

1. Radar Data Interface (RDI) System

This section discusses the Radar Data Interface (RDI) System hardware.

RDI System Overview

The RDI System is a PC-based hardware/software system which records and plays back up to 8 serial data streams. This system is primarily used to record / playback data transmitted between radar sites and air route traffic control centers (ARTCC).

The RDI System is an upgrade replacement for the various other radar data capture boards currently used by the Air Force and the FAA, offering the users greater flexibility. It's serial interface supports asynchronous and High level Data Link Communications (HDLC) support as well as synchronous formatted data. RDI provides output file formats which can be read by radar performance software tools. The RDI System can support re-transmission of recorded data for use as radar input simulation, target tracking and display analysis.

Note: The RDI Transmit mode have been DISABLED. Transmit mode is generally used for repeating a test over and over or supplying data of a known content for testing.

The RDI System is designed to be a passive, non-intrusive radar data interface and is currently used by the U.S. Air Force and FAA at various operational ATC sites. The RDI System is comprises three hardware components: the RDI Board, the RDI Cable, the RDI Adapter. Recording software is required to operate the system.

RDI Board

The RDI Board (RDIB) is a full-length plug-in printed circuit board for the PC ISA bus. RDIB is approximately 13.4"L X 4.5"H and occupies one 16-bit PC expansion slot, and will not interfere with other add-in boards. RDIB hosts a Motorola MC68000 microprocessor, 768 Kbytes of onboard RAM, 4 Kbytes of dual ported RAM and an eight serial port VLSI chip. RDIB receives and transmits TTL level signals up to 19,200 baud per channel to its single DB44 high density connector.

RDIB requires it's operating programs, microcode, to be "downloaded" from the microcomputer recording program, RDI-PC. The microcode is written in C programming language and uses small Motorola 68000 assembly language programs for loading code and fault isolation tests (FIT).

The user interface, RDI-PC, is a Windows™ 3.1 application written in C programming language. The user configures RDIB for recording or transmitting (playback) using RDI-PC. Site information, flight information, weather data, and radar types defined via the RDI-PC menu system. The software is user-friendly and self-explanatory, with built-in, context sensitive help.

RDI Cable

The RDI Cable (RDIC) is a 50 conductor twisted pair shielded cable with high density DB44 connectors on both ends. RDIC connects the RDI Board with the RDI Adapter.

RDI Adapter

The RDI Adapter (RDIA) hosts RS232 and RS530 transceivers to convert the radar data signals to TTL levels compatible with RDIB for each of the eight radar channel interface ports. RDIA connects to RDIB via RDIC.

RDI Software

The RDI Software, RDI-PC.EXE, is a Windows™ 3.1 program that uses the RDI System hardware to collect message data from various types of radar processors. The software is designed to support the simultaneous data collection of up to 32 RDIBs. Normally, no more than eight (8) RDIBs are used in a single computer (ten RDIBs can be used), due to the limitations of the Microsoft Disk Operating System (DOS).

Key System Features

- Windows™ 3.1 user interface for easy operation (RDI-PC)
- Supports multiple RDI Boards in one microcomputer (ISA slot-limited, up to 32 boards maximum)
- Raw data and formatted data record/playback capability, with 8 to 16 bit word lengths, of up to eight (8) data channels simultaneously per board
- serial channels
- Data rates tested up to 19.2K baud.
- Built-in fault isolation tests
- Internal / External clocks
- Record/Playback independent of channel selection, signal inversion, clock selection, or clock inversion
- External interface box (RDIA) required which allows adaptation to/from RDI Board

RDIB Installation & Testing

What You Need to Know

RDIB occupies 2000h (2KB) of address space in upper memory, typically in the D0000-DFFFFh range (C0000-C6000h may also be used). This address range allows up to eight (8) discrete locations (up to 8 RDIBs).

Prior to installing the RDIB in the PC, the user will need to determine an available upper memory address space that can be dedicated for each RDIB installed. This determination is dependent upon several factors, such as system board, SCSI Adapters, other peripheral boards, memory managers, etc. You may need to examine the system board and all other peripheral boards to determine an available address space.

Disable Shadow RAM

If the system board allows for shadow RAM, then the shadow RAM must be disabled in the RDIB address space. If shadow RAM is enabled, the memory address space for the RDIB will be overwritten and unavailable for use by the RDI software.

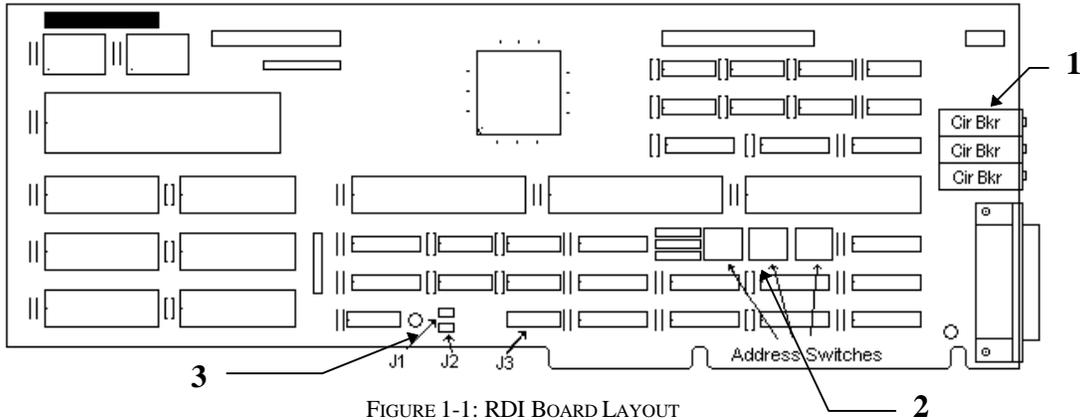


FIGURE 1-1: RDI BOARD LAYOUT

- RDIB Circuit Breakers.** The RDIB provides electrical power to the RDIA for the RS232/RS422 transceivers through the ISA bus interface and RDIC. The three 0.63A circuit breakers are on the +5V, +12V, and the -12V power lines of the RDIB's DB44 high density connector. These circuit breakers protect the RDIB and the PC system in the event of an electrical short originating in the RDIA or RDIC. Should an electrical short (fault) occur, the breaker(s) will trip, opening the electrical circuit. The RDIB will operate normally but the RDIA will be disabled. The tripped breaker will be visible by the extended push button. Once the fault is removed the breaker may be reset simply by pressing its push button.

Address Space:	A23-A20	A19-A16	A15-A12
D0000-D1FFFh	0000	1101	0000
D2000-D3FFFh	0000	1101	0010
D4000-D5FFFh	0000	1101	0100
D6000-D7FFFh	0000	1101	0110
D8000-D9FFFh	0000	1101	1000
DA000-DBFFFh	0000	1101	1010
DC000-DDFFFh	0000	1101	1100
DE000-DFFFFh	0000	1101	1110
Example dip switch settings:	 0 = off, 1 = on 0000	 0 = off, 1 = on 1101	 0 = off, 1 = on 1110

TABLE 1-1: RDIB ADDRESS SWITCH SETTINGS

1. RDIB Address Switches.

Switch Block A23-A20. Switch block A23-A20 provides memory addressing above 1MB, however, a DOS memory extender is required. Address ranges above 1MB are not used and are currently not supported. Future applications of the RDI System may make use of this option. Switch settings should all be set to zero to disable this option.

Switch Block A19-A16. Switch block A19-A16 provides memory addressing below 1MB. Switch settings may address RDIB in any of the upper memory blocks (UMB's), but conflicts with other PC subsystems frequently result. The D0000h is the recommended upper memory block to use for the RDIB.

Switch Block A15-A12. Switch block A15-A12 provides memory addressing within the designated UMB, with a resolution of 2KB. Switch settings may address a finer resolution but for successful operation the RDIB requires 2KB of address space.

2. RDIB Address Switches/Jumpers.

Jumper J1, LA+SA. J1 chooses which address lines create the "M16" signal on the RDIB. In order to have the LA address lines to create the "M16" signal, jumper J1 should be enabled (in). Removing the jumper (out), chooses the SA address lines to generate the "M16" signal (nonstandard). The ISA Bus specifications does not support the SA address lines generating the M16 signal. Experimentation is required to validate the SA option to work with the host microcomputer. Connect jumper J1 according to Table 1-2: rdib jumper connections. Default setting of jumper J1 is LA mode (jumper in).

Jumper J2, M16 Enabled. J2 sets RDIB in 8 or 16 bit mode. Throughput is greater in the 16 bit mode (jumper in) and is the recommended configuration for optimum performance. However, there may be instances where the RDIB in 16 bit mode may conflict with various other PC options, 8 bit mode may solve these conflicts. Connect jumper J2 according to Table 1-2: rdib jumper connections. Default setting of jumper J2 is 16 bit mode (jumper in).

Jumper J3, ISA IRQ. J3 sets the RDIB in Interrupt Driven Input/Output mode. These jumpers are not used and are currently not supported. Future applications of the RDIB may make use of this option. Jumper J3, ISA IRQ, should always be out to enable the Polled Input/Output mode. Connect jumpers J3 according to Table 1-2: rdib jumper connections. Default setting of jumper J3 is Polled I/O (jumper out - all positions).

