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# RECEIVING EQUIPMENT

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## Condensed Catalog

WATKINS JOHNSON COMPANY  
CEI DIVISION



GAITHERSBURG FACILITY

<http://watkins-johnson.terryo.org>

Watkins-Johnson Company was formed in December 1957 to engage in research, development and production of advanced electron devices and electronic systems. Now employing more than 3000 people, the Company is a diversified electronics firm with manufacturing facilities in the U.S. and overseas. Corporate offices are located in Palo Alto, California. Additional facilities are located in San Jose, California; Scotts Valley, near Santa Cruz, California; Windsor, England, 30 miles west of London; Munich, Germany; Rome, Italy; and the CEI Division in Gaithersburg, Maryland, near Washington, D.C.

CEI, formerly Communications Electronics Inc., was purchased by Watkins-Johnson in 1967. The equipment produced by the CEI Division presently covers the radio frequency spectrum from 1 kHz to 18 GHz. Practically all of the receivers, tuners, demodulators, frequency counters, and signal monitors built by W-J can be used separately or in complex system arrangements.

All Watkins-Johnson products, whether special purpose or catalog configured, incorporate the latest concepts in system design. Computer or remote control, high sensitivity, wide dynamic range, accurate signal reproduction, and effective human engineering are all provided in W-J products. Additionally, Watkins-Johnson has an in-house systems engineering capability and full support services including training, logistics and field engineering.

Drawing on the extensive experience of the Gaithersburg Facility, new units and systems have been developed to meet the increasing demand for precision EMI, EMC, and TEMPEST test and monitoring equipment. Additionally, many Watkins-Johnson equipments now include state-of-the-art shielding techniques which prevent W-J receiving equipment from adding to the already frequency-choked world.

For highly unusual applications, W-J will either modify existing products or design and fabricate new instruments to match customer needs. Utilizing in-house capabilities to the fullest, tight deadlines can be met even on quantity production runs. Of noteworthy importance in such special projects is the Company's provision for secure areas, which allows us to undertake rigidly classified assignments of wide scope and complexity.

NOTES

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## WJ-8718A HF Receiver



WJ-8718A

- Frequency Coverage from 5 kHz to 30 MHz in One Band
- Fully Synthesized Including BFO
- Five IF Bandwidths Up to 16 kHz
- AM, FM, CW, ISB, USB, and LSB Reception Modes
- Over 10 Performance Options and 4 Remote Control Options Already Available
- Low MTTB; High MTBF
- Modular Construction
- Remote Control Options Such as IEEE 488 and RS-232C/MIL-188C
- Meets MIL-E-16400 and MIL-S-901C Requirements
- High Dynamic Range

The WJ-8718A General Purpose HF Receiver is designed to be used in either a manual mode or with remote digital 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 of 5 kHz through 30 MHz.

Numerous performance and control options provide the exceptional flexibility necessary to conform to almost any user requirements. Plug-in modular construction throughout allows most options to be field installed after initial delivery should requirements change.

The standard front panel allows control of: analog meter functions, AGC decay time, manual gain control, detection mode, B.F.O. Control ( $\pm 8$  kHz) IF bandwidths, four tuning speeds and a tuning knob disable.



WJ-8718A/MFP

The MFP option provides in addition to the front panel controls offered in the standard version, a keypad for fast entry of tuned frequency or BFO offset information, 99 channels of addressable programmable memory and the ability for the receiver to step through the memory channels automatically and do specified spectrum scans. The MFP option also replaces the mechanically latching/indicating switches with momentary contact, electronic indicating switches which display all receiver operating modes when in local or under remote control.

## WJ-8617B VHF/UHF Receiver



WJ-8617B

- Fully Synthesized Tuning, 20-500 MHz (500-1100 MHz optional)  
100 Hz Resolution  
1 msec maximum for 10 kHz steps and greater  
Low phase Noise
- AM, FM, CW and Pulse Detection Modes (SSB, and LOG optional)
- High Dynamic Range
- Optional Built-in, Log/Lin Spectrum Monitor
- Built-in, Log/Lin Spectrum Monitor
- Modular Construction for Low MTTR
- High Operational Availability (A<sub>1</sub>)
- Low RFI – Designed to MIL-STD-461A
- 5 Selectable IF Bandwidths
- AFC Provides "Lock-on" Capability in SCAN/STEP and MANUAL Modes
- Internal Microprocessor-Based, Computing Controller
- IEEE-488 or RS-232C Remote Control Interface

This receiver is designed to fill the need for general purpose, cost-effective, digitally controlled receivers in the VHF/UHF frequency range.

Integrating the decision and control power of the internal 6800 microprocessor and advanced receiver technology, each receiver is capable of either Local Control as a stand-alone receiver, or with Remote Control as a basic building block for larger system requirements.

In MANUAL or STEP mode of operation the built-in memory provides 16 operator-programmable channels of memory (96 optional) for all receiver functions (including programmable Threshold Level, COR) or 8 programmed (48 optional) frequency search bands in the SCAN mode.

Additional to the STEP/SCAN modes of operation, the microprocessor provides decision capability for: special user-defined processing, signal acquisition and handoff operation in Master/Slave configurations.

Expansion capabilities built into the receiver provide a full range of optional module plug-ins, all of which have access to the internal microprocessor bus. These options may either be purchased with the receiver or field-installed at a later date to upgrade the receiver for new requirements.

## WJ-8619 Remote Receiver



- Frequency Range 20-500 MHz (20-1100 MHz with FE Option)
- Fully Synthesized Tuning
- AM, FM, CW, Pulse Detection Modes
- Automatic Preselection
- 96 Channel non-volatile memory
- Automatic Scan, Step Stability
- Capability for up to 5 IF BW's (customer selected)
- Most Modules interchangeable with WJ-8617B

The WJ-8619 Remote Receiver is a compact, digitally controlled receiver packaged in the Standard A1D size of the ATR configuration. The basic receiver covers 20-500 MHz extendable to 1100 MHz with the addition of the plug in frequency extender option. It can accept up to 5 IF Bandwidth modules selectable from eleven off-the-shelf options ranging from 10 kHz to 4 MHz. Standard detection modes include: AM, FM, CW, and Pulse. Options are available which include SSB, Variable BFO, BITE, DRD, and R Log.

The built in test (BITE) option provides the ability to verify receiver performance in a matter of seconds. This feature also provides rapid isolation of faults for lower MTTR.

Control of the WJ-8619 receiver is through the IEEE 488 bus from either a WJ-8617B receiver or a computer equipped with IEEE 488 capability. (The WJ-8617B receiver may also be on the computer bus for increased flexibility.)

## WJ-9023C Receiving System



WJ-9023C System

- Wide Frequency Coverage 30 MHz to 12.4 GHz
- Multiple Configurations for Full Local/Remote Control
- Band Tunable Preselectors, YIG Filters
- High Resolution Digital Tuning (10 kHz Step Size)
- AM, FM, and Log Detection Modes
- Frequency Scan and Memory Capability
- Fast Tuning Speed

The WJ-9023C is a receiving system having a broad tuning range from 30 MHz to 12.4 GHz with either operator (local) or remote control. The units that comprise the WJ-9023C Receiving System are listed below and can be configured for different applications:

- WJ-9023C/TSU Tuner Synthesizer Unit
- WJ-9023C/IFD IF Demodulator
- WJ-9023C/DCU Digital Control Unit or WJ-9023C/ICU Interface Control Unit

For applications requiring both local control and remote interfacing to an external computer, a DCU, IFD, TSU combination is required. Execution of the control functions in the remote operation mode via an IEEE-STD-488-1975 interface requires an ICU, TSU, IFD combination.

