

FOR

-RCS RECEIVER CONTROL SOFTWARE FOR WIN

WJ P/N 181445-001, Revision C



WATKINS-JOHNSON

CONTROL SOFTWARE OPERATION MANUAL
FOR
WJ-RCS RECEIVER CONTROL SOFTWARE FOR WINDOWS

WJ P/N 181445-001, Revision C

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WATKINS-JOHNSON COMPANY
700 QUINCE ORCHARD ROAD
GAITHERSBURG, MARYLAND 20878-1794

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CONTROL SOFTWARE OPERATION MANUAL

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FOR

WJ-RCS RECEIVER CONTROL SOFTWARE FOR WINDOWS

REVISION RECORD

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SECTION 1

GENERAL DESCRIPTION

1.1 INTRODUCTION

This section provides a general description of the WJ-RCS Receiver Control Software capabilities and applications. Refer to Figure 1-1. The use of the WJ-RCS Control Software package presumes the operator has a working knowledge of the Microsoft® Windows environment and is familiar with the options and capabilities that are available on the PC screen.

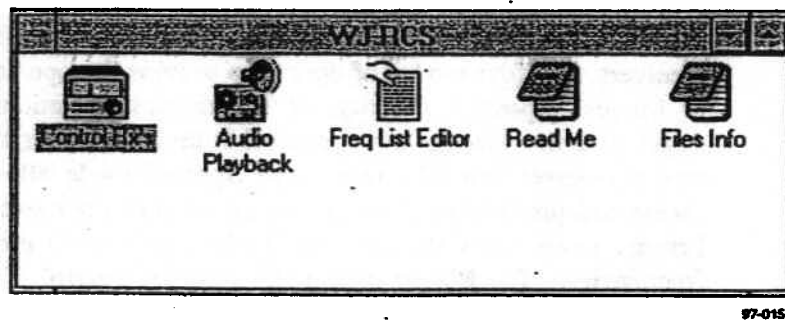


Figure 1-1. WJ-RCS Program Icons

1.2 GENERAL DESCRIPTION

RCS is a collection of software applications for many WJ receivers that run under Microsoft® Windows. These applications allow the receiver user to control, monitor and collect audio data. Using RCS, the receiver user can perform the following tasks:

- Perform real-time control of either a single receiver or multiple receivers.
- Provide a Signal Monitor Pan display when using a WJ-9168 Signal Monitor.
- Display RF spectral data from receiver sweep or step modes.
- Collect intercepted audio data on a PC as WAVE files.
- Play back and analyze collected audio data.
- Generate signal frequency lists.

1.3 RCS APPLICATIONS DESCRIPTION

RCS provides the following window applications to program and execute the missions as well as permit real time control of the receiver.

- Control Rx's
- Audio Playback
- Frequency List Editor

1.3.1 CONTROL RX'S

This application allows the user to have real-time control of up to twelve receivers. The four modes of operation provide the operator with a choice of Manual, Spectral, Priority, or Mnemonics operations. The Manual mode gives the operator direct control of the receiver through use of an on-screen receiver control panel. The Spectral mode allows a receiver to sweep and provide an RF Pan display for up to ten sweep sectors. The Priority mode steps the receiver through up to 100 predefined discrete frequencies. The Mnemonics mode provides control of the receiver via use of remote control commands. The Control Rx's application allows the user to specify other pertinent receiver parameters for each receiver, such as bandwidth, increment frequency, and a threshold value. The user may also assign up to four receivers to provide inputs to two signal monitors which provide outputs for instantaneous on-line analysis on the PC screen. Receiver fine tuning can be performed via mouse control of the RF on Signal Monitor Pan display. Signal lists generated during on-line operation may be used to generate lockout frequencies or change a receiver's operating parameters. These signal lists may also provide data for building off-line missions associated with the Mission Builder Application.

1.3.2 AUDIO PLAYBACK

The Audio Playback application allows the user to play back digital audio files created by the Spectral Acquisition and Priority Acquisition missions. This application graphically displays the digital audio files along with the time of collection, frequency and signal strength. Audio is available for playback by moving the pointer to the graphical file display and clicking on the mouse. Playback may be by individual audio files, sequentially by time of collection, or time sequentially by frequency. Individual files may be marked as identified, unidentified, or signals of interest. These files may be displayed as video waveforms, or analyzed using commercial WAVE audio packages.

1.3.3 FREQ LIST EDITOR

The Frequency List Editor application allows the user to create, edit, and store frequency lists independent of the software controlling the receiver. These lists can be recalled from memory and used at a future time.

1.4 EQUIPMENT SUPPLIED

The following equipment is required to use the WJ-RCS package:

- IBM 486DX33 or better PC with at least 4 MB of RAM and 4 MB of hard disk space.
- MS Windows 3.1 with MS DOS 5.0 or above. MS Windows 95 is recommended for multi-receiver control.
- At least one or more of the following communications Interface(s):
Serial Communications Port 1-4,
National Instruments GPIB card and NI-488.2 software, or
National Instruments VXI slot 0 controller with VISA.
- One or more of the following WJ receivers:
WJ-860X, WJ-860XA, WJ-8609A Miniceptor Family with RS-232 interface,
WJ-8611 VHF/UHF Receiver,
WJ-8629 VXI Digital VHF/UHF Receiver,
WJ-8634 VXI VHF/UHF Receiver Family,
WJ-8635 HF/VHF/UHF Receiver Family,
WJ-8654 Microceptor Family,
WJ-871XA HF Receiver Family,
WJ-8721 VXI Digital HF Receiver,
WJ-9902 Miniceptor Frame,
WJ-9903 Miniceptor Frame,
WJ-9904 Microceptor Frame, or
WJ-9908 Miniceptor Frame.
- MS Windows compatible WAVE device for audio storage and playback.
- Cable(s) to connect receiver to computer.

NOTES

SECTION 2
INSTALLATION

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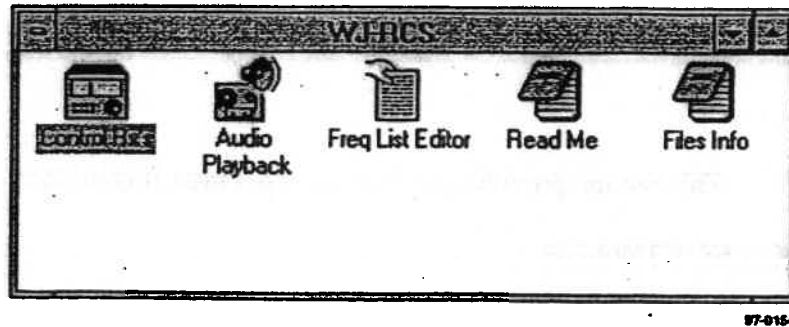


Figure 2-1. Program Group Window for WJ-RCS

2.3 EQUIPMENT MALFUNCTION

The RCS software was thoroughly tested prior to shipment. If an apparent malfunction is encountered after installation:

1. Verify that the PC has enough free RAM to load and run correctly. A minimum of 4 MB of RAM is recommended. At least 4 MB of free hard disk is required.
2. Run the program installation procedure again. If the malfunction persists, contact your Watkins-Johnson representative via mail, telephone, wire or cable at:

Watkins-Johnson Company
Customer Service Department
700 Quince Orchard Road
Gaithersburg, Maryland 20878-1794

Toll Free: 1-(800) 954-3577
TELEX: 89-8402
TWX: 710-828-0546
TELEFAX: (301) 948-5666
EASYLINK: 62928185

SECTION 2

INSTALLATION

2.1 INTRODUCTION

This section provides information about installing the RCS software.

2.2 INSTALLING THE RCS SOFTWARE

Before executing the RCS software, it must be properly installed on the operator's controlling computer. An installation program, SETUP.EXE, is provided on the RCS disk. This program ensures proper installation of all the RCS software to the operator's disk and creates configuration files that store configuration information for use by the RCS software.

NOTE: The following procedure is for installing the RCS software from DRIVE A to DRIVE C. If using any other drives or configurations, consult your computer's user manual.

To install the RCS software:

1. Start Windows.
2. Close all other applications.
3. Insert WJ-RCS SETUP disk into DRIVE A.
4. Select File from the Program Manager Menu Bar.
5. Select Run... from the File Menu.
6. At the Command Line, enter A: SETUP.EXE.
7. Select OK.
8. At the completion of the RCS software installation procedure, a WJ-RCS program group appears on the Program Manager Window. If the software loaded properly, the WJ-RCS program group should look like Figure 2-1.

SECTION 3

OPERATION

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SECTION 3 OPERATION

3.1 INTRODUCTION

This section provides instructions on using the RCS software to perform real-time control of a single or multiple receiver(s), create and listen to audio playback clips, and generate, edit, or store frequency lists. This software operates on a Windows™-capable personal computer. Successful operation assumes the following:

1. Requirements outlined in paragraph 1.5 have been met.
2. Software installation has been accomplished as outlined in paragraph 2.2.
3. Hardware configuration is completed.
4. Computer is running and the window shown in Figure 2-1 is present on the computer screen.
5. The operator is familiar with the Windows™ screen presentation and capable of manipulating and understanding the options available.

3.2 CONTROL RX'S

The Control Rx's application, part of the WJ-RCS Receiver Control Software, permits real-time control of up to twelve receivers and up to two WJ-9168 Signal Monitors. Multi-receiver configurations require Windows 95 or Windows NT. During its operation, the application can independently or simultaneously provide RF Pan displays and Signal Monitor Pan displays. The application also allows newly acquired signals to be logged onto a Signal List ASCII data file. This file can then be used to update a selected receiver's priority search list to further enhance signal acquisition or to provide a frequency for a lockout function. This signal list also provides data useable in creating missions for Mission Collection applications. Double-clicking on the Control Rx's icon, with the receivers turned off, produces the window shown in Figure 3-1. Check to see that the receivers are properly connected and power is applied. Click on the "Retry" button to get to the Receiver Control Panel screen. Double-clicking on the Control Rx's icon with the system receivers on, produces the window in Figure 3-2. The initial use of the software requires entering the system hardware configuration prior to use.

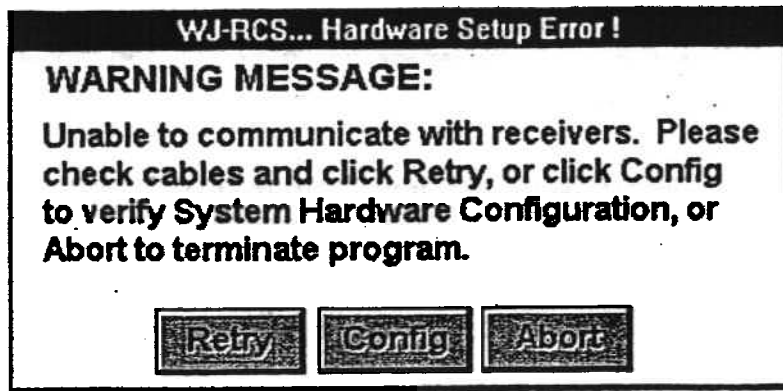


Figure 3-1. WJ-RCS Hardware Setup Message

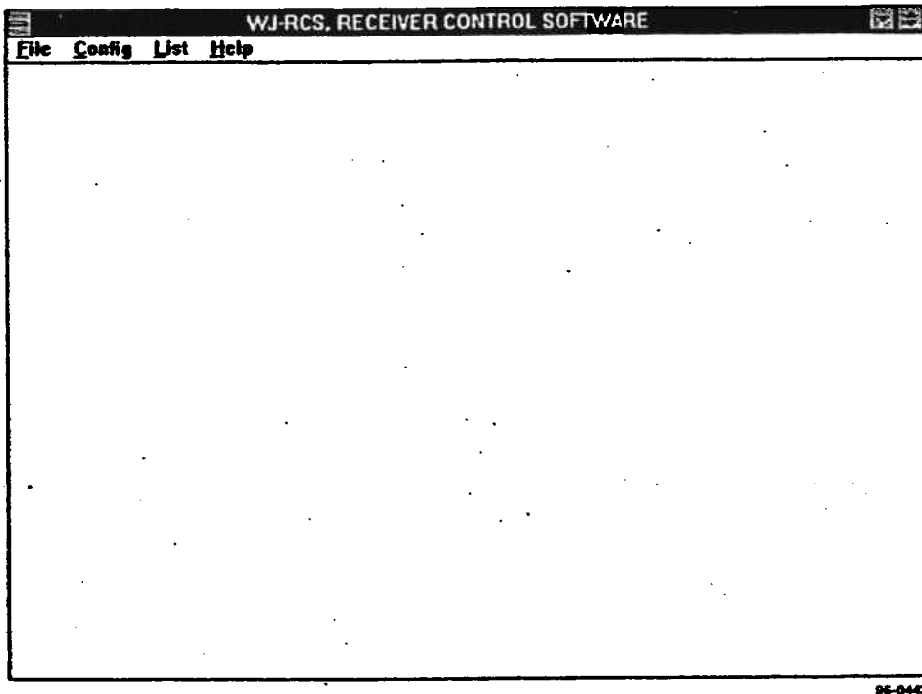


Figure 3-2. WJ-RCS Receiver Control Panel Window

The WJ-RCS Receiver Control Software has on-line help and help files to identify and provide operational directions for each area of the screen. By moving the pointer over the screen, pertinent information appears on the on-line help window at the bottom of the screen. To access help files, place the pointer over the desired area and press the F1 function key or click "Help" in the main menu bar.

3.2.1 CONFIGURING THE SYSTEM HARDWARE

There are two ways to enter the System Hardware Configuration Panel of the Control Rx's application. If accessing the application with the receiver powered down, clicking on the Control Rx's icon produces the screen shown in Figure 3-1. Move the pointer to the "Config" button and click the mouse. If the receiver has power applied, clicking on the Control Rx's icon produces the screen shown in Figure 3-2. Click on "Config" in the main menu bar, then "System". Either method produces the System Hardware Configuration Panel shown in Figure 3-3. In either case, if this is the initial use of the WJ-RCS Receiver Control Software, the system must be configured prior to its operation. The following steps will assist in system configuration:

1. Choose a unique, identifying name for each receiver.
2. Select the interface and interface configuration from pull-down menus.
3. Select unique addressing when using a GPIB interface.
4. If using WJ-9168 Signal Monitors, assign receivers to a monitor and input port via pull-down menu selections.
5. Select Signal Monitor interface and configuration from pull-down menus.
6. Select an appropriate Switched Audio Output (SAO) and headphone output.
7. Save the system configuration as a .CFG file for future use.

