

WJ-8716 HF RECEIVER



FEATURES

- TEMPEST Qualified
- 5 kHz to 30 MHz Frequency Coverage
- AM, FM, CW, ISB, LSB and USB Reception Modes
- IF Bandwidths from 300 Hz to 16 kHz
- Exceptional Signal Handling Capability
- Meets the EMI Requirements of MIL-STD-461A
- Remote Control Options such as IEEE 488

DESCRIPTION

The WJ-8716 General Purpose HF Receiver is designed to be used in either a manual mode or with remote digital frequency control. The unit is capable of detecting AM, FM, CW, ISB, LSB and USB emissions (A1, A2, A3a, A3b, A3h, A3j, A4, F1, F2, F3 and F4) over the frequency range.

The WJ-8716 uses a building block approach; certain features are available as options in order to increase the capabilities of the receiver. Also, an optional Remote Control Module or Manual Control Module is required for control

of the receiver mainframe. The receiver mainframe provides the following:

- 5 kHz to 30 MHz Frequency Coverage
- Seven Selectable IF Bandwidths from 0.3 to 16 kHz (including the ISB option)
- Seven-digit Yellow LED Frequency Display (See Note 1)
- AM, FM and CW Detection Modes
- Low Phase Noise Frequency Synthesizers
- 10 Hz Tuning Steps
- Tunable Synthesized BFO (± 8 kHz)
- Audio Level/Signal Strength Meter

Front-panel controls on the WJ-8716 include Meter Select, BFO Offset, Detection Mode, Gain Mode, IF Bandwidth Select, Phone, Audio Level Adjust and RF Gain.

The WJ-8716 is TEMPEST qualified with the following standard options installed:

- Manual Control Module (MCM)
- ISB Module (ISB)

The installation of other options would require retesting the WJ-8716 for TEMPEST qualifications.

The standard Remote Control Module allows remote digital BCD frequency control and IF Bandwidth selection via a 37-line parallel CMOS (5 volt) interface. Other control formats can be accommodated, such as IEEE 488 interface bus.

For Further Information Please Contact:

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Printed in U.S.A.

FEBRUARY 1979

Specifications subject to change without notice

The Manual Control Module allows for front-panel frequency control with single knob tuning and four-pushbutton selection of tuning speed (10 Hz, 100 Hz, 1 kHz, or 10 kHz resolution), and a tuning disable pushbutton. The Manual Control Module also provides for automatic storage and return of the frequency data during power interrupt.

The ISB Module allows for detection of USB, LSB or ISB signals. The separate upper and lower sideband filters are group delay compensated. The BFO is automatically set to the proper injection frequency when any SSB detection mode is selected. The ISB mode features an automatic gain-controlled IF amplifier, product detector and audio amplifier chain separate from the main signal path. The ISB upper sideband information appears at the Line Audio Output; the ISB lower sideband information appears at the ISB Audio Output.

The Sub-Octave Preselector Module provides improved second order intermodulation distortion performance of the basic receiver. The preselector filters are automatically selected from the internal RF frequency data information.

When ordering plug-in options for the WJ-8716 Receiver, please specify as follows:

SPECIFICATIONS

Tuning Range

Tuning Resolution

Antenna Conducted Oscillator Radiation

Antenna Input Protection

Input Impedance

IF Bandwidths (3 dB)

IF Shape Factor

Detection Modes

Gain Control Modes

 AGC and Manual Range

 AGC Threshold

 AGC Attack Time

 AGC Release Time

Frequency Display

Frequency Resolution/Readout

Frequency Stability

Frequency Control

Synthesizer Lock-Up Time

Synthesized BFO

Power Interrupt

5 kHz to 29.9999 MHz

10 Hz

-107 dBm, maximum

The antenna input will withstand the effects of RF power to +15 dBm and static build-up. The protection circuit automatically resets.