(The ICU is also available on order as an interface for other data bus configurations.) For applications in which the customer chooses to provide his own interface, an IFD TSU pair may be used without an ICU or DCU.

The WJ-9023C Receiving System is designed for both wide and narrowband applications over its tuning range with IF bandwidths from 10 kHz to 20 MHz. In the local operation mode all control functions are performed via the WJ-9023C/DCU. These functions include: operating mode selection, tuned frequency, detection mode, IF



bandwidth, AGC selection and IF gain, step size, and dwell time (during scan), AM or FM audio selection, pulse stretcher, and optional IF attenuation. In the remote control mode, all DCU functions are accessible digitally with the exception of the Audio Select, Audio Gain, and Aural Enhancement controls.

The TSU converts a selected frequency of the overall band to a 160 MHz IF output which is on the rear panel. The rear panel outputs provided on the IF Demodulator (IFD) include:

- Signal Monitor Output (160 MHz)
- AM Video
- FM Video
- Log Video (available on special order)

## WJ-9040 Receiving System

- 5 KHz to 23 GHz Capability
- Complete Control, Power, and Mechanical Compatibility
- Totally Modular
- Very Low Power Requirements
- Local/Remote Control by System Controller, RS 232C or IEEE 488
- Easily Expanded for Changing Requirements

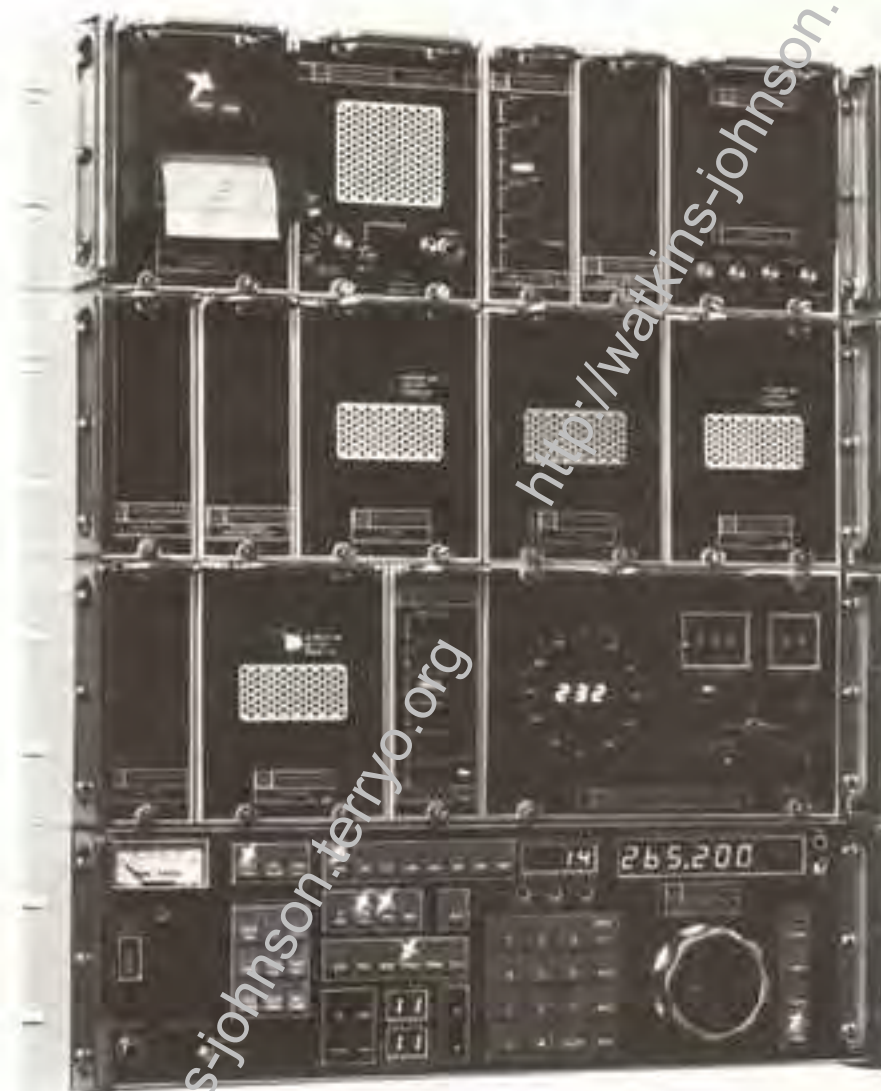
The WJ-9040 depicted here and on the cover, is the newest addition to the Watkins-Johnson family of fine receiving systems. The WJ-9040 offers a high performance, low cost alternative to complex C<sup>3</sup> requirements for automated receiving systems. As a user oriented system the WJ-9040 provides the user the ability to rapidly and simply configure receiving systems to satisfy his specific requirement.

Our unique design permits infinite variety in configuration of the full line of modules which include: HF, VHF, UHF receivers, Microwave Down converters; Direction Finding processor and display units; Special application demodulators; Multiple IF's (in addition to the receiver IF's); Alpha numeric generators; XY displays; Audio/video switching plugin's; Printers; Speaker modules; and System controllers.

The heart of the WJ-9040 system is the Equipment Frame with its rear mounted power supply, data interface module and RF reference generator. Each equipment frame has eight con-

nectors to supply power, data control and common analog interface to the front loaded modules. The modules are one-eighth, one-quarter and one-half 19" rack sizes and may be situated in any position in the equipment frame. Any RF connections required are through SMA Connectors on the rear of the applicable modules.

System control affected is through a 50 ohm coaxial cable for serial transmission of asynchronous data at a 125 kilobaud rate of 11 bit data. A Controller may interface at the System level, Zone level, or Equipment Frame level. The Equipment Frame interface to the modules makes possible the controller/module link-up. This link-up is achieved in a "dial-up" manner from the controller permitting near real time operations (no greater than 70 milli-seconds response to a change status command). The overall interface system and capability for inter-rack control makes fault isolation faster in the event of a problem; it also gives a soft fail mode to prevent catastrophic mission degradation.



## WJ-8888B HF Receiver



- 0.5 to 30 MHz
- AM, FM, CW, ISB, LSB, USB
- Synthesized LO with 10 Hz Resolution
- Built-in Memory
- Switch Selectable Tuning Speeds
- Total Digital Control

The WJ-8888B is a highly versatile HF receiver which covers the 0.5 to 30 MHz frequency range. The receiver has three operating modes: Local, Remote, and Memory. In the Local mode, the receiver is tuned manually by the operator. In the Remote mode, the receiver accepts and stores a digital word which controls the tuned frequency, detection mode, gain mode, IF bandwidth, RF gain level, and CFO frequency. In conjunction with the Local mode, the Memory mode enables the operator to store up to sixteen sets of receiver frequencies and control parameters which may be recalled as required.

The receiver is designed for the reception of AM, FM, CW, ISB, LSB, and USB emissions. Up to six IF bandwidths may be selected via front-panel pushbutton switches. Four switch selectable tuning speeds are provided with resolutions of 10 Hz, 100 Hz, 1 kHz and 10 kHz. Other features include automatic switching of sub-octave preselection filters to minimize intermodulation distortion and synthesized conversion oscillators for maximum receiver stability. The tuned frequency of the receiver is displayed on a front-panel seven-digit LED readout. Resolution of the display is 10 Hz over the entire tuning range.

The WJ-8888B is supplied with a 64 bit serial synchronous I/O interface. An optional serial asynchronous interface is available. Further digital interface information is available in Watkins-Johnson Application Note 1304-50 dated November 1975 and Addendum dated May 1976.

