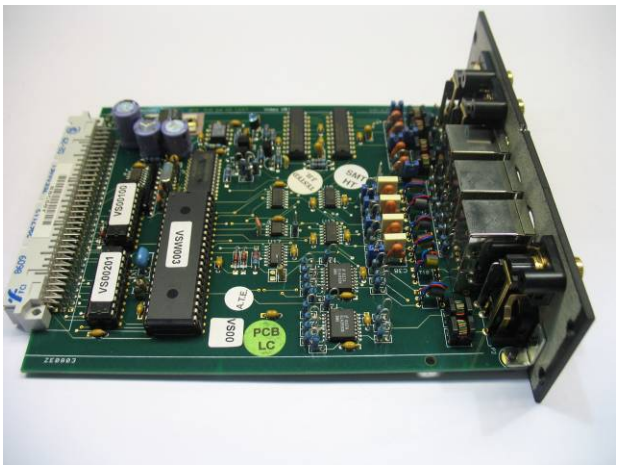
SU2622: IA45 PCB



SU1660: TP00 PCB

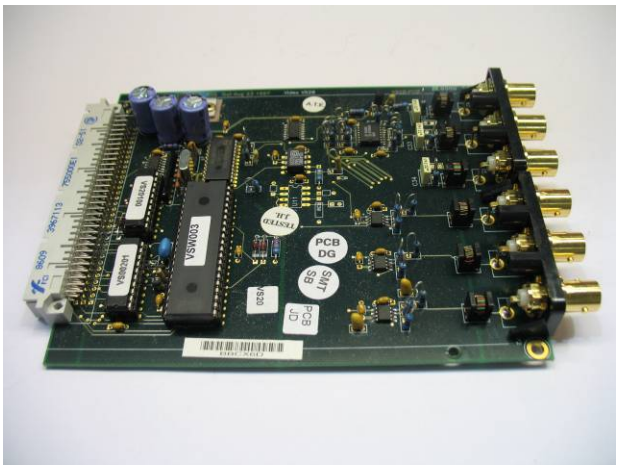


SU1668: ID30 PCB



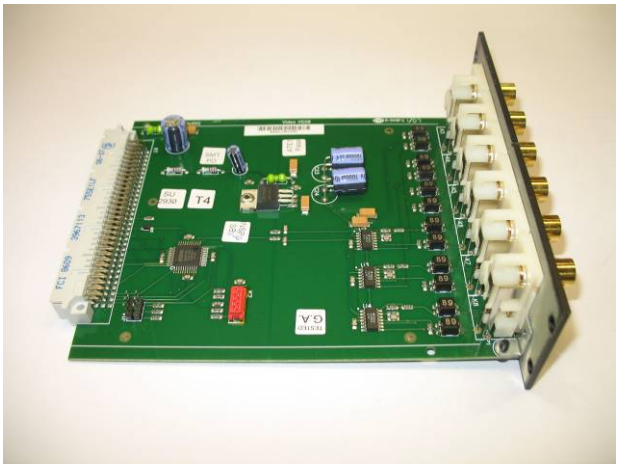
SU1676: VS00 PCB

SU2143: VS10 PCB



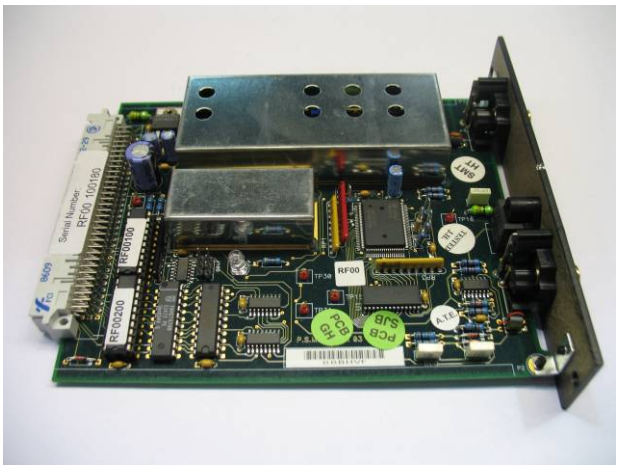
SU1692:VS20 PCB

SU2150: VS40 PCB



SU2930: VS50 PCB

SU1656: SLOO PCB



SU1975: RF00 PCB

TM00 TERMINATOR BOARD

5. Location of main sub-assemblies

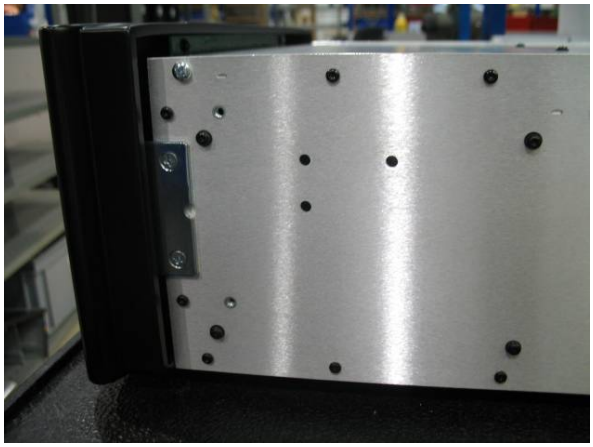
- The Display board and Switch board are located within the Fascia of the product. Remove the Fascia to gain access to these boards
- The PSU module, Cap board and Motherboard are located within the Main section of the chassis. The outer-cover and inner-lid must be removed to gain access to these items.
- All other cards plug into the Motherboard are accessed from the back-panel. In some cases, there are ribbon looms which connect internally to the card. Access to these can be made from the back-panel, but may be made easier by removing the outer-case and inner lid.

