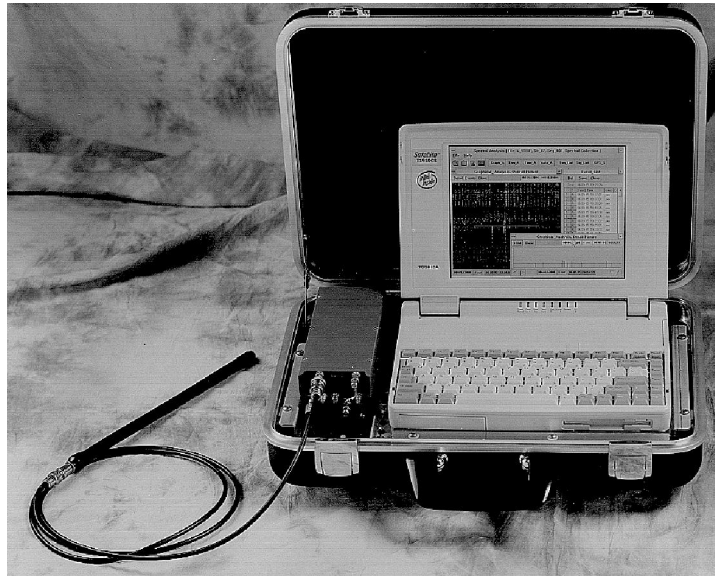


May 1996

## Portable Spectrum Management System WJ-8931/SYS-X



The WJ-8931/SYS is a portable Spectrum Management System (SMS) contained in a single briefcase. The system performs spectrum-monitoring and -management applications where portability and cost effectiveness are predominate factors. It provides a maximum of capabilities in a minimal-space battery operable system. The basic system capabilities include:

- Spectral survey
- Channel-occupancy measurements
- Interference identification
- Individual signal monitoring of RF signals between 2 and 1000 MHz (extendible to 2.4 GHz)

The compact system configuration allows easy use in both vehicular and manportable applications. A user may expand the system to include:

- Digital audio storage
- Real-time IF signal analysis
- Global Positioning System (GPS) location collection

### Features

- ❑ *Frequency coverage from 2 to 1000 MHz (easily extended down to 0.5 MHz or up to 2.4 GHz)*
- ❑ *Up to 4 user-selectable IF bandwidths ranging from 3.2 kHz to 100 kHz (optional wide bandwidth configuration)*
- ❑ *Detection modes of AM, FM, Pulse, CW, LSB and USB*
- ❑ *Spectral search at 25-MHz per second (with 100-kHz resolution)*
- ❑ *Channel-occupancy monitoring of over 150 channels per second*

HEIGHT	5.3 in (13.56 cm)	DEPTH	12 in (30.48 cm)
WIDTH	17 in (43.18 cm)	WEIGHT	<30 lbs (13.58 kg)

### **\*Restricted International Distribution\***

#### WATKINS-JOHNSON COMPANY

700 Quince Orchard Road, Gaithersburg, Maryland 20878-1794  
Phone: (800) WJHELPS or +(301) 948-7550  
FAX: +(301) 921-9479 Email: [wj.helps@wj.com](mailto:wj.helps@wj.com) Website: [www.wj.com](http://www.wj.com)

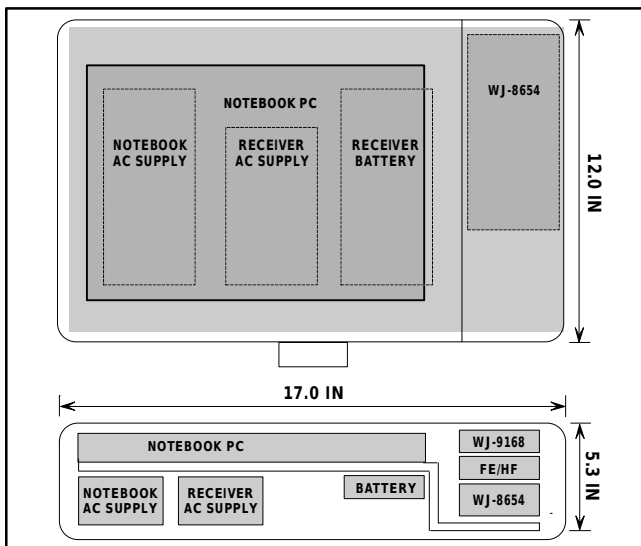
All International sales of WJ equipment are subject to USA export license approval.