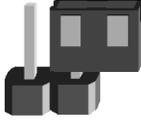
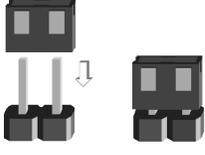
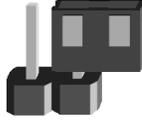
Computer	J1 LA+SA	J2 M16 Enabled	J3 ISA IRQ
Dolche 486	IN	IN	OUT (ALL)
UNISYS 386	OUT	IN	OUT (ALL)
8-bit SCSI	OUT	IN	OUT (ALL)
all others	IN	IN	OUT (ALL)
Example of jumper settings	 out	 in	 out

TABLE 1-2: RDIB JUMPER CONNECTIONS

Required Tools

You will need either a #2 Phillips or a nut driver to open the computer case and install the RDIB.

Installing the RDI Board

Install the RDI Board using the following *generalized* steps:

- STEP 1.** Power off the computer.
- STEP 2.** Using the appropriate tool, remove the computer cover to gain access to the ISA expansion bus slots.
- STEP 3.** Discharge static electricity by grounding yourself on the PC power supply case.
- STEP 4.** Select an empty full-length 16-bit ISA slot and remove the blank bracket at the end.
- STEP 5.** Carefully insert the RDI Board into the ISA slot noting any board guides at the end opposite the connector.
- STEP 6.** Attach the RDI Board bracket using the screw or nut from the previously removed blank bracket.
- STEP 7.** Replace the computer cover.

DOS Memory Managers

The RDIB occupies 2000h (2KB) of address space in upper memory, typically in the D0000-DFFFFh range. DOS memory managers (such as; EMM386, QEMM386, etc.) normally try to control access to upper memory. Memory managers controlling access to this memory range will conflict and prevent the successful operation of the RDI System.

It is necessary, to exclude the RDIB address space from use by any memory manager for each RDIB installed. Exclusion of RDIB address space from the memory manager depends upon the memory manager used. Normally this can be done in the CONFIG.SYS file, on the line that loads the memory manager. For example, if you are using MS-DOS EMM386 and the RDIB address space is D0000-D1FFFh you might use:

```
REM THE FOLLOWING LINE MAY BE USED IF YOU HAVE AN RDI BOARD  
DEVICE=C:\DOS\EMM386.EXE NOEMS X=D000-D1FF.
```

Windows™ 3.1

Windows normally tries to control access to upper memory, including D0000-DFFFFh address range. It is necessary to exclude the RDIB address space from use and control by Windows. This is done in the SYSTEM.INI file, in the [386ENH] section, on the EMMEXCLUDE line. For example, if the RDIB address space is D0000-D1FFFh you would use:

```
[386ENH]  
EMMEXCLUDE=D000-D1FF
```

Note: It is important that the excluded upper memory address range in the SYSTEM.INI file exactly match the range in the CONFIG.SYS file.

Restart the computer for the changes to CONFIG.SYS and SYSTEM.INI to take effect.

Testing

To test the RDI System, start the Windows™ based RDI software by double clicking the icon to display the RDI-PC dialog window. To test the status of the installed RDIB's, select BOARD ID from the UTILITIES MENU to obtain the board status.

Should the RDI software fail to "find" any valid RDIB's; ensure the proper memory manager and Windows™3.1 exclude statements are installed correctly.

If the upper memory range where the RDIB's are located are controlled by a memory manager, the RDI software will not be able to communicate with the RDIB's.

If the exclude statements are properly installed, then a hardware conflict (address, IRQ, or 16 bit mode) may be present with another board. Try changing jumpers J1 and J2 (J1 and J2 both in, J1 out and J2 in, J1 and J2 both out).

RDI Adapter Operation

Using the RDI Adapter

RDIA connects to the RDIB using the 44-conductor RDI Cable. The RDIC has a high-density DB-44 male connector on one end, and a high-density DB-44 female connector on the other end. Connect the male end of the cable to the RDIB and connect the female end of the cable to the RDIA.

Pin #	Name	Pin #	Name	Pin #	Name	Pin #	Name
1	COUT2	12	RD8	23	TD4	34	GND
2	RD2	13	TD8	24	RC4	35	COUT3
3	TD2	14	RC8	25	TC4	36	RD3
4	RC2	15	TC8	26	COUT7	37	TD3
5	TC2	16	COUT1	27	RD7	38	RC3
6	COUT5	17	RD1	28	TD7	39	TC3
7	RD5	18	TD1	29	RC7	40	COUT6
8	TD5	19	RC1	30	TC7	41	RD6
9	RC5	20	TC1	31	V _{CC}	42	TD6
10	TC5	21	COUT4	32	V _{EE}	43	RC6
11	COUT8	22	RD4	33	V _{SS}	44	TC6

TABLE 1-3: HD44F PINOUTS

The RDIC has a high-density DB-44 male connector on one end, and a high-density DB-44 female connector on the other end. Connect the male end of the cable to the RDIB and connect the female end of the cable to the RDIA.

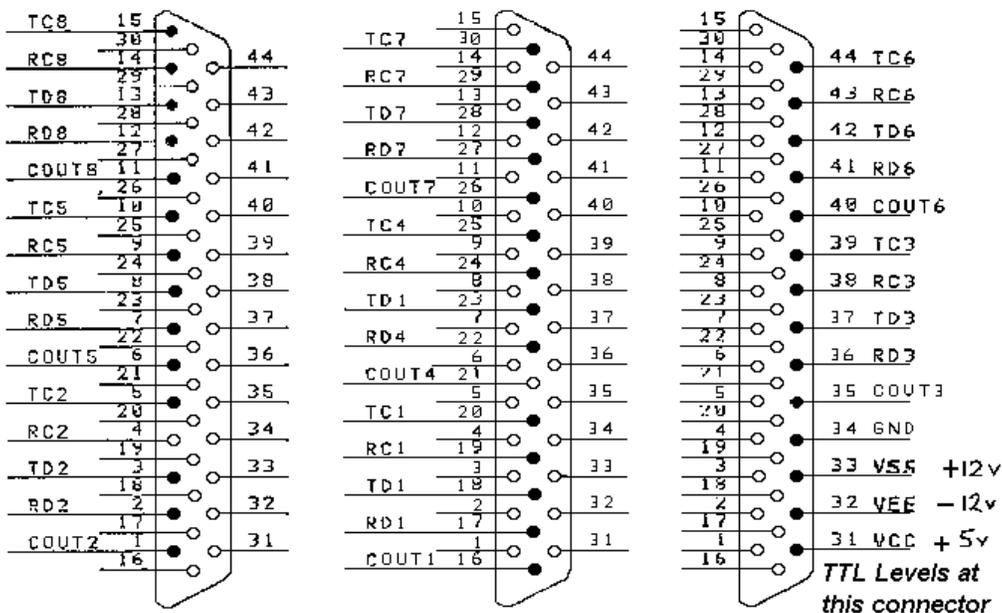


FIGURE 1-2: RDI BOARD I/O CONNECTOR, HD44F

RD	Receive Data
RC	Receive Clock
TD	Transmit Data
TC	Transmit Clock
COUT	Clock signal from 8 Channel board.
GND	Ground
V _{SS}	
V _{EE}	
V _{CC}	

TABLE 1-4: SIGNAL LEGEND

RDIA Mode Switches

The operating mode of the RDIA is determined by the two switches located in the upper-right front corner of the adapter labeled "RS-232/RS-530" and "Normal/Loopback".

RS-232/RS-530 Switch

The "RS-232/RS-530" switch determines the interface signal levels used on all 8 channels. The RDIA emulates a Data Communications Equipment (DCE) device, the same as a modem.

When in the "RS-232" position, RS-232 signal levels on the RS-232 standard pin-out are used for receive and transmit. When in the "RS-530" position, RS-422 signal levels on the RS-530 standard pin-out are used for receive and transmit.

See Table 1-5: EIA RS-232 (DCE) Signals and Table 1-6: EIA RS-530 (DCE) Signals.

EIA RS-232 (DCE)	
2	RX Data (In)
24	RX Clock (In)
7	Signal Ground
3	TX Data (Out)
17	TX Clock (Out)

TABLE 1-5: EIA RS-232 (DCE) SIGNALS

EIA RS-530 (DCE)	
2	RX Data + (In)
14	RX Data - (In)
24	RX Clock + (In)
11	RX Clock - (In)
7	Signal Ground
3	TX Data + (Out)
16	TX Data - (Out)
17	TX Clock + (Out)
9	TX Clock - (Out)

TABLE 1-6: EIA RS-530 (DCE) SIGNALS

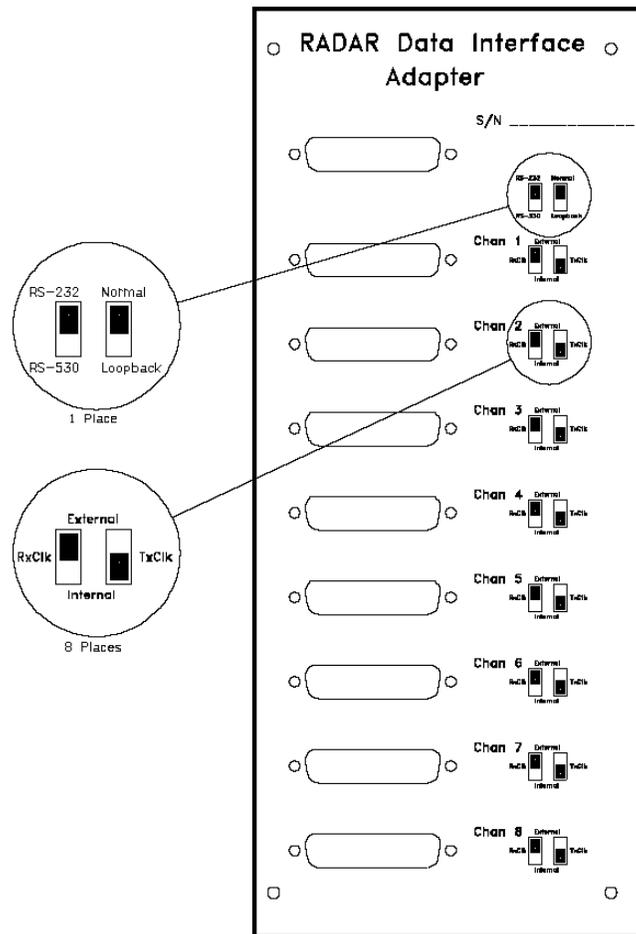


FIGURE 1-3: RDI ADAPTOR

Normal/Loopback Switch

The "Normal/Loopback" switch determines whether all 8 channels are connected normally or in a loopback test mode.

