NORTEL NETWORKS™

Companion Diagnostic Software for PCI User Guide

Companion Diagnostic Software for PCI User Guide

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Companion Diagnostic Software basics

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About Companion Diagnostic Software for PCI

Companion Diagnostic Software (CDS) for Personal Communications Interface (PCI) allows you to examine the operating characteristics of a wireless system while the system is operating at a customer site. The CDS application runs on a personal computer (PC). You can use it locally at the customer site or remotely from another location. When you use remote access, the PC interfaces with the wireless system indirectly via modems. When you use local access, the PC interfaces with the wireless system directly without modems. CDS performs automatic system configuration and automatic system diagnosis. It also presents on your PC screen data derived from wireless operation. The displays contain various levels of detail and are in the form of bar charts and statistical tables, with accompanying commentaries.

The two radio transceivers in a Base Station operate in an allocated frequency spectrum. Base Stations are grouped into cells, a cell may have two or more radios in it depending upon the number of Base Stations making up the cell. These cells overlap each other to ensure continuous radio coverage throughout the desired coverage area. In each cell, at any one time, one radio may be used to provide a common signalling channel (CSC) which locates and tracks portable movements. Companion Diagnostic Software provides access to information on the operating characteristics of both regular traffic and CSC radios.

CDS package checklist

The CDS package includes the following:

- high density 3 1/2" CDS diskette
- Companion Diagnostic Software for PCI User Guide

Equipment checklist

The following is a checklist of equipment requirements for each type of connection. For more detailed descriptions of the equipment required, see Appendix A of this guide.

Local access equipment

To install and use CDS with local access, you must have the following:

- Remote Access Device (RAD)
- RAD Time Compression Multiplexing (TCM) cable, to connect the RAD to the Controller
- IBM compatible PC (386 processor or greater)
- RS232 cable, to connect the PC to the RAD

Remote access equipment using the RAD internal modem

To install and use CDS with remote access via the RAD internal modem, you must have the following:

- RAD
- RAD TCM cable, to connect the RAD to the Controller
- IBM compatible PC (386 processor or greater)
- PC modem
- RS232 cable, to connect the PC to the PC modem
- Public switch line cable, to connect the PC modem to the public switch

Remote access equipment using a RAD external modem

To install and use CDS with remote access via the RAD external modem, you must have the following:

- RAD
- RAD TCM cable, 32 in (80 cm), to connect the RAD to the Controller
- IBM compatible PC (386 processor or greater)
- PC modem
- RS232 cable, to connect the PC to the PC modem
- Public switch line cable, to connect the PC modem to the public switch
- RAD external modem
- RS232 null modem cable, to connect the RAD to the RAD external modem

Optional equipment

You may want to have the following hardware:

- high density 3 1/2" diskette to make a working copy of the application
- hard drive for storing large amounts of data
- portable computer with battery power supply for greater mobility

Connect the equipment

You can make two types of equipment connections to examine wireless system operation using CDS. A local access connection may be made using an RS232 cable at the customer site, or a remote connection may be made through a PC modem to use CDS at a location other than the customer site.

Note: The RAD cannot be programmed if an RS232 cable is connected to its serial port. Ensure that the required RAD programming has been done before connecting the RS232 cable to the RAD serial port.

Local access connections

Figure 1 shows the connections that you must make to examine a wireless system using CDS at the customer site. Refer to the *Remote Access Device Installation Guide* if you require more detail on RAD hardware connections or programming.

Figure 1: Overview of CDS local connections and wireless system
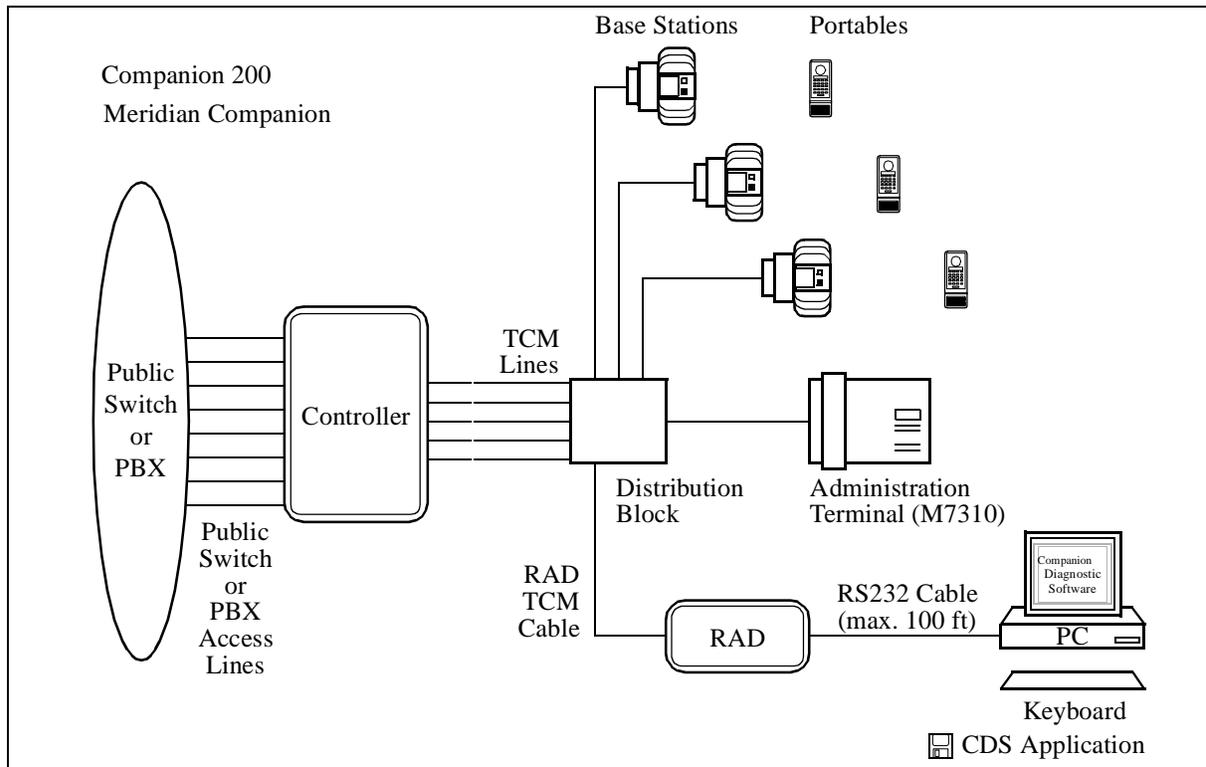
To connect the PC to the RAD

1. Connect one end of the RS232 cable to serial port 1 or 2 on the PC using a connector that matches your PC's port.

2. Place the PC within 100 feet (30 meters) of the RAD.

3. Connect the other end of the RS232 cable to the serial port on the RAD using a female 25-pin connector or 9-pin connector as required.

To connect the RAD to the Controller:

1. Connect one end of the RAD TCM cable to the RJ-11 port on the back of the RAD using the RJ-11 connector.

2. Place the RAD near the distribution block and within 100 feet (30 meters) of the Controller.

Note: Place the RAD as close as possible to the distribution block. Make sure that the combined length of the RAD TCM cable and the TCM lines between the distribution block and the Controller is less than 100 feet (30 meters).

