# PRC 320 Power supply module faults – v1.1 – © M. Ehrenfried – G8JNJ – 19/04/2011

I've now obtained a batch of faulty power supplies and I'm gradually working my way through them. They seem to have one or two common faults.

First check you have 12v on unit 5a.

If you have no 12v on Unit 5a and one of the transistors has gone. It's more than likely to have also taken out ML1, in which case you are stuffed !

On Unit 5b. If you can't obtain an unregulated 120v rail on the test bench, try loading the 6v rail with a 50ohm load. If the 6v rail is good either TR3 or D2 is likely to be faulty.

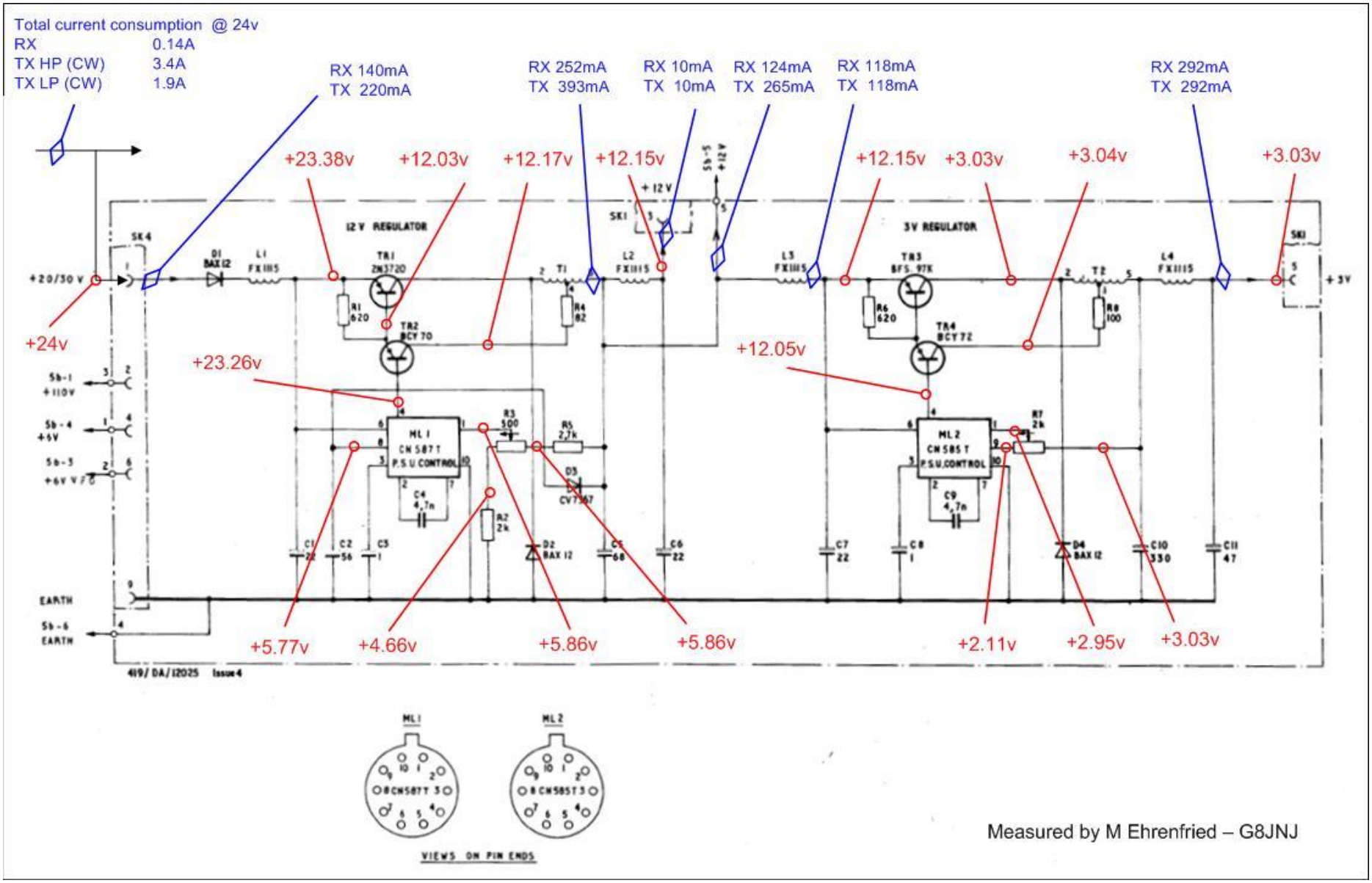
ZTX857 (300v 1A) seem to be a good substitute for TR6 & TR7 FRB700
2N5551 (120v 600mA) for TR3 CV7644
BCY71 works for TR1 & TR2