SYSTEM HARDWARE CONFIGURATION PANEL

File Options

Receiver Configuration

	Name	Interface	Serial Baud Rate	Serial Frame	Serial Device	WJ Slot	GPIB Prio Add	GPIB Sec Add	Sighon Number	Sighon Input
01	R1 8502A	Serial-Single COM 1	115200						1	1
02	R2 8554	Serial-MultiFrame COM 2	38400	27	1				1	2
03	R3 8507A	Serial-MultiFrame COM 2	38400	22	1					
04										
05	R4 9304	GPIB					1	1	2	1 Shared
06	R5 9304	GPIB					1	2	2	1 Shared
07										
08	R6 8711A	GPIB					2			
09										
10	R7 8529	Vx4				2				
11	R8 8721	Vx4				3				
12										

Signal Monitor Configuration, WJ-9168

	Interface	Serial Baud Rate	Serial Frame	Serial Device	GPIB Prio Add	GPIB Sec Add
01	Serial-MultiFrame COM 1	38400	23	1	1	7
02	Serial-MultiFrame COM 2	38400	23	1	1	7

SAO Auto ☐ SAO Man ☐ Phones Auto ☐ Phones Man ☐ Record ☒ Reset ☐ Option ☐

Ok X

Receiver Configuration window...

Figure 3-3. WJ-RCS Configuration Panel

Configuring The Receivers

The critical part of setting up the System Hardware Configuration Panel is to determine the configuration of the hardware, itself. Receivers and/or Signal Monitors have to be properly configured according to the desired setup and in accordance with instructions available in each equipment type's technical manual. To configure the receivers, fill in the Name, Interface Type, Baud Rate, Frame Address, Device Address, and the associated Signal Monitor Number and Input Port. The Frame and Device Addresses are only required if the receiver is configured to operate in a Multi-Drop interface mode. These addresses are dependent on the type of receiver being used and can be obtained from the receiver's technical manual. In the Single Drop mode, however, the Frame and Device Address fields should be left blank. This also applies to the Signal Monitor Number and Input Port fields. These fields should be left blank if there is no signal monitor available in the system. The following paragraphs pertain to configuring the receivers.

Device Name

Using the computer mouse, select the first box under "Name" by double-clicking in that space. A pop-up box appears on the screen for entering a unique, identifying name for receiver R.01. After entering the device name, click "OK" to complete entering the receiver's name.

Interface type

Double-click on the first box under the "Interface" column. A pop-up menu appears that allows selection of the interface type. Click on the down arrow to bring the selection list on screen. Highlight the type of interface that exists for the system. Click on "OK" to complete entering the interface type.

Baud Rate

Double-click on the first box under the "Serial Baud Rate" column. A pop-up window appears that allows selection of the baud rate. Click on the down arrow to see the baud rate selection list. Highlight the baud rate compatible with the PC and the receiver type being used. Click on the "OK" to complete entering the selected baud rate.

Frame/Device Address

There is no need to select a Frame Address or Device Address if the receiver is in Single Drop mode. However, if the receiver is in Multi-Drop mode, these address fields must be entered with the correct information. These address numbers are device specific and are dependent on the internal DIP switch settings associated with a receiver. Refer to the receiver technical manual for details. After researching the required information, double-click on the appropriate box in each column and insert the correct numbers. Click on the "OK" button after each entry to enter the correct information and return to the main configuration screen.

VXI Slot

Double-click on the first box under the "VXI Slot" column. A pop-up window appears that allows the VXI slot number to be entered. The slot number used must match the slot number in which the receiver is installed. This field only applies if the interface selected is VXI.

GPIO Primary Address

The GPIO Primary Address field is only active if the selected interface is GPIO. Double-click on the proper box in the "GPIO Prim Addr" column. A pop-up window appears. Enter the appropriate address of the frame. See the associated frame manual for details on setting the GPIO address. In devices like the WJ-990X, which hold multiple receivers, both the Primary and Secondary GPIO Addresses must be specified.

GPIO Secondary Address

The GPIO Secondary Address Field is only active if the selected interface is GPIO. The secondary address refers to a receiver address in a frame, such as a WJ-990X-type device. Double-click on the proper box in the "GPIO Sec Addr" Column. A pop-up window appears. Enter the appropriate address. For WJ-8711 and WJ-8611 receivers this field should be left blank.

Signal Monitor Number/Input Port

If the receiver connects to a signal monitor, the SigMon Number and SigMon Input Port fields need to be completed with the appropriate data. ~~These two fields must be left blank if the receiver does not connect to a signal monitor.~~

To tie a signal monitor to a receiver, the "SigMon Number" and "SigMon Input" columns require data entered. The numbers entered in these two fields are dependent upon the signal monitor's number being used and the

physical connections of the receivers to those signal monitor input ports. Double-click on the box in the "SigMon Number" column that corresponds to the receiver being configured. A pop-up window appears on the screen. Click on the down arrow on the right of the pop-up window. Highlight the signal monitor number that corresponds to the receiver being configured. Click "OK" to return to the main configuration screen.

To enter the signal monitor input port number, double-click on the appropriate box in the "SigMon Input" column. A pop-up window appears. Click on the down arrow in the right corner. Highlight the signal monitor input port number that corresponds to the receiver being configured. The "1 Shared" and "2 Shared" selections are for use with the WJ-9904/SM where the signal monitor is shared between 6 receivers.

CONFIGURING THE SIGNAL MONITORS

The signal monitor fields are to be left blank if there is no signal monitor connected to the system. If there is a signal monitor in the system, the Interface and Baud Rate need to be entered with the appropriate date. The Frame and Device Addresses need to be added if the signal monitor is configured to operate in the Multi-Drop mode.

Interface/Baud Rate

Refer to Figure 3-3. Configuring the signal monitors first requires the user to select the appropriate interface and baud rate. The "Interface" and "Baud Rate" columns under the Signal Monitor Configuration, WJ-9168 heading are used for this purpose. These two columns are selected, and data entered, in exactly the same manner as entering the interface and baud rate for the receiver configuration.

Frame/Device Numbers

Configuring the signal monitors for multi-drop is accomplished in the same manner as for multi-drop receivers. Two additional parameters, "Serial Frame" and "Serial Device" are required. These two addresses are device dependent numbers. Consult the WJ-9168 technical manual for the specific Frame and Device addresses. These two numbers are entered in exactly the same manner as for the receiver configuration.

Primary/Secondary Address

The Primary/Secondary GPIB address fields are used when the WJ-9168 is connected through a GPIB device like the WJ-9904 or WJ-8611. See the associated frame manual for details on configuring these selections. These addresses are entered in exactly the same manner as for the receiver configuration.

Configuring Switched Audio Output (SAO) and Headphones

Configuring Switched Audio Output

The Switched Audio Output (SAO) has three modes of operation, automatic, manual, and off. If neither of the SAO selections is chosen, the SAOs of the system receivers are turned off. The following outlines the operation of the two remaining modes.

The SAO "Auto" mode turns on the SAO of the receiver whose control panel is currently the active control panel and turns off all the others. Click on the word "Auto" to turn on this function. On the main Receiver Control Panel screen, there will be a receiver control window for each receiver configured within the system. As with other Windows operations, only one window is active at a time. To turn this function off, either click on "Man" or "Auto" again.

The SAO "Man" mode places an additional menu item on the Receiver Control Panel screen main menu bar. Click on the word "Man" to turn this function on. The additional menu selection is named "SAO". Clicking on this menu item produces a drop-down menu that lists the SAO On/Off option. To turn this function off, click on the word "Auto" or "Man" again.

Configuring the Headphones

The "Phones" selection consists of "Auto" or manual. The use of this function is dependent upon the receivers having a volume control. Receivers, such as the WJ-8607 and WJ-8607A do not have volume control commands. The following outlines the operation of these two modes.

The "Auto" mode is toggled off and on by clicking on the word Auto. An "X" appears in the box when it is selected. On the Receiver Control Panel screen, there is a receiver control window for each receiver configured within the system. Refer to Figure 3-4 for an example of control of two receivers. When in "Auto", the active receiver, last selected by the mouse, provides the headphone output and the others are shut off. Even though

the remaining receiver control windows may display a volume level, those outputs are turned off. Selecting one of the other receivers by choosing its control panel, turns on its volume, to the previously set level, and turns off the volume of the formerly active receiver.

Click on the "OK" button to accept the new System Hardware Configuration setup. Upon exiting this configuration setup, the WJ-RCS application produces a Receiver Control Panel screen similar to Figure 3-4. The screen displays one receiver control panel window for each receiver defined in the configuration setup. Size the screen for optimum viewing.

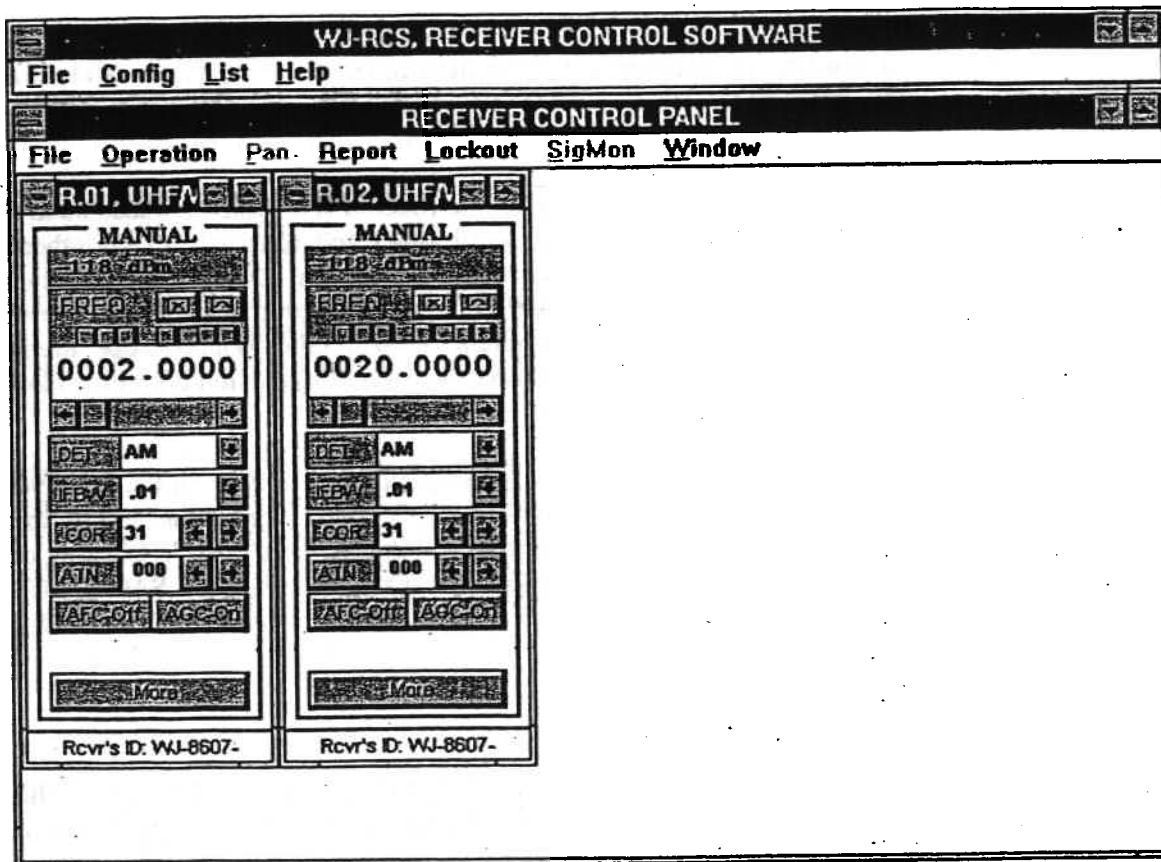


Figure 3-4. Receiver Control Panel

3.2.2 OPERATING THE SYSTEM

Refer to Figure 3-4. Once the operator enters the Receiver Control Panel window, a variety of options are available for setting receiver parameters and operating modes. The WJ-RCS application automatically queries the receivers as to their previous mode of operations. The Receiver Control Panels for the individual receivers depict the operating modes as last set. The operator has three methods to begin operations. The operator may choose to operate using the current receiver settings and operating mode, select a receiver and change its operation, or download a previously stored file containing receiver operation settings.

Selecting A File

To choose a previously saved operations file, click on "File" in the selected Receiver Control Panel menu bar, and then on "Open Operation" from the resulting pulldown menu. Select and open the appropriate file for execution. This automatically loads the data into the receiver and commences operation of the selected receiver using the new parameters.

Receiver Control

To gain control of a receiver, click on any part of the specific receiver control panel with the mouse. Subsequent menu bar operations are then associated with the selected receiver.

Selecting The Operating Mode

The user has four operating modes from which to choose: Manual, Spectral, Priority, and Mnemonic. Each receiver may be configured to operate in any of the modes. To enter or change the operating mode, click on "Operation" in the menu bar and then select the mode of operation.

3.2.3 OPERATING IN MANUAL MODE

Operating Procedures

To enter the Manual mode of operation from the Receiver Control Panel screen, click on "Operation" in the menu bar, then "Manual" from the associated pull-down menu. During manual mode of operation, signals may be added to a signal list or to a lockout list.

The Receiver Control Panel provides the operator the means to control the receiver in the manual mode. See Figure 3-4. This screen supports the standard receiver control parameters. To see the additional receiver parameters, click on the "More" button at the bottom of the receiver panel. See Figure 3-5. Pressing the "Done" button at the bottom of the expanded

panel returns the panel to its abridged presentation. For each receiver assigned during the system hardware configuration process, an individual receiver control panel appears on the screen. If the receiver has a volume control, a volume scroll bar appears on the panel.