50 ohms, unbalanced, nominal

Standard: 0.3, 1, 3.2, 6 and 16 kHz

IF BW	60 dB:3 dB, typical
0.3 kHz	7.0:1
1 kHz	4.5:1
3.2 kHz	2.5:1
6 kHz	2.3:1
16 kHz	2.0:1

Standard: AM, FM, CW

Optional: LSB, USB, ISB

Manual, Fast AGC, Slow AGC

100 dB, minimum

3.0 microvolt, typical

15 ms, maximum

Fast AGC: 25 ms, maximum

Slow AGC: 4 sec, maximum

7-digit yellow LED (See Note 1)

10 Hz

6×10^{-8} per day, 2×10^{-6} per year

Manual or Remote options

3 ms typical; 10 ms maximum

± 8 kHz in 100 Hz steps

With the Manual Control Module option, storage of the frequency data will automatically occur. If power is restored within 48 hours, the receiver will return to the previously tuned frequency.

Number to Order

WJ-8718/MCM-2†
WJ-8718/RCM†
WJ-8718/MCM†
WJ-8718/ISB
WJ-8718/PRE
WJ-8718/488-1

Options

Remote/Manual Control Module
Remote Control Module
Manual Control Module
ISB Module
Sub-Octave Preselector Module
IEEE 488 Interface Bus—Listen Only

WJ-8718/RED
WJ-8718/GRN

Red LED Frequency Display
Green LED Frequency Display

Additional options can be accommodated if required. Available options include the following (please inquire for details):

WJ-8718/B10
WJ-8718/SMO
WJ-8718/IFP

10 Hz BFO
Signal Monitor Output
Indicating Front Panel

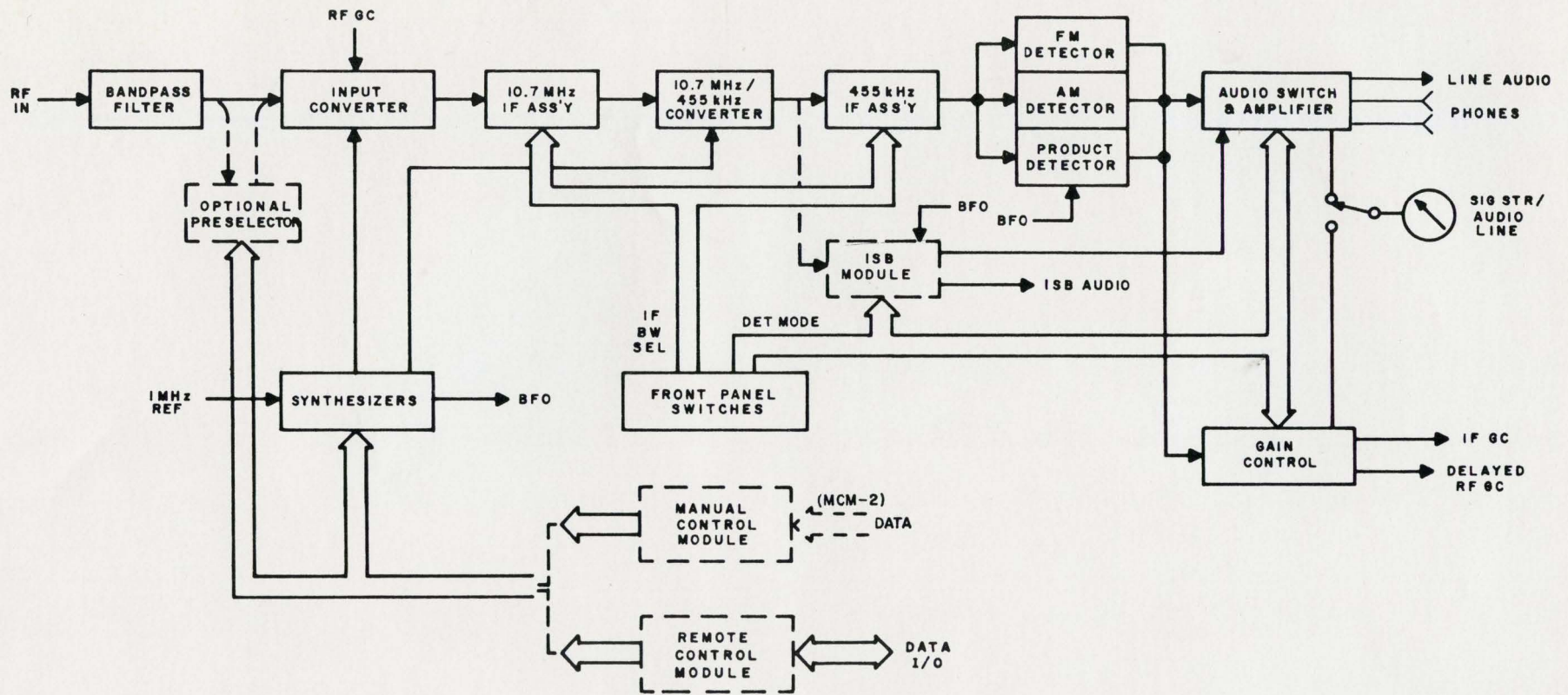
†One of these options is required for receiver operation.