## 373A-2 Receiver



- 500 kHz to 30 MHz
- Two Bands: 500 kHz to 10 MHz; 10 to 30 MHz
- AM, FM, CW
- IF Bandwidths: 6, 20, 100 and 500 kHz
- Suitable for RFI Detection

## 340A-7 VLF Receiver



- 1 to 900 kHz
- AM, FM, CW
- Voltage Tuned with Local or Remote Control
- IF Bandwidths: 1, 6, 20, and 50 kHz
- Five-digit Frequency Counter with DAFC
- Optional Slideback for EMI Testing
- Compatible with SM-8421 Signal Monitor

## WJ-9028 Receiving System



- 20 to 1000 MHz
- AM, FM, CW, Pulse
- Built-in Signal Monitor with Linear and Log Display Modes
- Built-in Frequency Counter with DAFC and Variable Intensity
- Uses WJ-9930 Series Plug-In Bandwidth Modules (See Page 9)
- Compact, 5¼" Rack Size

## 565 and 565A Receivers



565

- 20 to 1000 MHz
- AM, FM, CW, Pulse
- Bandwidths: 10, 50, and 300 kHz; and 3 MHz  
Optional Bandwidths Available
- Built-In Signal Monitor
- DAFC When Used with Compatible W-J Frequency Counter
- Accepts UH-100 and VH-100 Tuning Heads

NOTE: The 565A is a modification to accept three WJ-9930 Series IF Bandwidth modules (See Page 9) in place of the standard four.

## UH-100 Series, VH-100 Series Tuning Heads



VH-103

- Plug into 565 and 565A Receivers
- No Alignment Required When Changing Tuning Heads

TUNING HEAD	FREQUENCY RANGE
VH-101	20 - 90 MHz
VH-103	90 - 260 MHz
VH-105	200 - 425 MHz
VH-107	100 - 400 MHz
UH-101	235 - 500 MHz
UH-102	500 - 1000 MHz
UH-104	490 - 1000 MHz

## WJ-8922A Receiver



- 1 kHz to 3 GHz Frequency Range
- AM, FM and CW/SSB
- Double Demodulation Capability

The WJ-8922A TSCM Receiver is designed to cover the 1 kHz to 3 GHz frequency spectrum in either a manual tune/sector scan, or panoramic scan mode. Reception modes include AM, FM and CW/SSB with the capability for Double Demodulation. The WJ-8922A is extremely portable and flexible. The unit fits in a case which is suitable for airline luggage.

## WJ-8730A Receiver Series



WJ-8730A

- 20 to 1000 MHz
- AM, FM, CW, Pulse
- Accepts WJ-9060 Series Tuning Heads
- Wide Selection of IF Bandwidth Options (WJ-9930 Series)
- DAFC with Compatible WJ Frequency Counter
- Modular Concept to Meet a Wide Range of Requirements
- EMC Version – WJ-8730E

## Receiver Configurations

WJ-8730A	{ Two tuning heads Built-in signal monitor
WJ-8731A	{ Two tuning heads Tuning meter
WJ-8732A	{ One tuning head Built-in signal monitor
WJ-8733A	{ One tuning head Tuning meter

The WJ-8730A Series of Modular Receivers offers a wide selection of receiver configurations. Main frames are available with provisions for one or two WJ-9060 Series drop-in Tuning Heads and a signal monitor or tuning meter. Additionally, IF bandwidth options ranging from 10 kHz to 3 MHz are available. Each receiver in the series has provisions for three IF bandwidths; however, the modular concept allows selection of only one or two IF bandwidths if desired.

## WJ-9060 Series Tuning Heads



WJ-9063

- Gain x Noise Figure Product: 30 dB  $\pm$ 3 dB, all Tuning Heads
- 3rd Order Intermod Intercept Point:  $>$  -10 dBm, Tuning Heads
- Simple Drop-In Installation
- No Electrical Alignment Required after Installation
- Special Versions Available for Use with WJ-8730A

TUNING HEAD	FREQUENCY RANGE
WJ-9061	20-90 MHz
WJ-9062	90-300 MHz
WJ-9063	200-425 MHz
WJ-9064	250-500 MHz
WJ-9066	30-90 MHz
WJ-9068	490-1000 MHz

## WJ-9930 Series IF Amplifier/Demodulator Modules

- Plug-In Sets Consisting of IF Amplifier Module and Limiter/Discriminator Module
- Select Up to Three Sets for Use in the WJ-9028, WJ-8730A Series, and 565A

IF AMPLIFIER/DEMODULATOR	BANDWIDTH
WJ-9930-10	10 kHz
WJ-9930-20	20 kHz
WJ-9930-50	50 kHz
WJ-9930-100	100 kHz
WJ-9930-200	200 kHz
WJ-9930-300	300 kHz
WJ-9930-500	500 kHz
WJ-9930-1M	1 MHz
WJ-9930-2M	2 MHz
WJ-9930-3M	3 MHz

### 357 Receiver



- 1 to 600 kHz
- AM, SSB, CW, MCW, and FSK Reception
- Four-digit Frequency Display
- Digital Automatic Frequency Control (DAFC)

### 461 Series Receiver



- 300 to 550 MHz
- AM, FM
- Video Output
- Crystal Controlled
- Mount in EF-506B

### 440,441 Series Receivers



440

- 30 to 300 MHz
- 440 – AM
- 441 – FM
- Crystal controlled for high stability
- Variety of test accessories available
- Mount in EF-506B Equipment Frame

Basic Receiver	Frequency Range		IF Bandwidth (BW)	
	First Suffix	Frequency (MHz)	Second Suffix	BW (kHz)
440-( ) - ( )	-1	30-48	-1	50
441-( ) - ( )	-2	45-72	-2	20
	-3	70-105	-3	75
	-4	100-160	-4	100
	-5	150-220		
	-6A	210-260		
	-7	255-300		

Basic Receiver	Frequency Range		IF Bandwidth (BW)	
	First Suffix	Frequency (MHz)	Second Suffix	BW (kHz)
461-( ) - ( )	-1	300-450	-1	50
	-2	450-550	-2	20
	-3		-3	75
	-4		-4	100

### EF-506B Equipment Frame



- Accommodates up to six 440, 441, or 461 Series Receivers
- Built-in power supply provides operating voltage to receivers
- Occupies 5.25 inches of vertical rack space

## RS-180A Receiving System



RS-180A with EF-182A Equipment Frame

- 20 to 1000 MHz
- AM, FM
- CW Option for 30 to 250 MHz Range
- EMC Version — RS-168

The RS-180A Receiving System provides up to twelve independent receivers, a time-shared frequency counter with DAFC and an active multicoupler which permits operating all receivers from a single broadband antenna. An equipment frame which supplies system interface and dc operating voltage to the receivers and frequency counter is also provided. The EF-180A mounts up to six receivers and the EF-182A mounts up to twelve receivers.



483A

The 480A Series Receivers include ten plug-in units designated 481A through 490A. Each has squelch control, coarse and fine tuning controls, DAFC capability, and FM, AM/AGC and manual AM modes. A BFO pitch control is included on receivers having the CW option. A wide range of customer-selected IF bandwidths is offered with the series. In addition to the outputs required for system interface, a balanced video output and squelch logic level output is provided from each receiver. Two audio outputs and a signal monitor output from the selected receiver are provided via the frequency counter.