3. Connect the loose wires on the other end of the RAD TCM cable to an allowable free port (one of the first five TCM ports) at the distribution block.

Note: Although any of the first five TCM ports are allowable for the purposes of CDS, if you also intend to use the backup/restore feature in Companion Manager, you should use the first TCM port.

Ensure that the RAD TCM cable is free of bridge-taps and loading coils.

Remote access connections using the RAD internal modem

Figure 2 shows the connections that you must make to examine a wireless system using CDS from a remote location via the RAD internal modem. One of the lines into the Controller is dedicated to the RAD. This line is not available for other devices. If a dedicated line is not available through the Controller, the RAD can share a line with another device, although this is not recommended.

The RAD must be programmed to answer the line automatically when the PC dials in through the public switch. Refer to the *Remote Access Device Installation Guide* if you require more detail on RAD hardware connections or programming. If you require more detail on wireless system hardware connections, refer to the wireless system documentation.

Figure 2: Overview of CDS remote connections using the RAD internal modem
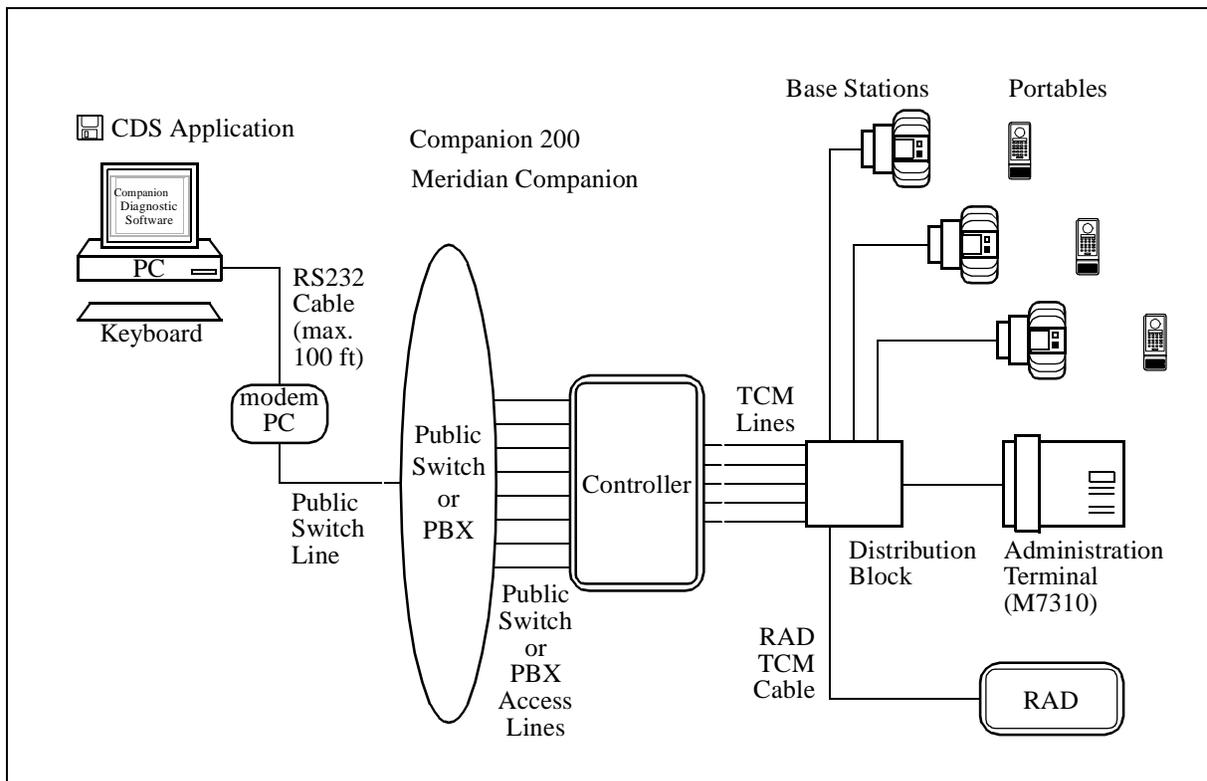
On-site connections required for remote access (with internal modem)

To connect the RAD to the Controller:

1. Connect one end of the RAD TCM cable to the RJ-11 port on the back of the RAD using the RJ-11 connector.

2. Place the RAD near the distribution block and within 100 feet (30 meters) of the Controller.

Note: Place the RAD as close as possible to the distribution block. Make sure that the combined length of the RAD TCM cable and the TCM lines between the distribution block and the Controller is less than 100 feet (30 meters).

3. Connect the loose wires on the other end of the RAD TCM cable to an allowable free port (one of the first five TCM ports) at the distribution block.

Note: While any of the first five TCM ports are allowable for the purposes of CDS, if you also intend to use the backup/restore feature in Companion Manager, you should use the first TCM port.

Ensure that the RAD TCM cable is free of bridge-taps and loading coils.

Off-site connections required for remote access (with internal modem)

PC serial ports 1 and 2 are supported by CDS.

To connect the PC to an external PC modem:

1. Connect one end of the RS232 cable to serial port 1 or 2 on the PC using a connector that matches your PC's port.

2. Connect the other end of the RS232 cable to the serial port on the PC modem using a connector that matches the modem serial port.

Note: The maximum length of an RS232 cable is 100 feet (30 meters).

To connect the PC modem to the public switch:

1. Connect one end of the public switch line cable to the RJ-11 port on the PC modem using an RJ-11 connector.

2. Connect the other end of the public switch line cable to the public switch network.

Remote access connections using a RAD external modem

To examine a wireless system using CDS from a remote location via a RAD external modem, no line into the controller is dedicated to the RAD. A line connects the RAD external modem directly to the public switch or Private Branch Exchange (PBX), bypassing the Controller. The PC dials the telephone number assigned to this line. The external modem is connected to the RAD by an RS232 null modem cable. See Figure 3 for the connections you must make to examine a wireless system using CDS from a remote location using a RAD external modem.

Note: Only 9600 baud can be supported with the external modem.

