

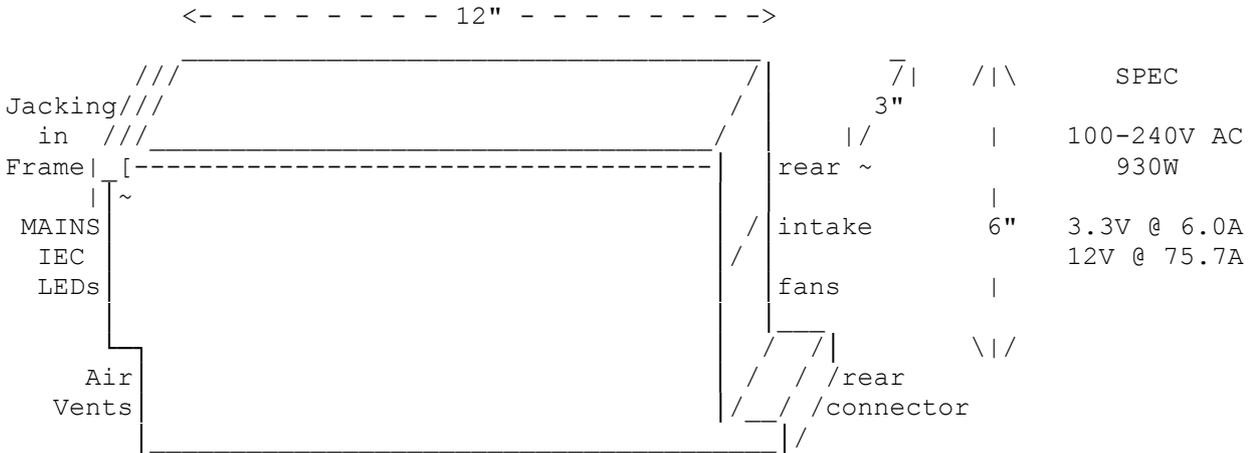
DEL 7000815 SMPSU 12V 75A Mods

By G8MNY

(Update Jun 16)

(8 Bit ASCII graphics use code page 437 or 850, Terminal Font)

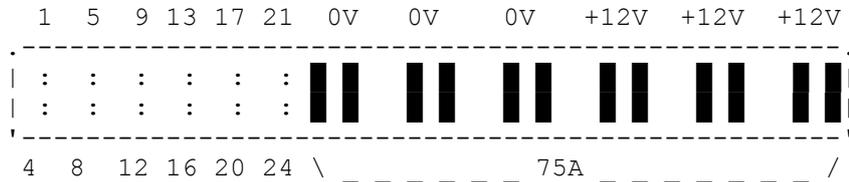
I bought this DEL server SMPSU at ham car boot sale. I needed 75A @ 13.8V for my T500M HF linear. So this seemed to meet my requirements, instead of floating a battery in the shack. But I have always wondered if a SMPSU would be RF quiet enough for this application?



Powering up the 930W PSU gives just the power connected green LED, until the 2 external links are put in, then 12V green LED lights. A fault yellow LED indicates overload trip etc.

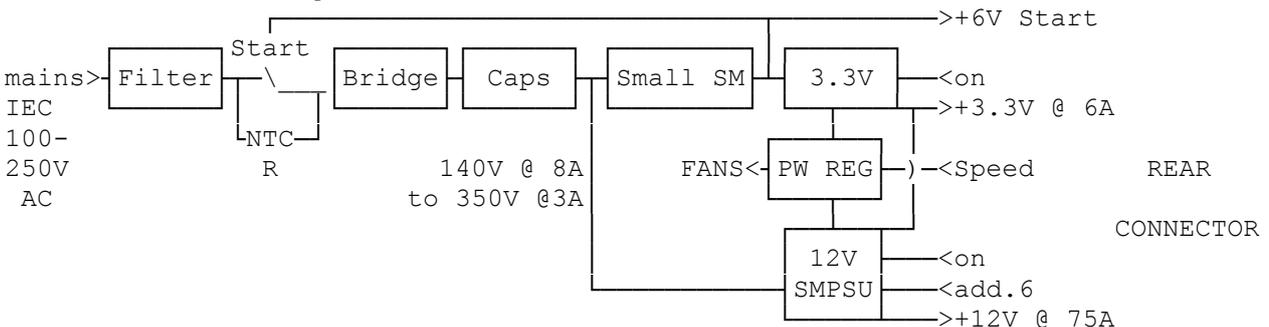
The rear connector links needed are 1-4 for +3.3V then (0v)2-23 for the +12V.