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.

WJ integrates the WJ-8931/SYS into a portable zero-style equipment case that contains:

- WJ-8654 *Microceptor* Receiver
- Notebook PC with WJ-8654/SMS software package
- Single sideband demodulator
- Small, broadband, 20 to 1000 MHz antenna and cable
- Headphone
- Interconnect cables
- AC supplies
- One 12-V batteries and one external 12-Vdc power supply

Most of the equipment mounts on a plate inside the case, which has a total weight of less than 30 pounds. The system operates in a 0 to 40°C environment. An operator can power the WJ-8931/SYS from either internal batteries or line (90 to 260 Vac). When not AC powered, the notebook PC receives power from its internal battery. Rechargeable system batteries power the receiver. The system operates approximately three hours on the self-contained batteries.



Case Layout

WPG103A

WJ's *Microceptor* (WJ-8654) forms the basis for the WJ-8931/SYS RF capabilities. The PC and WJ SMS software allows:

- Receiver control
- Mission storage
- Spectral data collection
- Channel-occupancy monitoring
- Spectral analysis of collected data

## Control Applications

The WJ-8931/SYS SMS software supports spectrum survey operations, channel-occupancy measurements, interference identification and tracking, or individual signal monitoring and recording operations. The user can move from one type of operation to another by simply selecting another control application on the Notebook PC.

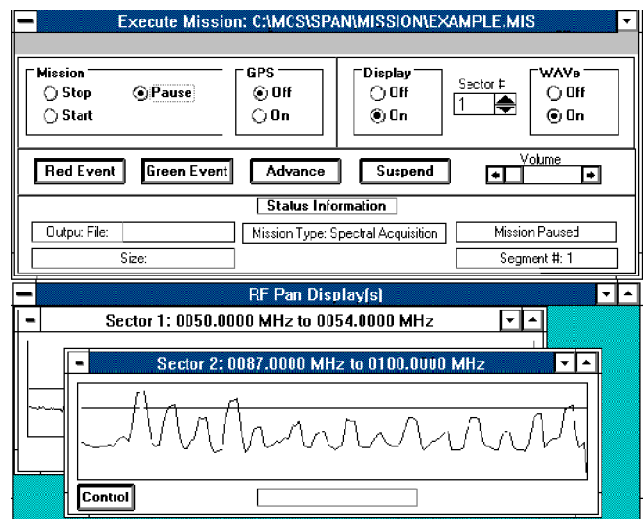
### Spectral Survey

The Spectral Survey application allows the user to:

- Define a frequency area for surveying
- Save it as a mission
- Cause the system to collect data with the defined mission

An operator can start the spectral data collection or program it to start at a defined time. While the collection is in process, an RF pan display is available in a window on the PC screen. The system permits spectral collection of up to ten user-defined F1-F2 segments with unique collection thresholds and bandwidths. The user can define up to 100 exclusion areas in the spectral survey mission. The user can also define the minimum signal threshold for spectral data storage to minimize data file sizes. When the operator sets the system to collect all energy levels, the collection process uses 1.0 MB of storage per hour.

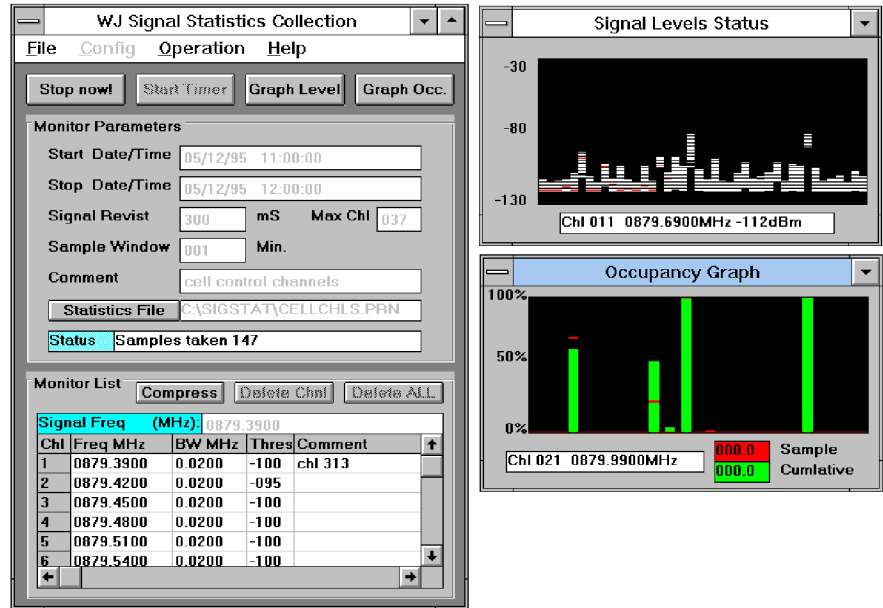
Typically, a user wants the spectral survey application to search for channel usage in unmanaged spectrums for long periods of time. The standard WJ-8931/SYS spectral analysis package allows the user to display and analyze collected data, or print it in waterfall form.



