Technical Data Sheet
Microwave Products Division

WATKINS-JOHNSON

Microwave Receiver
WJ-8969

DESCRIPTION

The WJ-8969 Microwave Receiver is designed for wideband and narrowband applications in the 0.5 to 18.0 GHz frequency range. Its tuning capability is accomplished by active RF preselection and appropriate conversion with distributed gains for optimal dynamic range. Four wideband IF bandwidths (160 MHz center frequency) of the customer's choice can be supplied standard with each receiver. The system can provide up to eight operator-selectable bandwidths when comprised of four narrowband (10 kHz to 5 MHz) and four wideband (10 MHz to 40 MHz) bandwidths. The installation of narrowband IF bandwidths requires an optional internal downconversion module (21.4 MHz center frequency). Detection modes include simultan- eous AM and FM as well as CW and Pulse. Other additional options for the WJ-8969 Receiver include an internal Log detector and 5 MHz external reference input.

FEATURES

- *0.5 to 18 GHz frequency coverage*
- *Designed for wideband and narrowband applications*
- *Excellent phase noise and NPR performance*
- *Frequency synthesized tuning in 1 kHz steps*
- *10 kHz to 40 MHz IF bandwidths*
- *Single interconnect cable up to 1,000 feet in length for remote tuner control*
- *Simultaneous AM, FM, as well as pulse and CW detection modes*
- *IEEE-488 control*

For Further Information Please Contact:
WATKINS-JOHNSON COMPANY
Microwave Products Division
3333 Hillview Avenue, Palo Alto, California 94304-1223
(415) 813-2140 FAX: (415) 813-2916

MAY 1996
Supersedes Technical Data Sheet dated April 1995

Many peripherals are also available, such as the CD-125 digital signal display and IF PAN displays to complement the system.

The WJ-8969 is comprised of the WJ-8969/IFC IF Demodulator/Controller and a WJ-8969/TUX518 Tuner Unit. The two half-rack units, both 3-1/2 inches high, can be attached side-by-side and installed in a standard 19-inch equipment frame, or the tuning unit can be installed in a remote location. Signal and control interconnection is provided by a single 50-ohm coaxial cable that can be as long as 300 feet. By using special low loss cables, this length may extend up to 1,000 feet. The TUX518 tuner replaced earlier versions of tuners, including the TU0145 (1-4.5 GHz), TU0412 (4-12.4 GHz), TU1218 (12-18 GHz), TU012 (1-12.4 GHz)and the TU0118 (1-18 GHz). These earlier version tuners can be provided upon request.

All system control is provided via the WJ-8969/IFC IF Demodulator/Controller Unit. Upon turn-on, the IFC performs a built-in-test routine to check for faults, identify IF filters, and automatically calibrate the gain for IF cable losses. The IFC permits operator control from its front panel or it provides an interface with an external remote controlling device with the IEEE-488 remote interface. When in the local control mode, all of the system control is exercised via the front panel controls and indicators. The front panel keyboard permits rapid frequency input for discrete frequency tuning, frequency scanning, and selective frequency stepping. Conventional tuning can also be performed using the front panel optical encoder tuning wheel which provides variable rate tuning from 1 GHz to 1 kHz step sizes. The front panel keyboard provides rapid selection of parameters such as OF Bandwidths, Detection Mode, Gain Control Mode, AGC, AFC, COR Threshold, and Tuning Rate.

A 24-character alphanumeric display simplifies radio operations, particularly the memory and scan functions. All control settings are prominently displayed for operator viewing. When in the remote control mode, the same control functions are exercised by the remote controlling device via the remote interface. The front panel displays the remote selections, but the keyboard is disabled to prevent conflicts in the control operation.