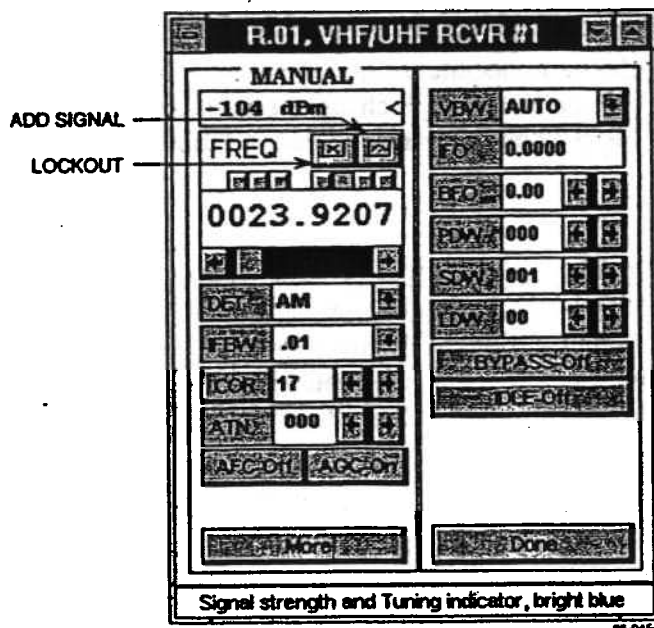


Figure 3-5. Individual Receiver Control Panel

Receiver Controls

The following controls and functions are available for operating the receiver. An on-line help window is also available at the bottom of the control panel. As the cursor moves from function to function on the receiver control panel, identification and parameters of that function appear in this window.

- **Lockout Button.** The Lockout button to the right of the word "FREQ" adds the current receiver's tuned frequency and bandwidth to the receiver LockoutList. This signal is excluded from the Spectral search operation.
- **Add Signal Button.** This button is located to the right the Lockout button. It adds the current receiver's tuned frequency, bandwidth, detection mode, and COR value to the Signal List. This data is stored in the Signal List in an ASCII data format. It can be used to create a priority list or lockout data for a selected receiver.

- **Change receiver frequency.** To change the entire receiver frequency, move the cursor to the frequency readout box and click the mouse. This action highlights the readout. Use the keyboard to enter the new frequency in MHz. It is not necessary to enter leading or trailing zeros. For instance, to enter 2.5 MHz, type "2.5" and press Enter on the keyboard. An alternate method is to use the frequency scroll bar located below the frequency readout. The frequency resolution, tied to the frequency scroll bar, is available from the boxes above the frequency field.
- **Detection mode.** Clicking on the down arrow in the "DET" box provides a list of available detection modes for the associated receiver. Choose the mode by clicking on the desired choice.
- **IF Bandwidth.** Clicking on the down arrow in the "IFBW" box provides a list of available bandwidths for the associated receiver. Choose the bandwidth by clicking on the desired choice.
- **Carrier Operated Relay (COR) threshold.** COR is a value that a signal must exceed before activating the audio output. It is a measure in decibels above the theoretical noise floor for the selected IF bandwidth. If "Infinite" is selected, the receiver audio is effectively shut off. Use the left-right arrows to change the COR value. An alternate method is to click on the COR readout box. This highlights the current value. Use the keyboard to enter the new value and press the "enter" key. To change the COR value to "Infinity" quickly, click on the word "COR".
- **Attenuation.** Set receiver attenuation by using the left-right arrows next to the "ATN" readout
- **AFC/AGC.** Select these two options by clicking on the appropriate control button. Clicking on the buttons toggles the function between On and Off.
- **Video Bandwidth.** Clicking on the down arrow in the "VBW" box provides a list of the available video bandwidths for the associated receiver. Choose an appropriate bandwidth by clicking on the choice or click on "Auto". The "Auto" choice automatically selects a video bandwidth equal to half of the selected IF bandwidth.
- **IF Oscillator.** Click on the "IFO" readout box to change this value. Use the keyboard to enter the appropriate value. The "IFO" frequency is only valid if the IFT detection mode is selected.

- **BFO.** Use the left-right arrows to change the Beat Frequency Oscillator (BFO) frequency or click on the readout box and enter the value via the keyboard. Press Enter to validate the entry.
- **Pre Dwell Timer.** Determines how long a receiver waits at a frequency during a scan before retuning. Type in the desired value or use the left-right arrows to change the value. The value is in 4 msec increments. Entering a number outside the 4 msec increment causes the readout to choose the nearest correct number, i.e., entering 995 causes the readout to be 996. Type in a "-1" for infinity. Refer to the associated receiver manual for a detailed explanation of this timer.
- **Signal Dwell Timer.** Determines how long a receiver sits on a frequency during a scan before retuning. Type in the desired value or use the left-right arrows to change the value. The value is in one second increments and is receiver dependent. Type in a "-1" for infinity. Refer to the associated receiver manual for a detailed explanation of this timer.
- **Loss Dwell Timer.** Determines how long a receiver sits at a frequency during a scan after losing a signal before retuning. Type in the desired value or use the left-right arrows to change the value. The value is in one second increments and is receiver dependent. Type in a "-1" for infinity. Refer to the associated receiver manual for a detailed explanation of this timer.
- **Bypass.** Clicking on this Control Button to "ByPass ON" causes the Preselector to be bypassed. Clicking on the button again, toggles the selection to "ByPass Off".
- Clicking on the button labeled "Done" closes the right half of the receiver control panel.

Remember, the receiver control panel appearance is dependent upon the type of receiver being used. The appearance of the on-screen receiver control panel may vary. The techniques on changing the parameters remain the same.

Signal List

The Signal List is used to build a data base for ease of system operations. Once parameters are entered, they may be used to build collection mission files, create on-line receiver tasking, or be stored for future use. Once parameters are on this list, they may be edited, deleted, stored, or transferred to an active receiver for on-line analysis.

Refer to Figure 3-6. To obtain the Signal List, click on "List" in the WJ-RCS menu bar, and then on "Signal" in the pull-down menu. A Signal List Panel appears on the screen. To add the current receiver parameters to this list, click on the Add Signal button on the active receiver control panel. The parameters are entered on the list and automatically highlighted.

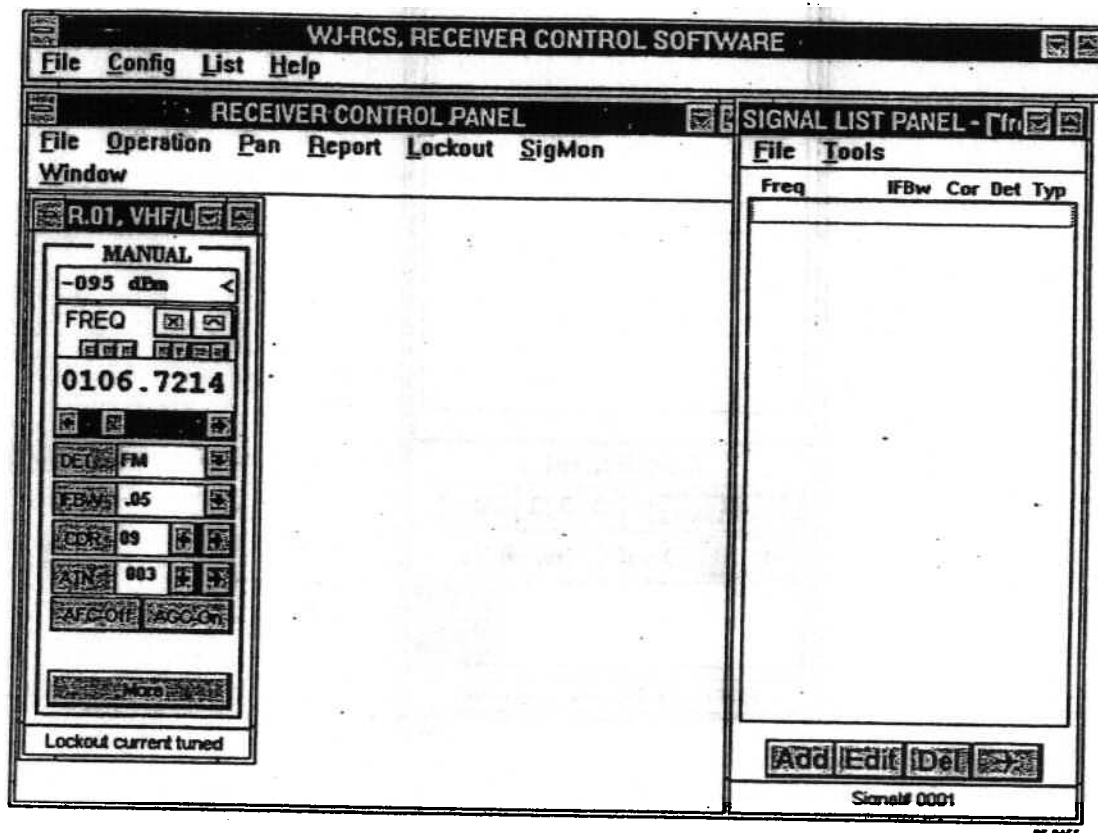


Figure 3-6. Signal List Panel

The operator has several choices in using the Signal List. Using options under the "File" pull-down menu, the operator may open a new file, open and existing Signal List file, import a file from other collection missions, rename a file using SaveAs, or close the Signal List file.

The operator has the option of manipulating the data on the Signal List. Those functions are found on a pull-down menu, under "Tools", or accessed through the buttons on the bottom of the screen. The functions include Add, Edit, Del, and Transfer. The following paragraphs outline their operations.

Signal List Add Function

Enter the "Add" function by using the "Tools" pull-down menu or by clicking on the "Add" button. See Figure 3-7.

The screenshot shows a window titled "SIGNAL LIST PANEL - [fr]". It has a "File" menu bar. Below the menu bar is a table with headers "Freq", "IFBW", "Cor", "Det", and "Typ". The table body is empty. Below the table is a section titled "Add Panel...". This section contains three input fields: the first is "00020.00000", the second is "00.030", and the third is "20". Below these fields are radio buttons for "AM", "soi", "ids", and "?s". The "?s" radio button is selected. Below the radio buttons is a text input field. To the right of the text input field are two buttons: "OK" and "X". At the bottom of the dialog is the text "EDIT or ENTER new comments".

Figure 3-7. Signal List Panel, Add Function

The Add Panel allows the user to enter the frequency, IFBW, COR value, detection mode, and type of signal. The bottom field is for entering comments. The meanings for abbreviations for the types of signals are as follows:

soi - Signal of Interest
ids - Identified Signal
?s - Unknown Signal

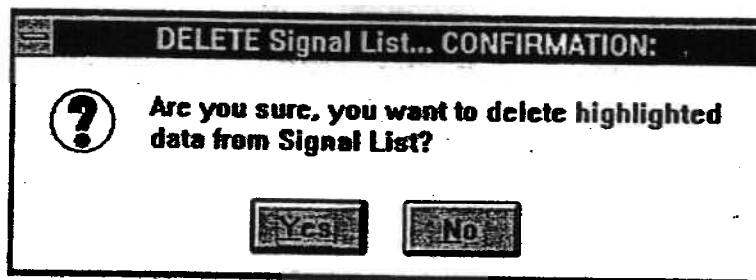
After entering the data, click on "OK" to add the data to the Signal List. Clicking on "X" causes the data to be ignored and exits the Add Panel.

Signal List Edit Function

Prior to editing the Signal List, highlight the data to be edited by clicking on that particular entry. Enter the "Edit" function by using the "Tools" pull-down menu or by clicking on the "Edit" button. A panel similar to the Add Panel appears on the screen. See Figure 3-7. The highlighted data appears in the fields. Select the field by double-clicking and change the data by using the keyboard. The edit function also supports multiple entry editing. Use the click and drag function to select more than one entry to edit. After a range of signals have been highlighted, press the Control Key in conjunction with a mouse and click to de-select individual signals from the range (if desired). After editing is complete, click on "OK" to exit the Edit Panel.

Signal List Delete Function

Prior to deleting any signal list entry, highlight the entry being deleted by clicking on that entry. Multiple entries are selected by using the click and drag function identically to the Add Function. Enter the "Del" function by using the "Tools" pull-down menu or the "Del" button. A pop-up window appears on the screen requesting confirmation prior to deleting the selected entries. See Figure 3-8. Click on "Yes" to delete the items, or "No" to exit the delete function.



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Figure 3-8. Signal List Delete Function

Signal List Transfer Function

Enter the "Transfer" function by using the "Tools" pull-down menu or the function button with the airplane on it. A pop-up window appears allowing the user to customize the transfer of data. See Figure 3-9. The following outlines the options available:

- Receiver. Click on the down arrow to bring up a list of all receivers configured in the system. Highlight the receiver that is to receive the Signal List data.
- Operation. Click on the down arrow to bring up the two choices of operation, Priority or Lockout. Highlighting Priority transfers the Signal List data to the selected receiver for priority search

operation. Highlighting Lockout transfers the Signal List data to the selected receiver's Lockout List.

- **Option.** Click on the down arrow to bring up the two options for the selected Signal List data, Overwrite and Append. Overwrite replaces the receiver priority or lockout list with the new data, destroying the current listing. Append adds the new data to the priority list or lockout list of the selected receiver.
- **Data.** Click the down arrow to bring up the options for the data menu. The menu offers the operator the choice of which entries on the Signal List are to be transferred. Options include the entire list, signals of interest only, IDs only, ?'s only, or highlighted entries only. Click on the appropriate choice.

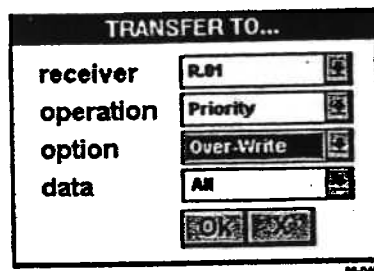


Figure 3-9. Signal List Transfer Function

Copy and Paste Function

The Copy and Paste functions allow the user to transfer data from one Signal List to another. Highlight the data from the Signal List to be copied and click on "Copy" under the "Tools" pull-down menu. Open the Signal List file that is to receive the copied data. Use the Paste function to complete the transfer. When activating the copy function, the copied data is temporarily stored in the Windows™ Scratch Pad. This information can be pasted into any Windows™ application.

Lockout List

While operating the receiver, the user may generate a list of lockout frequencies. These lockout frequencies are primarily used with the Spectral Search operation. Information in the lockout list is transferable to a Signal List for signal list database building. To bring the active receiver's Lockout List window to the screen, click on "Lockout" and then "Update" from the pull-down menu. Up to 100 lockout frequencies may be entered on the Lockout List. The user may manipulate the data on the Lockout List by using the four function buttons on the bottom of the screen. See Figure 3-10.