Sample Spectral-survey Application Screen

### Channel-occupancy Monitoring

The Channel-occupancy application provides long-term monitoring of user-defined target frequencies. The user first builds a mission by identifying channel sample rate and what frequencies to monitor, along with the channel bandwidth and activity threshold for up to 100 channels. The operator may save this mission for later use. The user may start the channel-occupancy collection or base it on a mission-programmed start and stop time. When the collection process is active, the system displays the current and previous signal levels for each channel. An occupancy window shows a graph of the cumulative and current sample occupancies for each channel. During channel-occupancy collection, the system stores statistical data of channel usage as ASCII files. The operator may analyze the activity file using a standard spreadsheet.



Sample Channel-occupancy Application Screen

### Individual Signal Analysis & Collection

The individual signal analysis and collection operations allow a user to define a single frequency or group of frequencies for monitoring or analysis. This operation is useful for interference investigation and signal

characterization. The system’s real-time receiver control application supports these operations. This application allows an operator to configure the receiver to monitor a target signal. If the system has the Signal Monitor option, a real-time IF signal presentation is available during this operation.

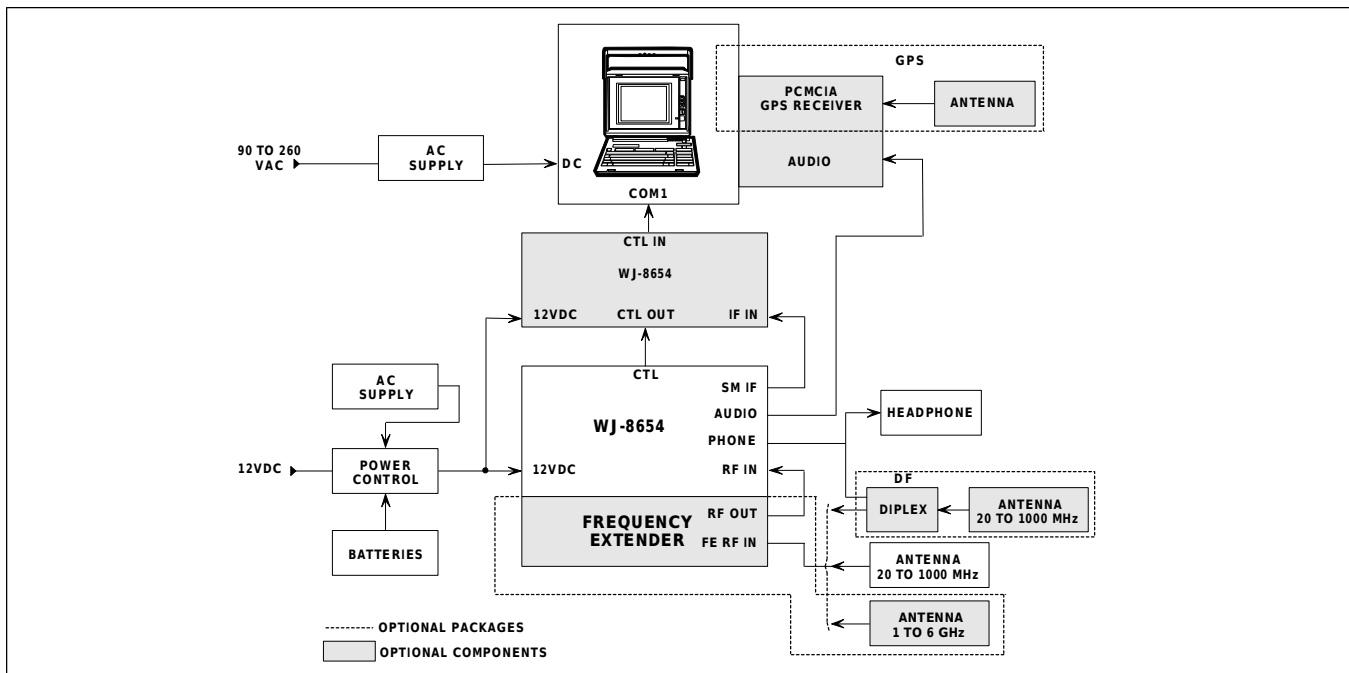
### Specifications

<b>Frequency Range</b> .....	<b>2 to 1000 MHz (base system)</b> <b>2 to 2400 MHz (with FE option)</b> <b>0.5 to 1000 MHz (with HFE option)</b>
<b>Detection Modes</b> .....	<b>AM, FM, CW, LSB, USB</b>
<b>IF Bandwidths</b> .....	<b>3.2 to 100 kHz (4, user-specified)</b>
<b>Spectral Collection Rate</b> .....	<b>4-msec per sweep increment</b>
<b>Channel Collection Rate</b> .....	<b>6-msec per channel</b>
<b>Collection Accuracy</b> .....	<b>± 2 dB</b>
<b>Collection Resolution</b> .....	<b>1 dB</b>
<b>Signal Measurement Range</b> .....	<b>100 dB</b>
<b>Battery Operation Time</b> .....	<b>&gt; 3 hours</b>
<b>Power Consumption</b> .....	<b>&lt; 60 W, configured for AC</b>
<b>Operating Temperature</b> .....	<b>0 to 40°C</b>