RECEIVER	TUNING RANGE
481A	30 - 60 MHz
482A	60 - 120 MHz
483A	100 - 180 MHz
484A	180 - 300 MHz
485A	30 - 90 MHz
486A	80 - 250 MHz
487A	20 - 80 MHz
488A	220 - 440 MHz
489A	250 - 500 MHz
490A	500 - 1000 MHz

The DRO-280A Frequency Counter is capable of controlling up to twelve receivers in the RS-180A System. Each receiver has its local oscillator frequency counted and its DAFC correction voltage updated every 15 milliseconds. A 12-position receiver selector switch on the counter is used to select the receiver whose frequency will be read-out on the LED display. The display lamp on the selected receiver is illuminated so that the operator can tell at a glance which receiver's frequency is being displayed. In addition, the selector switch provides selection of the appropriate audio output so that the operator may monitor the output of the selected receiver while observing the frequency of operation. The selector switch also provides selection of the appropriate signal monitor output for external monitoring of the spectrum about the selected receiver's IF.



WJ-9310

The WJ-9310 Multicoupler provides optimum coupling between a single antenna and as many as twelve receivers operating in the 20-1000 MHz frequency range. The multicoupler provides a nominal gain of 2 dB and has a noise figure of 6.5 dB from 20 to 300 MHz and 8.5 dB from 300 to 1000 MHz.

## RS-160 Receiving System



RS-160 with CSU-160 Tuner Switching Unit

- 2 to 1000 MHz
- AM, FM, Pulse
- Wide Range of Options

The RS-160 Pan-Man Receiving System consists of a family of products which can be configured to provide 2 to 1000 MHz panoramic or manual reception with either manual, remote, or computer control. The basic system consists of: a 205-2 Receiver, one of the eleven available plug-in Tuning Heads, a DRO-335 Frequency Counter with DAFC, and an SM-7301A Signal Display. This system allows panoramic reception of the frequency band covered by the tuning head installed or manual reception of any frequency in the band with DAFC stability.

The 205-2 Receiver is the heart of the system. This voltage-tuned unit has five operating modes: PAN, SECTOR, PAN/SEC, REMOTE, and MAN. The receiver provides AM, FM, and pulse reception with IF bandwidths of 10, 50, and 300 kHz and 1 MHz. Any one of the IF bandwidths can be selected when the receiver is in the MAN or REMOTE modes. In the PAN, SECTOR, and PAN/SEC modes the optimum IF bandwidth is automatically selected by the receiver.

The 215 Receiver has all the features of the 205-2 plus provisions for digital control via TTL compatible inputs from a digital controller.

The HH, VH, and UH Series Tuning Heads provide reception in the following frequency ranges:

### TUNING HEAD

HH-11  
VH-11  
VH-12  
VH-13  
VH-14  
VH-15  
VH-16  
VH-17  
UH-11  
UH-12  
UH-13

### FREQUENCY COVERAGE

2 - 30 MHz  
30 - 60 MHz  
60 - 120 MHz  
100 - 180 MHz  
180 - 300 MHz  
20 - 40 MHz  
40 - 80 MHz  
50 - 100 MHz  
250 - 500 MHz  
500 - 1000 MHz  
220 - 440 MHz

The DRO-335 Frequency Counter greatly enhances system versatility and ease of operation. It provides a six-digit readout of the receiver's manually tuned frequency up to 1000 MHz. With the DRO-335 it is possible to apply digital automatic frequency control (DAFC) to the receiver when it operates in the MAN mode.

The SM-7301A Signal Display functions as an RF Pan Display when the receiver is in the PAN, SECTOR or PAN/SEC mode and as an IF Pan Display when the receiver is in the MAN or REMOTE mode. A five-inch display tube is used. (Use SM-7301A-3 with the TSU-103B and CSU-160.)

The TSU-160 Tuner Switching Unit is an accessory device which mounts directly below the 205-2 or 215 Receiver. It connects to the receiver through the EC-150 Extender Cable which is installed in place of a tuning head. The TSU-160 can contain from one to seven of the tuning heads normally used with the 205-2 Receiver. A front-panel switch selects any installed tuner for operation. A flexible arrangement has been provided to connect antennas to the various tuning heads. With suitable antennas and seven tuning heads, coverage can be provided from 2 to 1000 MHz and any band within that range can be instantly selected for operation.

The CSU-160 Tuner Switching Unit permits sequential scanning (Autostep) of up to seven tuning heads, manual selection of any one tuning head or remote selection by applying coded binary information. With the CSU-160 it is possible to view the entire 2-1000 MHz spectrum in seven RF pan traces presented on the associated SM-7301A-3 Signal Monitor.

The TSU-103B is similar to the CSU-160 but has provisions for mounting only three of the HH-, VH-, or UH-Series Tuning Heads.

## WJ-8940B Receiving System

- Calibrated RF Signal Measurement and Analysis over the Frequency Range of 5 KHz to 1 GHz, Optionally 20 Hz to 18 GHz.
- Exceptional Receiver Sensitivity to Insure Compliance with EMI/EMC and TEMPEST Testing.
- AM, AM/AGC, FM, CW, and Log Detection Modes.
- 17 IF Bandwidths from 200 Hz to 50 MHz for Analysis of Narrowband and Broadband Signals, Optionally from 5 Hz to 50 MHz with ELF Extender.
- Audio, Video and IF Outputs for Signal Analysis and Digital Outputs for Displays.

The WJ-8940B Receiving System is a self calibrating, precision amplitude measuring system for EMI/RFI electromagnetic compatibility investigations and wideband RF ambient signal surveys. In its standard configuration, the WJ-8940B tunes from 5 KHz to 999.999999 MHz with 1 Hz resolution. Seventeen IF bandwidths from 200 Hz to 50 MHz, in a 1-2-5 sequence are available to meet specific testing requirements. Detection modes include AM, AM/AGC, FM, CW, and LOG.

In the LOG detection mode, peak, average, or quasi-peak measurement modes provide calibrated signal amplitude which is corrected for measurement variables. Included are RF attenuation, IF bandwidth, system gain variation, and optionally antenna correction factors which may be directly compared to a specification limit. The corrected data may be displayed in five ways: front panel plasma display, digital plotter for amplitude versus frequency graphs, analog X-Y-Z signals for external oscilloscope displays, serial data to a printer for hard copy, and in the Remote Control mode to an external controller or processor.

Additional outputs that are available from the WJ-8940B for operator use include: Signal monitor outputs to interface with IF pan displays, IF output of the selected bandwidth filter, video and audio signal outputs, and a peak detector output from the video processor.

The WJ-8940B Receiving System consists of six units integrated into a rack enclosure and include: Tuner/Synthesizer Unit (TSU), Auxiliary Synthesizer Unit (ASU), IF Demodulator (IFD), Digital Control Unit (DCU), Power Supply (PS), and a Circuit Breaker Panel (CB).



The Tuner/Synthesizer Unit (TSU) will accept six RF inputs from sensors such as: antennas, current probes, LISN's or signal generators. ASU provides a stable, accurate frequency reference for the system. The IFD contains the IF bandpass filters, detectors, and the video processor. Control of the entire system is via digital data busses between the DCU and all controllable units. Data and control information for a printer and a plotter are also generated by the DCU.

The WJ-8940B Receiving System has four major operating modes which are useful for many aspects of EMC testing. Fixed frequency mode, sector scan mode, and repetitive sector scan mode are the local modes with all necessary controls located on the DCU control panel. These are standard in the system without the need for an external controller and custom software. Remote operation of the unit is via either a 16 bit parallel interface or an IEEE-488 interface using a controller, calculator, or computer.

