BROADCAST AND COMMUNICATIONS RECEIVER 2

MODIFIED YAESU FRG8800 150kHz – 30MHz

We have taken this synthesised all mode communications receiver and made a series of modifications throughout to provide a receiver for rebroadcast purposes or checking transmitter performance as well as being suited to communications use. Completely new filter, detector and AGC boards yield exceptional noise and distortion specifications on AM and provide an extra bandwidth selection of 12kHz. An XLR balanced audio line output and a BNC buffered IF output for monitoring transmitted modulation envelope on an oscilloscope are added on the rear panel and mains safety is improved. A rechargeable battery system is fitted for the memory and clock back-up supply.

PRINCIPAL MODIFICATIONS

1. Rechargeable batteries and charging system fitted for maintaining memory and clocks.
2. Smoothing of unregulated dc supply improved
3. Hum rejection of main supply regulator improved
4. Attenuator switching in below 1600kHz removed
5. Ripple of first roofing filter improved
6. Image rejection improved to 85dB (originally 48dB)
7. First if amplifier fixed in gain except for delayed agc control
8. Front panel ATT control converted to varying agc threshold
9. Ripple of first 455kHz filter improved
10. Decoupling improved to yield better skirt response from main filters
11. New buffer amplifier fitted after noise blanker and before main filters to provide correct matching and improved signal to noise
12. New main if filter board fitted with improved 6kHz filter and new 12kHz filter
13. Front panel DIM control converted to filter selection switch
14. Termination of filters changed to improve group delay characteristic
15. Gain distribution in if stages altered and agc threshold raised
16. Output level on ssb and cw modes balanced and controlled If and hf audio response provided
17. New buffer and low noise and distortion am detector board fitted
18. FM de-emphasis corrected from 700μs to 100μs
19. Audio level on fm balanced and controlled If audio response provided
20. AGC arrangements removed and new agc control board fitted with average agc system selection suitable for am
21. Front panel AGC switch modified to provide fast and slow selection with both am and non-am systems
22. S meter amplifier modified to improve dynamic range of display
23. Audio preamplifier replaced to reduce distortion, increase clipping point, improve If response and provide controlled hf response
24. New earthing strap fitted on main unit
25. Noise blanker modified to prevent spurious triggering
26. Green filters on displays removed to increase luminosity
27. Front panel label removed and new identification label fitted
28. New labels for AM FILTER switch and rechargeable batteries fitted
29. Mains safety improved
30. Buffered if output provided on BNC socket for monitoring transmitted modulation envelope on an oscilloscope
31. Electronic floating line output provided on XLR connector

The receiver is available in free standing or rack mounting form and all the original features are retained: 12 memory channels; mains or battery operation option; active audio filter for CW NARROW; digital frequency and time display with two 24 hour clocks; timer for unattended recordings or external switching; all modes with squelch including narrow band frequency modulation; noise blanker. Three scanning modes are available on the keypad and two scan-stop modes are selectable by an internal switch, through which either all or only selected memories, or all frequencies between two memories (at selectable rates and steps), can be scanned.

SPECIFICATION

Frequency range	150kHz – 30MHz
Noise figure	8dB, 50 Ohms, 1MHz – 30MHz
Variation in RF gain relative to that at 10MHz, 50 Ohms source	300kHz – 30MHz ±3dB 150kHz –8dB
Sensitivity for 10dB signal to signal + noise ratio, 10MHz AM and FM modulation 1kHz	SSB AM, 30%, 6kHz FM, 1kHz dev. -120dBm (0.2μV) -107dBm (1μV) -110dBm (0.7μV)
Third order intercept point 150kHz–30MHz	+2dBm Measured for –60dB products with two signals 100kHz apart
Image rejection 910 kHz HF	Better than 85dB (originally 48dB), 2.7 and 6kHz filters; better than 75dB, 12kHz filter
Selectivity	AM wide 12 kHz: –6dB 21kHz: –50dB AM medium 6 kHz: –6dB 11kHz: –50dB AM narrow 2.7kHz: –6dB 6kHz: –50dB SSB/CW 2.7kHz: –6dB 6kHz: –50dB FM 12.5kHz: –6dB 30kHz: –40dB
Stability	Less than ±500Hz drift from 1 to 30 minutes after power on Less than ±500Hz drift after 30 minutes warm up
Automatic gain control	For a 75dB increase in input level from –90 to –15dBm the IF and AF outputs change by less than 4dB
ATT control	Varies AGC threshold (originally varied RF gain only)
Total harmonic distortion 10MHz at -40dBm, 90% modulation, AM 12kHz, AGC slow	200Hz – 6kHz -44dB, 0.6% (originally -20dB, 10%) 100Hz -40dB, 1%; 40Hz -28dB, 4%
IF output	25mV rms, minimum load 2k Ohms, BNC
AF line output	Electronically floating, XLR3 male Source impedance 50 Ohms. Clipping with 600 Ohms load +14dBm. Offset: none, dc blocked. Preset level adjustment covering +5 to +10dBm output for 100% modulated AM signal. Normally set for +8dBm
AF frequency response	Audio amplifiers to line output 30Hz – 8kHz ±0.5dB
Overall frequency response	Dependant on IF filter selected. E.g. on AM, 6kHz, -3dB 10Hz – 3kHz (originally 130Hz – 2.5kHz)
De-emphasis on FM	100μs (originally 700μs)
Noise on AM relative to 90% modulation, 6kHz bandwidth	-55dB mean reading, 20Hz–20kHz (originally -44dB) -52dB CCIR468-2, weighting and peak meter (originally-41dB)
Speaker and headphone output	1.5W into 8 Ohms, 10% THD. Minimum permissible load 4 Ohms stereo headphone A type jack and rear panel 3.5mm jack
Memory	12 channel with multi-function scanner Memory and clock backup batteries 3 x AA size rechargeable
Supply input	100–120, 220–240V, 50–60Hz, Standby: 5VA, On:35VA
Battery supply option	12–15V DC, 1.2A
Dimensions and weight	W334mm, H118mm, D225mm; 6.1kg
Accessories supplied	2 metres supply lead to BS6500 with IEC connector; spare fuse; 2 extender feet with pads; instruction book, circuit diagrams and full documentation of all modifications

RACK MOUNTING ASSEMBLY

Dimensions and weight	W483mm (19 inch), H177mm (4U), D230mm; 1.5kg

SURREY ELECTRONICS