



FEATURES

- 1-18 GHz Frequency Range expandable to 100 GHz with External Harmonic Mixing
- Automatic Preselection
- Attache Case Size
- Internal Battery or AC Powered
- Manual and Sweep Tuning
- Fully Shielded
- .1 to 20 MHz IF Bandwidths
- Log IF Amplifier Available
- 21.4 MHz IF Output Available
- Outputs for External Monitor Oscilloscope

DESCRIPTION

The MSR-902 is the Attache case portable version of the performance proven MSR-900 Series Microwave Receivers. Covering the 1-18 GHz frequency range, it provides maximum utility and small package size. With both sweep and manual tuning capability, the MSR-902 provides excellent capability for wideband spectrum surveillance and discrete signal analysis. Operational capability using internal battery power in conjunction with an external battery powered oscilloscope permits true portability. Housed in a standard attache case, the MSR-902 can be carried anywhere.

The MSR-902 employs YIG-tuned local oscillators to cover the frequency range of 1-18 GHz with automatically tracked YIG preselectors. External harmonic mixers are available to extend the frequency coverage to 40 or 100 GHz. Two type N antenna input connectors cover the 1-12 GHz and 12-18 ranges. A third type N connector is used with the external

mixers. Typical noise figure is 20 dB over the 1-18 GHz range. Three linear IF bandwidths are standard: .1, 1 and 20 MHz. A fourth optional bandwidth can be supplied, such as 5 MHz linear or 10 MHz logarithmic. Three tuning modes are provided in the MSR-902 providing maximum flexibility for signal acquisition and analysis. A four digit LED display indicates frequency in all modes.

Over the 1-18 GHz range, input signals are filtered by the tracked YIG preselector and down converted to a 250 MHz first IF. The first IF provides a 20 MHz bandwidth IF output, and associated AM/FM demodulators supply video output for this bandwidth. Further conversion follows with IF bandpass filtering and AM/FM demodulation for the 1 MHz and 100 kHz bandwidths. Switched AM and FM video corresponding to the IF bandwidth in use are supplied to output connectors to drive an external oscilloscope or other ancillary device. Switch selectable AM video

filtering is provided to limit the bandwidth to 50 kHz when desired. Horizontal sweep and blanking outputs are also provided to synchronize the external oscilloscope trace with the receiver frequency sweep and to blank the display during retrace. AM or FM audio is front panel selectable and available at a 600 ohm headphone jack for aural monitoring. A gain control sets the output to the desired level. Gain of the IF section of the receiver is front panel adjustable with a range of over 60 dB. The MSR-902 also features AFC and a negative going step marker on the associated oscilloscope trace to aid in identification of individual signals during band scan operation. The marker is adjustable by the RF tuning control.

Three tuning modes may be selected: Scan, Var-Scan and Manual. In the Scan mode, the receiver continuously sweeps any of the bands determined by the bandswitch. The sweep rate is variable from 0.1 to 30 Hz. When an external oscilloscope is used, the swept band is displayed as amplitude versus frequency. The setting of the RF tune control is indicated by the horizontal position of the negative step marker.

In the Var-Scan mode, the receiver sweeps symmetrically about a center frequency determined by the positioning of the RF tune control. The frequency sweep dispersion is variable from 1-10% of the RF Band being scanned. In this mode, the frequency display shows the scan center frequency. No marker is available. Audio is blanked in both scan modes.

Operation in the Manual mode disables the sweep circuitry, and the RF tune control determines the tuned frequency which is displayed to an accuracy of $1\% \pm$ one count by the four digit GHz display.

The self contained power supply operates from +12 volts DC or 115/230 volts, 50-400 Hz AC. Direct current power can be externally supplied or the internal rechargeable battery will provide up to one hour of continuous operation.



**VDA-60
VIDEO DISPLAY ANALYZER**



**AK-902
ACCESSORY KIT**

ACCESSORIES

Two accessory items are particularly useful with the MSR-902. The AK-902 Accessory Kit contains the following: 1-12 GHz log periodic antenna, 1-12 GHz omnidirectional antenna, 12-18 GHz horn antenna and external harmonic mixers with horn antennas covering 18-100 GHz. These items are packaged together with a collapsible tripod antenna mount in a small carrying case. The VDA-60 Video Display analyzer is a multi-function unit which enhances the utility of the

MSR-902 and oscilloscope. It provides the following functions:

RASTER: Generates a "falling raster" or television display.