6. Disassembling the product

(6.1) Removing the Outer Cover assembly

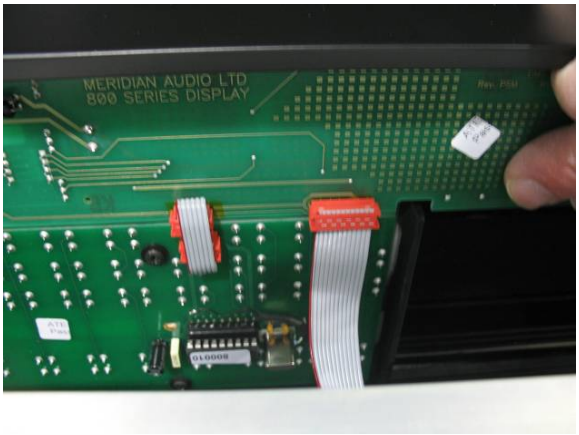
Remove the four screws on each side which secure the Outer Cover to the chassis.
From the rear of the unit, slide the Outer Cover backwards away from the chassis.

(6.2) Removing the Fascia assembly



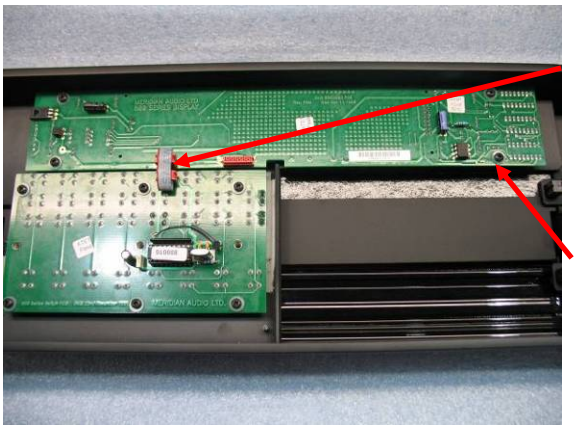
Remove the Top Cover Assembly as described above

Remove the four screws (two on each side) securing the front-panel assembly to the chassis.



Carefully tip the Fascia forward and disconnect this loom from the Display board. The Fascia can now be removed from the chassis.

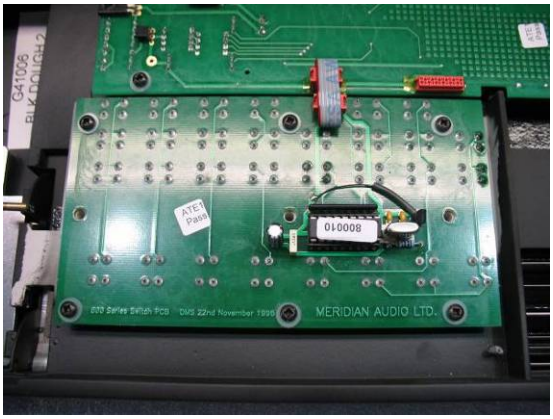
(6.3) Removing the Display board



Noting its orientation, disconnect the small loom from between the Display board and Switch board.