When in the "Normal" position, the channel receive and transmit signals are connected to the appropriate channel DB-25 female connector on the front of the adapter.

When in the "Loopback" position, the channel transmit signals are internally connected to the channel receive signals. Loopback is a diagnostic test to verify that the RDIB, RDIC, and RDIA hardware is operating normally.

Note: For proper loopback testing it is necessary to set the "RxClk" switches to "Ext" and the "TxClk" switches to "Int".

Channel Clock Switches

The source for receive and transmit clocks is determined by the channel's receive and transmit clock switches on the front of the adapter (See Appendix A).

Receive Clock Switches

Each channel's "RxClk" switch determines whether the receive clock source is external or internal to the adapter.

When in the "Ext" position, the channel receive clock source is external to the adapter and is incoming via the appropriate DB-25 female cable connector on the front of the adapter.

When in the "Int" position, the channel receive clock source is internal to the adapter, generated by the RDI Board's appropriate channel baud clock.

Transmit Clock Switches

The "TxClk" switch for each channel determines whether the transmit clock source is external or internal to the adapter.

When in the "Ext" position, the channel transmit clock source is the channel receive clock from the appropriate channel's DB-25 female connector on the front of the adapter.

When in the "Int" position, the channel transmit clock source is from the appropriate channel baud clock generated by the RDI Board.

2. Radar Data Interface (RDI) Software

This section discusses the Radar Data Interface (RDI) Record Software used for recording radar data to a microcomputer storage device (i.e., hard drive, removable media drive, etc.).

The RDI-PC Program

RDI-PC.EXE is a Microsoft Windows™ program that uses the Radar Data Interface Board (RDIB) to collect radar message data from various types of radar processors. The software supports the simultaneous collection of up to nine (9) RDI Boards. In actuality, no more than 8 RDI Boards are used in a single computer. The program can either receive radar data from or transmit radar data to the RDI Boards.

RDI-PC Command Line Start

The RDI-PC program can automatically start a session when run by placing several switches on the RDI-PC command line. The user must first set up a recording session as described in the following paragraphs and save it.

The RDI-PC command line format is as follows:

```
RDI - PC / START / SESSION = <SESSION FILENAME >
```

The user must manually enter/type the RDI-PC program name, option switches, and session data filename on the RDI-PC command line.

RDI-PC Command Line	Description
RDI - PC	<ul style="list-style-type: none"> • RDI - PC radar data recording executable program (RDI-PC.EXE) command • The user may specify the path (directory) where RDI-PC.EXE is located: ex) C:\RDI\ • The first position on the RDI-PC command line
/ START	<ul style="list-style-type: none"> • Option switches can be in either upper or lower case (not case-sensitive) • Option switches are identified by a leading '/' (forward slash). • The /START option is used to automatically run the RDI-PC radar data recording program. • The /START option may be left off causing the program to only load the session but not automatically run it. • The session switch <u>must</u> be included with the /START switch.

RDI-PC Command Line	Description
/SESSION = <SESSION FILENAME>	<ul style="list-style-type: none"> • <SESSION FILENAME> is the session path and filename previously saved • Includes the DOS path if radar data file is not located in the current directory. • May use an absolute DOS path = <drive:><\DOS path><filename>: ex) D:\RDI\SESSION1\SESSION1.SSN • May use a relative DOS path = <\DOS path><filename>: ex) \RDI\SESSION1.SSN • The /START parameter may be left off causing the program to only load the session but not automatically run it.
/RXBOTH	<ul style="list-style-type: none"> • /RXBOTH option records both raw data and formatted data from the same channel. • This option will cause all receive channels to save raw and formatted messages. • Files sizes can become very large using this option.

TABLE 2-1 RDI-PC COMMAND LINE OPTIONS

Recommendation: The user should be familiar with DOS commands and the file/directory structure.

A RDI-PC command line might look like this:

```
RDI - PC / START / SESSION = D:\SESSION1\WITHARSR.SSN<↵ENTER>
```

<p>Caution ! Automatically running the RDI-PC program from the command line will override any warnings the program may generate.</p>

The warning:

DATA WILL NOT BE SAVED TO FILE

will be displayed regardless of whether the program is run from the command line.

RDI Session window

A RDI Session is a set of user selections that either uses the RDI Boards (RDIB) to receive or transmit radar data. Only the settings for the current mode is saved when the program is exited or the Session Menu items are used.

Note: The RDI Transmit mode have been DISABLED. Transmit mode is generally used for repeating a test over and over or supplying data of a known content for testing.

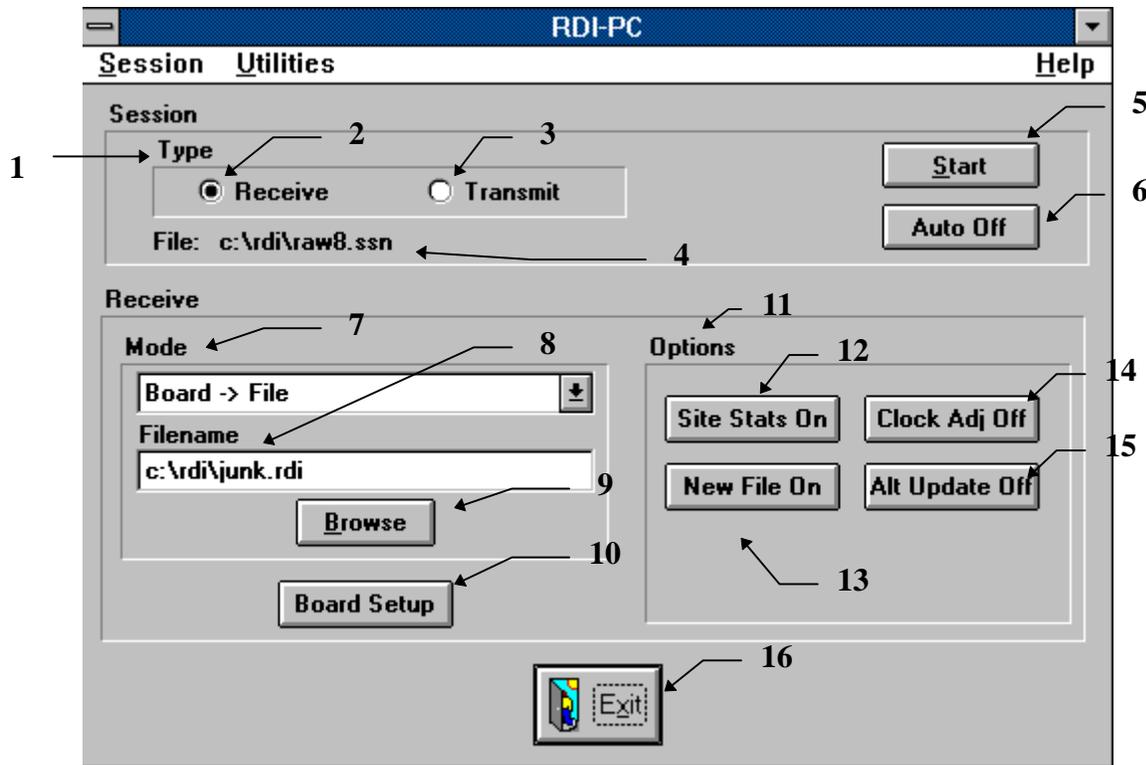


FIGURE 2-4: RDI-PC MAIN DIALOG - RECEIVE SESSION

1. **RDI Session Type.** Select the RDI session type by mouse clicking on the appropriate radio button. There are two types of RDI sessions, RECEIVE or TRANSMIT.
2. **Receive Session.** The receive session is used to collect radar data using the RDI Boards. Normally, the data is saved to a file for later processing.
3. **Transmit Session.** The transmit session is used to transmit previously recorded data from a receive session. This mode is generally used for repeating a test over and over or supplying data of a known content for testing.

Note: The RDI Transmit mode have been DISABLED. Transmit mode is generally used for repeating a test over and over or supplying data of a known content for testing.

4. **RDI Session File.** The RDI Session File is the filename of the current session. The user can not directly change the session file. This filename is updated to display the current session file that is active.
5. **Start Button.** Clicking on the START BUTTON will immediately start the session, recording or transmit. If the button is grayed and not selectable, it is usually because the session has not been completely set up. At least one board must be set to an address and at least one channel must be active.

6. **Auto Run Button.** Clicking on the AUTO RUN BUTTON will allow the user to start the program based on a start and/or stop time and date. The start and stop time may be used in any combination: just a start time, just a stop time, or both a start and a stop time.

Note: If the AUTO RUN BUTTON is grayed and not selectable, it is usually because the session has not been completely set up.

7. **RDI Session Mode.** The RDI Board Mode is used to select the type of receive session.

Board -> File. This receive mode collects data from the RDI boards and saves it in the specified file. During the collection process various on screen data is presented to the user. Refer to the recording paragraph for further details.