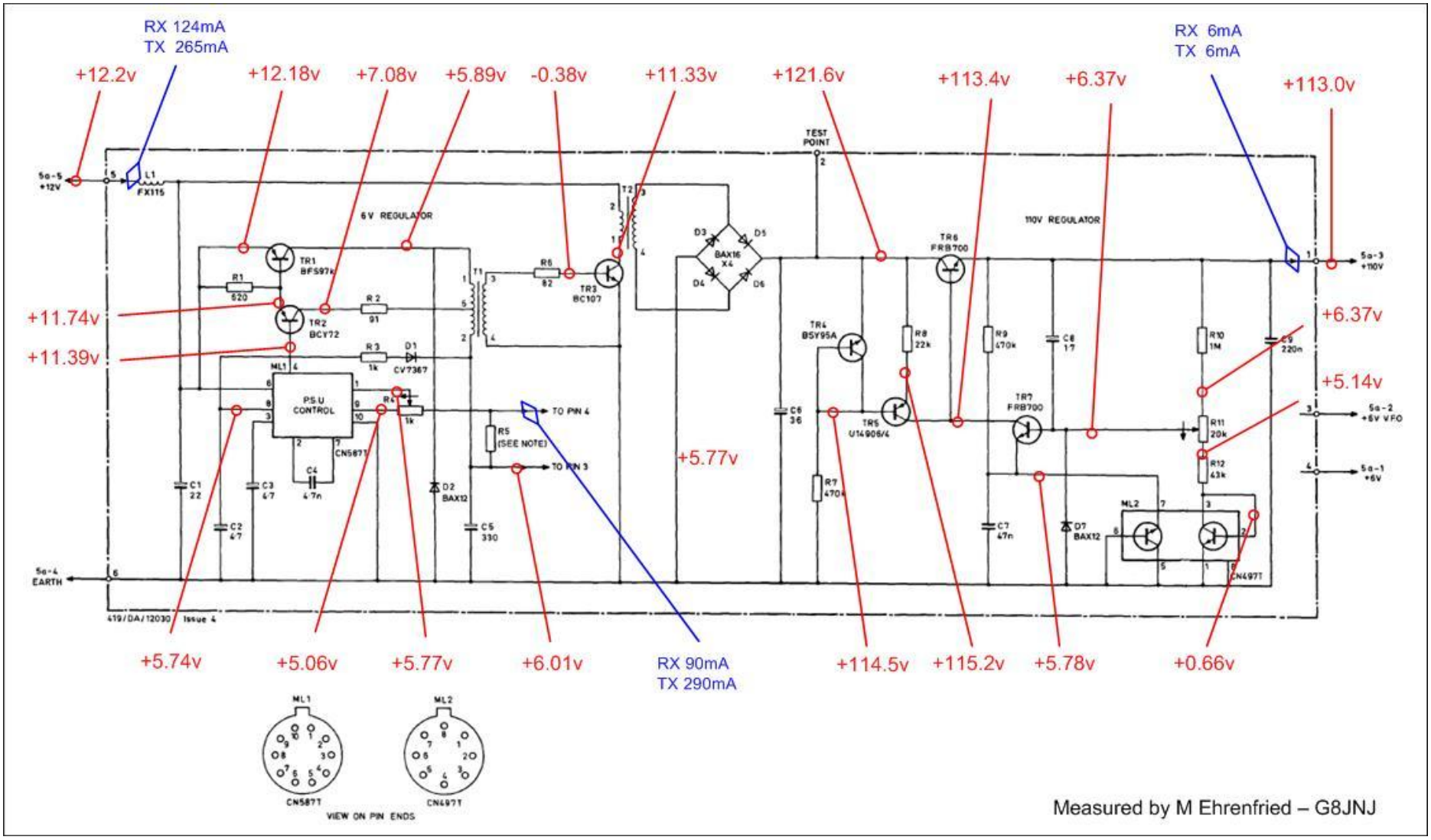
I originally mistakenly thought that the ML2 IC was a complementary npn / pnp pair, but I now realise that both devices are npn, and that TR7 and 1/2 of ML2 form some weird type of long tailed pair.