IF Rejection	Greater than 100 dB
Image Rejection	Greater than 100 dB
Sensitivity: (0.2 to 30 MHz, see CW Sensitivity for extended frequency range)	
AM Sensitivity	A 2.0 microvolt signal 50% AM modulated at a 400 Hz rate will produce at least a 10 dB (s+n)/n ratio at the audio output.
(6 kHz IF Bandwidth)	
FM Sensitivity	A 3.2 microvolt signal FM modulated at a 400 Hz rate with a 4.8 kHz peak deviation will produce at least a 17 dB (s+n)/n ratio at the audio output.
CW Sensitivity:	
(0.3 kHz IF Bandwidth)	
200 kHz to 30 MHz	A 0.50 microvolt signal will produce at least a 16 dB (s+n)/n ratio at the audio output.
50 kHz to 200 kHz	A 0.79 microvolt signal will produce at least a 16 dB (s+n)/n ratio at the audio output.
15 kHz to 50 kHz	A 1.8 microvolt signal will produce at least a 16 dB (s+n)/n ratio at the audio output.
5 kHz to 15 kHz	A 79 microvolt signal will produce a 16 dB (s+n)/n ratio, typically at the audio output.
ISB, (USB, LSB) Sensitivity	A 0.71 microvolt signal will produce a 16 dB (s+n)/n ratio at the audio output.
Audio Outputs:	
ISB Output	400 millivolts rms, minimum across 600 ohms
Line Audio	500 millivolts rms, minimum across 600 ohms for an input signal of 3 microvolts, 30% AM modulated at a 400 Hz rate.
Headphone Output	300 millivolts rms, minimum for an input signal of 3 micro- volts, 30% AM modulated at a 400 Hz rate (See Note 2).
Audio Distortion	Less than 5% at rated audio output
Audio Amplifier Response	±1.5 dB from 100 Hz to 8 kHz, 1 kHz reference frequency
Final IF Output	20 millivolts, minimum, into 50 ohms for input signals greater than 3.0 microvolts
Intermodulation Distortion:	
3rd Order Input Intercept Point	+20 dBm, minimum for signals separated by 30 kHz, minimum
Unwanted Sideband Rejection	50 dB at 350 Hz into unwanted sideband
Signal Meter	Indicates carrier level or line audio level
Reciprocal Mixing	With a desired signal of 25 microvolts, in the 3.2 kHz IF bandwidth, the desired signal-to-noise ratio will be greater than 20 dB, when an undesired signal 70 dB higher in am- plitude and removed 30 kHz in frequency is present.
Cross Modulation	With a desired signal of 10 microvolts, an undesired signal 70 dB higher, 30% AM modulated will produce less than 10% cross modulation for frequency separation of greater than 50 kHz in the 1 kHz IF bandwidth.
Operating Temperature Range*	0°C to 50°C
Power Consumption	Approximately 0.6 amps at 115 Vac
Power Requirements	115/220 Vac ±15% 48 to 420 Hz
Dimensions	5.25 inches high, 19 inches wide and 19.4 inches deep
Weight	Approximately 35 pounds

Note 1. Red or Green display available as an option.

2. A stereo headset will provide 300 millivolts rms for each sideband in the ISB mode. USB output available on the stereo phone "tip"; LSB output available on stereo phone "ring."

*Operation within specifications guaranteed at 25°C ±5°C



WJ-8716 RECEIVER MAINFRAME BLOCK DIAGRAM