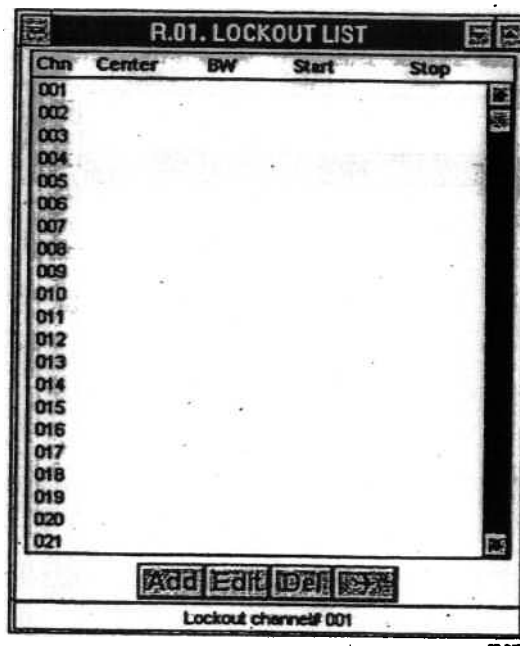


Figure 3-10. Lockout List Window

Add Function

Enter the "Add" function by clicking on the "Add" button. Two fields appear on the screen, one for the center frequency and one for the bandwidth. The channel number into which the lockout data is to be added appears to the left of the "Center Lockout Frequency" field. Enter the frequency in MHz by using the keyboard numeric keys. Press Enter to validate the entry. Enter the bandwidth in MHz in the same manner. Click "OK" to enter the data on the list. See Figure 3-11. The Start and Stop frequencies are automatically calculated and added to the data on the list.

The screenshot shows a window titled "R.01, LOCKOUT LIST". It contains a table with the following columns: "Chn", "Center", "BW", "Start", and "Stop". The first row of the table is highlighted, showing "003" in the "Chn" column. Below the table, there are two input fields labeled "Center:" and "BW:", with the value "# 003" entered in the "Center:" field. To the right of these fields are two buttons labeled "OK" and "X". At the bottom of the window, it says "Lockout channel# 003".

Figure 3-11. Lockout List Add Function

Edit Function

Prior to entering the edit function, highlight the lockout channel to be edited. Enter the "Edit" function by clicking on the "Edit" button. The edit function screen appears with the selected data in the two fields. See Figure 3-11. Edit the data. Click "OK" to enter the data on the list. If entering the edit function without highlighting a particular lockout channel, the function operates identically to the Add function.

Delete Function

Prior to entering the Delete function, highlight the lockout channel or channels to be deleted. Enter the function by clicking on the "Del" button. A Confirmation Window appears requesting the operator confirm the delete request. Click on the "Yes" or "No" button as appropriate.

Transfer Function

The Transfer function moves the highlighted lockout channels to the receiver's Signal List. Highlight the channels prior to clicking the "Transfer" button. After clicking the button, a Confirmation Window appears on the screen requesting the operator confirm the transfer request. Click "Yes" or "No" as appropriate.

Mnemonic Operation

The operator has the option of using the remote mnemonic commands instead of the receiver control panel for operating the receiver. Click on "Operation", then "Mnemonic" to activate this option. A blank screen appears on the screen, replacing the receiver control panel. Refer to the specific receiver technical manual for commands available.

Saving Receiver Operation

To save the current receiver's operation and parameters, click on "File", then choose either the "Save" or "SaveAs" function.

3.2.4 OPERATING IN SPECTRAL MODE

The Spectral Search mode allows the receiver to sweep from a start frequency, labeled "FRA", to a stop frequency, labeled "FRB". The mode also allows the operator to set an increment frequency, labeled "INC", for the sweep. The Spectral mode is capable of setting up ten separate sweep sectors per receiver. Two additional menu items are available in this mode of operation that were not available in the Manual mode. One is the "Pan" menu and the other is the "Report" menu. The other menu items are identical to the Manual mode of operation. See Figure 3-12. An RF Pan display is available in this operating mode.

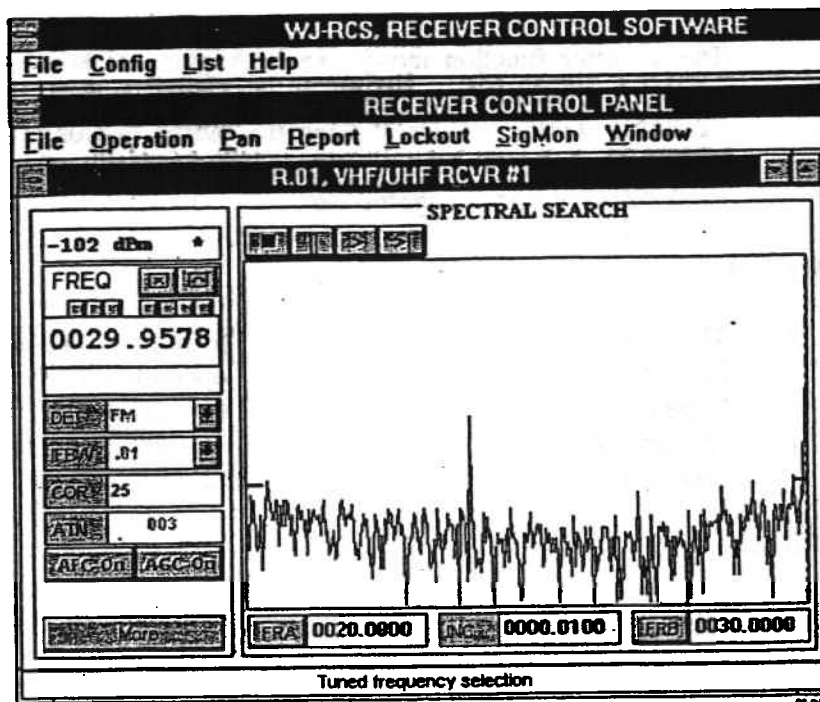


Figure 3-12. Spectral Operation Window

To enter Spectral operations, click on "Operation", then "Spectral" from the pull-down menu.

Creating a Sweep Sector

Spectral Search operation permits and excutes up to ten independently programmed sweep sectors. See Figure 3-13 and 3-14. To add a sweep sector, use the "Stop" control button to stop the search operation. Click on the "Add" button to open another sweep sector. The operator can then change the new sector to the desired values. After completing the set-up of the sweep values, click on "Start Search" button to activate the search. During the Spectral Search operation, RF Pan displays of each sweep sector is available on screen. Use the "Pan" menu from the menu bar to mainpulate and tailor the RF presentation for optimum viewing. There are two groups of control buttons located directly above the RF Pan display that play a major role in the spectral search operation. These buttons, from left to right respectively, perform the following functions:

- Stop control button: stops receiver from sweeping. Permits permanent change to the receiver parameters.
- Pause control button: pauses the receiver from sweeping. Permits temporary change to the receiver parameters. Starting the sweep

discards the changes and the receiver reverts to the previous settings.

- **Start Search control button:** starts the receiver sweep operation.
- **Single Sequence Search control button:** starts a single sweep of the receiver, ignoring all COR thresholds.
- **Add control button:** adds a sector to the receiver sweep operations when the sweep is stopped.
- **Delete control button:** deletes the selected sector from receiver sweep operations when the sweep is stopped.

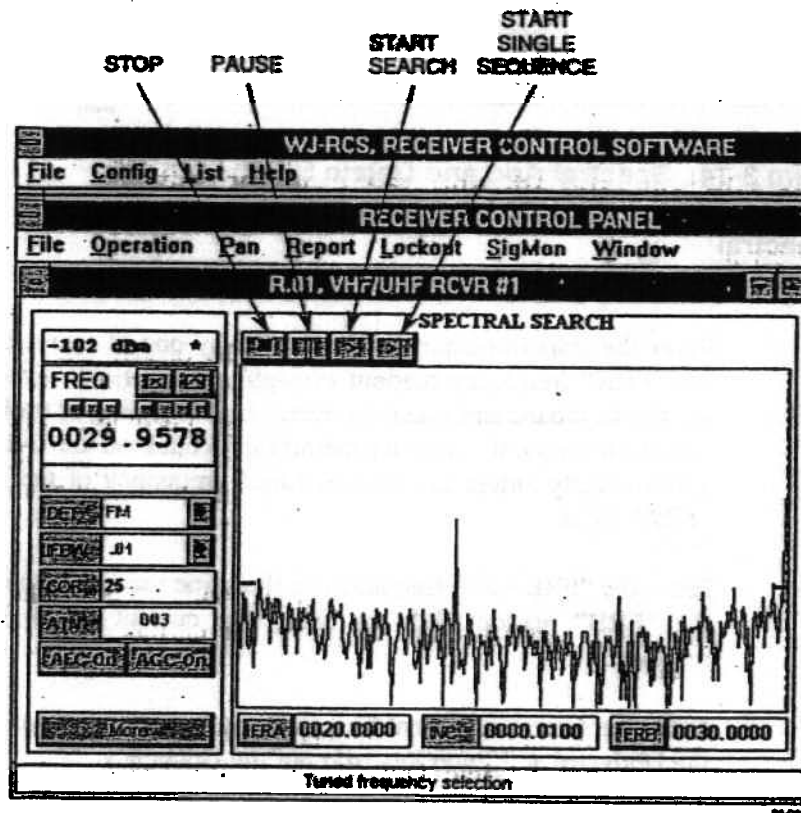


Figure 3-13. Spectral Mode Sweep Control Buttons

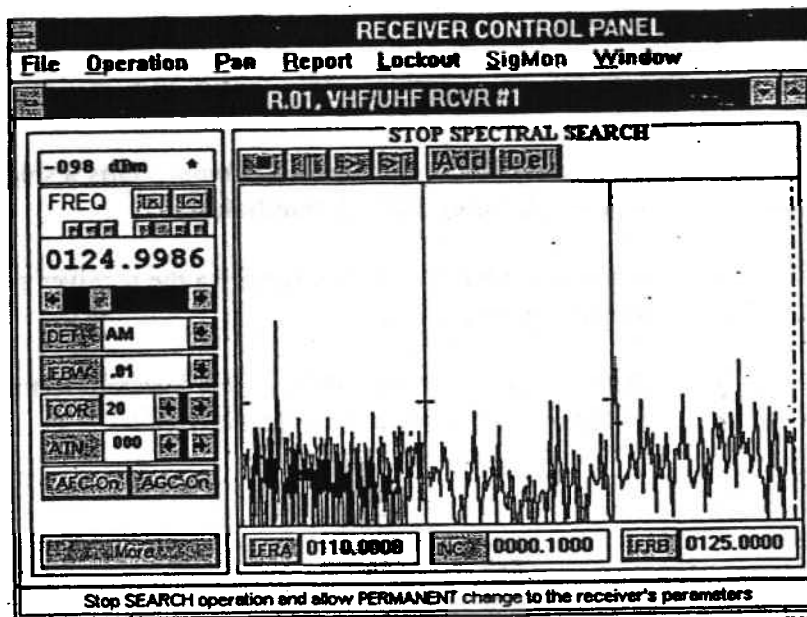


Figure 3-14. Spectral Add and Delete Sector Buttons

Entering the Spectral Search Frequencies

Enter the start frequency of the sweep by one of two methods. Click on the "FRA" frequency readout to highlight the field. Enter the frequency via the keyboard and press the Enter key. Leading or trailing zeros do not need to be entered. Another method is to click on the "FRA" button. This automatically enters the current tuned frequency of the receiver into the "FRA" field.

Enter the "FRB" stop frequency in the same manner, either by highlighting the "FRB" readout field or using the current tuned frequency of the receiver.

Enter the sweep increment frequency by highlighting the "INC" field. Use the keyboard and Enter key to input the frequency.

Starting the Sweep

To start the sweep, click on the Start Search or the Single Sequence Search button. See Figure 3-13. The single Sequence Search button enables a single sweep of the sector while ignoring the receiver's COR value. The Start Search button starts the receiver's normal sweeping action.

Reporting the Signals

In the Spectral Search operation, the operator has flexibility in how to tell the receiver report and acquire signals. Click on "Report" in the menu bar to select the options available from a pull-down menu. The following options are available:

- **All Signals.** The receiver stops on all signals that exceed the COR threshold value.
- **New Signals.** The receiver stops only on those signals, exceeding the COR threshold value, that were not active on the previous sweep.
- **Skip Adjacent.** The receiver only stops on the first signal in a close sequence of signals.

Creating New Sweep Sectors

To create additional sweep sectors, stop the sweeping operation by clicking on the Stop Search control button. See Figure 3-13. The current sweeping action stops and two control buttons appear above the Pan Display. See Figure 3-14.

Click on the "Add" button. An additional sector appears on the Pan Display. Insert the start, stop, and increment frequencies. Click on each area and insert the frequencies by either using the keyboard and Enter key, or use the Receiver Control frequency readout and the "FRA" and "FRB" buttons. Click on the "More" button of the Receiver Control Panel. Set receiver parameters for this particular sweep sector. Refer to paragraph 3.2.3 for operating receiver controls.

Add additional sectors in the same manner. Each click on the "Add" button produces an additional sector on the Pan Display. Ten sectors are available per receiver. After creating the sectors, start the receiver sweeping action by clicking on the Start Search button (see Figure 3-13). Figure 3-15 depicts a receiver configured with three sweep sectors.

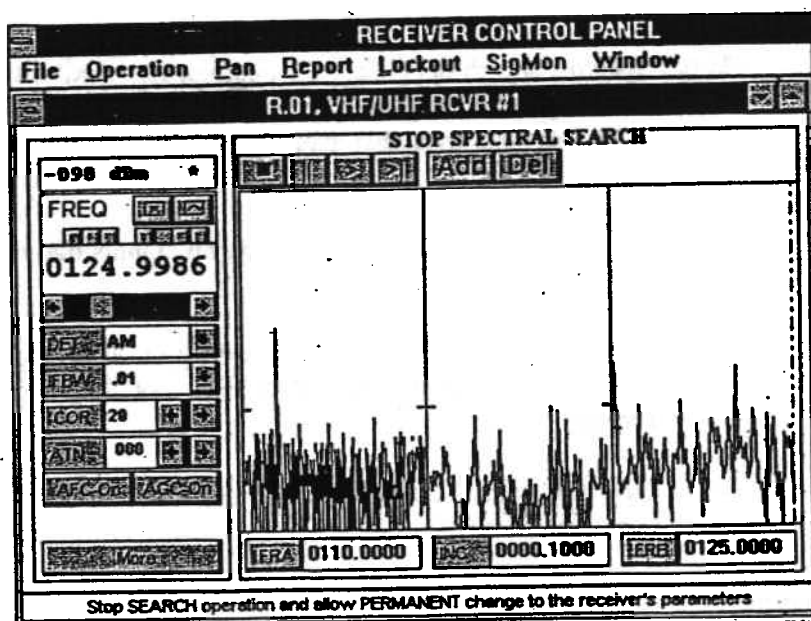


Figure 3-15. Spectral Operation With Three Sweep Sectors

Deleting Sectors

To delete sectors, stop the receiver sweep by clicking on the Stop Search button (see Figure 3-13). Place the cursor within the sector being deleted and click the mouse. Click on the "Del" button above the Pan Display. See Figure 3-14.