Board -> Screen Only. This receive mode processes received data from the RDI boards and presents various on screen data to the user. No data is saved to a file. The FILENAME CONTROL and BROWSE BUTTONS will be disabled when this mode is selected. This mode is intended for checking a session's setup and for maintenance purposes where a data file for post processing is not required. Not saving data to a file is the only difference between this mode and the BOARD -> FILE mode.

8. **Filename Control.** The FILENAME CONTROL contains the location (DOS path) and the user selected filename of the radar data recording file. The path and filename can be entered manually or the BROWSE BUTTON can be used to navigate through the directory tree. This control is disabled in the BOARD -> SCREEN ONLY mode.
9. **Browse Button.** The BROWSE BUTTON displays the Windows™ file selection dialog window. The user can change directories and enter a filename to save radar data to.
10. **Board Setup Button.** This BOARD SETUP BUTTON displays the Receive Board Setup dialog. The board setup dialog is where the installed RDI Boards are assigned board numbers. It also provides access for configuring the individual RDI Board configurations and information.
11. **Options.** The Options buttons are used to set up user preferences for the receive session. Various options can be turned on or off, and parameters can be adjusted that affect data processing during the record process.
12. **Site Statistics Button.** The SITE STATISTICS BUTTON displays the site statistics setup dialog window. The SITE STATISTICS BUTTON will indicate the PROCESS SITE STATISTICS check box status. The button will read SITE STATS ON if processing site statistics or SITE STATS OFF if not processing site statistics.
13. **New File Button.** The NEW FILE BUTTON displays the New file Setup dialog window. The NEW FILE BUTTON will indicate the file handling

status; the button text will display `NEW FILE ON` if a new radar data file is selected, otherwise it will indicate `NEW FILE OFF`.

14. **Clock Adjust Button.** The `CLOCK ADJUST BUTTON` displays the Clock Adjust Setup dialog window to set the RDIB clock adjustment interval. The `CLOCK ADJUST BUTTON` will read `CLOCK ADJ ON` if the RDIB clock is updated from the microcomputers internal clock or `CLOCK ADJ OFF` if no clock adjustment is set.

Recommendation: The RDIB clocks tend to drift apart from one another. If more than one RDIB is used for recording, it is recommended that while recording data, the `CLOCK ADJUST BUTTON` be set on to synchronize the RDIB(s) to the microcomputer clock daily or at two (2) hour intervals.

15. **Alternate Update Button.** The `ALTERNATE UPDATE BUTTON` displays the Alternate Update Message dialog window. While receiving data, the information on the display is updated when a particular type of radar message is received. Normally, the search RTQC (SRTQC) message is used to trigger the display update. The `ALTERNATE UPDATE BUTTON` will read `ALT UPDATE ON` if any radar is being updated by a message type that is not the default, otherwise `ALT UPDATE OFF` is displayed.
16. **Exit Button.** The `EXIT BUTTON` will terminate and exit the RDI-PC program. A prompt will be displayed to save the session if it has been modified.

RDI Session Menu

Use the RDI Session Menu to load and save RDI Sessions.

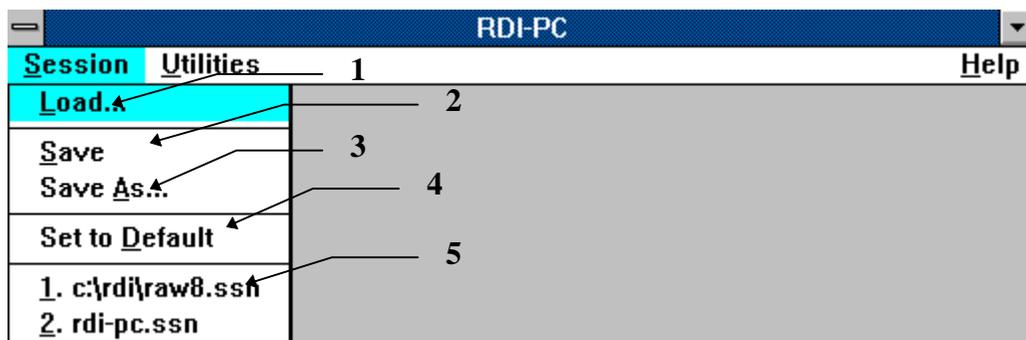


FIGURE 2-5: SESSION MENU

RDI Session Menu Items

1. **Load Session.** Selecting the `LOAD SESSION` menu item displays the file selection dialog window. Previously saved sessions may be loaded. These files have the `.SSN` file extension. The user is prompted to save

the active session if any user selections have been modified. The YES BUTTON will save the active session and then load the selected new session file. The NO BUTTON will not save the active session and then load the selected new session. The CANCEL BUTTON will not the active session and to return to the main dialog window without loading the selected new session.

2. **Save Session.** Selecting the SAVE SESSION menu item saves the active session's user selections to a file with an .SSN file extension. If the file already exists, the user will be prompted to select another filename or overwrite the existing file. SAVE SESSION will overwrite the previous session file without any further prompts.
3. **Save As Session.** Selecting the SAVE AS SESSION menu item saves the active session's user selections to a new file with a new name. If the file already exists, the user will be prompted to select another filename or overwrite the existing file. The new filename is the active session.
4. **Set to Default Session.** Selecting the SAVE AS SESSION menu item resets all user selections of the active session to a default of blank or NOT USED. The active session information is not saved with the new session information until the session save option is pressed.
5. **Session File List.** Selecting the SESSION FILE LIST menu item The last five recent session loaded will be listed in the session list and can be loaded simply by selecting one. The user is prompted to save the active session if any user selections have been modified. The YES BUTTON will save the active session and then load the selected new session file. The NO BUTTON will not save the active session and then load the selected new session. The CANCEL BUTTON will return to the main dialog window without saving the active session or loading a new session.

RDI Utilities Menu

Use the RDI Utilities Menu to perform RDIB testing and data file conversions.

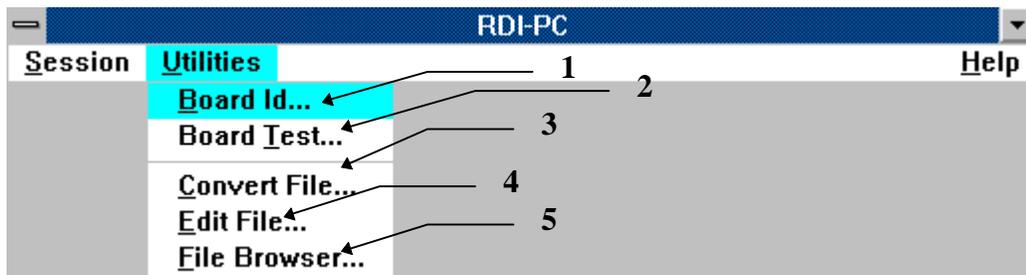


FIGURE 2-6: RDI UTILITIES MENU

RDI Utilities Menu Item

1. **RDIB Id.** The RDI BOARD ID menu item shows the memory addresses of all currently installed RDI Boards and their current status in the RDIB Status dialog window.
2. **RDIB Test.** The RDI BOARD ID menu item shows the memory addresses of all currently installed RDI Boards and their current status in the RDIB Status dialog window.
3. **File Convert.** See the File Convert section.
4. **File Edit.** See the Configuration section.
5. **File Browser.** See the Configuration section.

RDIB Status Dialog Window

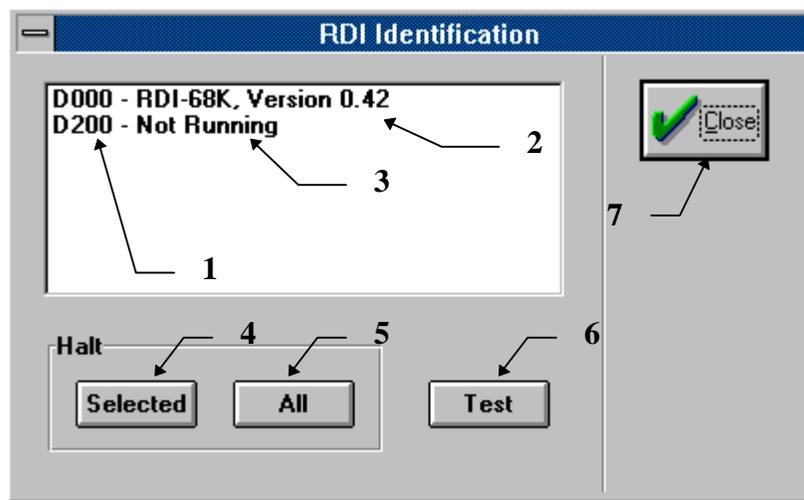


FIGURE 2-7: RDI BOARD IDENTIFICATION DIALOG

The RDIB Status dialog window detects all RDI Boards installed in the computer and displays each RDIB address and status is displayed.

RDIB Status	Description
Idle	The RDI Board is idle if only the microcode version string, RDI-68K, VERSION 0.42 is displayed after the hexadecimal memory address (D000, D200, etc.).
Halted	The RDI Board is halted if the NOT RUNNING string is displayed after the hexadecimal memory address (D000, D200, etc.).
Receive	The RDI Board is receiving data if the RX ONLY string is displayed after the version string.
Transmit	The RDI Board is transmitting data if the TX ONLY string is displayed after the version string.