Remove the four Torx T10 screws and nylon washers from the Display board. The Display board can now be removed.

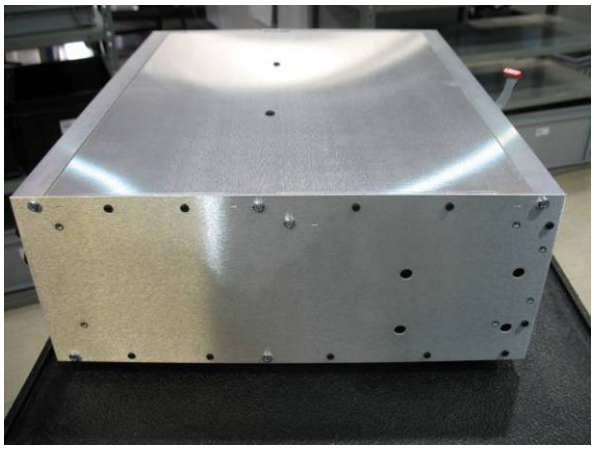
(6.4) Removing the Switch board



Noting its orientation, disconnect the loom between Display PCB and Switch PCB.

Remove 6 off Screws and Nylon Washers from Switch PCB. Remove Switch PCB.

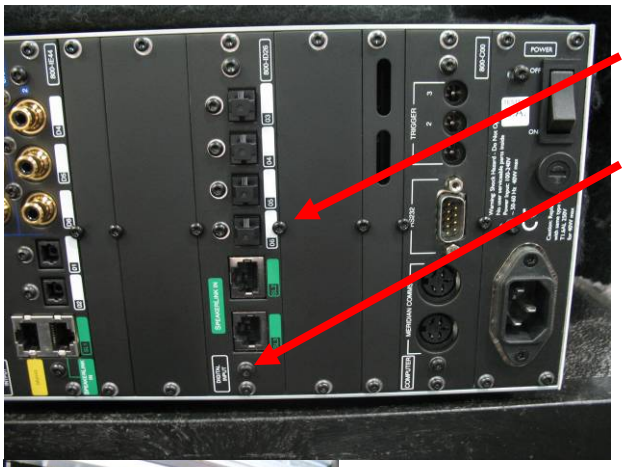
(6.5) Removing the Inner Lid



On each side of the chassis remove the four black self-tapping screws which secure the inner top cover to the chassis.

There will be one or two screws on the top of the inner top cover. Remove the screw(s)and the associated nylon washer(s). Remove the inner cover

(6.6) Removing boards from the back-panel

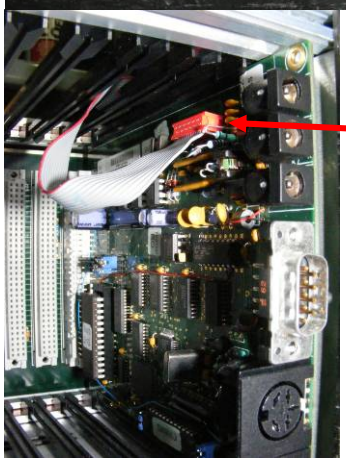


If fitted, remove any Torx-headed screws located between the board to be removed and the adjacent boards.

Remove the Torx T8 screws securing the board along the top and bottom of its mini back-panel.

The board can then be pulled backwards out of the chassis.

The Com board is connected internally by a loom. This must be disconnected - see below

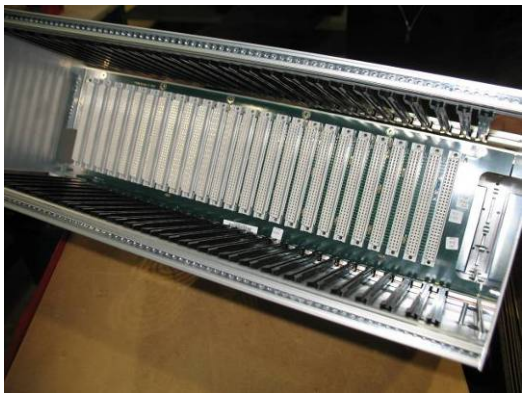


The Com board has a 12-way ribbon loom plugged into a header close to its upper edge.

Here, the mini back-panel has been removed – this is not essential in order to remove the board.

Noting its orientation, disconnect the loom. The Com board can now be pulled out of the unit.