Using the Pan Display

The Pan Display provides several options for the operator. Clicking on "Pan" in the menu bar, then on "Visible", provides the operator with an on-screen presentation of the sweep sectors and their start and stop frequencies. See Figure 3-16. The check marked displays appear on the screen. To stop a sector from being displayed, click on that sector in the pull-down menu display.

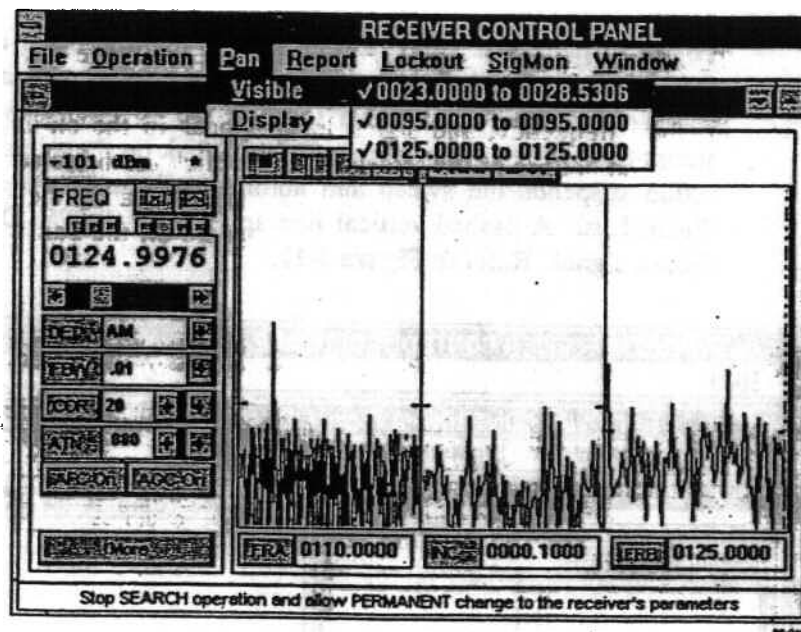


Figure 3-16. Pan Display with Visible Sector Parameters

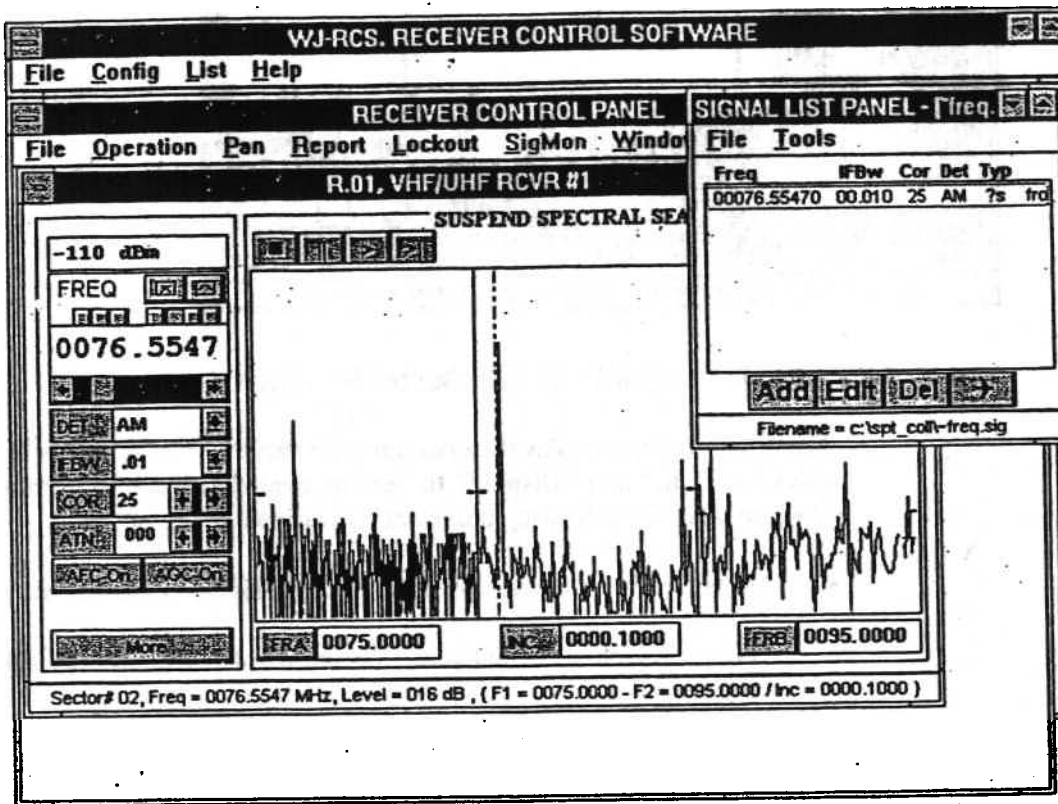
The other option provides the operator with various sweep display options. Click on "Pan" and "Display" to see the available options from a pull-down menu. The following describes the various sweep options.

- **Real.** Provides a real-time display of the signal environment.
- **Peak.** Keeps all signal peaks on the display whether the signal is active or not.
- **Cumulative.** Each sweep overwrites the previous sweep.
- **Decay.** Provides two choices of decay rate when a signal is no longer active. Clicking on "Decay" provides a pop-up window with a "Fast" or "Slow" decay rate choice.
- **Pen.** The pen size controls the thickness of the sweep line. Clicking on "Pen" provides a choice of five different pen sizes in a pop-up window. Click on the pen size desired.

Creating a Signal List

During Spectral operations, the operator has the option of adding a signal to a Signal List. This data can be used during Priority Search operations, to update or create a Lockout List, or provide data for building missions for Mission Collection applications.

To add a particular signal to the Signal List, move the cursor over the sector and signal desired. As the cursor moves over a sector, sector number, frequency, and signal level appear in the on-line help window across the bottom of the screen. Double-click on the selected signal. This action suspends the sweep and automatically adds the signal onto the Signal List. A dashed vertical line appears on the Pan Display over the chosen signal. Refer to Figure 3-17.



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Figure 3-17. Spectral Operations Signal List

An alternate method of adding a signal to the Signal List uses the Add Signal control button above the frequency readout on the Receiver Control Panel. When the sweep stops on a signal that exceeds the COR threshold, the receiver frequency readout displays the frequency. Click on the Add Signal button to enter the data to the Signal List. This method does not suspend the sweep operation.

Creating and Using the Lockout List

During Spectral operations, the user may create and use a Lockout List. There are two methods of creating a Lockout List. The operator may use the Lockout button on the individual Receiver Control Panel, or transfer frequencies from the Signal List to the Lockout List. To activate the Lockout List, click on "Lockout" on the menu bar and make sure that there is no check mark next to the "Ignore" menu item. When there is a check mark next to the "Ignore" menu item, the lockout function is discarded from the operation.

The Lockout button adds the frequency in the receiver control panel readout to the Lockout List. The following two methods provide a way to add lockout data.

- Suspend the sweep by clicking on the desired signal. A dashed vertical line appears and the frequency readout on the receiver control panel displays the selected frequency. Click on the Lockout Control button to add the data. Restart the sweep by clicking the Start Search button above the Pan Display (see Figure 3-13).
- When the sweep stops on a signal due to the signal exceeding the COR threshold, the frequency appears in the receiver frequency readout panel. Click the Lockout Button to transfer the data. This method does not stop the Spectral sweep operation.

The Signal List provides an alternate way of setting lockout frequencies. Data from the Signal List is transferable to the Lockout List via the "Transfer" button on the Signal List. Refer to paragraph 3.2.3 for explicit instructions on the use of this option.

Saving Spectral Operations

The receiver settings and sweep sector parameters for the Spectral operation of each receiver can be saved to a file for future use. The Lockout List and Signal List for each receiver is also saved. Click "File" on the menu bar and then "SaveAs". Provide a distinct name for each file that is saved.

3.2.5 OPERATING IN PRIORITY MODE

The Priority Search mode provides an automatic search of up to 100 channels of discrete frequencies. The search frequencies may be obtained from a previously saved Priority file, downloaded from a Signal List, or entered by using the Add Priority Channel control button. The receiver and menu control functions are identical to those in Spectral operations. No new functions have been added. Refer to Figure 3-18 for the Priority operations screen. To enter the Priority mode, click "Operation", then "Priority" from the menu bar.

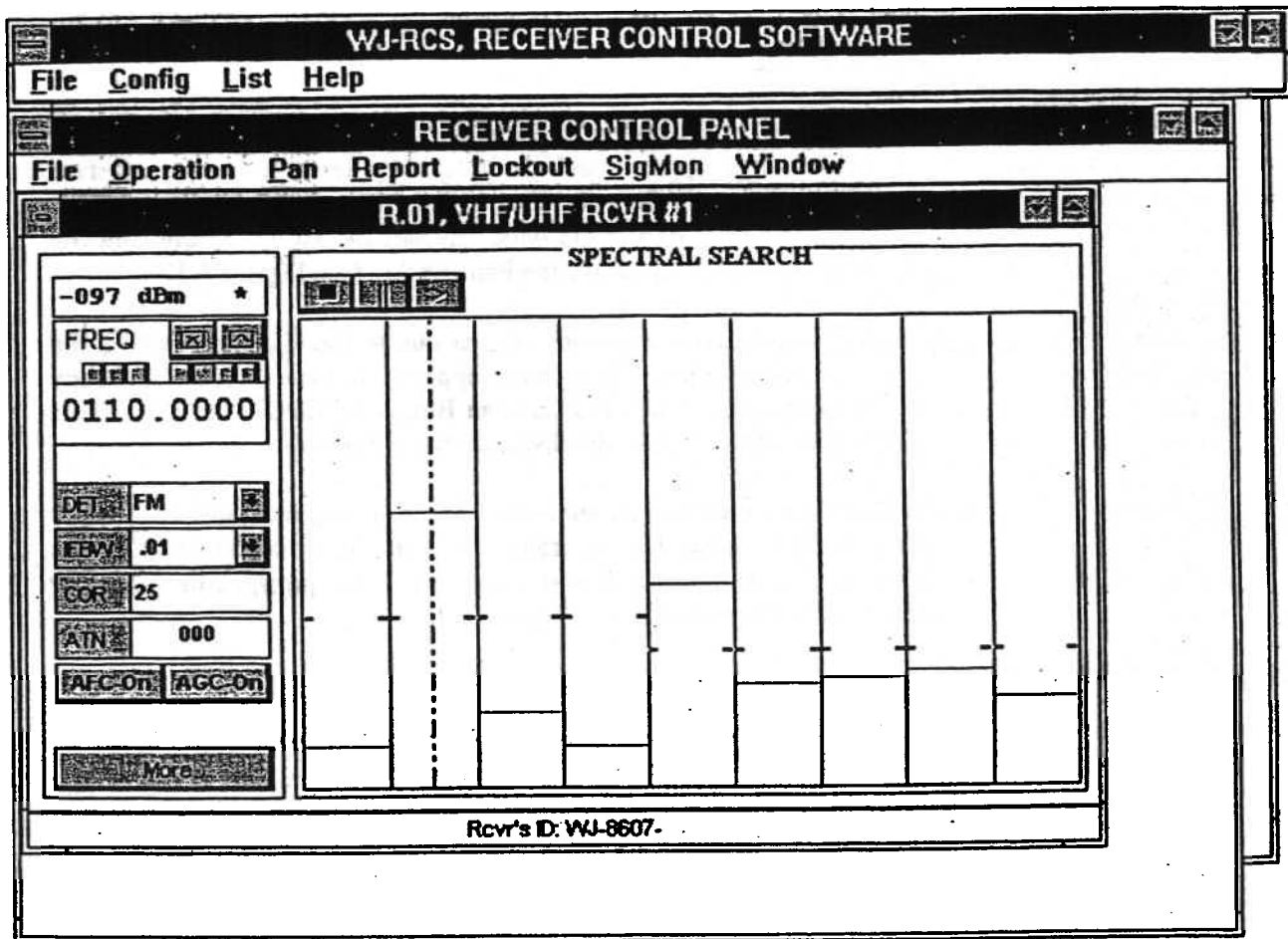


Figure 3-18. Priority Operations Window

Creating Priority Channels

To create a Priority channel from the receiver control panel, stop the receiver search mode by clicking the Stop Search button above the Pan Display. See Figure 3-19.



Figure 3-19. Pan Display Control Buttons

After clicking the Stop button, two additional buttons appear above the Pan Display, the "Add" and "Delete" buttons. These buttons add or delete a sector while in Priority operations. See Figure 3-20.



Figure 3-20. Priority Operations Add/Delete Channel Buttons

To create a Priority channel, click the "Add" button. The new channel appears at the right end of the Pan Display. Click on the new channel and change the channel parameters to the described set-up.

To create Priority channels from a Signal List, click "List", then "Signal" from the pull-down menu on the WJ-RCS Receiver Control Software main menu bar. Perform the following to transfer the selected signals:

- Highlight the signals to be transferred from the Signal List
- Click on the "Transfer" button (airplane) or click "Tools" then "Transfer" from the pull-down menu in the Signal List.
- Complete the pop-up menu selections (refer to paragraph 3.2.3).
- Click "OK" to transfer the data to the selected receiver.

To create Priority channels from a saved Signal List, click "List", then "Signal" from the pull-down menu. Select "File" then "Open" from the menu bar of the Signal List window. Open the appropriate file. Transfer the selected frequencies to the receiver as described above.