WJ-8969 SPECIFICATIONS

Tuning Scheme	Frequency synthesized local oscillators locked to an internal or external frequency reference
Frequency Range	0.5 to 18.0 GHz
Frequency Resolution	1 kHz, synthesized
External Reference	10 MHz standard, -10 to 10 dBm, 5 MHz optional
Internal Reference Accuracy	3 parts in 10^7
Noise Figure	15 dBm maximum, 9 dB typical
Input 1 dB compression Point	-10 dB maximum, -5 dBm typical
Noise Power Ratio	40 dB typical
Third Order Intercept	-5 dBm minimum, 0 dBm typical

WJ-8969 SPECIFICATIONS (Continued)

Image Rejection	80 dBm typical
SSB Phase Noise:	Offset Frequency / Typical (dBc/Hz) 1 kHz / -80 10 kHz / -83 100 kHz / -95 1 MHz / -118
RF-to-IF Gain	18 dB typical (system does self-calibration to adjust for IF cable losses)
RF Input Impedance	50 ohms, nominal
LO Level at RF Input	-80 dBm, maximum; -90 dBm, typical
Single-Tone Spurious Free Dynamic Range	65 dBm, typical (referenced to a 1 MHz measurement bandwidth)
Internally Generated Spurs	Less than MDS in 1 MHz bandwidth
Tuner IF	160 MHz center frequency
RF Input VSWR	2.0:1, typical; 2.5:1, maximum
Gain Control	Manual and AGC
Gain Control Range	0 to 90 dB, 1 dB steps
Demodulation	AM, FM, CW, and pulse
Selectable IF Bandwidths	Up to eight installed. Four centered at 160 MHz and four centered at 21.4 MHz. See Table 1 for values.
Connectors	BNC female (all except RF in and interconnect which are N-type female)
Video Outputs	AM (linear), FM, selected (panel selection) AM (log) (optional)
Video Response	DC to 1/2 selected IF bandwidth
Video Output Levels	AM (LIN):0 to 2 volts, DC coupled FM: ±0.5 volts, DC coupled AM (LOG): 0.2 to 2 volts, DC coupled
Video Output Impedance	50 ohms, nominal
Signal Monitor Output Impedance	50 ohms, nominal
Audio Outputs	Phone and line, 600 ohm, unbalanced
Remote Control	IEEE-488

IF Outputs (Signal Monitor)	160 MHz unfiltered; 40 MHz BW, minimum; 50 MHz BW, typical 21.4 MHz (optional); 8 MHz BW, minimum Switched IF filtered
Dimensions (Inches)	Tuner and IFC each: 3.5 (H) x 8.25 (W) x 20.0 (L)
Temperature Range	Operating: -5 to +55°C; nonoperating: -20 to +80°C
Power Requirements	115/230 Vac ±15%, 47 to 400 Hz, single phase IFC: 40 watts; Tuner: 120 watts
Weight	IFC: 21 pounds; Tuner: 25 pounds

OPTIONS

21.4 MHz Internal Downconverter	This option adds an internal module that converts the 160 MHz IF to 21.4 MHz and provides capability to include up to four narrowband filters on this converted IF in addition to the four provided on 160 MHz.
Narrowband Filters	If the 21.4 MHz converter option is ordered, up to four filters may be implemented on the 21.4 MHz IF.
Log Video Output	The IFC may incorporate an internal Log Detector.
5 MHz Reference Input	This option allows for a 5 MHz input instead of the 10 MHz normally provided.

TABLE 1. Available IF Bandwidths*

IF BW (kHz)	Center (MHz)
10	21.4
20	21.4
50	21.4
100	21.4
200	21.4
250	21.4
300	21.4
500	21.4
1000	21.4
2000	21.4
4000	21.4
5000	21.4

IF BW (kHz)	Center (MHz)
4000	160
5000	160
7000	160
10000	160
14000	160
15000	160
20000	160
22000	160
28000	160
30000	160
36000	160
40000	160

*Other IF bandwidths are available upon request. A maximum of four narrow (centered at 21.4 MHz) and four wide (centered at 160 MHz) filters may be selected for every IFC.