Figure 3: Overview of CDS remote connections using a RAD external modem
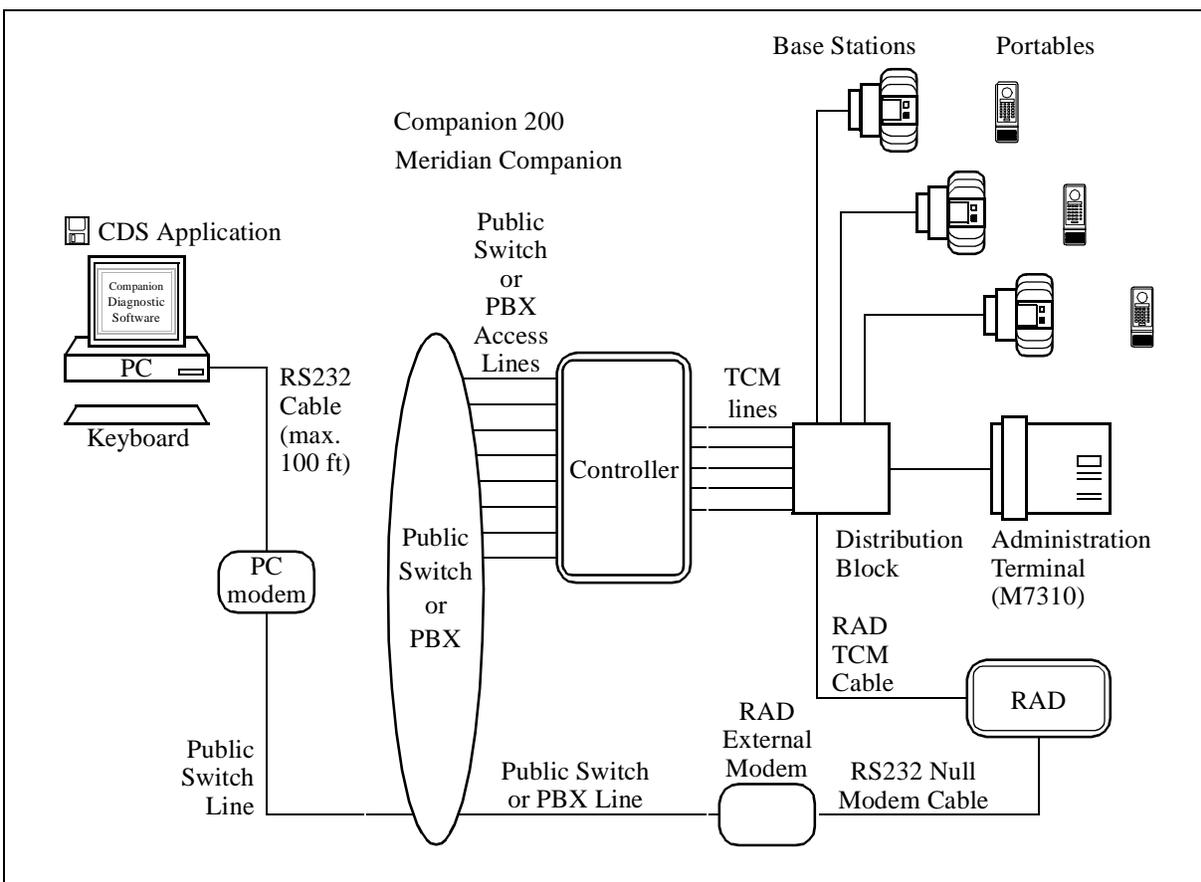
On-site connections required for remote access (with external modem)

To connect a RAD to the Controller:

1. Connect one end of a RAD TCM cable to the RJ-11 port on the back of a RAD using the RJ-11 connector.

2. Place the RAD near the distribution block and within 100 feet (30 meters) of the Controller.

Note: Place the RAD as close as possible to the distribution block (a 32 inch (80 centimeter) cable has been provided). Make sure that the combined length of the RAD TCM cable and the TCM lines between the distribution block and the Controller is less than 100 feet (30 meters).

3. Connect the loose wires on the other end of the RAD TCM cable to an allowable free port (one of the first five TCM ports) (refer to the *Remote Access Device Installation Guide*) at the distribution block.

Note: Although any of the first five TCM ports are allowable for the purposes of CDS, if you also intend to use the backup/restore feature in Companion Manager, you should use the first TCM port.

Ensure that the RAD TCM cable is free of bridge-taps and loading coils.

To connect a RAD to a RAD external modem:

1. Connect one end of the RS232 null modem cable to the serial port on the RAD using a female 25-pin connector.

2. Connect the other end of the RS232 null modem cable to the serial port on the RAD external modem using an appropriate connector.

To connect a RAD external modem to the public switch or PBX:

1. Connect one end of the line cable to the RJ-11 port on the RAD external modem using an RJ-11 connector.

2. Connect the other end of the line cable to the public switch or PBX.

Note: Only 9600 baud can be supported with the external modem.

Off-site connections required for remote access (with external modem)

PC serial ports 1 and 2 are supported by CDS.

To connect the PC to an external PC modem:

1. Connect one end of the RS232 cable to serial port 1 or 2 on the PC using a connector that matches your PC's port.

2. Connect the other end of the RS232 cable to the serial port on the PC modem using an appropriate connector.

Note: The maximum length of an RS232 cable is 100 feet (30 meters).

To connect the PC modem to the public switch:

1. Connect one end of the public switch line cable to the RJ-11 port on the PC modem using an RJ-11 connector.

2. Connect the other end of the public switch line cable to the public switch network.

Wireless system programming

The following is a summary of the wireless system programming required for a local or remote connection. This programming is performed on the wireless system's Administration Terminal, and should be recorded in the Programming Record of the *Remote Access Device Installation Guide*. Programming must be completed at the customer site before you can use CDS. Refer to the *Remote Access Device Installation Guide* if you require more detail on RAD programming. Refer to the wireless system documentation if you require more detail on wireless system programming.

Note: A RAD cannot be programmed if an RS232 cable is connected to its serial port. Ensure that the required RAD programming has been done before connecting the RS232 cable to the RAD serial port.

Note: The System ID must be programmed for the RAD before you can proceed. Refer to the *Remote Access Device Installation Guide* for instructions on how to program the System ID for the RAD. The RAD password defaults to the System ID.

Note: Displayed data is referenced to the time and date of the system. To ensure accurate referencing, use the Administration Terminal to set the time correctly.

Local access programming

Ensure that the following steps have been completed before setting up a new CDS site with local access:

• System ID programmed for the RAD

Remote access programming using the RAD internal modem

Ensure that the following steps have been completed before setting up a new CDS site with remote access using the RAD internal modem:

• the line into the wireless system dedicated to the RAD (note the telephone number)

• System ID programmed for the RAD

• line type programmed as Key Service Unit (KSU) for the RAD

• allowable line number programmed for the RAD (refer to *Remote Access Device Installation Guide*)

• Auto Answer programmed for the RAD

The Auto Answer settings programmed depend on how the RAD internal modem is used.

If a line is **dedicated** to the RAD:

• set auto answer 'on' for the RAD

• set the number of rings before auto answer to '1'

If a line is **shared** with the RAD:

• set auto answer 'on' for the RAD

• set the number of rings before auto answer to a number between '1' and '10'

Note: Beware of any telephony application that may cause the call to be answered before the RAD answers automatically (e.g., Call Forward or Voice Mail).

In the case of a shared line, an alternate approach, is to set RAD Auto Answer 'off' for normal wireless system operation. When you need

to initiate a diagnostic session, contact someone at that site and ask them to program RAD Auto Answer 'on', with the number of rings before Auto Answer to '1'. You may then make the modem call to the site and perform the diagnostics. At the end of the session, contact the on-site person and ask them to program RAD Auto Answer 'off' again.

Remote access programming using a RAD external modem

Ensure that the following have been completed before setting up a new CDS site with remote access using a RAD external modem:

- public switch line connected directly to the RAD external modem (note the telephone number)

- System ID programmed for the RAD

Note: The only modem speed supported for this configuration is at 9600 bps.

Make a working copy

Make a working copy of the original CDS diskette. Use the working copy diskette to install CDS on your hard drive or to use CDS from your floppy drive. Store your original diskette as backup.