Creating a Signal List

To create or add to a Signal List in Priority operations, use one of the following methods.

- Click on the Add Signal button above the receiver control frequency readout when the selected channel is active. The channel is active when the display in that channel turns red.

- Click on the desired channel and stop the search operation. Then click on the Add Signal button above the receiver control frequency readout. Then restart the search.
- or, Double-click on the selected channel display.

Creating a Lockout List

To create or add to a Lockout List in Priority operations, use one of the following methods.

- Click on the Lockout button above the receiver control frequency readout when the selected channel is active. The channel is active when the display turns red.
- Click on the desired channel and stop the search operations. Then click the Lockout button above the receiver control frequency readout. Then restart the search.
- Transfer selected frequencies from the receiver Signal List to the Lockout List.

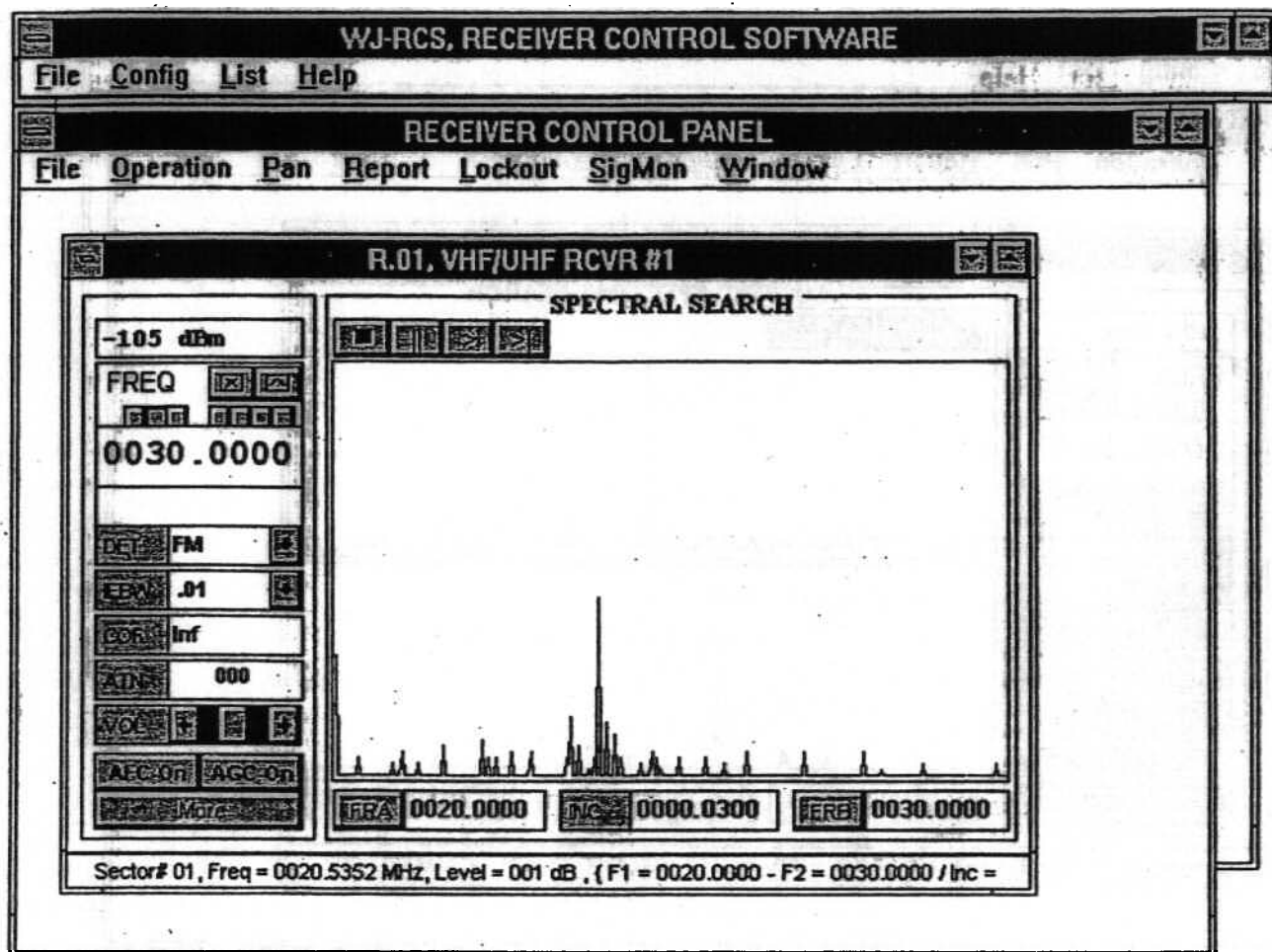
Lockout has no affect on the Priority Search operation. To temporarily ignore a priority search channel, use "Idle" control button on the receiver control panel to activate channel idling mode. This excludes the channel from the search.

Saving Priority Operations

To save the current Priority operations settings, click on "File" and then "SaveAs". Choose a distinctive name for the file for ease of recall at a later time.

3.2.6 Using the Signal Monitors

The WJ-RCS software permits the use of up to two WJ-9168 Signal Monitors. These monitors provide a pan display that allows fine tuning of the receiver on a signal of interest. Ensure correct configuration of the signal monitors with the receiver type being used. Refer to the WJ-9168 Signal Monitor manual for pertinent data and installation procedures. Ensure that the Configuration System Hardware screen has been updated with the proper information (see paragraph 3.2.1). If the configuration is correct, the Receiver Control Panel enables "SigMon" on the menu bar. See Figure 3-21.



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Figure 3-21. Receiver Control Panel with Signal Monitor Available

To turn the Signal Monitor on, click "SigMon", then "On" from the pull-down menu. The dashed vertical line in the Signal Monitor pan display represents the center of the tuned frequency. See Figure 3-22.

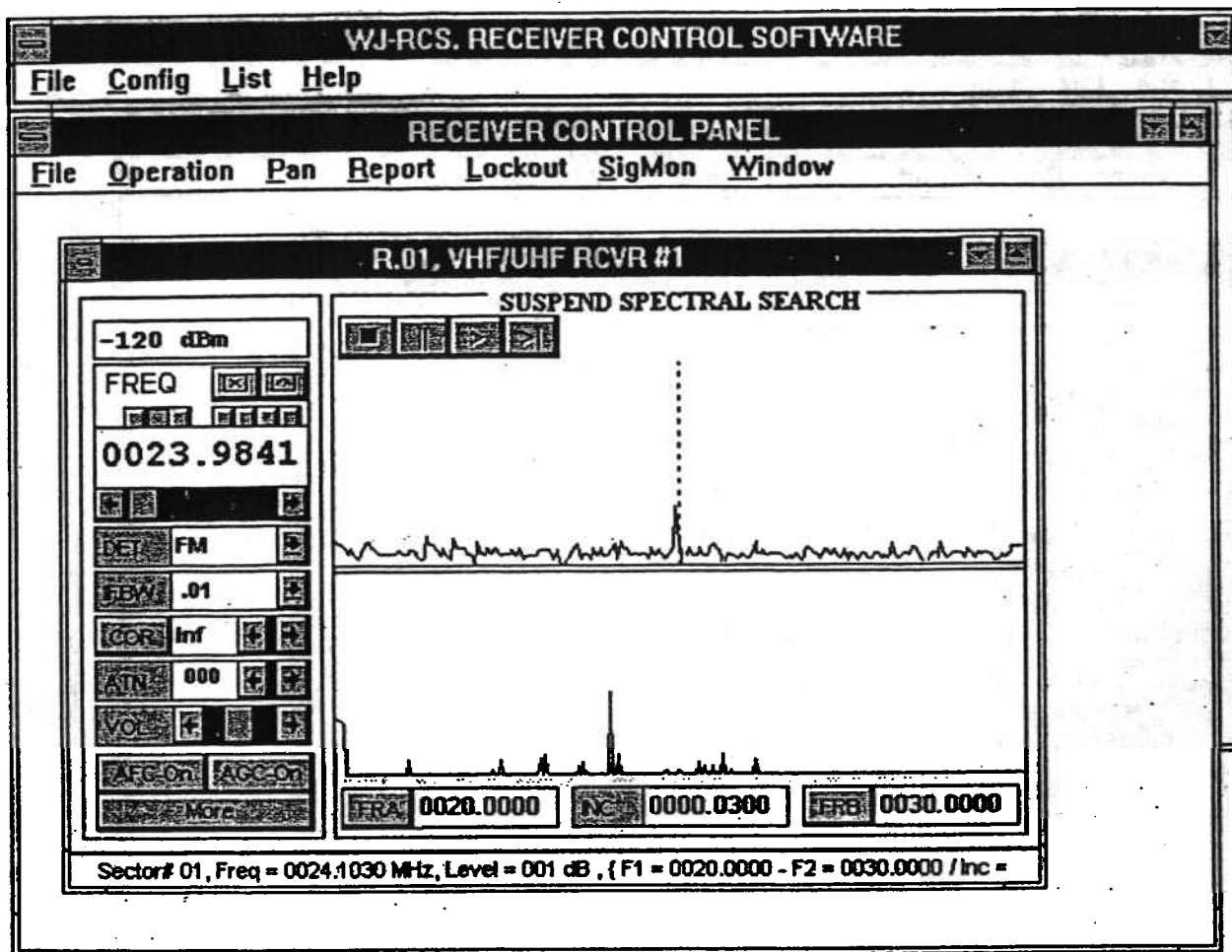


Figure 3-22. Signal Monitor Pan Display

To change the Signal Monitor pan display presentation, click on "SigMon", then "Sweep". This provides a pop-up window allowing the operator to change the display parameters for the best picture. See Figure 3-23.

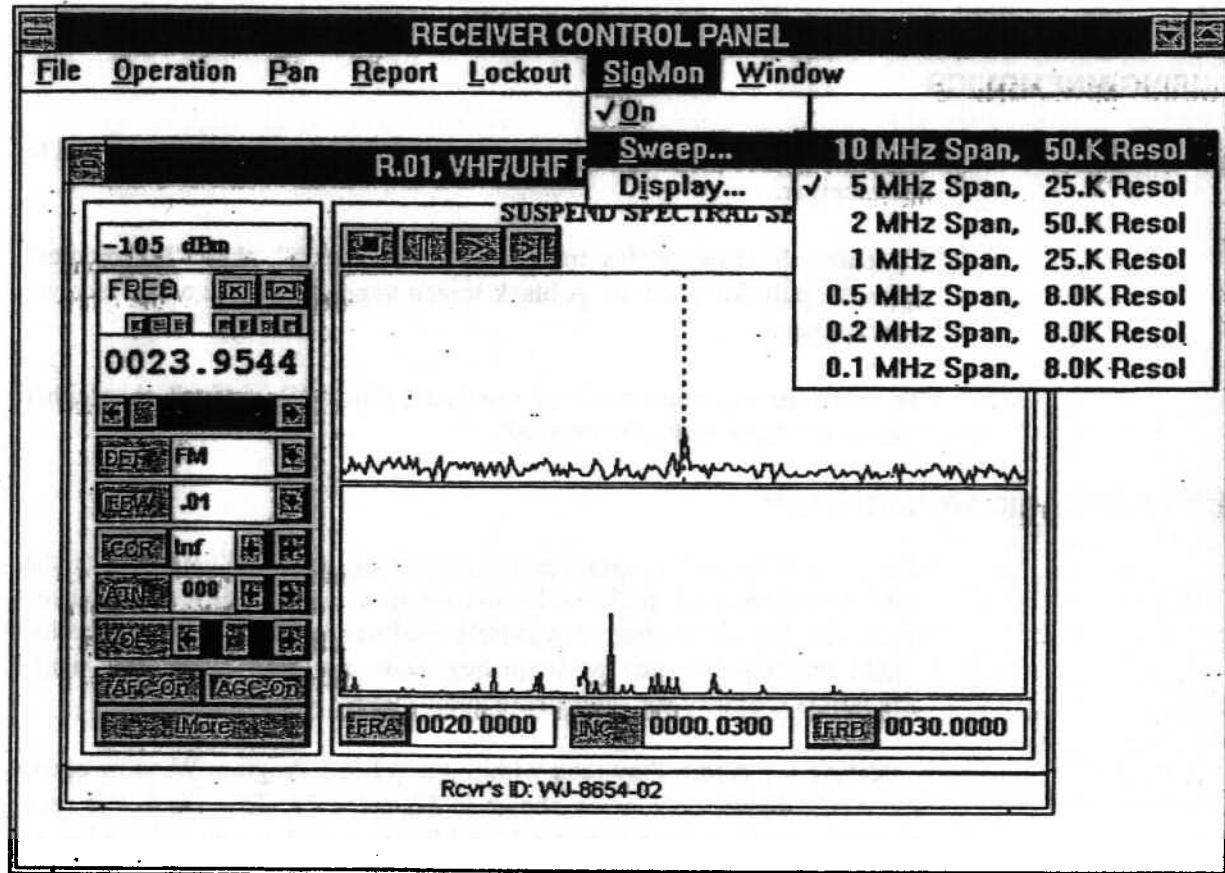


Figure 3-23. Signal Monitor Sweep Display Window

To change the Signal Monitor display line, click on "SigMon", then "Display". A pop-up window appears that allows a choice of the type of display. The following describes the various options.

- **Real.** Provides a real-time display of the signal environment.
- **Peak.** Keeps all signal peaks on the display whether the signal is active or not.
- **Cumulative.** Each sweep overwrites the previous sweep.
- **Decay.** Provides two choices of decay rate when a signal is no longer active. Clicking on "Decay" provides a pop-up window with a "Fast" or "Slow" decay rate choice.
- **Pen.** The pen size controls the thickness of the sweep line. Clicking on "Pen" provides a choice of five different pen sizes in a pop-up window. Click on the pen size desired.

3.2.7 USING MNEMONICS

The Mnemonics mode allows the user to send a direct ASCII command to the receiver.

To enter the Mnemonics mode, click "Operation", then "Mnemonics" from the pull-down menu. A blank screen appears in place of the receiver control panel.

To return to any other mode of operation, Click "Operation", then either "Manual", "Spectral", or "Priority".

3.3 AUDIO PLAYBACK APPLICATION

The Audio Playback program permits audio signals (or clips) stored on the hard disk during an audio collection mission to be retrieved and played back via the controlling computer's multimedia sound card. Detailed signal information such as frequency, start and stop times, and signal strength is provided for each stored audio signal.