### OPTIONS AVAILABLE:

**Option 2 Firmware Package:** Provides variable step size in scan modes, manual tuning step size (a function of IF bandwidth), tuning extended to 1 KHz, and expanded plot capabilities.

**Microwave Frequency Extender (MX):** A fully synthesized microwave tuner designed to extend the systems frequency range to 18 GHz with a minimum RF bandwidth of 500 MHz.

**ELF Extender:** Extends the frequency coverage down to 20 Hz and provides additional IF bandwidths of 5, 10, 20, 50 and 100 Hz.



## RS-125-17 Receiving System



RS-125-17 with Optional Equipment Console

The RS-125-17 is a highly versatile arrangement of equipments designed primarily to meet the tunable TEMPEST measurement requirements. The system is also well suited for spectrum surveillance, electromagnetic surveys, range monitoring, and analysis of electromagnetic emanations. The modular design approach permits integration of only the few components necessary for the user with limited test requirements, and allows for add-on expansion at a later time.

### Tuners

TUNER/RECEIVER	FREQUENCY RANGE	OVERALL BANDWIDTH	IF OUTPUTS
340A-7	1-900 kHz	1 MHz	2 MHz
HT-10-4	0.9-10 MHz	1 MHz	21.4 MHz
VT-11-4	10-30 MHz	4 MHz	21.4 MHz
WJ-9080A	30-1000 MHz	50 MHz	21.4 MHz, 160 MHz
TH-120R	1-2 GHz	20 MHz	21.4 MHz, 160 MHz
TH-245	2-4 GHz	20 MHz	21.4 MHz, 160 MHz
TH-480R	4-8 GHz	20 MHz	21.4 MHz, 160 MHz
TH-812R	8-12 GHz	20 MHz	21.4 MHz, 160 MHz
TH-1218	12-18 GHz	50 MHz	21.4 MHz, 160 MHz

#### Notes:

- (1) MTF-Series Microwave Tuner Frames required for TH-Series mounting and interface.
- (2) 50 MHz RF bandwidth for TH-Series is available.
- (3) Use WJ-9211 IF Converter with 340A-7.

- 1 kHz to 1 GHz – Expandable to 18 GHz
- Meets Narrowband and Broadband Tunable TEMPEST Measurement Requirements
- Meets TEMPEST Band/Bandwidth Combinations
- IF Bandwidths – 400 Hz to 50 MHz
- Full Support Provided for Complete Turn-Key Operation and System Integration
- Certification Testing Available

### Demodulators

#### DM-4CA DEMODULATOR

21.4 MHz Input

AM, FM, CW Pulse Detection

#### DM-212A, DM-235 DEMODULATORS

160 MHz Input

AM, FM, Pulse Detection

IF Bandwidths: DM-212A – 10, 20 MHz  
DM-235 – 30, 50 MHz

### Display and Monitor

#### SM-9804A, SM-1622 SIGNAL MONITORS

- Visual IF Pan Display
- Input Frequency: SM-9804A – 21.4 MHz  
SM-1622 – 160 MHz
- Sweep Widths: SM-9804A – 8 MHz  
SM-1622 – 20 MHz

#### DRO-333A-1 FREQUENCY COUNTER

- Provides Tuned Frequency Readout and DAFC for HT-10-4, VT-11-4, and WJ-9080B

#### Note:

Further information regarding the RS-125-17 and various system configurations is available in Watkins-Johnson Application Note 1307.50 dated December 1975.

## WJ-8640-1 Series Manpack Receiver



- 0.5 to 500 MHz
- AM, FM, CW, Optional SSB
- Built-in low-power frequency counter with DAFC
- Battery or external power source operation
- Ruggedized and waterproof construction
- Compatible with WJ-9180 Manpack Signal Monitor

The receiver provides wideband frequency coverage using one of the following WJ-9120 Series Tuning Head assemblies:

WJ-9120	0.5 - 50 MHz (dual band)
WJ-9121	20 - 250 MHz (dual band)
WJ-9122	20 - 80 MHz (single band)
WJ-9123	80 - 250 MHz (single band)
WJ-9124	250 - 500 MHz (single band)

The tuning head assemblies are modular, interchangeable units requiring only simple hand tools for installation.

The Receiver has a built-in low power consumption frequency counter with digital automatic frequency control (DAFC) for high LO stability. To conserve battery energy, the counter and DAFC circuitry can be operated independently from the six-digit LED readout. In addition, when frequency readout is desired, a display intensity control allows the operator to set the LED brightness for adequate viewing consistent with minimum power consumption.

Three IF bandwidths of 10, 50, and 200 kHz are supplied with the receiver. Optional bandwidths of 5 and 20 kHz are available. Sideband filters are available for LSB and USB detection in the 20 - 80 MHz band. Outputs from the receiver

include phones audio, record audio, and predetection IF. The front-panel cover supplied with the unit contains an integral power amplifier and loudspeaker for connections to the audio output.

The receiver operates from a detachable battery pack which holds either one BA-4386 magnesium battery or ten BA-30 (D-cell) batteries. The battery pack is also offered with a built-in charger which operates from a 115/220 Vac source. Receiver power can also be supplied from a vehicle battery or similar source via a front-panel connector.

## WJ-9180 Signal Monitor



- Operates with WJ-8640 Series Manpack Receivers
- 0 to 1 MHz Sweep Width
- Ruggedized Case
- Battery Powered
- Built-in Charger Available

The WJ-9180 Signal Monitor is ruggedized and operates with the WJ-8640 Series Manpack Receiver. It receives a 10 MHz signal from the receiver's SM OUT and provides a visual spectrum display of signal activity around the tuned frequency. The sweep width of the signal monitor is continuously adjustable from 0 to 1 MHz.

A variable sweep rate control is provided, which permits the operator to set the sweep rate for the optimum resolution at the sweep width being used to prevent loss of sensitivity by sweeping too fast. A front-panel switch also provides a sweep reversing feature on the Cathode Ray Tube.

The WJ-9180 power requirements are identical to those of the WJ-8640 Series Manpack Receivers.

## WJ-8975A Manpack Direction Finder



- Compatible with WJ-8640-1 Manpack Receiver with WJ-9121 Tuning Head, WJ-9180-1 Signal Monitor, and the WJ-9880 Portable Antenna.
- Manportable version of WJ-8971A Direction Finder.
- 20-150 MHz Frequency Range (Expandable to 500 MHz).

The WJ-8975 Direction Finder is designed for use in WJ's Manportable/Vehicular Direction Finding System with the WJ-8640-1 Manpack Receiver, the WJ-9180-1 Signal Monitor, and the WJ-9880 Portable Antenna.

The WJ-8975 Direction Finder is the controlling unit in the DF System. It controls the element switching at the antenna and processes the information obtained via the receiver signal monitor output. Since the WJ-8975 utilizes the signal monitor output of the receiver, and thus sees a fixed frequency output, it is not frequency limited. Derived bearing data is displayed digitally by a 3-digit LED display, and supplementally with a circular array of LEDs.

All controls needed for field operation of the WJ-8975 are located on the front panel. The OFF/OMNI/DF/CAL in the OFF position turns the entire WJ-8975 off. The OMNI position allows one element of the WJ-9880 DF Antenna to be used for general reception capability while nonessential internal direction-finding circuitry is turned off.

## WJ-8770 HF Transportable Receiver



- Fully Synthesized
- AM, FM, CW, USB and LSB
- 5 kHz Through 30 MHz Frequency Coverage
- Automatically Switched Suboctave Preselector
- Only 15 Watts From a 24 to 28V DC Source
- 4.5 Inches High, 11.5 Inches Wide, 15 Inches Deep

The WJ-8770 HF Transportable Receiver is intended for use in a rugged environment, such as an open military vehicle, in any part of the world, for reception and analysis of communication signals.