FIGURE 2-8: RDI BOARD STATUS

1. **RDIB Address.** The hexadecimal memory address of all RDIB Boards installed in the host computer.
2. **RDIB Microcode Version.** The RDIB Microcode Version level is displayed following the hexadecimal memory address.
3. **RDIB Status.** The RDIB status is displayed.
4. **RDIB Halt - Selected Button.** The microcode on each RDIB can be stopped by selecting the RDIB address from the display list and then pushing the SELECTED BUTTON in the Halt group. Multiple boards can be selected by holding down the <SHIFT> or <CTRL> keys and simultaneously selecting the RDIB addresses from the display list.
5. **RDIB Halt - All Button.** The ALL BUTTON stops all installed RDIB microcode execution. Halting the board will force the software to be downloaded again.
6. **RDIB Test Button.** The TEST BUTTON displays the RDIB Test dialog window.
7. **Close Button.** The CLOSE BUTTON closes the RDIB Status dialog window.

RDIB Test Dialog Window

The RDIB Test dialog window allows several board level tests to be initiated by the user.

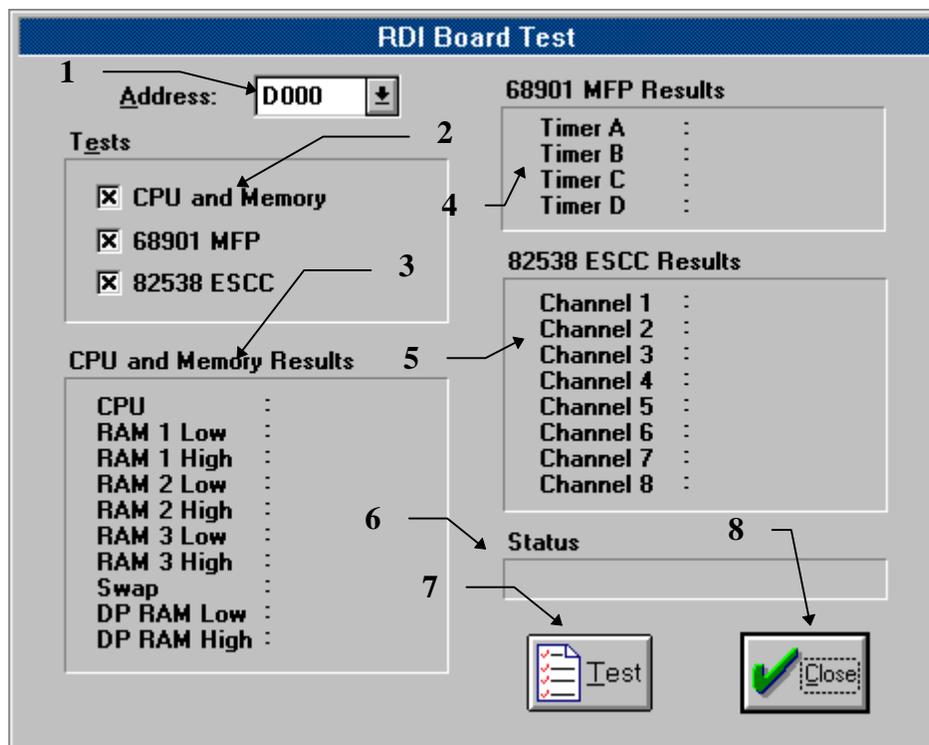


FIGURE 2-9: RDI BOARD TEST DIALOG

1. **RDIB Address List.** The user should first select the address of the board to test.
2. **RDIB Tests.** Select the desired tests by clicking on the check boxes in the Tests group. Normally, all tests should be run.
 - CPU and Memory Test.** This test checks the Motorola 68HC000-16 microprocessor chip, 7132 CMOS dual port RAM chip, and 68128 128Kx8 CMOS static RAM chip. Report any failures in the tests.
 - 68901 MFP Test.** This test checks the 68901 Multi-Function Processor (MFP) chip. Report any failures in the tests.
 - The 82538 ESCC Test.** This test checks the 82538 ESCC (Enhanced Serial Communications Controller) chip and requires a loopback adapter plug for successful completion. A RDIA box with the NORMAL/LOOPBACK SWITCH in the LOOPBACK position can be substituted for a loopback plug. For proper loopback testing, using the RDIA, it is necessary to set the "RxClk" switches to "Ext" and the "TxClk" switches to "Int". Report any failures in the tests.
3. **CPU and Memory Results.** The software invokes diagnostic communication of bit patterns across the expansion bus, onto the RDIB, to the CPU and memories, and back again. The pass/fail result is displayed next to the label on the RDIB Test dialog window.
4. **68901 Multi-Function Processor Results.** The software invokes diagnostic communication of bit patterns across the expansion bus, onto the RDIB, to the 68901, and back again. The pass/fail result is displayed next to the label on the RDIB Test dialog window.
5. **82538 Enhanced Serial Communications Controller Results.** Bit patterns are written by the microcomputer across the expansion bus, thru the dual port RAM, thru the CPU, thru the ESCC, out to the loopback plug (or RDIA), and then are read back thru the same path back to the microcomputer. The pass/fail result is displayed next to the label on the RDIB Test dialog window.
6. **Status Progress Bar.** The status progress bar displays the relative completion of each test.
7. **Test Button.** The TEST BUTTON initiates the selected RDIB tests as checked in the RDIB Tests group box.
8. **Close Button.** The CLOSE BUTTON closes the RDIB Test dialog window.

Receive Board Setup Dialog window

Receive Board Setup

Info Clipboard

Show Boards

1-8
 9-16
 17-24
 25-32

No.	Address	Status	No.	Address	Status
1	D000 <input type="button" value="Set"/>	<input checked="" type="radio"/> On <input type="radio"/> Off	5	None <input type="button" value="Set"/>	<input type="radio"/> On <input checked="" type="radio"/> Off
2	D200 <input type="button" value="Set"/>	<input checked="" type="radio"/> On <input type="radio"/> Off	6	None <input type="button" value="Set"/>	<input type="radio"/> On <input checked="" type="radio"/> Off
3	None <input type="button" value="Set"/>	<input type="radio"/> On <input checked="" type="radio"/> Off	7	None <input type="button" value="Set"/>	<input type="radio"/> On <input checked="" type="radio"/> Off
4	None <input type="button" value="Set"/>	<input type="radio"/> On <input checked="" type="radio"/> Off	8	None <input type="button" value="Set"/>	<input type="radio"/> On <input checked="" type="radio"/> Off

Board Functions

 No.

FIGURE 2-10: RECEIVE BOARD SETUP DIALOG

1. **Show Boards Group.** Click on the board number range to display the desired set of boards.
2. **Set Address Button.** The SET BUTTON for each board number assigns an installed board to a hexadecimal address. The user should understand the difference between the board address and the board number. The board address is set via the dip switches on the RDI Board itself. The board number is the number that tag each radar message that is collected by that board. It is strictly a software function used to identify data with a board in a multi-board system. For clarity, The user should assign board numbers in sequence starting with number 1, which board number is used with a particular address is not significant. A board address can only be assigned to one board number. Change board address assignments by first changing the current assignment to NONE and then assigning another address to the board number -- all site and configuration data will be lost. Use Info Clipboard to copy and paste the information to the new board.
3. **Status Switch.** The associated ON SWITCH or OFF SWITCH for each assigned board determines whether that board will be used in the session. The ON SWITCH selected includes that board in the receive session. The OFF SWITCH selected disables the board and no data is collected from that board. If an address is assigned to a board number,

and the ON SWITCH and OFF SWITCH are both disabled, this is an indication that there are no active channels for that board configured. The user should set up each RDIBs configuration by pressing the CONFIG INFO BUTTON.

4. **Flight Info Button.** The FLIGHT INFO BUTTON displays the Flight Data Information dialog window. All of the edit controls in this dialog are text fields. The user should enter the appropriate data for the recording session. This information is saved to all files recorded in the session.

The screenshot shows a dialog box titled "Flight Data". It contains the following fields and controls:

- Collection Point :** A text input field.
- Evaluation Type :** A text input field.
- Flight Level :** A text input field.
- Mode 3/A :** A text input field.
- Mode 2 Code :** A text input field.
- Remark 1 :** A text input field.
- Remark 2 :** A text input field.
- Remark 3 :** A text input field.
- Aspect :** A text input field.
- D-Value at Site :** A text input field.
- D-Value at End :** A text input field.
- OK :** A button with a green checkmark icon.
- Cancel :** A button with a red X icon.

FIGURE 2-11: FLIGHT DATA DIALOG

Board Functions

Board No.

The board number selected in this combination list box will be the target of the other buttons in the board functions group. When a board number is assigned to an address, it becomes the current selection.

Site Info Button

Click on the SITE INFO BUTTON to bring up the site information dialog window. This dialog contains edit controls to entering a site name and site identification strings for each radar. The radar type for each site is displayed for information only. By using the board combo box or board scroll buttons, site information can be viewed/edited for all assigned boards. This information is saved to all files recorded in the session.

Config Info Button

Click on the CONFIG INFO BUTTON to bring up the configuration information dialog. This dialog is used to set up each RDIB for data collection. This information is saved to all files recorded in the session.

Halt Button

Pressing the HALT BUTTON will terminate any program running on the selected RDIB and cause it to be downloaded the next time the board is used.

Test Button

Pressing the TEST BUTTON to display the TEST DIALOG WINDOW.

Info Clipboard Menu

The information clipboard provides a method of saving and moving the data associated with the flight, site, and RDIB configuration information. These clipboard items are duplicates of the information in the corresponding Board Function buttons. When the Receive Board Setup dialog window is first entered, the clipboard is initialized to the default state. The user can enter data into the clipboard and then paste it into the board information, or the user can copy the information from current board data. When the Receive Board Setup dialog is exited, the clipboard is destroyed.