Selecting the Audio Play icon within the WJ-RC Program Window opens the Audio Playback window shown in Figure 3-24. This window is used to open, close, and delete audio files (.EVA) stored on the disk during an audio collection mission. Four tool box items, located below the main menu, provide instant access to the items available from the File pull-down menu. These tool box items are from left to right, Open File, Close File, Delete File, and Exit.

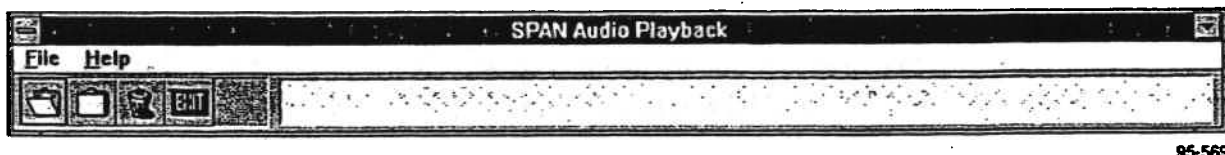


Figure 3-24. Audio Playback Window

3.3.1 PERFORMING AUDIO PLAYBACK FUNCTIONS

To play back audio events stored on the disk, the corresponding audio file must first be opened. Opening an audio file accesses the Segment Selection window depicted in Figure 3-25. Once a segment is selected, an individual audio clip or multiple audio clips may be selected for playback via the controlling computer's sound card. Additionally, audio clips of interest can be flagged for future reference.

3.3.2 SELECTING AN AUDIO SEGMENT

The Segment Selection window shown in Figure 3-25 identifies the number of mission segments contained in the selected audio event file. A new mission segment is created each time the audio collection mission—a Spectral Acquisition or Priority Acquisition—is stopped and started via the Mission Execution Application.

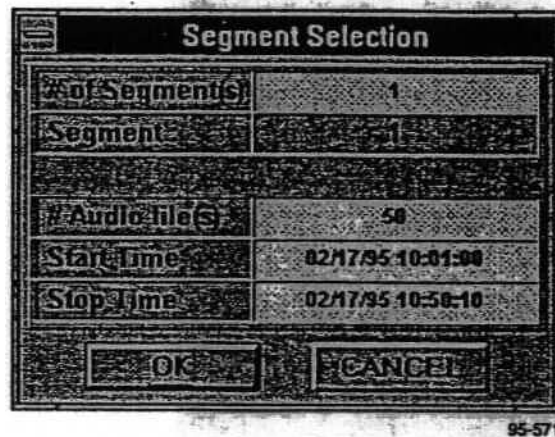


Figure 3-25. Segment Selection Window

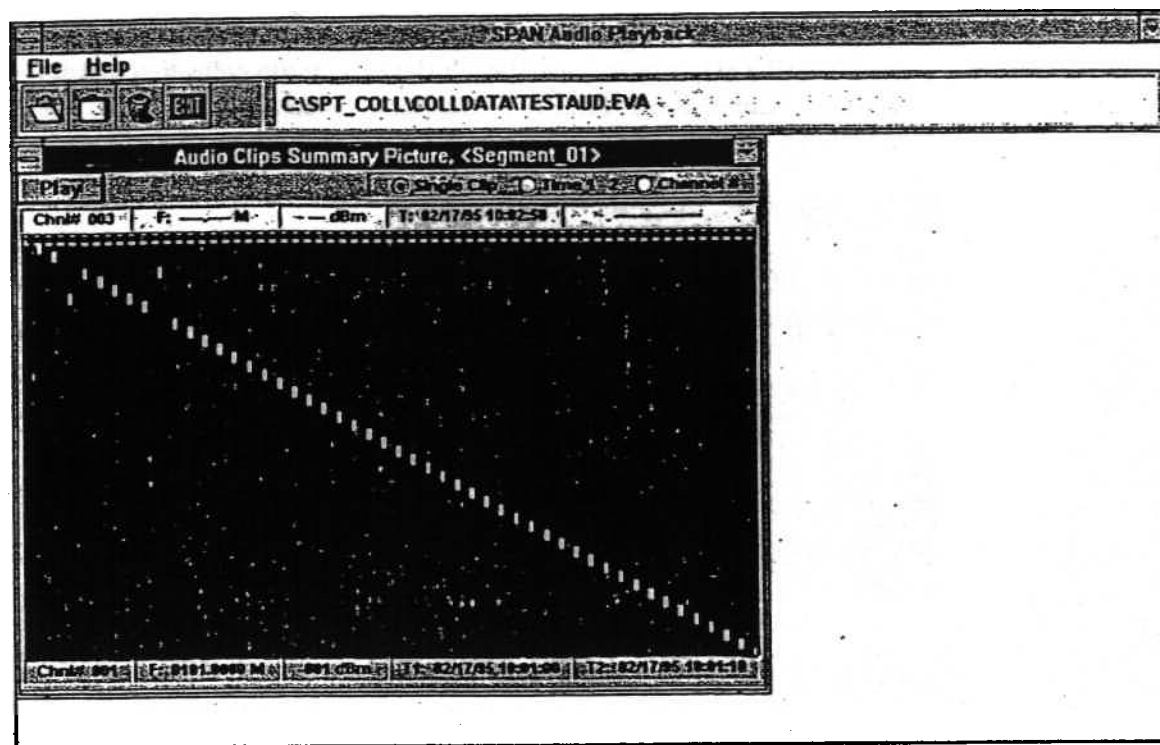
Referring to Figure 3-25, the "# of Segment(s)" field of the Segment Selection window identifies the number segments contained in the selected audio event file. The "Segment" field indicates the segment selected for audio playback. If more than one segment is contained in the opened audio file, a scroll bar is presented below the "Segment" field that allows the selection of a segment for playback. All displayed information on the Segment Selection window is updated as new segments are selected. Also identified in the Segment Selection window is the number of audio files stored, their start/stop times, and dates for the selected segment.

Once the segment number is selected for playback, press the OK button to access the Audio Clips Summary Window depicted in Figure 3-26. To exit the Segment Selection window and to return to the Audio Playback window, select Cancel.

Selecting Audio Clips For Playback

Selecting the OK button on the Segment Selection window (Figure 3-25) opens the Audio Clips Summary window shown in Figure 3-26. This window plots a graphical representation identifying the frequency and time of audio signals (or audio clips) received during the selected audio collection segment. It also allows the user to obtain detailed information regarding any audio clip within the frequency versus time display, and

permits playback of received audio clips via the controlling PC's sound card.



95-572

Figure 3-26. Audio Clips Summary Window

Points are plotted on the display for all audio signals (or clips) stored during the selected mission segment. Placing the playback marking cursor on a plotted point provides detailed information on that audio clip at the bottom of the Audio Clip Summary window. Information provided includes the memory channel number from which the audio signal was acquired, the channel's tuned frequency, the received signal strength, and the start/stop dates and times of the audio clip. Moving the mouse within the display area updates information displayed above the Audio Clip Summary window. Moving the mouse vertically updates the Chnl# field identifying the audio mission file channel number's location on the display. Moving the mouse horizontally updates time and date information (T: nn/nn/nn nn:nn:nn). When the mouse cursor is placed directly on a plotted audio clip, the channel's frequency and signal strength information are also provided.

To select a single audio clip for playback, select the "Single Clip" item located just above the time/date field. Then place the mouse cursor at the

desired audio clip and press the left mouse button. This highlights the selected audio clip and channel number. Detailed information concerning the tuned frequency, signal strength, and the start and stop dates/times for the selected audio clip are provided below the display area.

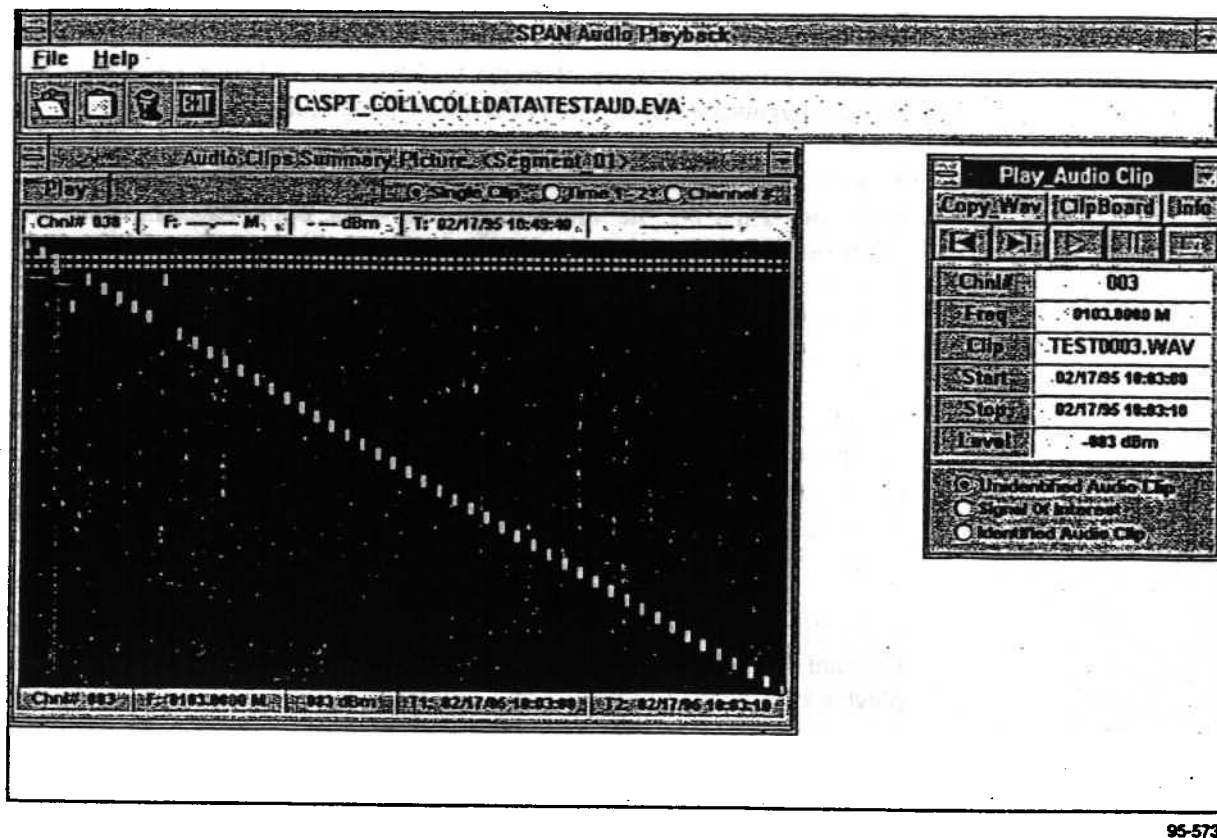
To select audio clips for playback between designated start and stop times, select the "Time 1-2" item located just above the upper date/time field. To select the start time, place the mouse cursor at the desired start time and press the left mouse button. To enter the stop time, move the mouse cursor to desired stop time and press the right mouse button. Once play is started, all audio clips between the designated start and stop times are played.

To select all audio clips for playback for a selected channel number, select the "Channel#" item located just above the upper date/time field. Move the mouse cursor vertically to the desired channel number and press the left mouse button. Once play is started, all audio clips for the selected channel number are played.

Once the type of playback is selected (i.e., Single Clip, Time 1-2, or Channel #), selecting the Play button with the mouse starts the audio playback.

Starting, Stopping, and Tagging Audio Clips

Once playback starts via the Audio Clips Summary window (refer to Figure 3-26) the Play_Audio Clip window opens as shown in Figure 3-27. This window provides information on the audio clip currently playing. This window also provides such details as the memory channel number, tuned frequency, signal level, start/stop times, and the .wav file name assigned to that particular audio clip.



95-573

Figure 3-27. Play_Audio Clip Window

There are five playback control buttons on the Play_Audio Clip window just above the "Chnl#" field. The control buttons, from left to right, are to:

1. Play the Previous audio clip
2. Play the Next audio clip
3. Play a Paused audio clip
4. Pause audio playback
5. Stop audio playback.

There are three additional control buttons; Copy_Wav, Clipboard, and Info, just below the Play_Audio Clip title bar.

The Copy_Wav button permits copying the currently monitored audio clip's ".wav" file to a designated disk drive and file name. This file can then be stored or used by other multimedia devices as required.

The ClipBoard button, when selected, places the information displayed for the current audio clip into a "clipboard". This information can then be placed directly into other windows' application programs.

Selecting the INFO button opens the Comments window shown in Figure 3-28. This window shows the operator comments that were entered from the Mission Builder program. Comments can be edited using the computer keyboard as desired. Closing this window updates and saves the entered message.



Figure 3-28. Comment Window

Initially, all audio clips are tagged as "Unidentified Audio Clip". This identification field is located in the lower portion of the Play_Audio Clip window. Once audio clips have been played, signals of interest can be tagged by selecting the "Signal of Interest" item with the mouse. Identified signals with no apparent interest can be tagged as an "Identified Audio Clip".

3.4 FREQ LIST EDITOR APPLICATION

The Freq List Editor application is used to build a data base for ease of system operations. Once parameters are entered, they may be used to build collection mission files, create off-line receiver tasking, or be stored for future use. Once parameters are on this list, they may be edited, deleted, or stored.

Refer to Figure 2-1. To open the Freq List Editor, click on the icon in the WJ-RCS group menu. A Freq List Editor Panel appears on the screen (see Figure 3-29). To add the current receiver parameters to this list, click on the Add Signal button on the active receiver control panel. The parameters are entered on the list and automatically highlighted.

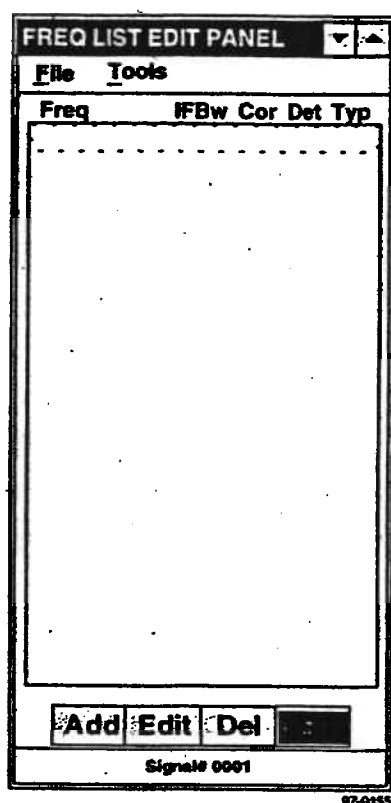


Figure 3-29. FREQ List Editor Window

The operator has several choices in using the Freq List Editor. Using options under the "File" pull-down menu, the operator may open a new file, open an existing Signal List file, import a file from other collection missions, rename a file using SaveAs, or close the Signal List file.