(6.7) Removing the Motherboard



Disconnect the two looms which connect the Cap board to the back of the Motherboard

Using a suitably-long screwdriver, remove the six screws retaining the top edge of the Motherboard to the upper chassis rail.

Remove the Motherboard from the rear of the chassis.

7. Removing and replacing the PSU and Cap board

(7.1) An overview of the PSU and Cap board

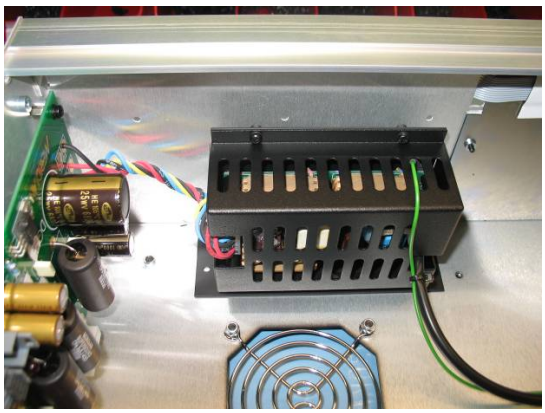
There have been two differing power supplies and used on 861.There has also been two differing mounting methods for the Cap board. If the PSU is to be changed from the older type to the new, a modification is required on the Switch PCB within the fascia of the unit.

Whenever a new PSU is fitted, its output voltage must be checked (and adjusted if necessary) as described in Section 8 of this document.

This picture shows a unit with the oldest combination of PSU and Cap board. The PSU is of the old type indicated by the fact that it carries the “Meridian” logo. The Cap board is mounted on the floor of the chassis alongside the PSU. If the Cap board is replaced, the new board must be fitted to the side of the chassis in order for its output looms to reach the Motherboard. This may necessitate drilling four new holes in the side of the chassis in order to mount the board. Instructions for doing this are given below.

This unit contains the old type of PSU, but the Cap board is mounted on the side of the chassis. The new Cap board can be fitted as a direct swap for the old one.

This picture shows the new-type PSU and the Cap board is mounted on the side of the chassis. The new Cap board and the PSU can be fitted as a direct swap for the old one.

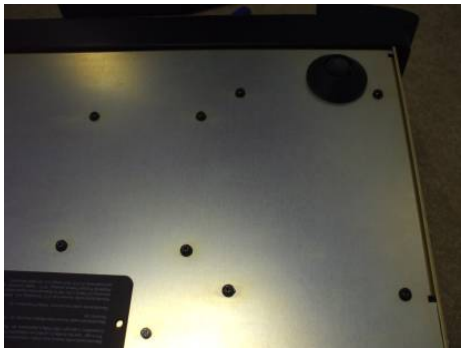


(7.2) Removing and replacing a floor-mounted Cap board

Disconnect the output cable loom from the PSU (old-style PSU shown).

Disconnect the two looms connecting the Cap board to the Motherboard.

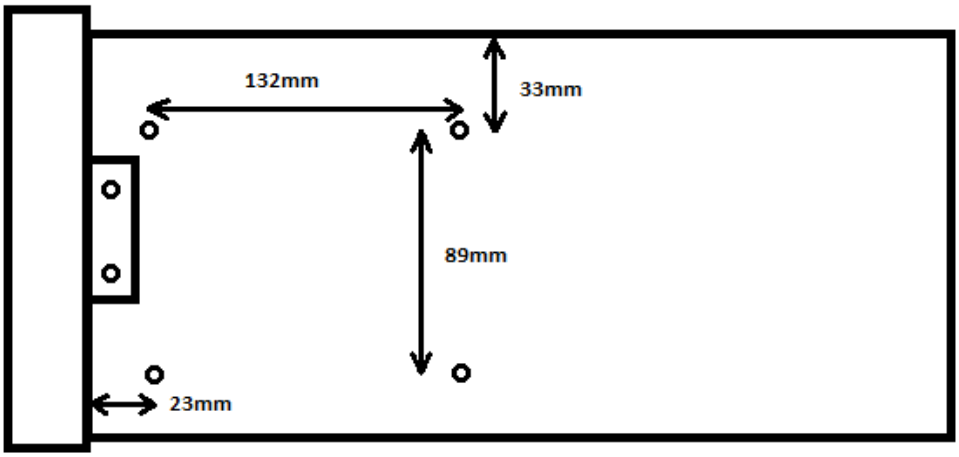
If fitted, this loading resistor needs to be detached from the chassis. It is bonded to the case with adhesive and can be prised off without too much effort. The replacement Cap board does not feature such a resistor, so it can be discarded.