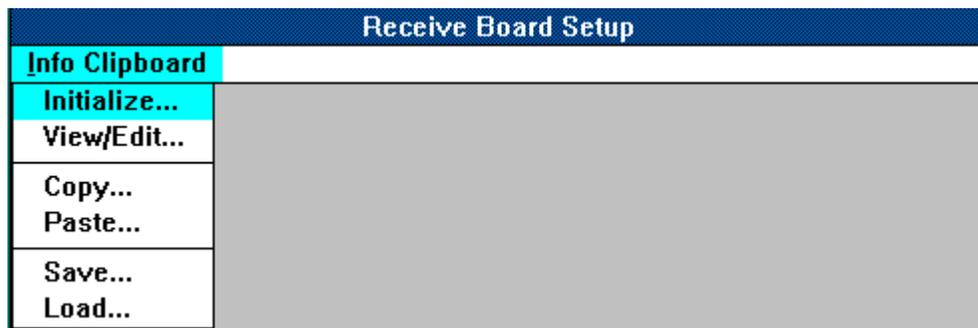


FIGURE 2-12: INFO CLIPBOARD MENU

Initialize

Selecting the INITIALIZE menu item will bring up the Info Clipboard dialog. The user can then select which items to initialize.

View/Edit

Selecting the VIEW/EDIT menu item will bring up the View/Edit Clipboard dialog window. The user can then view and/or edit the information stored in the clipboard items.

Copy

Selecting the COPY menu item will allow the user to select and copy items for the designated board to the clipboard.

Paste

Selecting the PASTE menu item will allow the user to select and paste items from the clipboard to the designated board.

Save

Selecting the SAVE menu item will allow the user to select and save to a file any desired clipboard items.

Load

Selecting the LOAD menu item will allow the user to load previously saved clipboard items into the clipboard. After a clipboard file is selected, only those items in the file will have their corresponding check boxes enabled. If an item is not contained in the clipboard file, any data already in the clipboard is not changed.

Configuration Data Window

Click on the CONFIG INFO BUTTON to bring up the configuration information dialog. This dialog is used to set up each RDIB for data collection. This information is saved to all files recorded in the session.

Configuration Data

Board: 1

Radars

No.	Type
1	CD 1
2	SRR
3	SOCC
4	MAR 1
5	RAW
6	NOT USED
7	NOT USED
8	NOT USED

Channels

No.	Radar	Status		Baud Clock	Data Pol		Clock	
		On	Off		Norm	Inv	Norm	Inv
1	1	<input type="radio"/>	<input type="radio"/>	Ext	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
2	1	<input checked="" type="radio"/>	<input type="radio"/>	Ext	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
3	2	<input checked="" type="radio"/>	<input type="radio"/>	Ext	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
4	3	<input checked="" type="radio"/>	<input type="radio"/>	Ext	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
5	4	<input checked="" type="radio"/>	<input type="radio"/>	Ext	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
6	4	<input checked="" type="radio"/>	<input type="radio"/>	Ext	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
7	5	<input checked="" type="radio"/>	<input type="radio"/>	Ext	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
8	8	<input type="radio"/>	<input checked="" type="radio"/>	Ext	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

Baud Clocks

A	Off
B	Off

Buttons: OK, Cancel, Toggle All

FIGURE 2-13: CONFIGURATION DATA DIALOG

RDIB List

By using the board combo box or board scroll buttons, configuration information can be viewed/edited for all assigned boards.

Radar - Type Assignment

This combo box is used to assign the appropriate type of radar processor to each radar that is being used. If a radar number is not being used, it should be set to "NOT USED". This will allow post-processing programs using the collected files to know which sites are being used. The ASR-9 format is not currently tested. This radar type should not be used.

Radar Channel Assignment

These combo boxes are used to assign the channels to the appropriate radars. The user select the radar that the channel is assigned to. Any unused channels should be set to a radar that is not used. By doing this, any user post-processing the recorded file will be able to determine the recording configuration correctly.

Status Switch

The user should click on the "On" radio button to record a radar's channel and "Off" if the user does not want to record the channel. If a channel is assigned to a radar of the type "NOT USED", the channel will be off and the buttons disabled.

Channel Baud Clock Assignment List

Normally the channel clock is provided externally, i.e. by the modems. Therefore, the user should select the EXT item in the combo box. If the RDI Board must provide the clock, the user must first set one of the two baud clocks to the proper baud rate. This will cause that clock to appear in the baud clock combo box where it can be selected.

Data Poland Clock Pol Switch

The DATA POLand CLOCK POL radio buttons are used to set the polarities of each channel. The polarity for RS-530 channels will usually be NORM (normal), while the polarity for RS-232 channels will be INV (inverted).

Note: Due to different equipment and wiring at sites, the user may have to try all combinations of polarity, i.e. normal data + normal clock; inverted data + inverted clock; normal data + inverted clock; and inverted data + normal clock.

The user can use the BOARD -> SCREEN ONLY in receive mode to check and verify the setup. The setup is correct when data appears to be normally collected.

Toggle All Button

Click on this button to change the state of all data and clock polarities for all channels.

Baud Clock Generators

The RDIboard has two baud clock generators which can be used to provide clock signals for receiving data. Normally, these clocks are set to OFF since the clock is provided externally.

To use the clocks select the desired baud rate from the appropriate combo box; clock A or clock B designator. The clock designator will then be available in all channel - baud clock combo boxes for assignment.

Auto Run Dialog window

When the auto run dialog window is first displayed, the times and dates are set to the current time and date and both start and stop times are not checked. Enter the desired times and dates and click on the appropriate start or stop time and/or check the start or stop boxes.

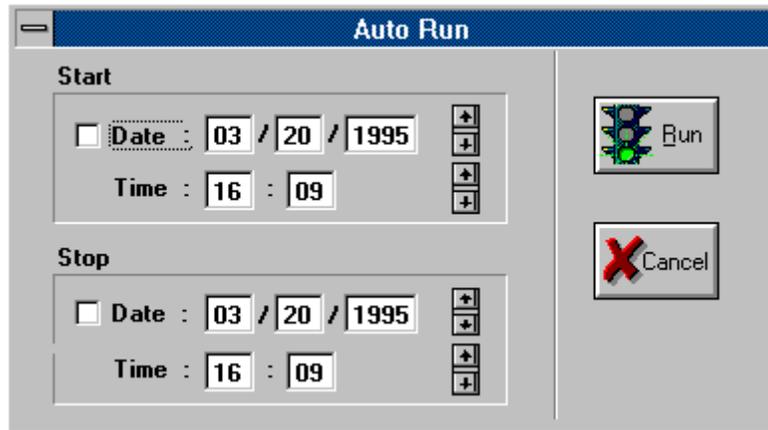


FIGURE 2-14: AUTO RUN DIALOG

Click on the RUN BUTTON to start the timed session or to the CANCEL BUTTON to return to the main dialog window. If the RUN BUTTON is clicked, a dialog showing the start time and date will be displayed. When the computer clock reaches this date and time the session will automatically begin.

Note: At least one board must be set to an address and at least one channel must be active.

Site Statistics Dialog window

Click on this button to bring up the site statistics setup dialog. The site statistics button on the main dialog will indicate the PROCESS SITE STATISTICS check box status. The button will read SITE STATS ON if processing site statistics or SITE STATS OFF if not.

Site Statistics

Process Site Statistics

Scan Average

No of Scans:

Altitude Cell (100s ft)

	Start (>=)	End (<)
<input checked="" type="radio"/> Use Common	<input type="text" value="-12"/>	<input type="text" value="999"/>
<input type="radio"/> Use Individual		
Reinforcement	<input type="text" value="-12"/>	<input type="text" value="999"/>
Height Error	<input type="text" value="-12"/>	<input type="text" value="999"/>
Search Runlength	<input type="text" value="-12"/>	<input type="text" value="999"/>
Beacon Runlength	<input type="text" value="-12"/>	<input type="text" value="999"/>

FIGURE 2-15: SITE STATISTICS DIALOG

Process Site Statistics

Click on this check box to turn site processing on or off.

Note: Site statistics only display information on full scans. This includes the message total items. Therefore the messages before the first scan marker and the messages after the last scan marker are not counted.

Scan Average

The user can enter the number of scans used to compute the site statistics in the “No. of Scans” edit control. The scan marker can be set using the ALT UPDATE BUTTON on the main dialog window. After the RDI Record program has received the designated number of scans, the statistics are computed and displayed. The internal working variables are then cleared and processing for the next average is started.

Altitude Cell

Altitude cells can be specified for various site statistics. If the user selects the USE COMMON switch, then the common cell range will be used for all appropriate statistics. If the user selects the USE INDIVIDUAL switch, then the individual cell ranges are used. The user should specify the cell ranges in the appropriate edit fields.

Clock Adjust Dialog window

The CLOCK ADJUST BUTTON on the main dialog will indicate the ADJUST RDI CLOCK EVERY (HH:MM:SS) check box status. The button will read CLOCK ADJ ON if the RDIB clock is being updated from the microcomputer's internal clock.

Set the desired time in hours, minutes, and seconds in the time controls. The thumb wheel can be used to increment or decrement the section of time after that section has the cursor.

