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# VXI VHF/UHF Receiver WJ-8634



The WJ-8634 is a fully synthesized, general-purpose VHF/UHF receiver for surveillance and monitoring of RF communications from 20 to 1000 MHz. The unit is packaged in a single-slot C-size VXI (VMEbus Extensions for Instrumentation) module measuring 9.2 x 13.4 x 1.2 inches (23.37 x 34.04 x 3.05 cm). The WJ-8634 is ideal for applications where high density and the highest degree of integration is required. By placing the receiver directly on a standard instrumentation and computing bus, the challenge of system integration is significantly reduced.

The standard configuration of the WJ-8634 supports frequency coverage from 20 to 1000 MHz with tuning to 2 MHz allowed with reduced performance. An HF-extended configuration of the WJ-8634 allows operation from 0.5 to 1000 MHz. The HF converter provides a +20 dBm third-order intercept point for signals spaced outside the 16-kHz first IF bandwidth. The HF converter mounts inside the WJ-8634 VXI module. A UHF frequency extended configuration of the WJ-8634 is also available and supports a frequency coverage from 20 to 2400 MHz. The 2400-MHz extender is housed in the WJ-8634 VXI module.

## Features

- ❑ Complete VHF/UHF receiver in a single-slot, C-size, VXI module
- ❑ Standard configuration frequency range: 20 to 1000 MHz
- ❑ HF extended configuration frequency range: 0.5 to 1000 MHz
- ❑ UHF extended configuration frequency range: 20 to 2400 MHz
- ❑ Narrowband configuration supports:
  - 4 IFBWs between 6.4 & 100 kHz
  - AM, FM, SSB, CW & IFT Detection Modes
  - 10-Hz Tuning Resolution in SSB mode
- ❑ Wideband configuration supports:
  - IFBWs between 300 kHz & 12 MHz
  - AM & FM Detection Modes
- ❑ -5 dBm 3rd-order intercept, typical
- ❑ Tracking Preselector Filter
- ❑ Low Phase Noise
- ❑ VXI message-based control

HEIGHT	9.2 in (23.37 cm)	DEPTH	13.4 in (34.04 cm)
WIDTH	1.2 in (3.05 cm)	WEIGHT	<6 lbs (2.73 kg)

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**All International sales of WJ equipment are subject to USA export license approval. This material provides up-to-date general information on product performance and use. It is not contractual in nature, nor does it provide warranty of any kind.**

The WJ-8634 features low phase noise frequency synthesizers with 100-Hz tuning resolution, in a low-power VXI package. A high-performance tracking preselector filters incoming RF signals, and rejects undesired out-of-band signals. The narrowband configuration of the receiver supports installation of up to four 21.4-MHz selectable IF filters, ranging from 6.4 to 100 kHz. Two of the IF filters are included in the unit. A 3.2-kHz filter is also included in this configuration for narrowband SSB detection. An IF translation (IFT) mode is available in the narrowband configuration, which allows an operator to use the receiver as a narrowband down-converter. An available wideband configuration supports the installation of up to four 21.4-MHz selectable IF filters ranging from 300 kHz to 12 MHz. In the wideband configuration, two IF filters are included in the unit.

The mechanical packaging design of the WJ-8634 receiver uses modern surface-mount technology. RF isolation is provided using multilayer PC-boards fastened into a milled-aluminum chassis. All RF interconnections are available on the front panel of the

unit. RF signals are passed in and out of the unit via SMA-type connectors.

The WJ-8634 is operated remotely via a VXI interface. Since there is no front panel control on the receiver, all functions except power-on/off are accessible over this interface. Data is passed to and from the receiver using the VXI-standard Word Serial Protocol.

The WJ-8634 Receiver supports three basic modes of operation:

- MANUAL (fixed-frequency operations)
- SWEEP (contiguous coverage from start to stop frequency)
- STEP (preprogrammed discrete frequencies)

The receiver is interactive in all of its modes of operation and is capable of alerting the controlling device of signal activity. While in SWEEP or STEP mode of operation, the receiver is capable of logging the COR status of the signals in the coverage area and only reporting changes to the controlling device. In the SWEEP mode of operation, bands or signals may be locked out of the coverage area. Non-volatile memory is included in the receiver for storage of up to 200 sweep or step setups, and up to 200 lockout bands.