Remove the Cap board by undoing the four screws securing it to the chassis through either the underside or the side of the chassis as relevant.

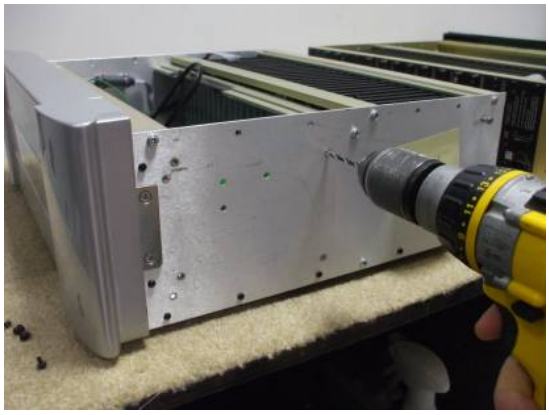
Retain all fixing screws, washers and the hexagonal mounting-pillars used on the Cap board as these parts will be required to mount the new assembly

Position of holes in side of chassis for fitting new-type Cap board to units previously fitted with “floor-mounted” Cap board:



Using a 3.5mm drill bit, make four holes in the side of the chassis as shown in the diagram above. The new Cap board can also be used as a template to assist with this task.

Ensure that no metal debris is left within the unit!

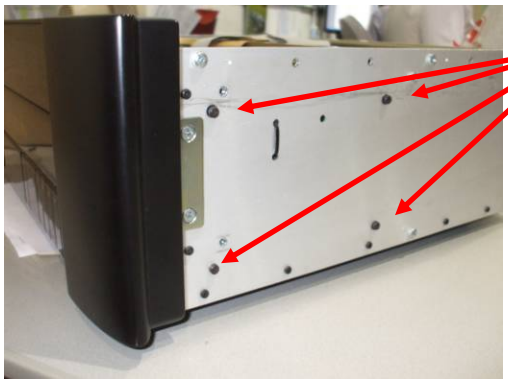


The new Cap board should be fitted using the mounting screws, washers and hexagonal pillars retained from the old board.

(7.3) Removing and replacing a side-mounted Cap board

Disconnect the output cable loom from the PSU (old-style PSU shown).

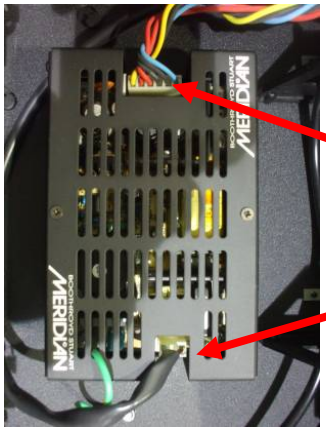
Disconnect the two looms connecting the Cap board to the Motherboard.



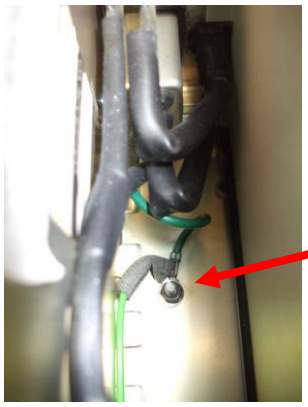
Remove the Cap board by undoing the four screws securing it through the side of the chassis.

Retain all fixing screws, washers and the hexagonal mounting-pillars used on the Cap board as these parts will be required to mount the new board.

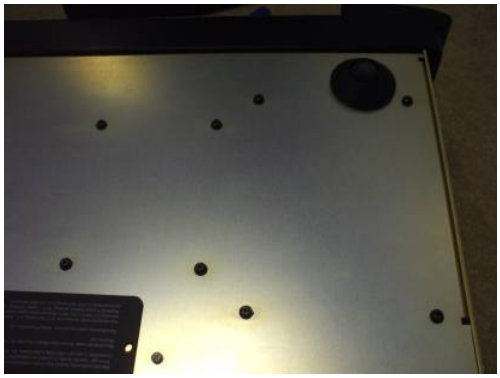
(7.4) Removing and replacing the older type of PSU



Disconnect the input and output cable looms from the PSU.