SYNC: Variable frequency source to externally synchronize an oscilloscope.

TDR: Two pulse signal formats for time domain reflectometry measurements.

VIDEO: Wide band, high gain video amplifier.

DC OFFSET: Variable DC offset for oscilloscope input.

NOTES

SPECIFICATIONS

Frequency Range	....	1-18 GHz, extendable to 100 GHz using external harmonic mixers.
Noise Figure	.....	20 dB(*), 1-18 GHz.
Frequency Indication	.	4-digit direct reading LED display. Accuracy $\pm 1\%$, +1 count
Tuning Method	.....	Electronic.
Tuning Modes: Scan	.	Full band sweep at variable rate with manually tuned frequency marker
Var Scan	.....	Variable 0 to $\pm 5\%$ sweep around center frequency.
Man	.....	Dual-speed control of receiver frequency plus vernier.
Preselection	.....	Automatically tracked 3-section YIG filter in all tuning modes.
Tuning Indicator	.....	Uncalibrated signal level meter.
AFC	.....	10:1 correction.
Antenna Conduction	.	-70 dBm maximum. -60 dBm above 12 GHz.
Radiated and Conducted Noise	....	Fully RFI-protected.
Image Rejection	.....	70 dB minimum. 60 dB above 12 GHz.
IF Rejection	.....	80 dB minimum.
RF Inputs	.....	Type N; 50 ohms nominal.
IF Gain Control	.....	60 dB range.
**Linear IF Bandwidths	.....	.1, 1, 20 MHz.
IF Output	.....	10 MHz bandwidth at 250 MHz -6 dBm maximum output at 50 ohms, 14 dB gain from mixer.
Demodulator Outputs:		
AM	.....	DC coupled, low impedance with post detection bandwidths of .05, 5 and 10 MHz corresponding to IF bandwidth selected. Output is 0.5 to 10V peak at 50 ohms.
Demodulator Outputs:		
FM	.....	DC coupled, low impedance with post detection bandwidths of .035, .35 and 6 MHz corresponding to selected IF bandwidth. Output level .2V p-p at 50 ohms with deviation equal to IF bandwidth.
Demodulator Outputs:		
Audio	.....	5.0 mw. 600 ohms phone jack, variable with audio gain control
Sweep Rate	.....	Variable 0.1 to 30 Hz.
Oscilloscope Outputs	.	Horizontal: 3V p-p DC coupled 1000 ohms. Blanking: +5V pulse at 5000 ohms.
Power Requirements:		
	115/230V, 50-400 Hz	..... 75 Watts
	+12 VDC	..... 50 Watts
	Internal Battery	..... Standard
	Battery Life	..... 1 Hour
Size (Inches)	.....	5 x 17 x 12 Attache case.
Weight (Pounds)	.....	35
*Typical over 90% of band. Add 3 dB for maximum noise figure.		
**Other bandwidths available between .1 and 20 MHz on special order. 10 MHz Log IF available.		



ORDERING INFORMATION (Please see latest price list.)

MSR-902 Receiver	1 to 18 GHz installed in commercial Attache case
Receiver	Fundamental Mixing, YIG Preselection
	<input type="checkbox"/> Option 2 Provision for External Harmonic Mixers 18-100 GHz
	<input type="checkbox"/> Option 2A Provision plus External Mixers 18-40 GHz
(1) <input type="checkbox"/> Option 3	Log IF Amplifier — 10 MHz Bandwidth
(2) <input type="checkbox"/> Option 4	21.4 MHz IF Output
(1) <input type="checkbox"/> Option 5	Additional IF Bandwidth

- (1) Options 3 and 5 not available together
 (2) Option 4 can be supplied only if internal battery is deleted. +12 VDC external power capability is maintained.



AK-902 Accessory Kit



VDA-60 Video Display Analyzer

WARRANTY

All Micro-Tel products are unconditionally warranted for a period of one year except for physical damage, provided the equipment is returned to the plant in Hunt Valley.