# WJ-8931/SYS

The user can expand the WJ-8931/SYS capabilities with a variety of options, any one of which will not increase the overall system case size.

Model #	Features	Physical Characteristics
<b>WJ-8931/SM Signal Monitor</b>	<ul style="list-style-type: none"> <li>Near real-time IF pan display on the PC</li> <li>An examination of the signal to which the receiver is currently tuned plus other signals within +/- MHz of the current tuned frequency</li> <li>Aids in signal selection, tuning &amp; analysis processes</li> </ul>	<ul style="list-style-type: none"> <li>Adds WJ-9168 Signal Monitor Module, SM control software &amp; interface cables</li> </ul>
<b>WJ-8931/DAS Digital Audio Storage</b>	<ul style="list-style-type: none"> <li>Record audio from receiver audio output onto PC hard disk</li> <li>Storage of up to 5 hours of carrier-activated uncompressed audio</li> </ul>	<ul style="list-style-type: none"> <li>Adds audio hardware, audio playback software &amp; interface cables</li> <li>Requires 200-MB free hard-disk space</li> <li>Stores in MS-Windows™ WAVE file format</li> <li>Includes playback software to analyze the recorded audio clips</li> </ul>
<b>WJ-8931/GPS GPS Collection</b>	<ul style="list-style-type: none"> <li>Location logging</li> <li>Log file of locations from which system has collected RF data</li> <li>Route plot to identify system location for collected spectral data</li> </ul>	<ul style="list-style-type: none"> <li>Adds PCMCIA GPS Receiver</li> <li>Includes software</li> </ul>
<b>WJ-8931/FE Frequency Extender</b>	<ul style="list-style-type: none"> <li>Extension of upper frequency limit from 1 to 2.4 GHz</li> </ul>	<ul style="list-style-type: none"> <li>Adds WJ-8654/FE &amp; 1 to 2 GHz antenna</li> </ul>
<b>WJ-8931/HFE HF Extender</b>	<ul style="list-style-type: none"> <li>Extends lower frequency limit to 0.5 MHz with true HF converter</li> </ul>	<ul style="list-style-type: none"> <li>Adds WJ-8654/HFE</li> </ul>
<b>WJ-8931/RMT Remote Collection</b>	<ul style="list-style-type: none"> <li>Data collection from a remote site via dial-up connection</li> <li>Data collection from remote site via modem back to local site for analysis</li> </ul>	<ul style="list-style-type: none"> <li>Requires PC &amp; modem at local site</li> <li>Adds modem &amp; software to notebook PC at remote site</li> </ul>



WJ-8931/SYS Block Diagram

WPG112A