Undo the nut retaining the grounding cable to the chassis and remove the cable from the stud. This is located on the floor of the chassis in the void behind the mains inlet.

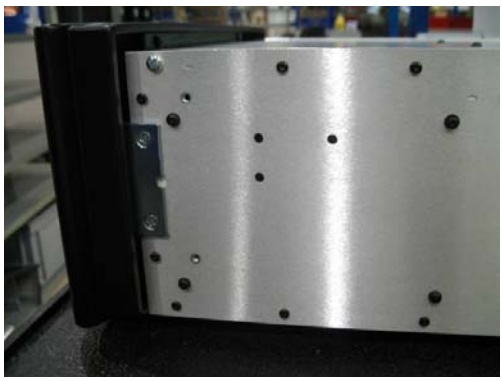


Release the PSU from the unit by undoing the four screws on the underside of the chassis.

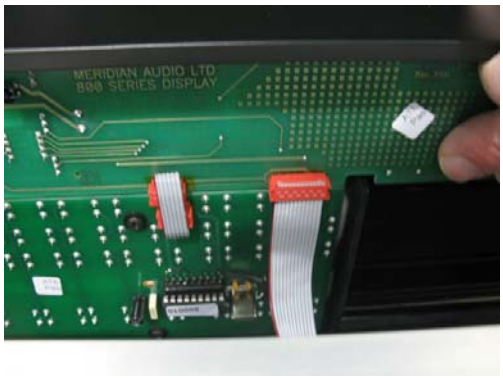
Retain all fixing screws and washers as these parts will be required to mount the new assemblies

Modifying the Switch PCB (required when replacing the old-style PSU)

When fitted with the new-type PSU, the 861 requires a modification to the Switch board. This involves removing a capacitor and fitting a three-pin “watchdog” IC. The Switch board is located within the front-fascia assembly. To gain access to it, the fascia must be removed as described in Section 6.



Remove the fascia by removing the four screws securing the front-panel assembly to the chassis.

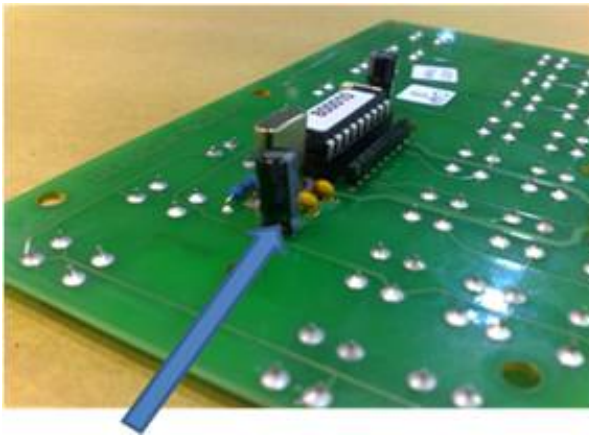


Carefully tilt the front-panel forward and disconnect the display loom from the Display board.

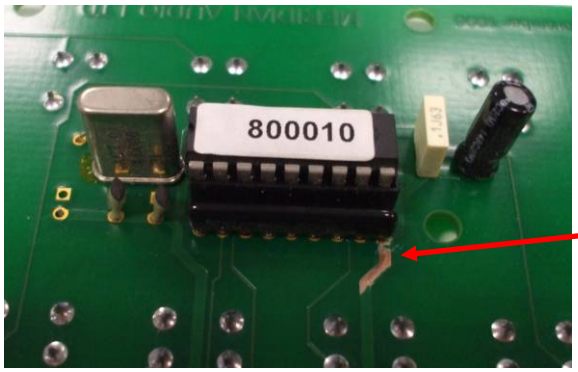
Place the front-panel assembly face down onto a protective surface.

Noting the orientation, disconnect the loom between the Display board and the Switch board.

Remove the six screws and nylon washers from the Switch board. Remove the Switch board.