Installing and using CDS on your hard drive

To install CDS on your hard drive:

1. Insert the working copy diskette of CDS into your floppy drive.

   Assuming your hard drive is 'C' and your floppy drive is 'A',

2. At the MS-DOS C:\> command prompt, type:
   A:
   and press

   [Enter]

3. At the prompt A>, type:
   CD_SETUP <source-drive> <destination-drive>
   for example: CD_SETUP A C
   and press

   [Enter]

Note: The DOS commands in CD_SETUP and similar applications are not case-sensitive.

A `CDSPCI` directory will be created containing all the files listed below (see 'Files needed by CDS' and also 'Appendix E'). You can now use CDS from your hard drive.

Using CDS from your floppy drive

You can use CDS from your floppy drive, but beware of diskette space limitations. If you plan to use CDS from your floppy drive:

1. Insert the working copy diskette of CDS into your floppy drive.

You can now use CDS from your floppy drive. Ensure that DOS write protect is off and that the diskette remains in the floppy drive for the entire CDS session. To set up, follow the same procedure as for setting up CDS for a new site. See the section on 'Site administration'.

Files needed by CDS

The CDS application provides a directory called CDSPCI at the highest level on the drive that you have chosen. The following files are in the CDSPCI directory and are required to use the application:

*   `CDS.EXE`: the main CDS program
*   `CDS_ADM.EXE`: the CDS Administration Utility program
*   `HELVB.FON`: the Helvetica font used to format text on the display screens of CDS
*   `RUNCDS.EXE`: the batch program for CDS, only required when CDS is run in batch mode
*   `LNG_MSG.DAT`: the default language file

Site administration

- Location access
- Administration data

To create new sites or change the administration data of an existing site, you must first access the CDS Administration Utility. CDS can be set up to investigate and store data for multiple sites.

The steps to create a new site or change the administration data of an existing site vary with the type of connection, either local or remote. If you want to use CDS on an existing site with its current administration data, go directly to 'Starting CDS' in the Using CDS section of this guide.

Setting up CDS for a new site

When you are setting up CDS for a new site, you must know the RAD System ID of the wireless system and the set value that determines the edge of a cell or "cell edge RSSI" (default is -70 dBm).

Note: The System ID must be programmed for the RAD before you can proceed. Refer to the *Remote Access Device Installation Guide* for instructions on how to program the System ID for the RAD. The RAD password defaults to the System ID.

Local access

To set up a new site with local access:

1. Change to the CDSPCI directory. Type:
    CD \CDSPCI
    and press

    Enter

2. Open the CDS Administration Utility. Type:
    CDS_ADM
    and press

    Enter

3. When you are prompted for the site name, type an alphanumeric name with a maximum of eight characters to identify the new site, and press:

    Enter

4. If no site sub-directory by that name exists, a prompt will ask you to confirm the new site name. When you are prompted for this confirmation, type:

Y

press

`Enter`

and go directly to step 5.

OR

If a site sub-directory by that name exists, the previous RAD password of the existing site is presented on your PC screen. A prompt will ask you to enter a new RAD password. If you do not want to change the value, you can press `Enter` to get the previous value.

If you still want to create a new site, return to step 2 and repeat the procedure with another site name.

Note: Once you have opened the administration data of an existing site, you must follow all of the prompts before you are able to exit. If you do not want to change a value, you can press `Enter` to get the previous value.

5. When you are prompted for the RAD password, a maximum of 10 numeric characters, type the RAD password and press:

    `Enter`

Note: The RAD password is the same as the System ID, unless another application has changed it.

6. When you are prompted for the type of connection, type:
    L
    and press

    `Enter`

7. When you are prompted for the PC serial port, type the one-digit number (1 or 2) that identifies the serial port on the PC that is connected to the serial port on the RAD. Press:

    `Enter`

8. When you are prompted for the cell edge RSSI, type the cell edge RSSI (default is -70 dBm). Press:

    `Enter`

When the new site sub-directory has been successfully created, CDS displays a message and exits the CDS Administration Utility.

Remote access

When you are setting up CDS for a new site with remote access, you must know some relevant wireless system values. Before you begin, obtain the following values from the wireless system coordinator at the site.

RAD System ID The System ID/password programmed for the RAD.

Telephone number The telephone number of the line dedicated to the RAD internal modem or the external modem. Valid characters for remote access are the digits 0 to 9 and a comma (,). The comma can be used to make the modem pause for dial tone. The duration of the pause is modem dependent.

Dial type The dial mode, Pulse or Tone, of the line connecting the PC modem to the public switch.

Cell edge RSSI The system measured RSSI value at the cell edge (default is -70 dBm).

Note: If the required wireless system programming has not been done, you must complete these tasks before you can proceed. See 'Wireless system programming' in the CDS Basics section of this guide for more detail on wireless system programming requirements.

To set up a new site with remote access:

1. Follow steps 1 to 5 under the 'Local access' heading.

2. When you are prompted for the connection type, type:
   R
   and press

   [Enter]

3. When you are prompted for the number to dial, type the telephone number assigned to the line dedicated to the internal or external RAD modem and press:

   [Enter]

4. A prompt will ask for the dial type of the line connecting the PC modem to the public switch. When prompted for the dial type, type:
   P for Pulse or T for Tone
   and press

   [Enter]

5. When you are prompted for the modem speed, type the baud rate (300, 1200, 2400, 9600) for the PC modem and press:

   [Enter]

   Note: A baud rate of 300, 1200, and 2400 for the PC modem dictates the baud rate of the RAD internal modem. The 9600 baud rate can only be used in the case of an external modem connected to the RAD via a RS232 null modem cable, or in the case of an autobaud with the FastRad.

6. You will be prompted with the recommended modem initialization string. You will then be prompted with the current modem initialization string. When you are creating a new site, the current modem initialization string is the same as the recommended one. If you do not want to change the modem initialization string press:

   [Enter]

   and go directly to step 7.

OR

If the PC modem is Hayes compatible but does not default to the Hayes mode, you will need to change the modem initialization string. Type the string required by the Hayes compatible PC modem and press:

Enter

Note: See Appendix A in this guide for further information on the PC modem initialization string.

7. When you are prompted for the PC serial port, type the one-digit number (1 or 2) that identifies the serial port on the PC connected to the serial port on the PC modem. Press:

Enter

8. When you are prompted for the cell edge RSSI, type the cell edge RSSI (default is -70 dBm). Press:

Enter

When the new site sub-directory has been successfully created, CDS displays a message and exits the CDS Administration Utility.

Files created by setting up a new site

The procedure to set up CDS for a new site creates a site sub-directory with an extension of .SIT in the main CDSPCI directory. You can have many site sub-directories in the main CDSPCI directory. The following file is in each site sub-directory:

CDS_ADM.DAT

This site administration file contains the administration data pertaining to the site for which the sub-directory was created.

Changing the administration data of an existing site

If relevant wireless system programming, or the type of connection has changed, any attempt to start CDS for an existing site under the previous administration data will result in an error. Before you can successfully start CDS for that site, you must access the CDS Administration Utility and change the administration data of the affected CDS site to correspond to the new wireless system values.

