

Section 3

TECHNICAL DATA & CIRCUIT DESCRIPTION

GENERAL SPECIFICATION

Application

General-purpose solid-state VHF receiver with versatile frequency control suitable for point-to-point communications, search and surveillance, monitoring and laboratory use.

Reception Modes

AM - FM - CW - PULSE

Frequency Coverage

Models 1990R/1-X & 1990R/1-S: 25-235MHz
in five ranges.

Models 1990R/2-X & 1990R/2-S: 25-500MHz
in seven ranges.

Models 1990R/3-X & 1990R/3-S: Identical to 1990R/2 but with the following additional output facilities. (a) 5MHz Synchronizer Standard (b) FM Audio.

Suffix identity 'X' : crystal facility (ten channels)

'S' : integral synchronizer.

Intermediate Frequency

21.4MHz.

Filter Complement

Standard bandwidths : 250kHz + 30kHz.

Options : 'A' 250kHz + 30kHz + 15kHz
'B' 250kHz + 30kHz + 7.5kHz
'C' 250kHz + 15kHz + 7.5kHz
'D' 250kHz + 15kHz
'E' 250kHz + 7.5kHz

Specify 30kHz filter b/w for 50kHz channeling.
15kHz 25kHz
7.5kHz 12.5kHz

NB: Use of crystal facility or synchronizer is recommended when using 7.5kHz bandwidth.

Aerial Inputs

50/75Ω unbalanced. Additional input available direct to bal. mixer for Wideband applications.

Output Facilities

Separate 'wide' and 'narrow' IF outputs, positive video, negative video, external loudspeaker, headset and 600Ω lines (bal. or unbal.).

Environmental

-10°C to +50°C (-20°C to +70°C storage).

Calibration Accuracy

Within .5% up to 235MHz and within 1% from 235-500MHz without use of built-in calibrator (Cursor Adjuster at mid-position).

Calibrator provides 1MHz and 10MHz markers for precise frequency setting.

Power Supplies

AC : : 100/130V or 200/260V (40-60Hz).

DC : : 12V with negative earth.

Consumption (AC/12V) : RECEIVER - 15W/
10W RECEIVER COMPLETE WITH SYNCHRONIZER - 35W/30W.

Dimensions and Weight (with Synchronizer)

Rack-mounting style:

Panel : 483mm x 133mm (19in. x 5.25in).

Rack intrusion: 411mm (16.1875in).

Weight : 18.4kg (40.5lb).

Bench-mounting style:

Width : 502mm (19.75in).

Height : (including feed) : 164mm (6.5in.).

Dept : 457mm (18in.).

Weight : 21.3kg. (47lb.)

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FREQUENCY COVERAGE

| RANGE | FREQUENCY |
|-------|-----------------|
| 1 | 25MHz - 39MHz |
| 2 | 39MHz - 60MHz |
| 3 | 60MHz - 95MHz |
| 4 | 87MHz - 140MHz |
| 5 | 140MHz - 235MHz |
| 6 | 235MHz - 365MHz |
| 7 | 360MHz - 500MHz |

PERFORMANCE SUMMARY

Typical data: not to be interpreted as a test specification.

Sensitivity (10dB S+N/N with standard o/p)

| MODE | BW | 25-140 MHz | 140-235 MHz | 235-500 MHz |
|------|--------|---------------|----------------|----------------|
| *AM | 30kHz | 3 μ V | 5 μ V | 10 μ V |
| **FM | 250kHz | 2 μ V | 5 μ V | 5 μ V |
| CW | 30kHz | 2 μ V | 3 μ V | 3 μ V |

(*) 30% mod at 1kHz. (**) 22.5kHz deviation.

Noise Factor

Typically 4dB and of the order 8dB at any frequency: better than 10dB direct to Mixer.

Image Rejection

Greater than 50dB to 200MHz
40dB 235/500MHz.

IF Rejection

Greater than 60dB above 35MHz.

Stability

Free running oscillator : 1 part in $10^5/^{\circ}\text{C}$.
Crystal oscillator : 1 part in $10^6/^{\circ}\text{C}$.
Synchronizer : 0.5 part in $10^7/^{\circ}\text{C}$.
(*) -10°C to $+50^{\circ}\text{C}$.

AFC Hold

At least 1% of signal frequency (operative in free-run mode only).

Selectivity

Dependent on filter complement (see page 19)

| | | |
|---------|-----------------------------|----------|
| WIDE : | 250kHz at -3dB (L/C filter) | |
| NARROW: | PASSBAND | STOPBAND |
| | 30kHz (+ 15kHz) | +50kHz |
| | 15kHz (+ 7.5kHz) | +25kHz |
| | 7.5kHz (+3.75kHz) | +12.5kHz |

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Dynamic Range

40dB (with AGC disabled). Taken for 5% total distortion with 60% modulation at 1kHz.

AGC Characteristics

Less than 10dB change in output for 80dB increase in input from 3 μ V.

FM Deviation

Linear acceptance to 75kHz.

Audio Output

- Ext. loudspeaker (3 Ω) : 1.5W at 10% distortion.
- Line (600 Ω with CT) : 20mW at 5% distortion.
- Headset : Low/medium-Z.
- Response : Within 3dB, 200Hz-8kHz.

Video Outputs

Separate +ve and -ve outputs of 1V p-p into 50 Ω .

Video Response

Level within \pm 3dB from 20Hz to 250kHz.

RF Oscillator Output

50-150mV into 50 Ω .

5MHz Std. Output

(3S version only) 350mV into 50 Ω .

FM Audio Output

(3S version only) approx 900mV into 10k Ω .

IF Outputs (quoted for 10 μ V signal)

Separate wide and narrow-band outputs matched to 50 Ω .

Low-level wideband output : 15 μ V
Narrow-band output * : 50mV

(1) B/W set by receiver IF selectivity.

Muting

Threshold adjustable to 3 μ V carrier.

Two MUTING options are available dependent on Module fitted:-

OPTION A :: 23kHz NOMINAL :: LP3396
OPTION B :: 15kHz NOMINAL :: LP3396/1