If you substitute some MPS2222A transistors (or something similar - generic high gain npn) they don't quite have the same conduction point as the original transistors in ML2. But you can fiddle this by adjusting the value of R10 (680k is a good starting point) so that the mid-point voltage on R11 (set 110v) is approx. 0.6v higher than the voltage measured on the emitter of Tr7.

It’s possible to replace ML2 with a 5.6v zener and normal silicon diode. Whilst it does provide some degree of regulation, the 110v output voltage is not as regulated as it should be, as it tracks variations in the 12v input voltage to the board.

If you are not worried about the PSU being as the original design. Rip out all the bits of the 110V regulator circuit apart from TR6 and R8 22K. Connect all the pads of TR5 together so that R8 22K biases the base of TR6. Replace R7 470K with two 1w 56v zener diodes connected in series. Connect C8 1.7uF previously removed from the board across the series connected zeners, to provide a short duration 110v start-up delay.


Total current consumption @ 24v
RX 0.14A
TX HP (CW) 3.4A
TX LP (CW) 1.9A
RX 140mA
TX 220mA
RX 252mA
TX 393mA
RX 10mA
TX 10mA
RX 124mA
TX 265mA
RX 118mA
TX 118mA
RX 292mA
TX 292mA
+23.38v
+12.03v
+12.17v
+12.15v
+12.15v
+3.03v
+3.04v
+3.03v
+24v
+23.26v
+12.05v
+5.77v
+4.66v
+5.86v
+5.86v
+2.11v
+2.95v
+3.03v
12 V REGULATOR
3V REGULATOR
+20/30 V
+ 12 V
+ 3V
EARTH
ML1
CN587T
P.S.U CONTROL
ML2
CN585T
P.S.U.CONTROL
TR1 ZN3720
TR2 BCY70
TR3 BFS 97K
TR4 BCY72
D1 BAX12
D2 BAX12
D3 CV7367
D4 BAX12
419/DA/12025 Issue4
VIEWS ON PIN ENDS
Measured by M Ehrenfried – G8JNJ


RX 124mA
TX 265mA
+12.2v
+12.18v
+7.08v
+5.89v
-0.38v
+11.33v
+121.6v
+113.4v
+6.37v
RX 6mA
TX 6mA
+113.0v
TEST POINT
6V REGULATOR
110V REGULATOR
5a-5 +12V
L1 FX115
TR1 BFS97k
TR2 BCY72
TR3 BC107
TR4 BSY95A
TR5 U14906/4
TR6 FRB700
TR7 FRB700
BAX16 X4
D1 CV7367
D2 BAX12
D7 BAX12
R1 620
R2 91
R3 1k
R4 1k
R5 (SEE NOTE)
R6 82
R7 470
R8 22k
R9 470k
R10 1M
R11 20k
R12 43k
C1 22
C2 47
C3 47
C4 47n
C5 330
C6 36
C7 47n
C8 1·7
C9 220n
PSU CONTROL
CN5877
CN4977
ML1
ML2
TO PIN 4
TO PIN 3
5a-3 +110V
5a-2 +6V VFO
5a-1 +6V
5a-4 EARTH
419/DA/12030 Issue 4
+11.74v
+11.39v
+6.37v
+5.14v
+5.77v
+5.74v
+5.06v
+5.77v
+6.01v
RX 90mA
TX 290mA
+114.5v
+115.2v
+5.78v
+0.66v
VIEW ON PIN ENDS
Measured by M Ehrenfried – G8JNJ