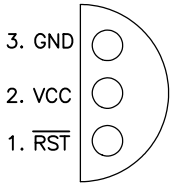


Remove capacitor C3



Scrape away a section of the solder-resist layer of this track as shown here

The watchdog IC - Meridian part-number D81813

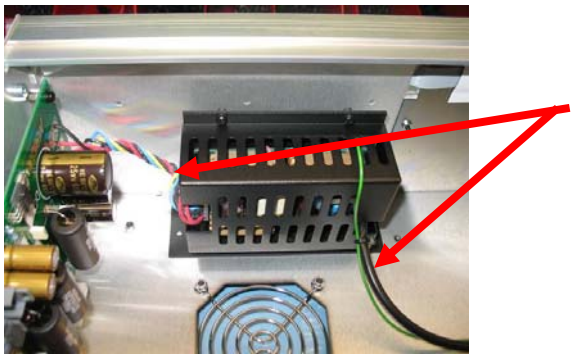


Solder the two outer pins of the IC into the footprint left by the removal of the capacitor. The centre pin (VCC) of the IC should be connected to the exposed track as shown.

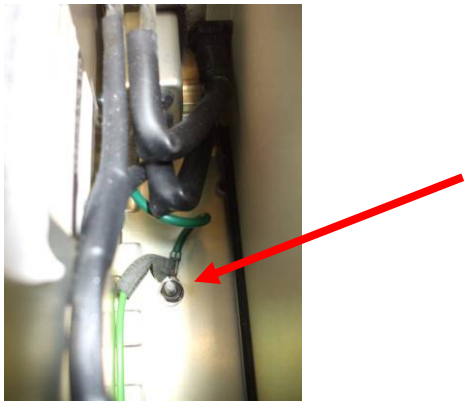
Note: Failure to carry out this modification may result in the front-panel keys locking up after a power cycle.

Following the modification, the “Brightness” and “Contrast” of the front-panel display may need adjustment in order to return the product to a standard appearance. See the user-manual for further details. No other adjustments should be necessary.

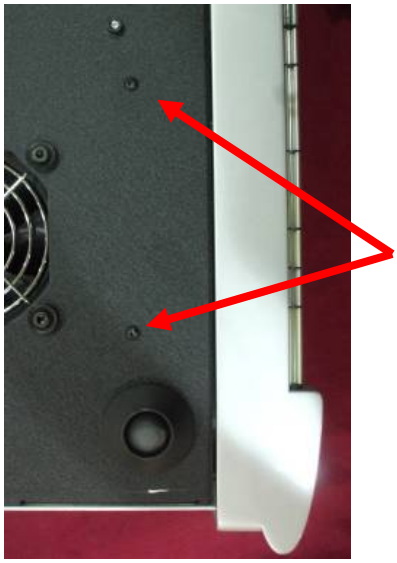
(7.5) Removing and replacing the newer type of PSU



Disconnect the Mains Input and Motherboard PCB looms from the PSU.



Undo the nut retaining the grounding cable to the chassis and remove the cable from the stud. This is located on the floor of the chassis in the void behind the mains inlet. Undo the M4 nut to disconnect the grounding wire.



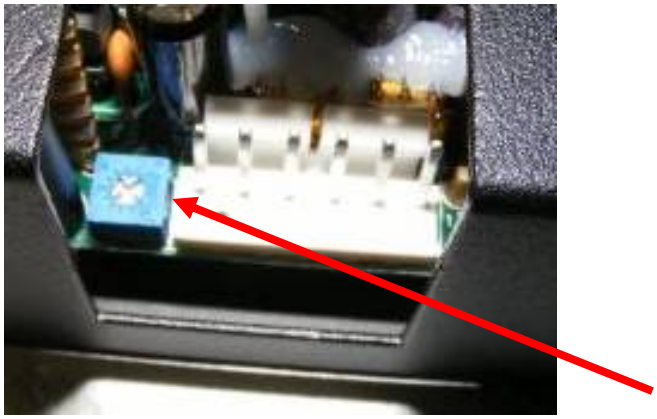
These two T10 Torx screws on the underside of the unit secure the PSU to the chassis. Remove these screws and the PSU can be lifted out of the unit.

The new PSU is a direct swap for the old one. Ensure that the green grounding wire is re-connected securely.

8. Adjusting the output voltage of the PSU

Note: This instruction applies to all units being serviced, regardless of the type of PSU removed from the unit. This voltage must be checked and adjusted before any further use of the unit is attempted.

While measuring the voltage, the output of the PSU should be adjusted to provide 5.2V on the output of the PSU. This is measured between the red and black output wires on the PSU. The adjustment is carried out using a small screwdriver to turn the trimmer located adjacent to the 6-way header on the PSU as shown here:



Output adjustment trimmer

Once the voltage has been set correctly, the unit can be powered down and the inner and outer top-covers can be re-fitted.