The operator has the option of manipulating the data on the Frequency List. Those functions are found on a pull-down menu, under "Tools", or accessed through the buttons on the bottom of the screen. The functions include Add, Editing, Del. The following paragraphs outline their operations.

3.4.1 FREQUENCY LIST ADD FUNCTION

Enter the "Add" function by using the "Tools" pull-down menu or by clicking on the "Add" button. See Figure 3-30.

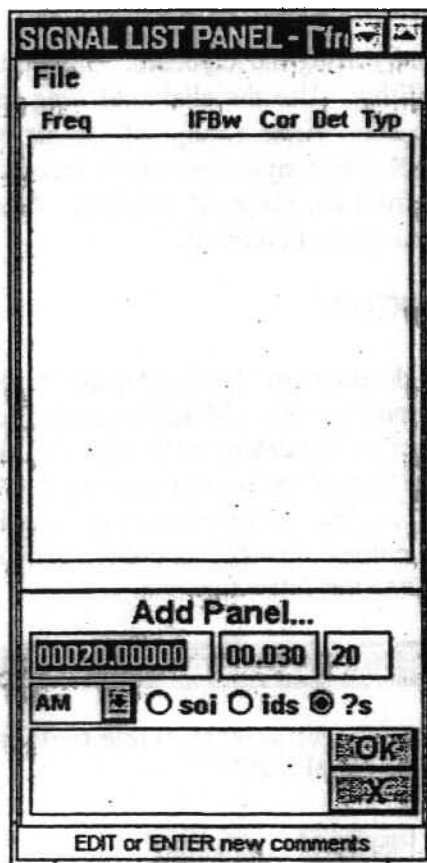


Figure 3-30. Frequency List Panel, Add Function

The Add Panel allows the user to enter the frequency, IFBW, COR value, detection mode, and type of signal. The bottom field is for entering comments. The meanings for abbreviations for the types of signals are as follows:

soi - Signal of Interest
ids - Identified Signal
?s - Unknown Signal

After entering the data, click on "OK" to add the data to the Signal List. Clicking on "X" causes the data to be ignored and exits the Add Panel.

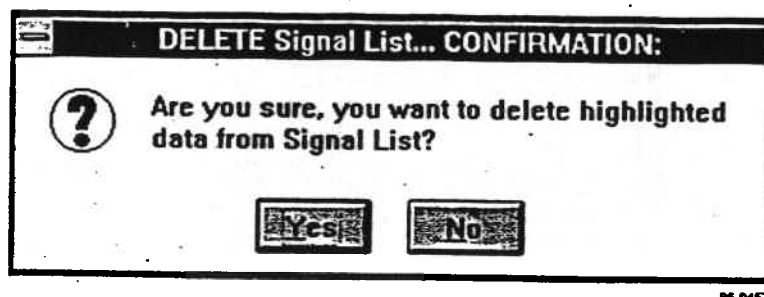
3.4.2 FREQUENCY LIST EDIT FUNCTION

Prior to editing the Signal List, highlight the data to be edited by clicking on that particular entry. Enter the "Edit" function by using the "Tools" pull-down menu or by clicking on the "Edit" button. A panel similar to the Add Panel appears on the screen. See Figure 3-30. The highlighted data appears in the fields. Select the field by double-clicking and change

the data by using the keyboard. The edit function also supports multiple entry editing. Use the click and drag function to select more than one entry to edit. After a range of signals have been highlighted, press the Control Key in conjunction with a mouse and click to de-select individual signals from the range (if desired). After editing is complete, click on "OK" to exit the Edit Panel.

3.4.3 FREQUENCY LIST DELETE FUNCTION

Prior to deleting any signal list entry, highlight the entry being deleted by clicking on that entry. Multiple entries are selected by using the click and drag function identically to the Add Function. Enter the "Del" function by using the "Tools" pull-down menu or the "Del" button. A pop-up window appears on the screen requesting confirmation prior to deleting the selected entries. See Figure 3-31. Click on "Yes" to delete the items, or "No" to exit the delete function.



06-0457

Figure 3-31. Frequency List Delete Function

3.5 TRACE UTILITY



CAUTION

The Trace utility creates a log file of all communications between the computer executing the WJ-RCS control software and the controlled receiver. This log file grows very rapidly during normal operations and will use up your hard disk space if it is kept running.



CAUTION

Only use the Trace utility when directed to do so by knowledgeable WJ personnel. If you feel that you have a need to use this utility, contact the factory at 1-800-WJ-HELPS for further guidance.

The Trace utility is a software debugging tool used in the development of the WJ-RCS software. It has limited end uses. Nevertheless, if you have called for assistance with an RCS problem, you may be asked to execute it by a WJ engineer. To do so, proceed according to the following steps:

1. Shut down the WJ-RCS application. Use Windows Explorer or File Manager to locate and open the SPT_COLL directory on the drive where the WJ-RCS program is installed.
2. Create a new file in the SPT_COLL directory named "~traceon.-on".
3. Start the WJ-RCS application and perform the operation of interest. This initiates the logging of communications.
4. Stop the WJ-RCS application. To view the log of communications that has occurred between the PC and the receiver, open the "trace.txt" file in the SPT_COLL directory. This can be done with a text editor or a word processor.

<p>NOTE: Subsequent runs of the Trace utility will overwrite the "trace.txt" file. To retain a log file for later viewing, save it under a new filename.</p>

5. Delete the "~traceon.-on" file from the SPT_COLL directory to disable this utility.

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READ_RCS.TXT

CURRENT RELEASED SOFTWARE STATUS

Name: WJ RECEIVER CONTROL SOFTWARE
 Suite-name: WJ-RCS
 SCD: 842328
 Version: 01.01.01
 Date: 09/16/97

Suite:

AUDIO PLAYBACK	02.01.02*	<SPAN_AUD>
CONTROL RX'S	01.02.01*	<WMCS>
FREQ LIST EDITOR	01.01.00	<FREQLIST>

To install WJ-RCS Suite into C: drive

- Run windows application program.
- Insert WJ-RCS SETUP disk into A: or B: disk drive.
- Use File function from Windows Program Manager to run SETUP application furnished in WJ-RCS SETUP disk.

WJ-RCS SOFTWARE PROFILES

Version: 01.01.00
 Date: 07/31/97

AUDIO PLAYBACK	02.01.01*
CONTROL RX'S	01.02.00*
FREQ LIST EDITOR	01.01.00*

Version: 01.00.00
 Date: 12/31/96

AUDIO PLAYBACK	02.01.00
CONTROL RX'S	01.01.00
FREQ LIST EDITOR	01.00.00

Name: AUDIO PLAYBACK
 Filename: SPAN_AUD.EXE
 Version: 02.01.02
 Date: 09/10/97

READ_RCS.TXT

Version: 02.01.02
Date: 09/10/97

1. Modify the application to handle an incompletd '.EVA' file without crashing. Prior to this modification, the program will crash if the '.EVA' file has incompletd data field.
2. Modify the program to not stop playing eventhough an invalid audio clip is encountered during the play by time, by track or by frequency. Prior to this modification, if an invalid audio clip is encountered, the application will cease its play operation and then wait for the user to re-activate the play button.

Version: 02.01.01
Date: 07/31/97

1. Fix single clip displayed cursor sizing bug. Prior to this fix, if audio file is very larger, the cross-hair cursor may not extend its horizontal lines throughout the whole picture.
2. Add 'Delete All Data' function to the Signal List's Tools menu. This function allows the user to quickly erase all data from the list.

Version: 02.01.00
Date: 12/31/96

1. Add a capability to playback audio data collected from Control Rx's application.
2. Replace Freq_List editor with a more comprehansive Signal_List editor panel. This editor panel is fully backward and forward compatible with existing signal list file structure, '.SIG'.

Version: 02.00.00
Date: 07/30/97

1. Add a capability to playback audio of a Spectral audio data file.
2. Allow access to a Frequency List data file.

Version: 01.01.00
Date: ../../..

1. Add 'Delete All Data' function to the Tools menu. This function allows the user to quickly erase all data from signal list file.

Version: 01.00.00
Date: ../../..

1. New release

Name: CONTROL RX'S
Filename: WMCS.EXE

Version: 01.02.01
Date: 09/10/97

Version: 01.02.01
Date: 09/10/97

1. Fix problem related to Open File command on the Receiver Control Panel. Prior to this fix, this command can not open mission file that is saved under the root directory. For example if open file "C:\test.acq" will result in the display of "Incompatible file format or file not available" error message. Eventhough this file is available and in in a proper format. If file is retrieved from a subdirectory then there is no problem.
2. Disable SAO, turn off audio recording and set Volume control to 0 if the related receiver control panel is closed or terminated. Prior to this fix, if closing the receiver control panel, the SAO, volume control and audio recording related to the panel will continuous function as they last set. This results in hearing more than one audio from multiple receivers.
3. Fix the problem related to audio recording activated while the receiver is in the Spectral or Priority mode. Prior to this fix, if audio recording is activated during the Spectral or Priority operation, the program will sometime generate a warning message saying that the receiver is not responding or the RF Pan display may display out of sync pan information and the signal strength updating ceases to continuously function.
4. Add defaulted audio clip status (,0) to the '.EVA' data file so that the file will be fully complied wiht the WJ's '.EVA' audio management data file format.

Version: 01.02.00
Date: 07/30/97

1. Allow high speed serial interface's baud rate selections. New baud rate selections include: 28.8 Kbaud, 38.4 Kbaud, 57.6 Kbaud and 115.2 Kbaud.
2. Support COMM 3 and COMM 4 serial interface selection.
3. Add GPIB I/O interface. The user can select GPIB or IEEE-488 interface in the System Hardware Configuration. This I/O interface option will only work with National Instruments GPIB PC card.
4. Allow the selection of communication timeout error via 'Options' menu in the System Hardware Configuration window. Timeout selection includes: 1sec, 2sec, 4sec, 8sec, 16sec, 32sec and 64sec. Communication timeout error determines how long the program will wait for a response from the receiver before declares communication error.
5. Remember the previous system setting (operation and screen setup). Application will automatically boot up with operation and screen setup as they were before the program was last exited.
6. Add Auto-Handoff function.
7. Capable of controlling WJ-871XA, WJ-8611, WJ-8700, WJ-8609A and WJ-8721 receivers.

READ_RCS.TXT

Version: 01.01.00
Date: 12/18/96

1. Add Manual HANDOFF capability. From Signal List panel, the user can handoff any signal from the list to any receiver by first selecting the receiver and then double-clicking on a signal from the list.
2. Add VXI I/O interface. The user could select VXI interface in the System Hardware Configuration. This VXI I/O will only work with slot 0 purchased from National Instrument.
3. Add Audio recording capability. Application will automatically detect if the hardware platform possessed multimedia capability. If it did then Audio recording function is available for the user to use.
4. Change the display of the Priority Search Pan for vertical lines to Bar graph style.
5. Previous version, Signal Monitor will not work with COMM Port 1. This problem is fixed with new released software version.
6. With the previous software and in multi-drop mode, SM does not work consistently. This problem is solved with the new released software.
7. Allow the user to select background color for SM Pan display.
8. New frequency added to the Freq List is now boundary check +/- half bandwidth instead of exact match checking.

Version: 01.00.00
Date: 10/30/96

1. New release

```
Name:      FREQ LIST EDITOR
Filename:  FREQLIST.EXE
Version:   01.01.00
Date:      07/16/97
```

Version: 01.01.00
Date: 07/16/97

1. Add 'Delete All Data' function to the Tools menu. This function allows the user to quickly erase all data from signal list file.

Version: 01.00.00
Date: 12/18/96

1. New release

WJ-RCS, Receiver Control Software
Version 01.01.01
09/16/97

FILE_RCS.TXT

Must consist of:

SPT_COLL				
directory				'spectral collection main
8609-xx.crx	1057bytes	04/08/97 10:21:12AM		'8609-XX receiver
personality configuration file				
8609a-xx.crx	1057bytes	02/04/97 11:50:52AM		'8609A-XX receiver
personality configuration file				
860x-xx.crx	1118bytes	02/04/97 11:50:48AM		'860X-XX receiver
personality configuration file				
860xa-xx.crx	1118bytes	02/04/97 11:50:44AM		'860XA-XX receiver
personality configuration file				
8611-xx.crx	813bytes	02/04/97 11:49:32AM		'8611-XX receiver
personality configuration file				
8629-xx.crx	1086bytes	02/04/97 11:49:52AM		'8629-XX receiver
personality configuration file				
8654-01.crx	1134bytes	02/04/97 11:50:40AM		'8654-01 receiver
personality configuration file				
8654-03.crx	1134bytes	02/04/97 11:50:34AM		'8654-03 receiver
personality configuration file				
8654-xx.crx	1134bytes	02/04/97 11:50:26AM		'8654-XX receiver
personality configuration file				
8700-xx.crx	1071bytes	06/17/97 11:19:54AM		'8700-XX receiver
personality configuration file				
8711-xx.crx	574bytes	03/14/97 09:43:32AM		'8711-XX receiver
personality configuration file				
8809-xx.crx	1086bytes	02/04/97 11:50:16AM		'8809-XX receiver
personality configuration file				
8809a-xx.crx	1086bytes	02/04/97 11:50:10AM		'8809A-XX receiver
personality configuration				
file_rcs.txt				
freqlist.exe	31761bytes	07/16/97 03:06:02PM		'frequency list editor file
read_rcs.txt				
span_aud.exe	74241bytes	09/10/97 04:41:14PM		'audio playback execution
file				
span_aud.hlp	38874bytes	11/20/96 08:18:16AM		'audio playback help file
wmcs.exe	433553bytes	09/10/97 02:36:28PM		'receiver control software
execution file				
wmcs.hlp	82084bytes	04/30/97 12:28:26PM		'receiver control software
help file				