REAR CONNECTOR (my Nos)



- Pin Identified use
- 1 3.3V PSU control (+ve = on)
- 2-3 0V
- 4 Start voltage (+6V) link to pin 1
- 7 Fan speed link to 0V for slow
- 8 Earth wire drop compensation, put to a +Ve for +0.6V more.
- 9-12 0V (3.3V rail)
- 13-16 +3.3V output (@ 6A from small SMPSU)
- 23 12V PSU control (0v = on, once 3.3V is on)

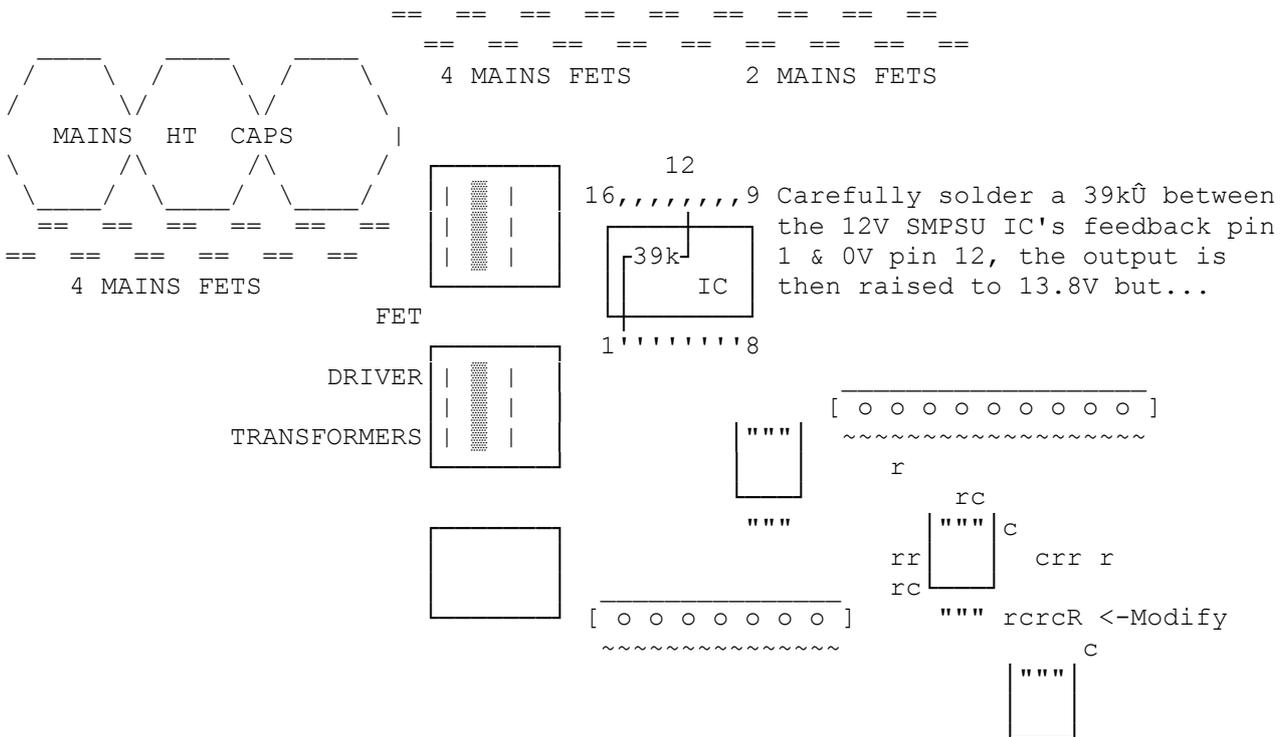
SCHEMATIC (something like this?)



MOD TO RAISED 12V OUTPUT TO 13.8V

This involves disconnecting the mains, removing the steel cover, locating the

control IC (large surface mount IC pins) & also the voltage protection circuit where some very fine soldering is needed ! For good access, unplug the 2 cable connectors.