9. Terminator cards – how many to fit and where to fit them

The 861 may be fitted with “terminator” cards. These are small boards which plug into the Motherboard to affect data flow across the back-plane. The number and position of the terminator cards is determined by the combination of output cards fitted to the unit and whether an IA45 input card is fitted. If the correct combination of terminator cards is not fitted to the unit, audio problems may occur. These include sporadic clicks and pops or unexpected bursts of noise or tones on the audio outputs.

TM00 Terminator card

There are two positions where a terminator can be fitted. The Com board is always fitted on the extreme right of the Motherboard (viewed from the rear of the unit). If terminators are fitted, they plug into the slot which is next to the Com board and/or the outermost slot at the extreme left side of the Motherboard.

If the 861 is not fitted with an IA45 board:

In the following description, “left” and “right” refer to the position when looking at the back-panel of the unit. Note that the two types of each analogue output board are equivalent; OA02M and OA12M are equivalent to each other as are OA03 and OA13.

Here is a list of the various combinations and the associated requirement for fitting terminators for a unit which is not fitted with IA45 :

			Left terminator	**Right terminator**
No IA45	OE12	No analogue outputs	Yes	Yes
No IA45	OE12	1 x OA02M or OA12M	Yes	Yes
No IA45	OE12	2 x OA02M or OA12M	Yes	Yes
No IA45	OE12	1 x OA03 or OA13	Yes	Yes
No IA45	OE12	2 x OA03 or OA13	Yes	Yes
No IA45	No OE12	1 x OA02M or OA12M	No	No
No IA45	No OE12	2 x OA02M or OA12M	No	No
No IA45	No OE12	1 x OA03 or OA13	No	No
No IA45	No OE12	2 x OA03 or OA13	No	Yes

If the 861 is fitted with an IA45 board:

The IA45 multi-channel analogue input board can cause unpredictable problems with data flow across the back-plane (Motherboard) of the 861. Therefore, if a unit is fitted with an IA45, it may be necessary to experiment with terminator positions in order to avoid unwanted audio problems. However, there are cases where none of the combination of terminator fittings will prevent these problems. If this is case and if the system requirements allow it, changing the output card combination may result in a successful outcome. Such an example is to fit an OE12 even though it is not needed. Nevertheless, it may be the case that a particular unit simply will not support the IA45 and the combination of boards required. One work-around is to remove the IA45 and to substitute the IA40 multi-channel analogue input board in its place.

For all combinations of output boards, start by fitting both left and right terminator cards. Check the unit will produce audio successfully when a digital input is fed with each of the following signals:

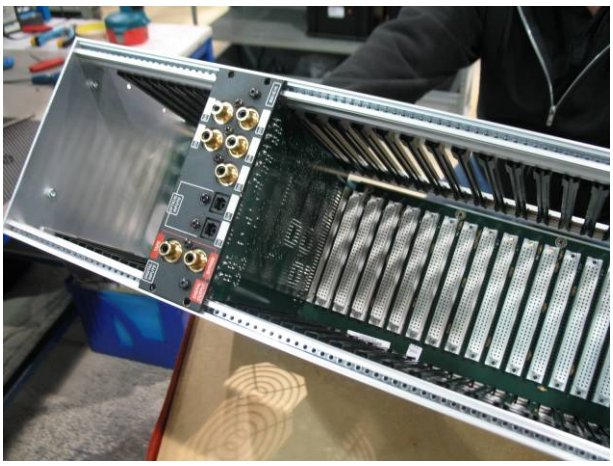
- Dolby Digital 5.1
- DTS 5.1
- PCM or MHR at 44kHz
- PCM or MHR at 48kHz
- PCM or MHR at 96kHz.

If problems occur, try removing the one of the terminators – start with the left-hand one. On problem units fitted with two analogue output cards, it may also prove fruitful to position the IA00 board on the extreme left of the back-panel and to plug the left terminator card into the slot just to the right of the IA00 board.

10. Reassembling the unit

In most instances, reassembly is a straightforward reversal of the disassembly process.
Ensure all earth connections are fully tightened.

(10.1) Fitting the Motherboard



To ensure the Motherboard is aligned correctly, locate it inside the chassis without securing it. Slide one of the plug-in boards into the guide rails to align the Motherboard. Using a suitably ling screwdriver, secure the Motherboard with 6 x M2.5 screws along the top edge of the board