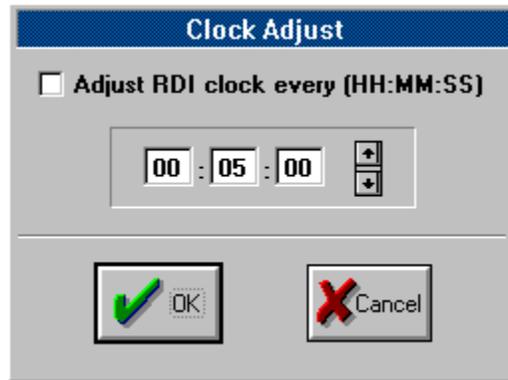


FIGURE 2-16: CLOCK ADJUST DISPLAY

Create New File Dialog window

The NEW FILE BUTTON on the main dialog window will read NEW FILE ON if a switch other than OFF is selected. When automatically creating new radar data files, the filenames will have a system predefined format as follows:

YJJTTTT.rdi
Y = the last digit of the year
JJJ = the year julian date
TTTT = the time in 24 hour format

Create New File

When

Off

On the Half Hour

On the Hour

Elapsed DDD HH:MM = 000 02 : 00

File Size (KB) > 1000

Destination

Specified Directory

d:\temp\

Directories for Day of Week

OK

Cancel

FIGURE 2-17: NEW FILE DISPLAY

A check for a filename conflict is done when the recording session is initially started. If the filename already exists, the date/time is incremented by one minute and rechecked until a unique filename is made.

During the recording session, a filename conflict will cause the recorded data to be saved to the previous file. The check will be accomplished again at the next new file time. This is done to prevent any possible loss of data due to excessive time spent trying to create new files. Files created using this option will all have the same start time in the flight information. This is to keep the message times sequential in all the files and allows appending a series of these files together for processing.

Off

Selecting the OFF switch will cause all radar data to be saved to the filename displayed in the main dialog window. The controls in the Destination group will be disabled.

On the Half Hour

Selecting the ON THE HALF HOUR switch will cause a new file to be created on each half hour. If the recording is started at 3:45, a new file will be started at 4:00, the next at 4:30, etc.

On the Hour

Selecting the ON THE HOUR switch will cause a new file to be created on the hour, each hour. If the recording is started at 3:45, a new file will be started at 4:00, the next at 5:00, etc.

Elapsed DDD HH:MM

Selecting the ELAPSED DDD HH:MM switch will cause a new file to be created after DDD days, HH hours, and MM minutes from the start time of each file.

File Size (KB) >

Selecting the FILE SIZE (KB)> switch will cause a new file to be created after the file size exceeds the specified number of kilobytes. A kilobyte is determined as 1000 bytes.

Specified Directory

Selecting the SPECIFIED DIRECTORY switch in the Destination group will cause all new files to be placed in the subdirectory entered in the edit fields.

Caution ! The subdirectory MUST begin and end with a backslash and MUST exist when the dialog is exited.

The BROWSE BUTTON can be used to select a subdirectory.

Directories for Day of Week

Selecting the DIRECTORIES FOR DAY OF WEEK switch will place all new files in predefined directories for each day of the week, i.e. all files created on Sunday will be placed in the Sunday directory.

The SPECIFIED DIRECTORY switch and BROWSE BUTTON are disabled with this selection. The default day of week directories are:

```
SUN=R:\SUN\  
MON=R:\MON\  
TUE=R:\TUE\  
WED=R:\WED\  
THU=R:\THU\  
FRI=R:\FRI\  
SAT=R:\SAT\
```

To override any or all of the directories place the new directory in the RDI-PC.INI file located in the C:\WINDOWS subdirectory using the following format:

```
[DOW DIRECTORIES]  
TUE=d:\temp\  
THU=d:\temp\
```

The specified path must begin and end with a backslash and be entered after the group name. Names and paths are not case sensitive. A check for the existence of all directories is done when the OK BUTTON is selected.

Alt Update Dialog window

During a receive session, the RDI Record program updates statistic information on the screen when a particular type of message is received from the radar. Normally, this is a search RTQC message. In some cases however, this message is not sent or the user may have a reason for using another type of message for that radar.

The button will read ALT UPDATE ON if any radar in the current session is being updated by a message type that is not the default (RTQC).

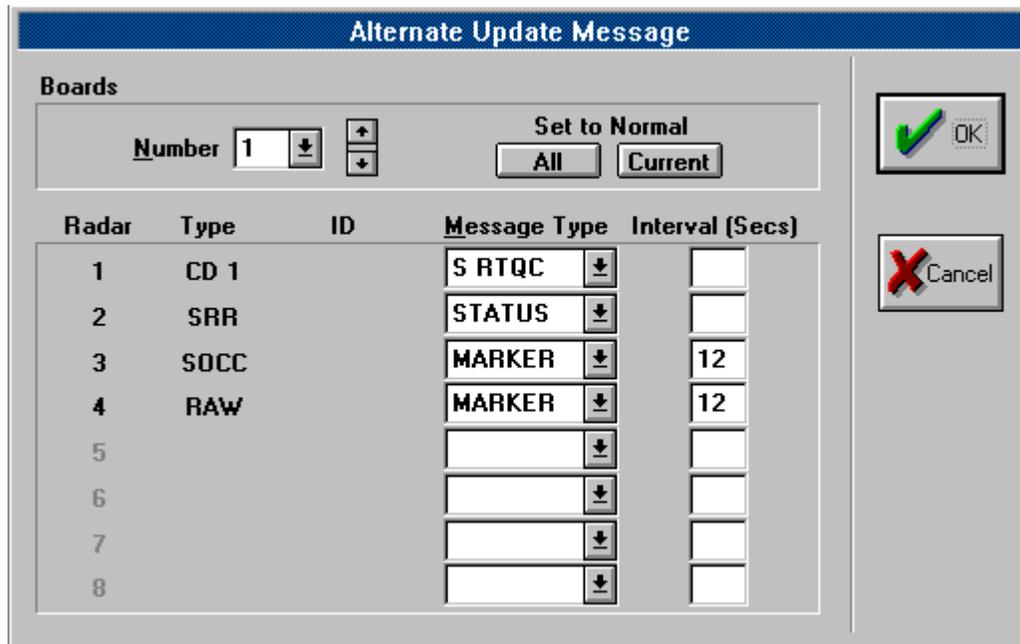


FIGURE 2-18: ALTERNATE UPDATE MESSAGE DIALOG

The marker message type is not generated by any radar. This is a special message type that is generated by the RDI board and placed in the data stream along with the rest of the radar messages. This update type could also be used to segment a recorded file into time intervals or as a substitute scan marker for analysis. If this message type is used for updating, the default time interval between marker messages is 12 seconds. The time interval can be set to any number of whole seconds between 1 and 999.

Board Number

Select the appropriate board from the board number field box or use the scroll thumb wheel buttons to cycle through the available boards.

Set to Normal - All Button

The SET TO NORMAL - ALL BUTTON resets all RDIBs to use the default update message type for each radar.

Set to Normal - Current Button

The SET TO NORMAL - CURRENT BUTTON resets the currently displayed RDIB to use the default update message type for each radar.

Message Type

Select the desired update message type from those available for each radar type used in the corresponding field. For each RDIB radar number, the available radar type and site id is displayed. Radars that are not used are disabled.

Processor Type	SRTQC	BRTQC	STATUS	MARKER
ARSR 3	D	X	X	X
ARSR 3 WX	D	X	X	X
ARSR 4	D	X	X	X
ASR 9	D	X	X	X
ATS	D	X	X	X
ATS 3D	D	X	X	X
CD 1	D	X	X	X
CD 2C	D	X	X	X
CD 2T	D	X	X	X
DTE 2	D	X	X	X
MAR 1	D	X	X	X
MAR 3	D	X	X	X
MAR 4	D	X	X	X
MAR 5	D	X	X	X
MAR 6	D	X	X	X
RAW				D
RBD	D	X	X	X
SOCC				D
SRR			D	X
TPS-70 9 bit	X	D	X	X
TPS-70 13 bit	D	X	X	X
TPS-75	X	D	X	X
D = default message type X = available message type				

TABLE 2-2: AVAILABLE UPDATE MESSAGE TYPES

Interval (Secs)

Enter the radar scan time interval in whole seconds, between 1 and 999.

3. Recording

The recording process is initiated by pressing the START BUTTON or AUTO RUN BUTTON or RDI-PC command line. The recording session is a DOS program that is started by the RDI-PC Windows™ program. The user can not run the DOS program directly.

Record Session Display Statistics

Once the record session has been initiated, the user selects between three different display statistics screens and other various actions. Statistics for all screens are accumulated until the recording session is ended or a new file is created or a data processing error occurs. In the case of a new file or error, the display statistics variables are zeroed and the screens are updated. Recording will continue as usual.

Message Statistics Screen

F20-DOS v2.01 11/10/1997								
Board 1	QNB	QNB	RST	RST	ODS	ODS	BHS	BHS
Channel	1	2	3	4	5	6	7	8
Beacon	0	0	0	0	0	0	0	0
Search	0	0	0	0	0	0	0	0
Site ID	0	0	0	0	0	0	0	0
WX Status	0	0	0	0	0	0	0	0
Misc	0	0	0	0	0	0	0	0
Tgts/scan	0	0	0	0	0	0	0	0
Errs/scan	0	0	0	0	0	0	0	0
Scan count	0	0	0	0	0	0	0	0
Total Idle	0	0	0	0	0	0	0	0
Total Msgs	0	0	0	0	0	0	0	0
[Message Window]								
(Shift-ESC) to Quit			U. Update		B. Board			
TAB. Site Stats			M. Msg Totals		E. Error Totals			
Fl. Pause			F5. Bookmark		F9. Save Screen			
Start: 13:05:25 Time: 13:05:30 Bytes Saved: 16 KB Avail: 117743 KB								

FIGURE 3-19: MESSAGE STATISTICS SCREEN

The message statistics screen, activated by pressing the <M> key, displays various message summary totals for each channel of the selected RDIB. The channel column will be blank if the corresponding channel is not being used in the active session. The screen is automatically updated every time an update message is received.