Note: Once you have opened the CDS Administration Utility for an existing site, you must follow all of the prompts before you are able to exit. If you do not want to change a value, you can press the ⌊ Enter ⌋ key to get the previous value settings.

Local access

To change the administration data of an existing site with local access, or to change an existing site from remote access to local access:

1. Change to the CDSPCI directory. Type:
   CD \CDSPCI
   and press

   ⌊ Enter ⌋

2. Open the CDS Administration Utility. Type:
   CDS_ADM
   and press

   ⌊ Enter ⌋

3. When you are prompted for the site name, type the alphanumeric name that identifies the existing site. Press:

   ⌊ Enter ⌋

4. If a site sub-directory by that name exists, the previous RAD password of the existing site is presented on your PC screen. A prompt will ask you to enter the new RAD password with a maximum of 10 numeric characters. When you are prompted, type the new RAD password. Press:

   ⌊ Enter ⌋

   Go directly to step 5.
   If you do not want to change the RAD password of the existing site, press:

   ⌊ Enter ⌋

OR

If no site sub-directory by that name exists, a prompt will ask you to confirm a new site name. If you still want to attempt to change the administration data of an existing site, you must return to step 3 and try again.

When you are prompted, type:
N
and press

Enter

OR

If you no longer want to attempt to change the administration data of an existing site, exit the CDS Administration Utility. When you are prompted, type:
E
and press

Enter

5. The previous connection type is displayed. When you are prompted for the new connection type, type:
L
and press

Enter

6. The previous serial port number is displayed. When you are prompted for the new PC serial port, type the one-digit number (1 or 2) that identifies the serial port on the PC connected to the serial port on the RAD and press:

Enter

7. When you are prompted for the cell edge RSSI, type the cell edge RSSI (default is -70 dBm). Press:

Enter

When the administration data has been successfully changed, CDS confirms the site data and exits the CDS Administration Utility.

Remote access

If the administration data of an existing site with remote access has changed, or you want to change an existing site from local access to remote access, you must know some relevant wireless system values. Before you begin, contact the wireless system coordinator at the site to ensure that you know the following:

RAD System ID   The System ID/password programmed for the RAD.

Telephone number   The telephone number of the line dedicated to the RAD internal modem or the external modem. Valid characters for remote access are the digits 0 to 9 and a comma (,). You can use the comma to insert a pause for dial tone. The length of the pause is modem-dependent.

Dial type   The dial mode, Pulse or Tone, of the line connecting the PC modem to the public switch.

Cell edge RSSI   The system measured Receive Signal Strength Indicator (RSSI) value at the cell edge (default is -70 dBm).

To change the administration data of an existing site with remote access, or to change an existing site from local access to remote access:

1. Follow steps 1 to 4 under the 'Local access' heading.

2. The previous connection type is displayed and you are prompted for the new connection type. If you are already in remote access, press:

    `Enter`

    If you are in local access, type:
    R
    and press

    `Enter`

3. The previous number of the remote modem is displayed and you
    are asked if you want to change it. If you do not want to change
    the number, press:

    Enter

    Go directly to step 4.

    OR

    If you want to change the number, when you are prompted with
    the new telephone number, type the new telephone number
    assigned to the line dedicated to the internal or external modem
    RAD and press:

    Enter

4. The previous dial type of the line connecting the PC modem to
    the public switch is displayed and you are asked if you want to
    change it. If you do not want to change the dial type, press:

    Enter

    Go directly to step 5.

    OR

    If you want to change the dial type of the line connecting the PC
    modem to the public switch, when you are prompted for the new
    dial type, type:
    P for Pulse or T for Tone
    and press

    Enter

5. The previous modem speed is displayed. You are asked if you
    want to change the modem speed. If you do not want to change
    the modem speed, press:

    Enter

    Go directly to step 6.

    OR

If you want to change the modem speed, when you are prompted for the new modem speed, type the new baud rate (300, 1200, 2400, 9600) for the PC modem and press:

| Enter |

Note: A baud rate of 300, 1200, and 2400 for the PC modem dictates the baud rate of the RAD internal modem. The 9600 baud rate can only be used in the case of an external modem connected to the RAD via a RS232 null modem cable, or in the case of an autobaud with the FastRad.

6. You will be asked if you want to change the initialization string sent to the PC modem. If you do not want to change the initialization string, when prompted, press:

| Enter |

Go directly to step 7.

OR

If you want to change the initialization string, when prompted type the new initialization string and press:

| Enter |

Note that the current modem initialization string and the recommended modem initialization string are not necessarily the same. The current modem initialization string is the last value that you entered.

Note: See Appendix A in this guide for further information on the PC modem initialization string.

7. The previous PC serial port is displayed. You are asked if you want to change the PC serial port. If you do not want to change the PC serial port, press:

| Enter |

If you want to change the PC serial port, when you are prompted for the new PC serial port, type the one-digit number (1 or 2) that

identifies the serial port on the PC connected to the serial port on the PC modem. Press:

Enter

8. When you are prompted for the cell edge RSSI, type the cell edge RSSI (default is -70 dBm). Press:

Enter

When the administration data has been successfully changed, CDS confirms the site data and exits the CDS Administration Utility.

Using Companion Diagnostic Software

- Getting started
- Selecting data
- Screen components
- Keyboard functions

Starting CDS

To start the application:

1.   From the CDSPCI directory, type:
     CDS
     and press

     [Enter]

2.   At start up, CDS presents a site selection display screen.

Figure 4: Site selection display screen
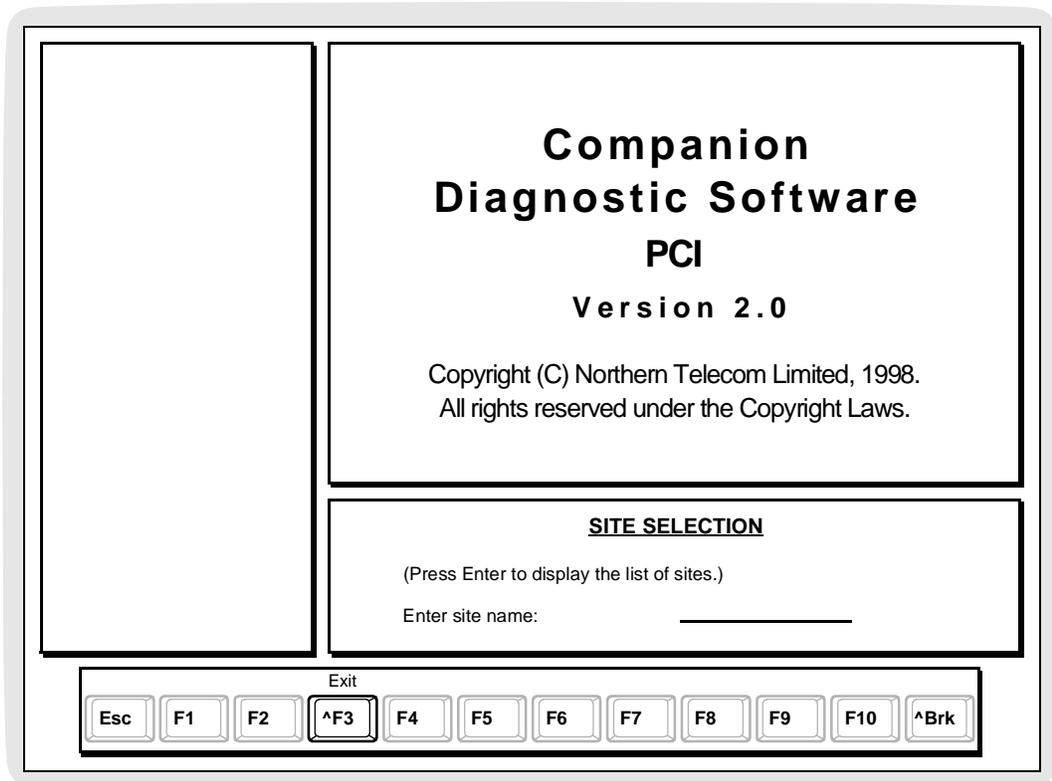
3. The site selection display screen prompts you for a site name.
    Type the name of the site you want to examine. Press:

    [Enter]

    OR

    To display the list of all possible sites, press:

    [Enter]

Figure 5: List of Sites display screen

The list of sites display screen prompts you for a site name. Type the
name of the site you want to examine. Press:

[Enter]

Note: Once you start CDS for a selected site, you must exit and start
a new CDS session to examine data from another site.

Selecting data

During a CDS session, you can examine data fetched directly from the wireless system or a dataset. A dataset is data fetched from the wireless system in a previous CDS session that was saved in a file on disk. See the Utilities section in this guide for instruction on how to manage site datasets.

After you enter the target site name, CDS searches the site sub-directory for saved datasets. If the target site has previously saved datasets, CDS presents a saved datasets display screen.

Figure 6: Saved datasets display screen

1. To select a saved dataset, type the dataset number and press:

   Enter

   OR

   To fetch data directly from the wireless system, press:

   Enter

Note: You cannot examine both a saved dataset and data fetched directly from the wireless system during a single CDS session. You must start a new CDS session to change the type of data being examined.

Automatic system configuration

CDS automatically determines the system configuration whenever you fetch data directly from a wireless system.

CDS informs you if there have been any hardware changes since the last time CDS was connected to the system. If there are any differences from the configuration of a previous diagnosis session, a warning appears on the screen (see Figure 7). File or display the new configuration by going to the "View System Configuration" in the Utilities Menu.

Figure 7: Configuration Change Notice

```
*****************************
          IMPORTANT
*****************************


     The wireless system configuration has changed!

          Display or file the new configuration using the
     "View System Configuration" command in the UTILITIES Menu.
```

```
***Message Logged at Wed Mar 19 13:48:05 1998
064 CCV-I-AUTOVRFY Configuration was automatically verified for all cells.

                  Press any key to continue...
```

| Esc | F1 | F2 | ^F3 | F4 | F5 | F6 | F7 | F8 | F9 | F10 | ^Brk |
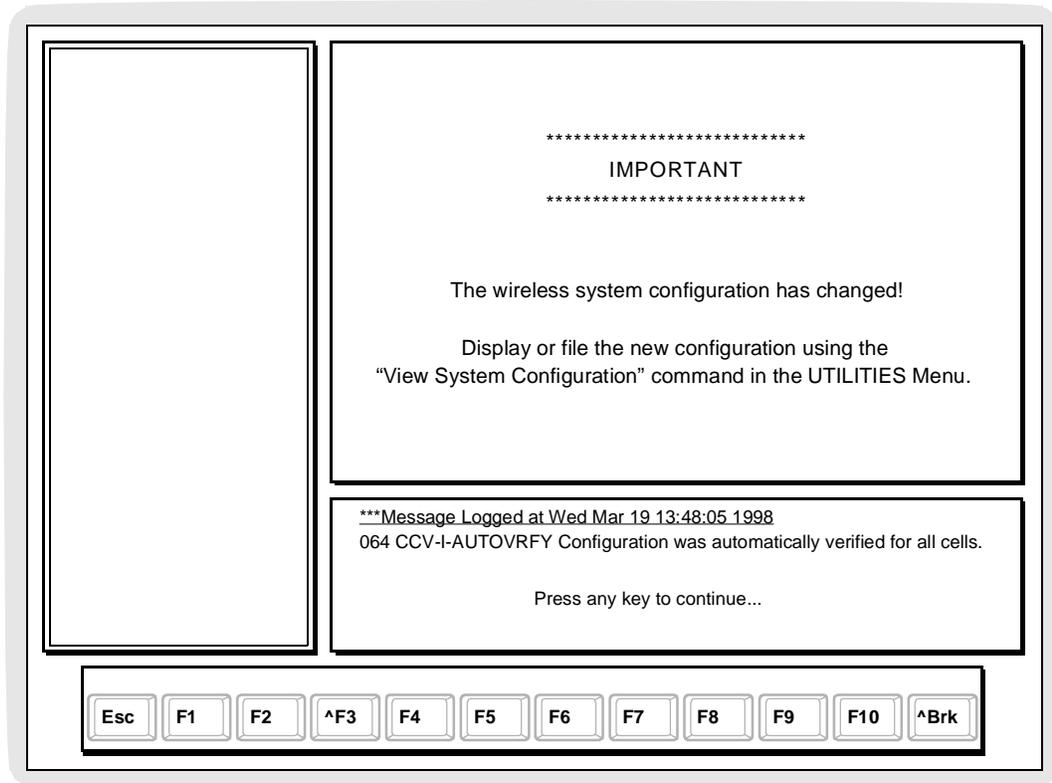
After automatic system configuration is completed the Main menu screen is displayed, if no changes are found.

Exiting CDS

To exit CDS:

1. Press:

    Ctrl + F3

Note: This is signified by '^F3' on your screen. (^ = 'Ctrl')

Display screen components

The display screens have four basic components. They may have a fifth component, depending on the depth of analysis available on the current display screen.