The WJ-8770 HF Transportable Receiver is evolved from the WJ-8718 HF Receiver and uses many of the circuits, modules and techniques developed for that family of receivers.

The WJ-8770 is supplied with four plug-in IF Bandwidths in addition to the USB and LSB filters normally supplied. Fully synthesized operation is provided in all operating modes with 10 Hz tuning resolution. Other tuning resolutions from 10 kHz per step are selectable via a front-panel control. The WJ-8770 has automatically selected sub-octave preselectors prior to the first mixer to enhance the second order intermodulation characteristics.

The WJ-8770 may be operated from an optional Battery Eliminator module which operates from a 115/220 Vac source. Receiver power can also be provided from a vehicle battery or similar source.

## WJ-8971A Direction Finder



- 3-Digit LED Bearing Indication, 1° increments – no CRT
- Accuracy 3° RMS
- Built-in Calibrator
- Operates in 20 to 1000 MHz frequency range with Receivers having a 21.4 MHz wideband IF output
- Ease of operation

The WJ-8971A and the WJ-8971A-5 Direction Finder operates on a pseudo-doppler principle. It derives bearing information by comparing the phase of the incoming signal on each of four antennas in relation to one another. Synchronized antenna commutation and signal handling circuitry provide accurate, reliable, and rapid DF capability. The combination of analog and digital networks results in a lightweight, compact unit requiring only a minimum of power and rack space.

The WJ-8971A provides multiple integration times to help alleviate the deterioration of bearing accuracy by signal modulation. The bearing integration times of 0.5, 1, and 2 sec can be selected by the front-panel pushbuttons. The lower integration time provides for the fast acquisition of short duration signals. The longer integration times are used to help alleviate signal modulation and increase the signal-to-noise ratio.

A built-in calibration system allows the operator to accurately calibrate the unit without the need for an external signal of known location.

The WJ-8971A-5 shown offers in addition to the above: multiple IF Bandwidths, Offset correction to the bearing display, Bearing information available on a remote output connector and remote control capability.

## DF Antennas



Watkins-Johnson makes four different styles of direction finder antennas to work with WJ-8971A or 8971A-5 DF processor units and the WJ-8975A man pack DF unit. These antennas are the WJ-9871A mobile antenna, the WJ-9872A fixed site antenna, WJ-9873 ruggedized antenna, and the WJ-9880 man pack antenna. These antennas are totally interchangeable with any of the DF units, the choice of antennas would depend on the desired frequency coverage and application.

	<u>WJ-9872A</u>	<u>WJ-9880(-1)</u>
Frequency		
Low Bay . . .	20-150 MHz	20-175 MHz
High Bay . . .	150-1000 MHz	150-850 MHz (-1 option only)
	<u>WJ-9871A</u>	<u>WJ-9873</u>
Frequency		
Low Bay . . .	20-235 MHz	20-235 MHz
High Bay . . .	150-1000 MHz	150-1000 MHz

## WJ-9450 Demodulator/ Control Unit



- 160 MHz Input Frequency
- AM, FM, Pulse Detection
- Five-digit LED Frequency Display
- Three Independent IFDs
- Six IF BWs per IFD
- AFC

The WJ-9150 Series Remote Tuning Heads are self-contained modular units for use with the WJ-9450 Tuner Control Unit demodulators. The WJ-9150 Series receives signals from 1 GHz to 18 GHz in five separate tuners. Additional information may be obtained from data sheet 310.50.

## 112, 112-1 Microwave Receivers



112

- 1 to 18 GHz
- AM, FM, Pulse
- Modular Tuning Heads (TH-Series)
- IF Bandwidths:
  - 112: 0.1, 2, 4, 10, 20 MHz
  - 112-1: 0.1, 0.5, 1, 10, 20 MHz
- EMC Version – 112R

## MTF-100A, MTF-101, MTF-102A Microwave Tuner Frames



MTF-100A

- MTF-100A and MTF-101 mount two TH-Series Tuning Heads
- MTF-102A mounts one TH-Series Tuning Head
- MTF-100A and MTF-102A operate independently
- MTF-101 operates with MTF-100A
- IF outputs at 160 MHz and 21.4 MHz
- Accept external AFC and AGC
- Analog tuning voltage provided
- Compatible with DM-112, DM-212A and DM-235 Demodulators

## TH-Series Tuning Heads



TH-120R

- 1 to 18 GHz
- Four-stage YIG Preselector
- Solid-state Local Oscillator
- TH-5 Series available with 50 MHz bandwidth
- EMC Qualified when used with 112R

TUNING HEAD	FREQUENCY COVERAGE
TH-120R	1 - 2 GHz
TH-145R	1 - 4.5 GHz
TH-245R	2 - 4.5 GHz
TH-480R	4 - 8 GHz
TH-812R	8 - 12 GHz
TH-1218	12 - 18 GHz

## WJ-9518A and WJ-9518AE FDM Demodulators



The WJ-9518A and WJ-9518AE (Delay Equalized) FDM Demodulators contain six completely independent SSB demodulators capable of processing signals in the frequency band from 200 Hz to 15 MHz. The equipment tunes this range in either 1 or 4 kHz increments. Variable tuning speed is provided which allows tuning the complete range in approximately 15 seconds.

The WJ-9518A and WJ-9518AE (Delay Equalized) FDM Demodulators feature high stability and tuning accuracy using internal frequency synthesizers. An LED display indicating the operating frequency, as well as a full set of controls for front-panel operation, are shared by all six demodulators. A demodulated select switch is used to determine which demodulator's operating parameters will be monitored or changed. A phone jack is provided to permit the operator to monitor the output of the selected demodulator.

More than 6 channels may be configured in a system by the use of multiple units and utilization of various optimal base band-buffer amplifiers to distribute the input signal. Control of all functions of the WJ-9518A and WJ-9518AE (Delay Equalized) FDM Demodulators is either remote or local. The WJ-9518A and WJ-9518AE (Delay Equalized) FDM Demodulators are designed for standard 19-inch rack mounting and has a panel height of 5.25 inches and a depth of 21 inches.

## WJ-9525 and WJ-9525-1 FDM Demodulators



This equipment consists of four WJ-9525/DU Demodulator Units and one WJ-9525/CU Control Unit installed in a WJ-9525/CRF Controller Rack Frame.

The WJ-9525 FDM Demodulator contains four completely independent SSB demodulators capable of processing signals in the frequency band from 0 to 308 kHz. The WJ-9525-1 FDM Demodulator is an essentially identical unit configured for a tuning range of 0 to 552 kHz. The equipment tunes this range in 10 Hz increments and is designed for use with baseband signals having a 4 kHz carrier spacing in either Erect or Inverted modes. Both modes refer to the same 4 kHz spectral segment.

The WJ-9525/DU Demodulator Unit is supplied with IF filters having a total differential delay of less than 300 microseconds from 200 to 3200 Hz. IF filters with

different group delay characteristics or for different carrier spacings are also available. The WJ-9525/DU features high stability and tuning accuracy using internal frequency synthesizers. Each demodulator contains a LED display to indicate the operating frequency as well as LEDs to indicate Gain mode and Sideband mode. A front panel level indicator and a gain control combine for rapid setting of the Manual Gain mode to the proper operating level. Individual indication of Local or Remote control and of that channel which is under active control of the WJ-9525/CU are provided.