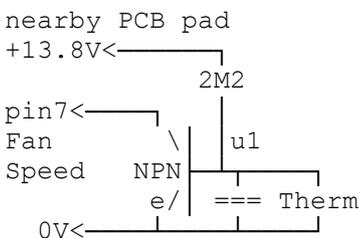
To stop the over voltage trip, a very small SMD 10K resistor R that needs a 270R put across it, for the trip just over 13.8V. Or even a short (fine 2A fuse wire) or a solder blob for no trip. (SMPSU rarely go over voltage, they usually just blow up!)

Be aware when testing, most of the components are at mains potential! Use a mains isolation transformer if doing live testing.

Result is a very stable 13.8V that trips out just over 75A, ideal for full performance from ham gear & floating with 12V batteries etc. N.B. With an external battery (SMPSU OFF) the fans spin slowly, battery drain is 400mA !

MOD TO SLOW DOWN & CONTROL FAN SPEED

The two 3 wire 12V 0.45A fans, run from 3.3V or 12V via a pulse width speed controller. So to thermally control the fan, I used a 100kΩ thermistor (old telephone bell circuit type) in a heat-shrink sleeve, placed near the front of the PSU exiting air to gently control the fan speed with the aid of a high gain NPN.



A 2M2 sets the temperature that the thermistor just lets the high gain NPN conduct to keep the fans slow. A wire under the little rear PCB picks up pin 7.

Components are mounted on the back of the connector & positioned so as to not to foul the fan/plate!

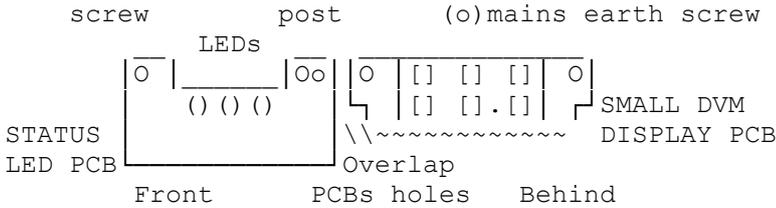
When hot exit air warms the thermistor, it turns off the NPN & the Fans slowly speed up to full speed.

AF noise is very low on slow speed, & the air temp hardly rises on SSB mode. But for full continuous rating, say on CW modes like FSTV, QRO PSK31 & or with a hot ambient, the faster fan speed might be needed.

MOD FOR A SMALL DVM DISPLAY

A small 3 digit LED IC sized DISPLAY can be mounted next to the status LEDs behind the front grill, & wired up to the rear 13.8V large pad (wires threaded

into the heatshrink) care must be taken not to sort out the DC!

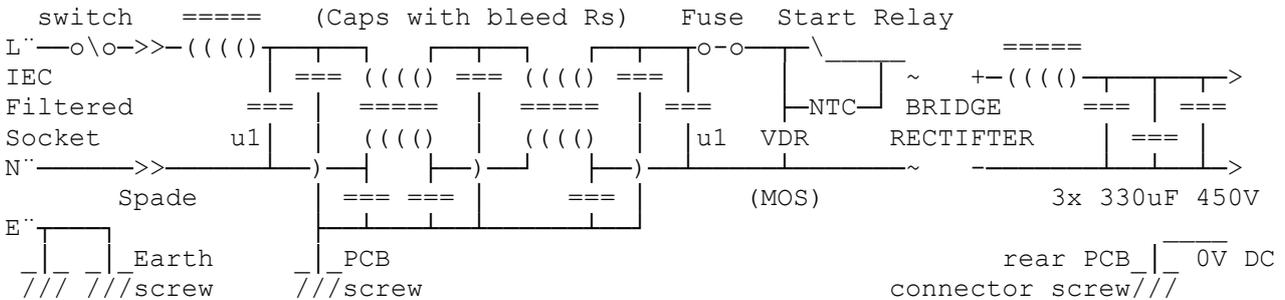


A "hard wire tie" through the small LED PCB hole next to the locating LED PCB hole, is enough to support the small display behind it. Make sure neither the case or mains earth screws foul display PCB. (bend "post" as needed,)

MOD FOR MAINS SWITCH

I put in a small mains switch behind the existing front panel hole, but there is not much room. Paralleling contacts gives the switch better reliability at this power.