Figure 8: Display screen components
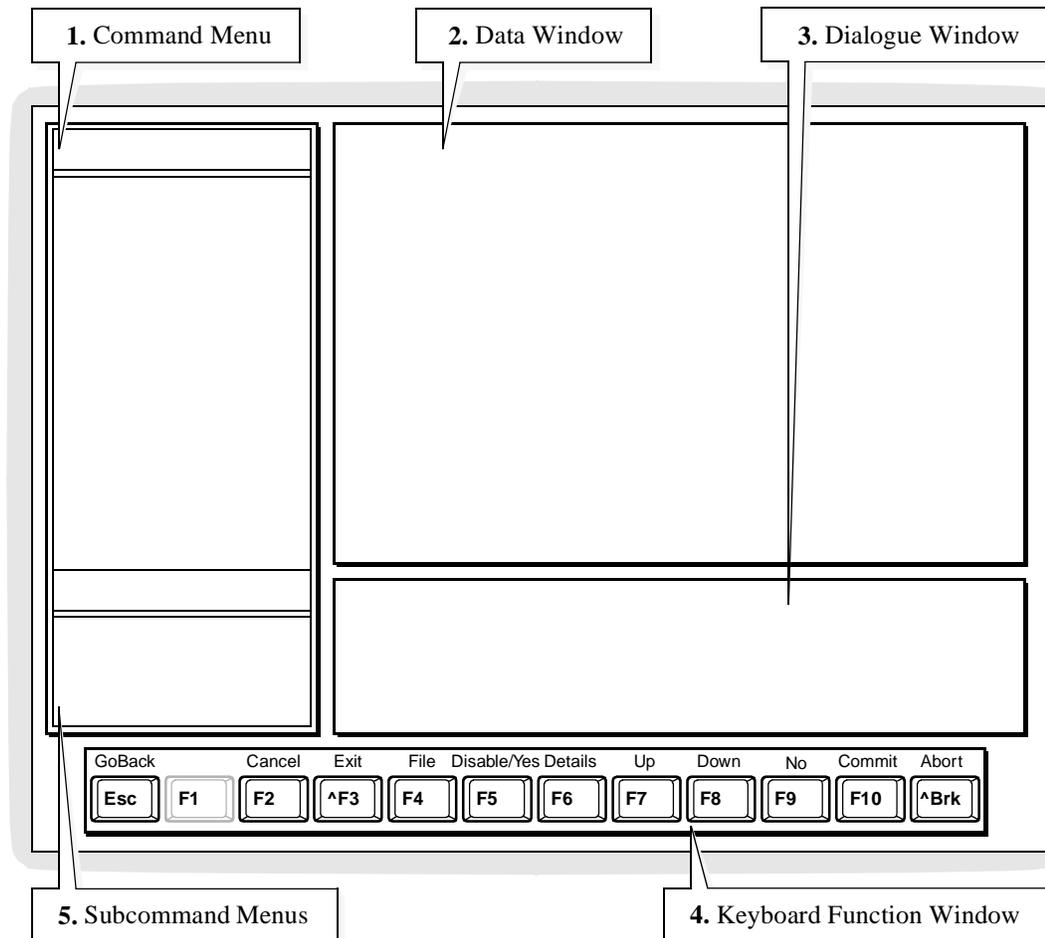
1. The **command menu** presents the commands available to access more detailed information from the current display screen.

2. The **data window** presents statistics in the form of tables, bar graphs, or text explaining the results of the automatic system diagnosis.

3. The **dialogue window** briefly summarizes or supplements the tables or bar graphs presented in the data window.

4.   The **keyboard function window** indicates the keyboard
functions available on the current display screen. Bold keys are
active.

5.   The **subcommand menus** offer further choices, if available, to
select time interval, type of comparison data, or type of data
display.

A Typical CDS Session

Assuming that a site is already set up (as given in the "Site
Administration" section), the CDS operator will normally perform
the following steps:

1.   **Start CDS**—In the CDSPCI directory, type CDS and press Enter.
CDS will display the Site Selection screen (Figure 4).

2.   **Select Site**—CDS will prompt you for the name of the Site.
Type in the <sitename> and press Enter.
CDS then displays the list of available datasets for the selected site.

3.   **Choose current system information or historical dataset**—You may review a previously
saved dataset [type the dataset name and Enter], or the system's present status [press
Enter]. While CDS is fetching data and configuring a wireless system, it displays a
fetch status bar. Wait about five minutes, depending on the size of the system.
The main menu appears when completed.

4.   **Conduct Diagnosis**—The Diagnosis command is highlighted. Press D or Enter.
The Diagnosis Display Screen is displayed (see Figure 12).

5.   **Analyze Results**—The Diagnosis Results bar chart summarizes the system's performance.
Press F6 to obtain further on-screen details (press F6 again to return to the graph). Refer to
Appendix B for full explanations.

6.   **Save Information**—The compiled data is now resident in active memory. To save it for
future reference, create a dataset in this way:
        • Return to the main menu   —> Press the ESC key
        • Select the Utilities-level menu   —> Press U(tilities)
        • Create a dataset   —> PressC(reate Dataset)
CDS will prompt you for a dataset name (Hint: use today's date, up to 15 characters) and
press Enter. CDS will indicate when the dataset has been saved and return you to the
Utilities display screen.

7.   **Exit CDS**—Press the Ctrl + F3 keys (^F3) to close the CDS session.

Keyboard functions

The PC function keys shown below are used to manipulate the display screens and to select commands. Keys that must be pressed in unison are joined by a plus sign.

Table 1: Keyboard functions

Functions	Keys
Cancel procedure pending disable command.	F2
Exit Companion Diagnostic Software.	Ctrl + F3
File displayed statistical information to disk.	F4
Disable a radio to monitor it.	F5
Diagnosis details or display.	F6
Scroll data up one page.	F7 or Page Up
Scroll data down one page.	F8 or Page Down
Select the next command.	Tab or ↓
Select the previous command.	Shift + Tab or ↑
Go to the top of the list.	Home
Go to the bottom of the list.	End
Delete the last character entered.	Backspace
Abort the current command.	Ctrl + Pause (Break)
Go back to the previous display screen.	Esc

Although not every keyboard function is available for every display screen, the Keyboard Function window highlights the keys you can use with the current display screen. The Control key is represented by the ⌃ symbol on the Keyboard Function window.

Making menu selections

To make a selection from a Command or Subcommand Menu:

1. Type the letter of the command highlighted.

    OR

    Press the Tab or arrow keys until the command you want is highlighted by the box outline, then press:

    ⎡ Enter ⎤

Commands and subcommands that are active on the current display screen are enclosed in a shaded box. If no shaded box appears on the current display screen, the active command is the title of the Command Menu.

To go to the previous level of a command path:

1. Press:

    ⎡ Esc ⎤

Files created when using CDS

The following file is created in the \CDSPCI directory when using CDS:

CDS_ERR.LOG

The following files are created in the \CDSPCI\<sitename>.SIT directory when using CDS:

R_RESULT.LOG

<filename>.PDM
(for example, 194HCN38.PDM)

RADIOS.CEL

REPORT.TXT

CDS_ADM.DAT

See Appendix E for more information on these files.

Display screens

- Diagnosis
- Monitor
- Utilities

Command map

The following map shows the hierarchy of commands and subcommands available to access information. Typing the outlined letters selects the command.

Table 2: Command map

Level 1 Commands	Level 2 Commands	Level 3 Commands	Subcommands
Diagnosis	Quality of Service	Lost Links Voice Quality	Auto Interval Busiest Hour 24 Hour Interval
	System Faults	Base Station Resets Radio Resets Synch Failure Lost Integrity	
	Radio Signals	Weakest Radio Next Weakest	Versus System Versus Cell
		Radio Statistics	
	Cell Signals	Weakest Cell Next Weakest Cell Statistics CSC-Link Statistics	
	Interference	Lost Link RSSI	
	Traffic	Radio Occupancy Cell Occupancy	Busiest Hour Next Busiest
			Bar Chart Statistics
	CSC Usage	Cell Statistics Radio Statistics	Busiest Hour Next Busiest
Monitor	Background RSSI Reset RIM Query BS Faults Clear BS Faults Clear Counters		
Utilities	View System Configuration Create Dataset Delete Dataset		

