

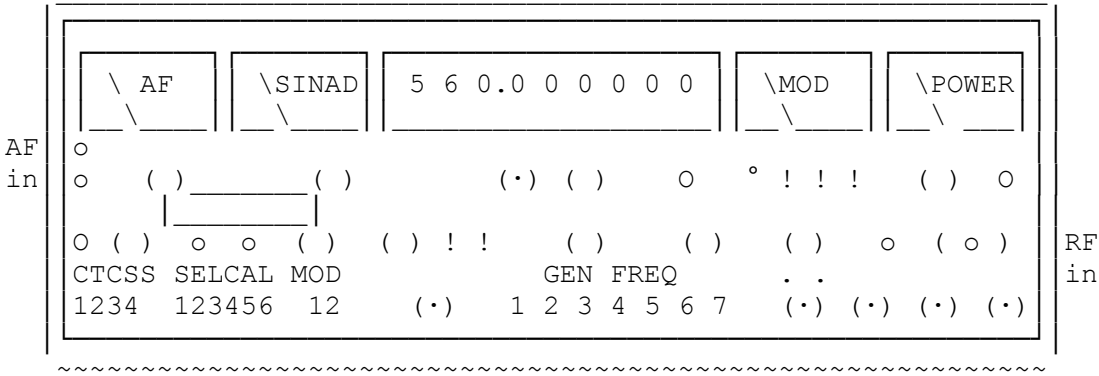
RTT Comms Test Set

By G8MNY

(New Oct 14)

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

I bought this large test set in it's flight case, made in the UK, at a recent junk sale. It looked very smart & could do quite a lot. It came with an Operating Guide, but no service information. (nothing on internet)



SO WHAT IS IT?

It is VHF/UHF RF test set with all of these in one Box...

Dummy Load.

Power meter.

Frequency Counter (very accurate).

PLL RF Signal Generator (7 thumbwheels)

PLL CTCSS tone Generator (4 thumbwheels)

Selcall ID Generator & Decoder (No PCB).

AF Oscillator (Wayne type but from 2 thumbwheels!).

AM/FM/PM Modulation Meter (automatic Rx).

SINAD Meter (Sensitivity Testing).

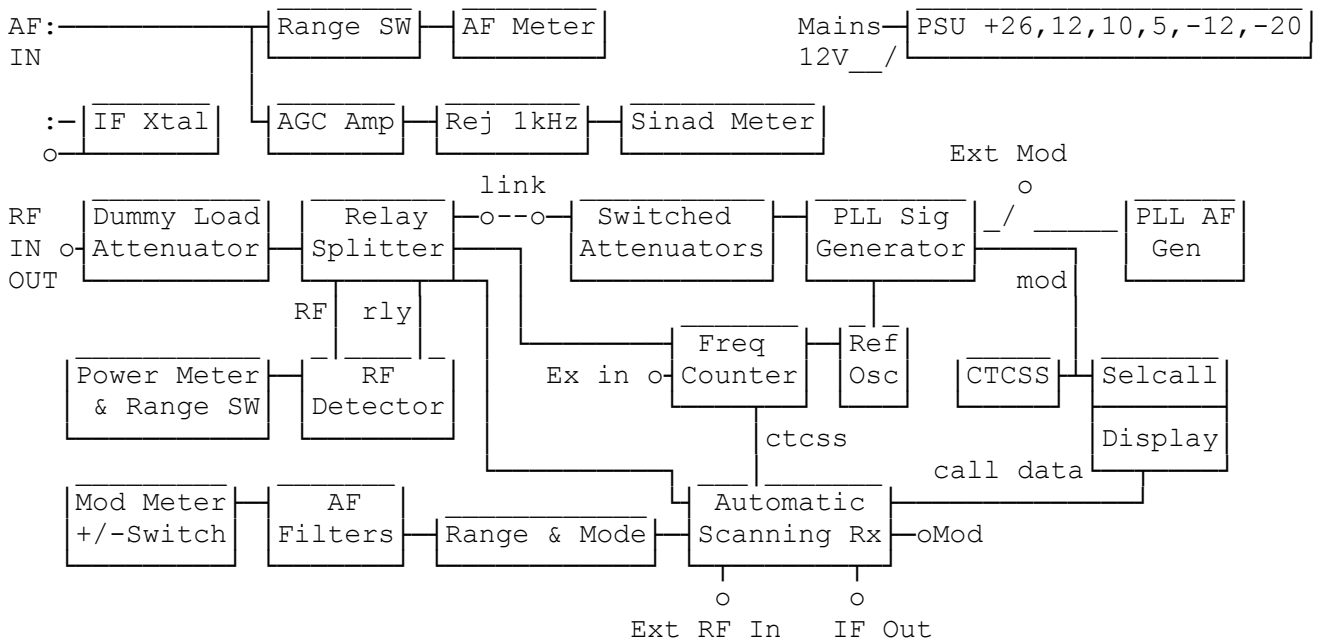
AF Volt & dB meter.

IF Xtal Oscillator.