I also turned around the shrouded IEC filtered mains socket 180°, so that a right angle IEC plug lead now goes under the PSU (large feet). To removed the IEC socket (needed to free the main PCB) the 4 metal corner springs have to be pressed in & socket worked out at the same time.

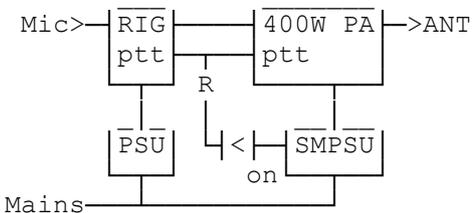


The mains plug IEC lead must be fused @ 5A (UK 13A 240V plugs), as an arcing mains plug will take out a 3A fuse when suddenly charging up the 990uF (Xc=1.5Ω @ 100Hz!) if the start cycle relay is still closed, or the NTC Rs have not cooled down!

On a small generator it wants to take 1kW, so if the mains dips at all, the SMPSU increases the mains current, presenting a negative Z mains load! This can overload the generator & a stop start mains oscillation occurs.

MOD TO SWITCH ON 12V FROM PTT

As I only use this SMPSU for my 400W HF PA & it is 0V controlled.

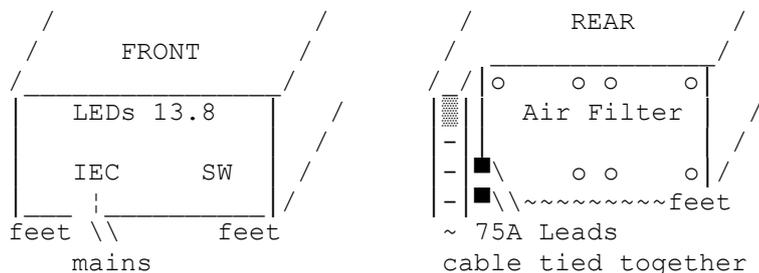


So it can be directly connected (via a resistor & diode if needed) to the rig PTT-PA control line for less QRM on Rx. (N.B. 3.3V SMPSU still runs!)

But this may not be quick enough? However I found the RFI levels are too low to bother with this option, & I can always power down the PSU leaving the Rx on my linear PSU if needed.

FINNISHING OFF

I took off the front jacking in frame, & cut off the front steel lobes & filed edges smooth. Rubber feet were glued on after grinding some "key" into the surface. Then I took off the steel case, I cleaned & painted it, masking off the metal-metal facing edges to make good RF case to case contact.



I made an air filter from plastic scouring pad, cut to size & 8 holes burnt into it to match rubber fan stalks.

For DC leads, I burnt 2 holes in the side of the PCB connector by the Fans to take the 2x 75A DC 30cm long flex cables. Splayed their wire ends to fill between the 3 copper spade grips & quickly soldered up with a hot heavy iron, so not to melt the PCB connector. Then I melted in some heat glue to protect the high current connections. This gives some cable support as well as cables ties too.

ON AIR

The RF QRM from the 110kHz 12V inverter switching is very low level, due to the complex mains filter. With a spectrum analyser & ferrite ring pickup, the mains cable RFI was very low too. But magnetically quite loud near the box case, as the earthed steel case is very thin. (originly in use it had a 2nd metal shroud in a rack)

A wobbly RF carrier is only very slightly noticeable on 160/80/40m with a nearby wire aerial (not at all heard on distant garden dipole aerial) & mostly well below my neighbour's TV/PC QRM. But a further "mains filter adapter" did remove nearly all traces of the wobbly carrier on my shack nosie aerial wire.

All seems every good, DC is better regulated than my float battery system & 30A PSU.

Power consumption with no load & fans on slow it was 26W (45VA).

SPARE SMPSU

At another Ham rally, I bought a second one as a spare & that has been modified OK too, with no problems.

Also see my Tech buls "Switch Mode PS Principles", "Clip on QRM Probe", "Mains Plugtop Filter Adapter", "Reducing Electronic RF QRM", & "T500M 12V 500W HF Linear"

Why don't U sent an interesting Bul?

73 De John, G8MNY @ GB7CIP