MPS 14 REPAIR ENGINEERING NOTES

The MPS14 may appear daunting to look at when first examined for repair however it is at core level a robust and reliable PSU. If you adopt a logical approach to fault finding, fault diagnosis is generally quick and conclusive.
In order to assist here are a few guidelines to help promote a productive and economic repair.
The most common symptom presented is a unit that is in PROTECT. Please refer to a circuit diagram.

Usually the power supply will go into PROTECT if supply rails do not establish themselves quickly from switch-on, or PROTECT will occur if a rail gets shorted or the power supply has an internal fault which evokes PROTECT on or off-load.

Assuming for the moment that we are not dealing with a genuine fault elsewhere i.e. cable or console there are some quick checks to make on the PSU:

1) First establish that the Power Factor circuit is working because if not, the PSU will struggle to work but will likely go into PROTECT especially on load. Measure voltage at TP3 with respect to primary GND it should be 370VDC. If it is less e.g. 330VDC then the PFC is not working. If that is the case check: - TR1/D6/D28/IC1/IND1.
2) If PSU trips into PROTECT on switch-on, check for shorted rails (+17V/-17V/+48V/+12V) it is worth noting that the protection circuit will trip in the same way should an output rail be missing. If there is no shorting of an output rail, short out pins 6&7 of IC5, this will override s/c protection and switch PSU on. Whilst shorted measure voltage rails to see if any are missing or low or observe supply LEDs.
3) If PSU fails to respond, check the Auxiliary PSU output:- REG 1 =11.8-12V
4) Measurement of Pin 6/7/9 of IC5 indicate the status of the trip cct. When PSU is cold Pin6=6.3V Pin7=4.8V Pin9= 5.1V, when at running temperature of 40°C, Pin6=6.3V Pin7=5.6V Pin9=8V typically.
5) If for example you find Pin 6 is higher than normal you may well find that one of the power rails is high (this would increase the voltage sample at the summing input to the trip comparator). A typical cause of this is a s/c post regulator (TR8 or TR9) or alternatively the phantom rail regulator is high. (These conditions would also produce a noisy o/p).
6) Similarly if Pin7 of IC5 is high this would indicate a problem with the temperature monitor cct or a low -17V rail. So just by measuring these inputs will guide you as to what condition the PSU is in. Pin1 of IC5 is active High in a trip condition. This feeds the fault protection cct with a shutdown level.
7) Notes on Fan control and over temp circuit.
   MPS 14 has a two stage fan control circuit. Two comparator inputs are set up to respond to two Thresholds of voltage from TH2 thermistor. The following table indicates the voltage to temperature relationship of the comparator:

POST HEATSINK TEMP °C	PIN 9/11 IC5	FAN STATUS	OVER TEMP
20	6V	OFF	-
40	8.6V	SLOW(Q3ON)	-
55	9.6V	SLOW(Q3ON)	-
60	10V	SLOW(Q3ON)	-
72	10.6V	FAST(Q3&Q4ON)	-
76	10.8V	FAST(Q3&Q4ON)	-
78	10.9V	FAST(Q3&Q4ON)	-
79-80	11V		PROTECT

As the voltage (as seen from the table) rises as a result of TH2 resistance lowering through temperature increase, this increase gradually causes TR13 to conduct which, once its base rises above 11v, consequently conducts pulling its emitter to +12v and raising Pin 7 of IC5 above Pin 6 invoking PROTECT.