SPECIFICATION

- Power AC IEC Mains input 230V/115 @ 60W or 12V DC @ 4A.
- RF Input N socket 50Ω 40dB Load atten. Max 1kW peak, 50W continuous.
- Power meter 1W 3W 10W 30W 100W 300W (RF detection Counter & Rx switching)
- Frequency Counter 9 digit 1Hz-560MHz in 3 gate times & averaging to 1Hz.
- Freq Reference Accuracy < 1/10⁷/month, internal Oven Xtal reference.
- Signal Generator 100Hz steps 60MHz-560MHz (OK @ 40MHz).
- Attenuator 0-9dB +7x 10dB steps gives 1.8uV-50mV before 40dB Load atten.
- AF Meter 0.25mV - 10V with dB scale.
- Pilot tone(CTCSS) PLL 10Hz-999.9Hz Mod Level adjustable & Counter Decoder.
- Selcall PLL 7 char, Mod Level adjustable & Decoder.(No PCB)
- Modulation PLL Osc 100Hz-9.9kHz or external, Level adjustable.
- AF Meter Bal/floating input, 3,10,30,100,300mV,1,3,10V 11Hz-27kHz -3dB
- SINAD meter Auto level, 1kHz Notch, 0-20dB/0-100% Noise+Distortion.
- Modulation meter Auto Rx. +/- peak, AM 50% 100%, FM 5kHz 20kHz, PM 2Rad 5Rad.
- Rx AF Filters Comms 300-3kHz, HiFi 50-15KHz.

SCHEMATIC (reverse engineered)



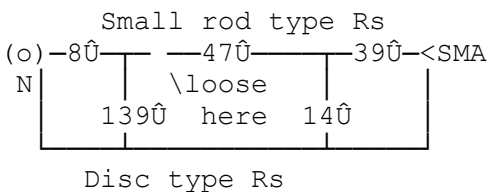
It was made in UK 1989. It uses several PLL oscillators for the RF generator & modulation oscillators. Auto RF switching disconnects the Signal Generator when the Power Meter detector sees Tx RF, so only the Tx signal is measured. Useful but Confusing when chasing faults!

FAULTS

Going through all mazes of functions it does, I found several faults....

1/ Mains switch. The long push rod had come off the PSU switch deep inside & also the button top had swollen & jammed in the case. Heat glue & sanding the button top down solved this.

2/ Load 40dB attenuator. This presented 147Ω not 50Ω! It looked clean & not smelling, so not burnt out? So I stripped it down, to find it was all quite loose, & no open circuits Rs or burnt bits. Put backs all together & did up tight, all OK now.



3/ FM deviation range not right/un-calibratable. Stripping down the Rx unit, I found a broken 10k preset. Replaced, but needed to be 15K to calibrate the 5kHz range! Also the 20kHz range need a series preset on the range switch to get that right too. (previous owner's playing?)

4/ 12V DC input inverter NPN collector framing (OK on isolated battery). Filed metal case away. This may have been from a bad upgraded from small to large Tab transistors.

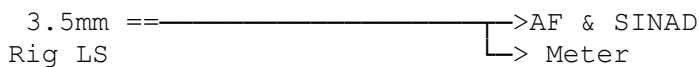
5/ PM un-calibratable. Something is wrong I have not found yet, But I did learn that when FM AF Mod Frequency = Deviation, it gives 1 Radian of Phase Mod.

6/ AF Mod frequency not very accurate, still looking into the 8 relay switched

Wayne Bridge osc. But no outrigger of the strange PCB connector.

MODS

A/ As well as making up a set of test leads for it.



PL259 <0=====N> N Plug RF Dummy Load in, or BNCs
Both UR67

N Plug <N=====N> N Plug RF Dummy Load in, or BNCs

B/ I changed the Reference Oscillator fine tune 10K preset resistor, inside the counter box for a multi turn version, & drilled a hole to access it with the inside cover on. This permitted the finest of tweaks when hot without modifying it for an external off air Reference, that jitters would cause measuring problems. I also made a polystyrene cover for the hot oscillator box. This reduces the oven power & makes the temp more stable (& hence Frequency) more quickly. Warm up time....

Counter error Hz in off air locked 500MHz reference.

Time min

0	1	5	10	15	30	40	50	60
-30K	-1K	+261	+122	+95	+69	50	42	31
6/10 ⁵	2/10 ⁶	5/10 ⁷	3/10 ⁷	2/10 ⁷	<2/10 ⁷	1/10 ⁷	<1/10 ⁷	<1/10 ⁷

C/ Max deviation measuring range changed from 20kHz to 100kHz. (E.g. now does 5kHz & 100kHz), I put in a 10K series preset on the range switch.

D/ Added Meter illumination LEDs. Ground down 4 white LEDs to a thin square sliver 4x4x2mm. Wired up in series & glued on top of meters, making sure the top fascia bezel did not foul, & feed them via a 220R from the 12V rail.

E/ Thinking about adding a Tx mode LED, so you know which mode it is in.

F/ I am also thinking of stripping out the Selcall from front panel (no PCB anyway) & replacing it with a small LS+Amp+Vol & a Source switch. So AF in, Filtered SINAD AF, Mod, or Rx AF, can be heard.

See my tech Buls on "Syston Donner 115 Pulse Gen", "198kHz Off Air Standard", "Comparing Off Air Freq Standards", "Off Air Lock for Ref Osc" & "Scope RF Trick".

Why don't U send an interesting bul?

73 de John, G8MNY @ GB7CIP