The MISC item contains a scan total of the following message types:

SECTOR_MARK	STRAOBE
MAP	MODE 4

Error Statistics Screen

The error statistics screen, activated by pressing the <E> key, displays various message summary totals for each channel of the selected RDIB. The channel column will be blank if the corresponding channel is not being used in the active session. The screen is automatically updated every time an update message is received.

```

F20-DOS v2.01 11/10/1997
Board 1      QNB      QNB      RST      RST      ODS      ODS      BHS      BHS
Channel      1        2        3        4        5        6        7        8
-----
Parity        0         0         0         0         0         0         0         0
Header        0         0         0         0         0         0         0         0
Sync          0         0         0         0         0         0         0         0
Errs/scan     0         0         0         0         0         0         0         0
Total Errs    0         0         0         0         0         0         0         0

BRTQC        0         0         0         0         0         0         0         0
SRTQC        0         0         0         0         0         0         0         0
Status, Site Id 0         0         0         0         0         0         0         0
Tgts/scan     0         0         0         0         0         0         0         0

Data Loss     0         0         0         0         0         0         0         0
-----
[ Message Window ]

(Shift-ESC) to Quit   U. Update           B. Board
TAB. Site Stats       M. Msg Totals      E. Error Totals
Fl. Pause             F5. Event          F9. Save Screen

Start: 13:05:25   Time: 13:05:36   Bytes Saved: 67 KB   Avail: 117692 KB

```

FIGURE 3-20: ERROR STATISTICS SCREEN

Site Statistics Screen

The site statistics screen, activated by pressing the corresponding numeric key for the desired site. The available site numbers are indicated in the key selection menu. If the board to display is changed, the available site numbers are updated. The key selections menu will indicate NO SITE STATS if site statistics were turned off in RDI-PC. This screen displays various totals for each channel of the selected board. The channel column will be blank if the corresponding channel is not being used in the session. The screen is updated automatically every time an update message is received.

F20-DOS v2.01 11/10/1997							
Board 1	Site 1 - QNB						
	Scan	Total	Scan	2 of	30,		2 total
Beacon	0	0	Dup Mode 3	0	C	Val%	0.0
			Neg MC%	0.0	3A	Val%	0.0
Search	0	0	Zero M3%	0.0	2	Val%	0.0
Strobe	0	0	R/R%	0.0	1	Val%	0.0
Site Id	0	0					
All Msgs	113	191					
Errors	0	0	<50	<100	<150	<200	>=200 All
Reinf Rate %			0.0	0.0	0.0	0.0	0.0
Avg Sch RL			0	0	0	0	0
Avg Bcn RL			0	0	0	0	0
[Message Window]							
(Shift-ESC) to Quit	U. Update		B. Board				
12345678. Site Stats	M. Msg Totals		E. Error Totals				
F1. Pause	F5. Bookmark		F9. Save Screen				
Start: 13:05:25	Time: 13:05:45	Bytes Saved: 117 KB	Avail: 117642 KB				

FIGURE 3-21: SITE STATISTICS SCREEN

Key Selections Menu

(Shift-ESC) to Quit	U = Update	B = Board
TAB = Site Stats	M = Msg Totals	E = Error Totals
F1 = Pause	F5 = Bookmark	F9 = Save Screen

1. **Quit.** To quit the recording session the user should hold down either shift key and press the escape key. This will terminate recording but does not exit the recording session. The program then allows the user to review the statistics screens. To exit the program, press the escape key.
2. **Update.** Pressing the <U> key will update the current statistics screen with the current counts.
3. **Board.** Pressing the key will cycle through the available RDIBs in the active recording session and display the new RDIBs statistics. The current RDIB number is displayed in the upper left corner of the screen.
4. **Site Stats.** Pressing the <TAB> key corresponding to the desired site displays the site statistics screen. If the RDI-PC program's PROCESS SITE STATS option has been turned off, NO SITE STATS is displayed.
5. **Msg Totals.** Pressing the <M> key displays the message statistics screen.
6. **Error Totals.** Pressing the <E> key displays the error statistics screen.
7. **Pause.** Pressing the <F1> function key causes all RDIBs to stop collecting data. A message in the Message Window displays the status

of the recording process. Pressing the <P> key again will start recording.

Remember ! When the RDIBs are paused, no data will be collected!

8. **Bookmark.** Pressing the <F5> function key will cause a timed event, a bookmark message, to be placed in the radar data file. Bookmarks are assigned a sequential number starting at 1. The message window displays the bookmark number and time when the <F5> key is pressed. The last bookmark information is displayed on the site statistics screen. Bookmark numbers are reset to 1 when a new file is created

Tip: The user should write down the bookmark number, time, and a description of why the bookmark was assigned for later reference.

9. **Save Screen.** Pressing the <F9> function key will cause the currently displayed statistics information to be written to a file on the disk. The file will have the same base name as the record file, but will have the .STS file extension. The user can repeatedly press the <F9> key for any screens and the information will be appended to the statistics file. This file is an ASCII text file and can be viewed with any text viewer, such as EDIT.COM or NOTEPAD.EXE.
10. **Message Window.** Any messages from the RDI-PC program, whether caused by the user or by the program itself, are displayed in the message window. Any new message will overwrite the old message. If a radar channel loses valid data, i.e. from a lost data line or corrupted data, but still has the clock line functioning for twenty 256 bit buffers, a channel lost message will appear in the window. This is about 2 seconds at 2400 baud. Data will not be collected on this channel for 300 buffers, or about 32 seconds at 2400 baud. The RDIB will then try to find an idle message within the next 20 buffers. If it does not, it again waits for 300 buffers. If valid data reappears on the channel, a channel acquired message will appear in the message window and data collection will continue.

Suggestion: The user can clear the message window by press any key not in the key selections menu. The space bar is an excellent choice.

11. **Start.** The Start field indicates the start recording time.
12. **Time.** The Time field indicates the current time while the program is recording and the end time when the program is terminated.
13. **Bytes Saved.** The Bytes Saved field displays an approximate total byte count of the data being saved. The value is displayed in 1000's of bytes and is rounded down.

14. **Avail.** The Avail field displays an approximate total byte count of the space available left on the recording medium. The value is displayed in 1000's of bytes and is rounded down. If the total space left goes below 50KB, the program will automatically self terminate.

4. Statistics Algorithms

Message Statistics Algorithms

Statistic	Algorithm	Comments
type scan total	messages of that type since last scan marker	
Tgts/scan	reinforced, beacon, and search messages since last scan marker	
Errs/scan	parity, header, and sync errors since last scan marker	
Scan count	scan marker messages since start	
Total Idles	idle messages since start	
Total Msgs	messages since start	exclude idles

FIGURE 4-22: MESSAGE STATISTICS SCREEN ALGORITHMS

Error Statistics Algorithms

Statistic	Algorithm	Comments
type scan total	messages of that type since last scan marker	
Errs/scan	parity, header, and sync errors since last scan marker	
Total Errs	errors since start	
BRTQC	BRTQC messages since start	
SRTQC	SRTQC messages since start	
Status	Status messages since start	
Tgts/scan	reinforced, beacon, and search messages since last scan marker	
Data Loss	number of times RDI board lost data	

FIGURE 4-23: ERROR STATISTICS SCREEN ALGORITHMS

Site Statistics Algorithms

Statistic	Algorithm	Comments
Totals		
Scan column	total since last scan marker	
Avg column	$\frac{\text{messages in last N scans}}{\text{N scans}}$	
Total column	total since start	
Type Total	messages of that type	
Targets	reinforced, beacon, and search messages	
All Msgs	all messages excluding idles	
Errors	all errors	
Overall Statistics		* indicates BRTQC msgs not used
Mode 3A Duplicate Codes	# of reoccurring mode 3A codes	excludes 1200 and 1275, no valid check
Mode 3A Negative Altitude %	$\frac{\text{neg mode C msgs}}{\text{valid mode C messages}}$	mode C altitude > 1000 ft
Mode 3A Zero Mode Code %*	$\frac{\text{\# of zero mode 3A codes}}{\text{(reinf + beacon)}}$	no valid check
Reinforcement Rate %	$\frac{\text{reinf}}{\text{(reinf + beacon)}}$	based on reinforced bit, exclude 1275
Mode C Valid %*	$\frac{\text{\# of valid mode C codes}}{\text{(reinf + beacon)}}$	mode C must be > -1000 ft
Mode 3A Valid %*	$\frac{\text{\# of valid mode 3A codes}}{\text{(reinf + beacon)}}$	
Mode 2 Valid %*	$\frac{\text{\# of valid mode 2 codes}}{\text{(reinf + beacon)}}$	
Mode 1 Valid %*	$\frac{\text{\# of valid mode 1 codes}}{\text{(reinf + beacon)}}$	
Altitude Cell Statistics		+ only messages within altitude, range cell are used
Reinforcement Rate %	$\frac{\text{reinf}}{\text{(reinf + beacon)}}$	based on reinforced bit, exclude 1275
Signed Height Error	$\frac{\text{sum of (valid radar height - valid mode C height)}}{\text{reinf messages}}$	messages must have valid radar and mode C heights
Runlength	$\frac{\text{sum of (runlengths)}}{\text{messages}}$	messages with runlength only

FIGURE 4-24: MESSAGE STATISTICS SCREEN ALGORITHMS