The WJ-9525/CU Control Unit provides for the tuning and control of the WJ-9525/DU Demodulator Units. The full set of controls is shared by the four demodulators. A demodulators select switch is used to determine which demodulator's operating parameters are to be controlled.

The WJ-9525/CRF Control Rack Frame contains the power supply and plug-in provisions for four Demodulator Units and a Control Unit. It also contains baseband signal routing and reference signal generation for four channels and control interface provisions between the control unit and four demodulator units. Rear panel switches allow selection of an independent baseband input or connection to the same input as the next lower numbered channel. Buffered, unity gain baseband outputs are available from channels 2 and 4.

Control and monitoring of all functions of the WJ-9525 are either remote or local. Standard remote interface is compatible with the IEEE-488 - 1975 Bus. Other remote control formats are available.

## DM-112 Demodulator



- 160 MHz Input Center Frequency
- AM, FM, Pulse
- IF Bandwidths: 0.1, 2, 4, 10, 20 MHz
- Built-in Signal Monitor
- Video Response: 20 Hz to 15 MHz
- Provides AGC and AFC Voltage to Associated Tuner

## DMS-107, DMS-107-1 Demodulators



- 100 kHz to 10 MHz
- AM, FM, CW
- IF Bandwidths: 20, 50, 100, 300, and 500 kHz; 1, 2, and 3 MHz

NOTE: DMS-107-1 has IF Bandwidths of: 20, 50, 100, 300, and 500 kHz; 1, 3, and 5.5 MHz

## DM-212A, DM-235 Demodulators



DM-235

- 160 MHz Input Center Frequency
- AM, FM, Pulse
- IF Bandwidths: DM-212A—10, 20 MHz  
DM-235—30, 50 MHz
- Video Response: DM-212A—20 Hz to 10 MHz  
DM-235—20 Hz to 25 MHz
- Provides AGC and AFC Voltage to Associated Tuner

## DMS-105A Tunable Demodulator



- 1 to 1600 kHz
- AM, FM, CW, MCW, FSK, SSB
- IF Bandwidths: SSB Mode—2.5, 4, and 8 kHz;  
All other modes—150 Hz, 1, 5, 7, 8, and 16 kHz
- BFOs: 1 kHz Offset, Crystal  
Zero Beat, Crystal  
Variable,  $\pm 8$  kHz
- Translated IF Outputs: 15, 50, and 100 kHz  
(DMS-105A and DMS-105R: 10, 50, and 100 kHz)
- EMC—use DMS-105R

## WJ-9472



- FSK or OOK Demodulation
- 1 Hz Mark and Space Frequency Control, 200 to 9999 Hz
- Multipole Baud Rate Matched Filters, 10 to 4000 Baud
- Microprocessor Control for Operational Flexibility
- Modular Construction for Easy Maintenance
- Oscilloscope Tuning Display With WJ-9472/SMU Plug-In
- DFSK or Diversity Demodulation With WJ-9472/DDU Plug-In
- Data Regeneration With WJ-9472/DRU Plug-In
- IEEE 488 or RS-232 Control with WJ-9472/488 or WJ-9472/232

The WJ-9472 Two-Channel FSK Demodulator System is designed to provide a maximum of flexibility in a minimum of space. The basic WJ-9472 System consists of one WJ-9472/CRF Control Rack Frame and two WJ-9472/DU Plug-In FSK Demodulator Units.

The WJ-9472/CRF will accept and provide power for the two WJ-9472/DU Demodulator Units as well as the optional WJ-9472/SMU Plug-In Oscilloscope Tuning Display and the optional WJ-9472/DDU Plug-In Diversity/DFSK Unit. The WJ-9472/CRF contains the control and display circuitry to operate the basic system. Control is performed by means of front panel switches which are interpreted by an internal preprogrammed microprocessor.

All of the signal parameters for each of the two WJ-9472/DU Plug-In FSK Demodulator Units can be set independently. Front panel controls allow selection of signal source; mode i.e., FSK (Frequency Shift Keying) or OOK (ON-OFF Keying); and signal sense. The mark and space frequencies may be entered directly with 1 Hz resolution as any two frequencies in the audio range of 200 to 9,999 Hz. Alternately, the frequencies can be entered in terms of center frequency and shift. The optimal sixth order mark and space filters are electronically matched to the signal by entering the keying speed in baud from 10 to 4000 baud or by entering the element length in milliseconds.



## FT-210, FT-210E IF-Tape Converters



FT-210E

- 21.4 MHz Input Center Frequency
- 1.075 MHz Output Center Frequency
- Data Bandwidth—150 kHz to 2.0 MHz
- FT-210E has equalizer for minimal group delay variation
- Mount in EF-101 and EF-201D Equipment Frames
- WJ-9222 and WJ-9222E have identical specifications but in 1 $\frac{3}{4}$ -inch half-rack chassis

## FT-222-X IF-Tape Converter



- 21.4 MHz Input Center Frequency
- 20 to 200 kHz Output Center Frequency (-X number denotes customer-selected center frequency; e.g., FT-222-100 has a 100 kHz center frequency)
- Additional output frequencies and bandwidths available
- Easy and reliable operation

## IFC-162 Frequency Converter



- 160 MHz Input Center Frequency
- 21.4 MHz Output Center Frequency
- Overall Bandwidth—6 MHz
- Companion unit to FT-201A and FT-210E
- WJ-9240 has identical specifications but in a 1 $\frac{3}{4}$ -inch half-rack chassis

## 1 $\frac{3}{4}$ -inch Half-Rack Frequency Converters



WJ-9222 and WJ-9240

- Small size, compact construction
- WJ-9222E is electrically identical to FT-210E
- WJ-9240 is electrically identical to IFC-162
- WJ-9810 Rack Mount Adapter available for mounting only one unit

## TF-210 Tape-IF Converter



- 1.075 MHz Input Center Frequency
- Accepts Input Center Frequencies from 150 kHz to 2.0 MHz with corresponding reduction in data bandwidth
- 21.4 MHz Output Center Frequency
- Digital Front-Panel Tuning
- Internal or External Reference Source

**DRO-290B Frequency Counter**



- 20 to 90 MHz Readout Frequency Range
- DAFC Capability
- Preset for 10 MHz Receiver IF
- Six-digit Display
- Companion to 521A-1 Receiver

**DRO-302B, DRO-309B, DRO-315, and DRO-333A Frequency Counters**



DRO-302B



DRO-333A

- Half-rack and Full-rack Packages
- DAFC Capability
- Internally Switched Presets of 21.4 and 60 MHz Controlled by Frequency Range Switch
- Externally switched Presets of 8, 10, 21.4, 60 MHz and one Optional Preset
- Automatic Range and Preset switching when used with compatible WJ Receiver
- Frequency Output Provided in BCD Format
- Designed to Prevent EMI/RFI Radiation

**DRO-311 Frequency Counter**



- 20 to 500 MHz Readout Frequency Range
- Time-Shared for VHF Receivers
- Provides DAFC Control and Sequential BCD Output for up to Four Receivers
- Automatic Preset Selection when used with 565 or WJ-8730A Series Receivers
- Drives up to four RD-105 Remote Display Units

Counter	Frequency Readout Range	Mounting
DRO-302B	100 kHz to 500 MHz (3 bands)	EF-101 or EF-201D
DRO-309B	100 kHz to 1000 MHz (4 bands)	Equipment Frame
DRO-315	100 kHz to 500 MHz (3 bands)	Designed for
DRO-333A	100 kHz to 1000 MHz (4 bands)	19-inch rack