WJ-8634 Configurations

Model Number	Frequency Range (MHz)	IFBW Range	Comments
WJ-8634	20 to 1000	6.4 to 100 kHz	Narrowband
WJ-8634-1	20 to 2400	6.4 to 100 kHz	Narrowband/UHF Extender
WJ-8634-2	0.5 to 1000	6.4 to 100 kHz	Narrowband/HF Extender
WJ-8634-3	20 to 1000	0.3 to 12 MHz	Wideband
WJ-8634-4	20 to 2400	0.3 to 12 MHz	Wideband/UHF Extender

## Inputs/Outputs

- Antenna Input (SMA)
- SW IF Output (SMA)
- Video Output (SMA)
- Signal Monitor Output (SMA)
- 10-MHz Reference (SMA)
- Auxiliary Control Port (Subminiature D)

The following signals are available on the Auxiliary Control Connector:

- Line Audio
- Switched Audio
- Received Signal Strength Indicator
- COR output

## Specifications

<b>Frequency Range (standard)</b> .....	20 to 1000 MHz (tuning to 2 MHz allowed)
<b>HF Extender</b> .....	0.5 to 1000 MHz
<b>UHF Extender</b> .....	20 to 2400 MHz (tuning to 2 MHz allowed)
<b>Tuning Resolution</b> .....	100 Hz (10-Hz SSB)
<b>Internal Reference Accuracy</b> .....	±2.5 ppm, max
<b>Detection Modes</b>	
<b>Narrowband</b> .....	AM, FM, CW, SSB, IFT
<b>Wideband</b> .....	AM, FM
<b>RF Input</b> .....	50 ohm, 2.5:1 VSWR, typical
<b>Preselection</b> .....	20% nominal bandwidth, tracking
<b>Noise Figure (standard)</b> .....	10 dB, max below 500 MHz
	12 dB, max above 500 MHz
<b>HF Extender without preamp</b> .....	16 dB, max (0.5 to 30 MHz)
<b>HF Extender with preamp</b> .....	11 dB, max (0.5 to 30 MHz)
<b>UHF Extender</b> .....	15 dB, max (1000 to 2400 MHz)
<b>3rd-order Intercept (20 to 1000 MHz)</b> .....	-5 dBm, typical (-10 dBm, min)
<b>HF Extender (0.5 to 30 MHz)</b> .....	+20 dBm, min
<b>UHF Extender (1000 to 2400 MHz)</b> .....	-15 dBm, min
<b>2nd-order Intercept (20 to 1000 MHz)</b> .....	+45 dBm, typical (+25 dBm, min)
<b>HF Extender (0.5 to 30 MHz)</b> .....	+40 dBm, min
<b>UHF Extender (1000 to 2400 MHz)</b> .....	+20 dBm, min
<b>Maximum RF Input without Damage</b> .....	+20 dBm
<b>HF Extender</b> .....	+15 dBm
<b>UHF Extender</b> .....	+15 dBm
<b>1st Image Rejection</b> .....	80 dB, typical (70 dB, min)
<b>2nd Image Rejection</b> .....	65 dB, typical (60 dB, min)
<b>IF Rejection</b> .....	80 dB, typical (70 dB, min)
<b>Phase Noise</b> .....	-60 dBc/Hz @ 1 kHz
	-98 dBc/Hz @ 20 kHz, max (20 to 500 MHz)
	-96 dBc/Hz @ 20 kHz, max (500 to 1000 MHz)
<b>HF Extender (at HF extender output)</b> .....	-115 dBc/Hz @ 20 kHz, max (0.5 to 30 MHz)
<b>UHF Extender</b> .....	-90 dBc/Hz @ 20 kHz, max (1000 to 2400 MHz)
<b>Tuning Time (SWEEP)</b> .....	2 msec, typical to within 1 kHz of final frequency
<b>Tuning Time (MANUAL 20 to 1000 MHz)</b> .....	19 msec, max to within 1 kHz of final frequency
<b>HF Extender (0.5 to 30 MHz)</b> .....	24 msec, max to within 1 kHz of final frequency
<b>UHF Extender (1000 to 2400 MHz)</b> .....	24 msec, max to within 1 kHz of final frequency
<b>LO Level at RF Input</b> .....	-90 dBm, max
<b>Internally Generated Spurious</b> .....	-110 dBm equivalent RF input, max
<b>Gain Control Modes</b> .....	MGC/AGC, 90-dB typical range
<b>AFC</b> .....	Selectable
<b>Signal Monitor Output</b> .....	Nominally 10-dB gain above the RF input
<b>Selected IF Output</b> .....	Centered at 21.4 MHz, -40 dBm nominal output level
<b>IF Bandwidths</b> .....	4 selectable (2 supplied & 2 optional) plus 3.2-kHz BW SSB filter in narrowband configuration
<b>Video Output Level</b> .....	0.5 V peak-to-peak into 600 ohms (30% deviation in FM or 50% AM modulation)
<b>Video Frequency Response</b> .....	dc to 1/2 the IF bandwidth, -3 dB
<b>Audio Output</b> .....	ac-coupled multipin connector
<b>Sensitivity</b> .....	See Table for Standard Narrowband/Wideband IF Bandwidths
<b>COR/ Squelch (TTL output)</b> .....	50 dB range, min
<b>RSSI Output</b> .....	0 to 5 V into 10k ohms multipin connector
<b>VXI Interface</b>	
<b>Protocol Supported</b> .....	Word Serial Protocol, IEEE-488.2
<b>Device Type</b> .....	Message-based device, VXI servant
<b>Card Size</b> .....	VXIbus C-size module
<b>Slots Used</b> .....	1 slot
<b>Data Transfer Handshake</b> .....	Normal Transfer Mode
<b>Data Transfer Capability</b> .....	A24, D16 circuitry provided
<b>EMI Shielding</b> .....	Completely Enclosed Module

