

Technical Data Sheet

Microwave Products Division



WATKINS-JOHNSON

Microwave Receiver WJ-8969B



DESCRIPTION

The WJ-8969B is a TEMPEST qualified Microwave Receiver designed for receiving applications in the 0.5 to 20 GHz tuned frequency range, with emphasis on small size, low phase noise and high NPR. The receiver is a single complete unit, with the tuner, demodulator, and controller functions combined. A 70 MHz IF with 40 MHz minimum IF bandwidth is utilized for all receiving functions with up to six selectable IF filters included.

Small step tuning, in 1 kHz synthesized steps, is implemented with very good phase noise performance. This performance, combined with the SAW filters used for IF filtering, provides excellent results in digital and analog signal reception applications.

FEATURES

- *0.5 to 20 GHz frequency coverage*
- *TEMPEST qualified*
- *Frequency synthesized tuning in 1 kHz steps*
- *Wideband 70 MHz IF Output*
- *Excellent phase noise and NPR performance*
- *Low group delay using SAW filters*

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The WJ-8969B front panel provides all system controls for operations including manual tuning, memory scan, step and lockout programming and implementation, gain control, IF bandwidth selection, AGC and AFC functions and demodulation mode control. The receiver implements built-in test which monitors system performance and automatically indicates hardware problems during operation. The IF filters, ranging from 250 kHz to 40 MHz, are customer installable and the receiver automatically identifies installed

filter values upon power-up.

The WJ-8969B is a 3-1/2 inch high, standard 19 inch rack mountable chassis with all connections provided on the rear panel and all operator controls on the front panel. An IEEE-488 remote interface is included for computer control or status connections. Peripheral units such as IF Pan displays, digitally refreshed displays, and standard analysis equipment can easily be interfaced to the WJ-8969B.

WJ-8969B SPECIFICATIONS

Input Frequency Range	0.5 to 20 GHz	
Frequency Resolution	1 kHz, synthesized	
Frequency Accuracy	3 x 10 ⁻⁷ after 10 minute warm up, over operational temperature. 1 x 10 ⁻⁷ , typical.	
LO Radiation	-90 dBm, maximum <-100 dBm, typical	
Noise Figure	15 dB, maximum 13 dB, typical	
Input VSWR	2.5:1, maximum	
Image Rejection	70 dB, minimum	
RF to IF Gain	11 dB, minimum (at WB Sig. Mon. Output)	
1 dB Compression Dynamic Range	90 dB, minimum (1 MHz BW)	
Phase Jitter	1.5°, maximum integrated from 100 Hz to 40 MHz	
SSB Phase Noise	<u>Offset</u>	<u>dBc/Hz</u> <u>(Maximum)</u>
	1 kHz	-73
	10 kHz	-83
	100 kHz	-93
	1 MHz	-120
Gain Control	Manual and AGC, 80 dB range in 1 dB steps	

WJ-8969B SPECIFICATIONS (Continued)

IF Bandwidths	6 selectable, see Table 1
IF Outputs	Signal Monitor: 70 MHz, 40 MHz BW Filtered IF: 70 MHz, bandwidth selection dependant; -25 dBm nominal (AGC)
Noise Power Ratio	40 dB, Nominal
Demodulation	AM, FM, Pulse
Video Outputs	AM: 0.1 to 1.2 V p-p, adjustable; DC Coupled FM: 0.1 to 1.2 V p-p, adjustable; AC Coupled Selected Video: 0.1 to 1.2 V p-p, not adjustable; DC Coupled
Video Impedance	50 Ω , nominal
Video Response	DC to 1/2 selected IF Bandwidth
Connectors	
Inputs	RF Input, SMA Female AC Power IEEE-488
Outputs	Pan IF, BNC Female Selected IF, BNC Female AM Video, BNC Female FM Video, BNC Female Selected Video, BNC Female Auxillary Serial Interface, Twin-ax Female
Digital Control	IEEE-488
Physical Size (H x W x D)	3.5 x 19 x 20 inches, including handles, connectors, controls etc.
Temperature Range	Operating: 0 to +50°C Non-operating: -20 to +80°C
Power	115, 230 Vac \pm 15% 47 to 400 Hz Single Phase 140 Watts
EMI	MIL-STD-461B, CE03 and RE02; NACSIM 5100A ¹
Weight	50 pounds

¹The WJ-8969B has been certified to meet all requirements of NACSIM 5100A for a customer application. Production receivers are currently tested in a customer sponsored TEMPEST QA program.

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Table 1. Available IF Bandwidth Filter Values (3 dB BW, 70 MHz Center)

250 kHz	6.5 MHz	18 MHz
500 kHz	7.0 MHz	20 MHz
750 kHz	7.5 MHz	22 MHz
1.0 MHz	8.0 MHz	24 MHz
1.5 MHz	8.5 MHz	26 MHz
2.0 MHz	9.0 MHz	28 MHz
2.5 MHz	9.5 MHz	30 MHz
3.0 MHz	10.0 MHz	32 MHz
3.5 MHz	11.0 MHz	34 MHz
4.0 MHz	12.0 MHz	36 MHz
4.5 MHz	13.0 MHz	38 MHz
5.0 MHz	14.0 MHz	40 MHz
5.5 MHz	15.0 MHz	
6.0 MHz	16.0 MHz	