**SM-9404A, SM-9804A  
Signal Monitors**



- 21.4 MHz Input Center Frequency
- Variable Sweep Width: SM-9404A—0 to 4 MHz  
SM-9804A—0 to 8 MHz
- Resolution—6 dB Valley Between Signals 20 kHz Apart (100 kHz Sweep Width)
- Sweep rate 5 to 25 Hz, variable
- Built-in Center Frequency Marker
- Mount in EF-101 or EF-201D Equipment Frame

**SM-1622, SM-1622-1  
Signal Monitors**



- 160 MHz Input Center Frequency
- Switch Width: 0 to 20 MHz
- Resolution: SM-1622—200 kHz  
SM-1622-1—1 MHz
- Built-in Center Frequency Marker
- Mount in EF-101 or EF-201D Equipment Frame

**WJ-9188A-18 Signal Monitor**



- IF Signal Display Unit Designed for Use with WJ-8888B HF Receiver or the WJ-8718 HF Receiver with SMO Option
- Provides 5 kHz, 15 kHz or 30 KHz Sweep Widths
- Over 40 dB of On Screen Dynamic Range in LOG Mode
- Display Area of 2.5 Inches High by 3 Inches Wide

**PD-602 Pan Display**



The PD-602 Pan Display is designed for use with Watkins Johnson Receiving Systems. The PD-602 is used to provide a visual display of the frequency spectrum information from associated receiving equipment.

The CRT display area is 10 cm for the X-axis and 8 cm for the Y-axis. The PD-602 mounts in an EF-602 Equipment Frame. By using the EF-602, two PD-602s can be mounted side-by-side in a standard 19 inch rack, using 5.25 inches of vertical rack space. Each PD-602 has its own internal power supply which operates from a 115 or 230 VAC source.

## WJ-9941/NMS Noise Monitor



The WJ-9941/NMS is a precise measurement system for the monitor of RF System performance. It is intended for use in receiving systems which have operating frequency ranges between 10 MHz and 18 GHz. The WJ-9941/NMS permits fault isolation and performance monitoring in the RF Distribution (Preamplifier) and Receiver portions of a system.

The system can be tailored for any desired configuration of Antennas, Preamplifiers, and Receivers. The basic system has power and controls for seven system test points. Each test point can be installed in the RF distribution path or in the receiver path at the discretion of the user.

The system permits each test point to be adjusted to compensate for differences in the Noise Sources. The measured noise figure for each test point is presented to the operator via a three digit display with resolution to 0.1 dB. The reading accuracy is to within 0.5 dB in the 0 to 10 dB range or to within 1 dB in the 10 to 29.0 dB range.

The WJ-9941/NMS is comprised of 3 basic units and up to 7 Noise Source Relays (Expandable to 25).

## SOR-1A Signal Operated Relay



The SOR-1A Signal Operated Relay is a solid-state device which operates a relay when activated by any one of three selectable inputs: voice frequency, positive-going dc voltage, or negative-going dc voltage. This unit has been designed to operate tape recorders or other remote monitoring devices in response to an audio signal from a receiver or other audio circuit or from a dc voltage from the AM detector or AGC line in the receiver.

## S-9203A, S-9903E Speaker Panels



- Companion Units to W-J Receivers
- Accept up to Seven Audio Inputs
- 5 Watt Output
- High Input Impedance
- S-9203A mounts in EF-101 or EF-201D Equipment Frame

## EF-201D Equipment Frame

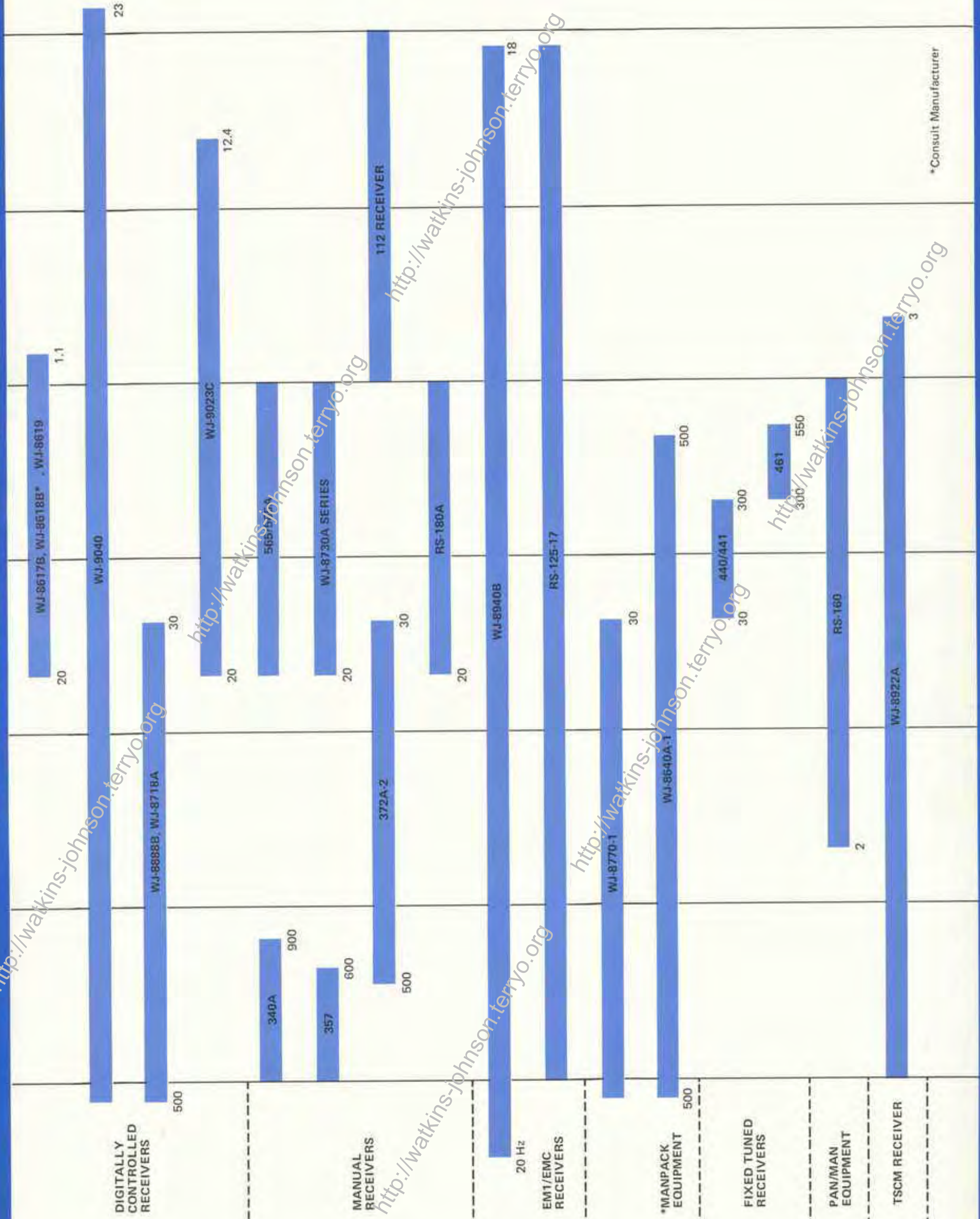


- Mounts two W-J half-rack units
- Occupies 3.5 inches of vertical rack space



EF-201D with SM-9404A Signal Monitor and DRO-309B Frequency Counter

# RECEIVER FREQUENCY RANGE CHART



\*Consult Manufacturer

<http://watkins-johnson.terryo.org>

<http://watkins-johnson.terryo.org>

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