<b>Power Requirements</b> .....	<b>+5V</b>	<b>+12V</b>
<b>Narrowband</b> .....	<b>4.5 W</b>	<b>6.0 W</b>
<b>Wideband</b> .....	<b>4.5 W</b>	<b>6.5 W</b>
<b>HF Extender (add to narrowband)</b> .....		<b>3.5 W</b>
<b>UHF Extended (add to narrowband or wideband)</b> .....		<b>2.5 W</b>
<b>Power Consumption (standard)</b> .....	<b>&lt;11 W</b>	

**Environmental Specifications**

<b>Temperature</b>	
<b>Operating Temperature Range</b> .....	<b>-20 to +55°C Case</b>
<b>Non-Operating Temperature Range</b> .....	<b>-40 to +70°C Case</b>
<b>Shock</b> .....	<b>Meets the environmental conditions of MIL-E-5400T, paragraph 3.2.24.6.1 pertaining to equipment shock</b>
<b>Vibration</b> .....	<b>Meets the environmental conditions of MIL-STD-810D, method 514.3, section I-3.2.4, category 4, propeller aircraft. Figure 514.3-25(a) defines the power spectral density with <math>L_i = 0.3 (g^2/Hz)</math>, and <math>F_i = 68 Hz</math>.</b>
<b>Humidity</b> .....	<b>95% relative humidity, non-condensing</b>

**IF Bandwidths\*\***

	<b>Bandwidth (kHz)</b>	<b>60:3 dB Bandwidth Shape Factor</b>	<b>Sensitivity (dBm)* 20 to 500 MHz</b>	<b>Sensitivity (dBm)* 500 to 1000 MHz</b>
<b>Standard Wideband</b>	<b>300</b>	<b>5:1</b>	<b>-90</b>	<b>-88</b>
	<b>500</b>	<b>5:1</b>	<b>-88</b>	<b>-86</b>
	<b>1000</b>	<b>4:1</b>	<b>-85</b>	<b>-83</b>
	<b>2000</b>	<b>4:1</b>	<b>-82</b>	<b>-80</b>
	<b>4000</b>	<b>4:1</b>	<b>-79</b>	<b>-77</b>
	<b>6000</b>	<b>4:1</b>	<b>-77</b>	<b>-75</b>
	<b>8000</b>	<b>4:1</b>	<b>-76</b>	<b>-74</b>
	<b>12000</b>	<b>4:1</b>	<b>-74</b>	<b>-72</b>
<b>Standard Narrowband</b>	<b>6.4</b>	<b>3:1</b>	<b>-107</b>	<b>-105</b>
	<b>10</b>	<b>3:1</b>	<b>-105</b>	<b>-103</b>
	<b>20</b>	<b>3:1</b>	<b>-102</b>	<b>-100</b>
	<b>30</b>	<b>3:1</b>	<b>-100</b>	<b>-98</b>
	<b>50</b>	<b>3:1</b>	<b>-98</b>	<b>-96</b>
	<b>100</b>	<b>3:1</b>	<b>-95</b>	<b>-93</b>

**\*Sensitivity Conditions:**

**AM - An input signal AM modulated 50% by a 1-kHz tone will produce a minimum video output S+N/N ratio of 10 dB**

**FM - An input signal FM modulated at a 1-kHz rate with a peak deviation equal to 30% of the selected IFBW will produce a minimum video output S+N/N ratio of 17 dB (Note: A 400-Hz modulation rate is required for IFBW's of 10 kHz or less.)**

**\*\* Consult the factory for other bandwidth sizes**