Main menu

Figure 9: Main menu
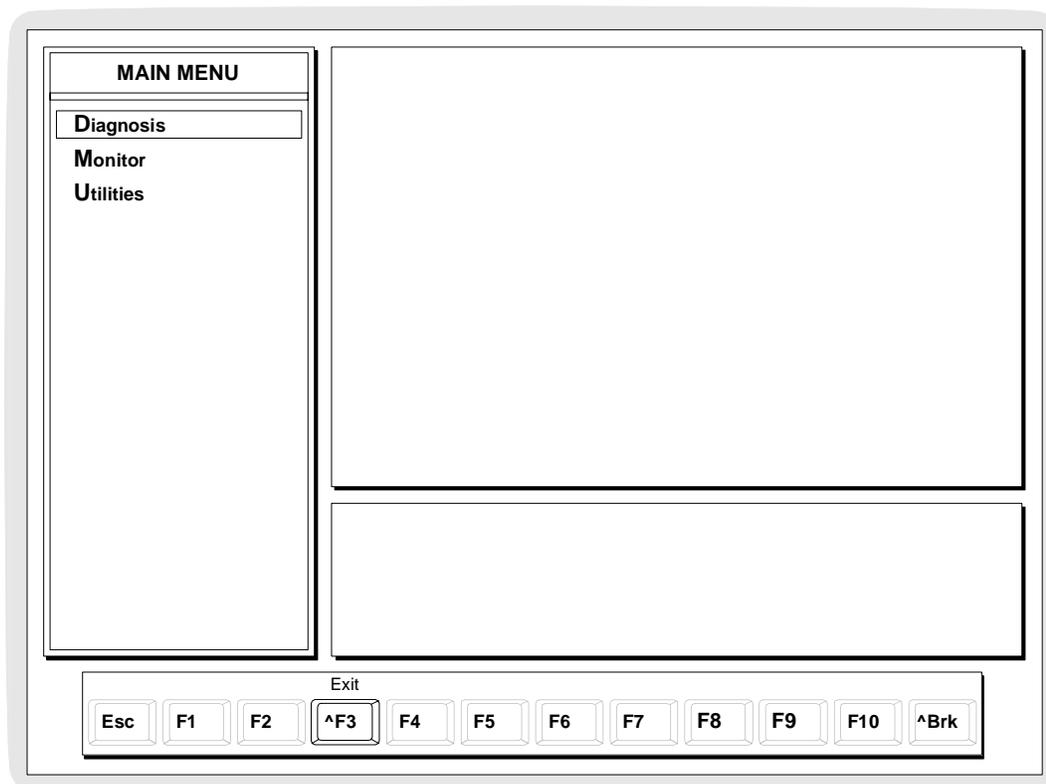
After entering the target site name and selecting the data, the main menu display screen is presented. Select from the available first level command choices.

Diagnosis Option

The diagnosis option is the single most powerful command in CDS. Selecting this option results in the following:

1.   Automatic System Diagnosis

The CDS diagnostic function analyses and evaluates stored historical data from the wireless system and automatically determines what problems your system is experiencing. The data examined can be fetched from a previously saved dataset in the site sub-directory or it can be fetched directly from the wireless system. A diagnostic results summary is immediately displayed in the form of a bar chart annotated with a summary of the number of alarms and warnings that may have been found. A detailed description of these alarms and warnings along with

recommended actions is made available to you through further display screens as well as being written to the site directory in the REPORT.TXT file (see "Automatic System Diagnosis" below).

2. **Diagnosis Menu**

Diagnosis display screens allow you to manually evaluate and examine historical data on the operation of the wireless system. The data examined can be a previously saved dataset in the site sub-directory or data can be fetched directly from the wireless system (see 'Diagnosis Menu Options' below). The level 2 commands available under the Diagnosis menu are:

•Quality of Service

•System Faults

•Radio Signals

•Cell Signals

•Interference

•Traffic

•CSC Usage

Monitor Option

Monitor display screens present real time wireless system information and are not available if you start CDS with a saved dataset (see 'Monitor' below). The level 2 commands available under the Monitor menu are:

•   Background RSSI

•   Reset RIM

•   Query BS Faults

•   Clear BS Faults

•   Clear Counters

Utilities Option

The Utilities option manages the data captured by CDS (see 'Utilities' below). The level 2 commands available under the Utilities menu are:

•   View System Configuration

•   Create Dataset

•   Delete Dataset

Diagnosis

Select the diagnosis key whenever you want to diagnose problems on a wireless system.

Automatic System Diagnosis

The Automatic System Diagnosis function is automatically invoked when you choose the diagnosis option from the main menu. Automatic System Diagnosis identifies problems in the wireless system and gives you explicit actions for these problems. Automatic System Diagnosis determines what operational problems exist in four major areas corresponding to the vertical bars in the graph in Diagnosis Display Screen on page 47.

1. **System Faults**

   System Faults provides an overall view of detected system faults, since the last system autodiagnosis on a live system, in the following categories:

   •Base Station resets

   •Radio resets

   •Synchronization failures

   •Lost integrity

   Alarms and warnings are issued based on the number of times the fault has occurred.

2. **Signals**

   Signals examines the average signal strength of individual radios and cells in the wireless system.

   Radio signal statistics are calculated for the elapsed time since the last system reset.To get enough radio signal samples to allow accurate analysis, the system should have been operating for about a week. If the number of samples for a given radio or cell is below a system- calculated threshold, the analysis is not done for that radio or cell.

   There are two types of warnings issued in this category.

   a. The average radio RSSI is weak in a cell.

      This warning is issued for cells whose radios have an average Receive Signal Strength Indicator (RSSI) below a system-

calculated threshold. The cause of a weak average radio RSSI in a cell may be high traffic in adjacent cells.

b.   The average radio RSSI is weak for a radio.

This warning is issued for radios whose average RSSI is below a threshold. The calculated threshold is based on the quality of service measure. If a radio in a Base Station is demonstrating low RSSI, it must be checked against the other radio in the Base Station.

3.   Interference

Interference examines the channel occupancy pattern. If the higher channel segments are used more than the lower ones, this is an indication of a potential source of interference.

4.   Traffic

Traffic examines individual radios and cells for traffic overloading.

Traffic statistics are kept for the last 24 hours of operation. Every hour is checked for high traffic conditions for both cells and radios.

There are three types of warnings issued in this category.

a.   Total traffic is high in a cell.

This warning is issued for cells whose total traffic (i.e. the sum of the traffic on all radios in the cell) is greater than a pre-defined threshold (currently set to 2.4 Erlangs). When this situation occurs, the cell starts to run out of free channels or radios. In this case you should add another Base Station to the cell and/or redeploy the system focusing on increasing the cell density near the high traffic cell.

b.   Average radio traffic is high in a cell.

This warning is issued for cells whose average radio traffic is greater than a system calculated threshold. When this situation occurs, there is a high probability that a call attempt will be blocked because there are no radios available in the cell. In this case, you should add another Base Station to the cell.

c. Average radio traffic is high for a given radio, and another radio in the same cell has handled little or no traffic.

When this situation occurs, there is a high probability that the radio that has handled a small percentage of the traffic is not functioning properly. In this case, you should check the radio to determine if it is functioning properly.

Note: If the low traffic radio has been operating as a CSC radio for a significant percentage of the past 24 hours, then this warning is not issued.

Figure 10: Diagnosis Display Screen
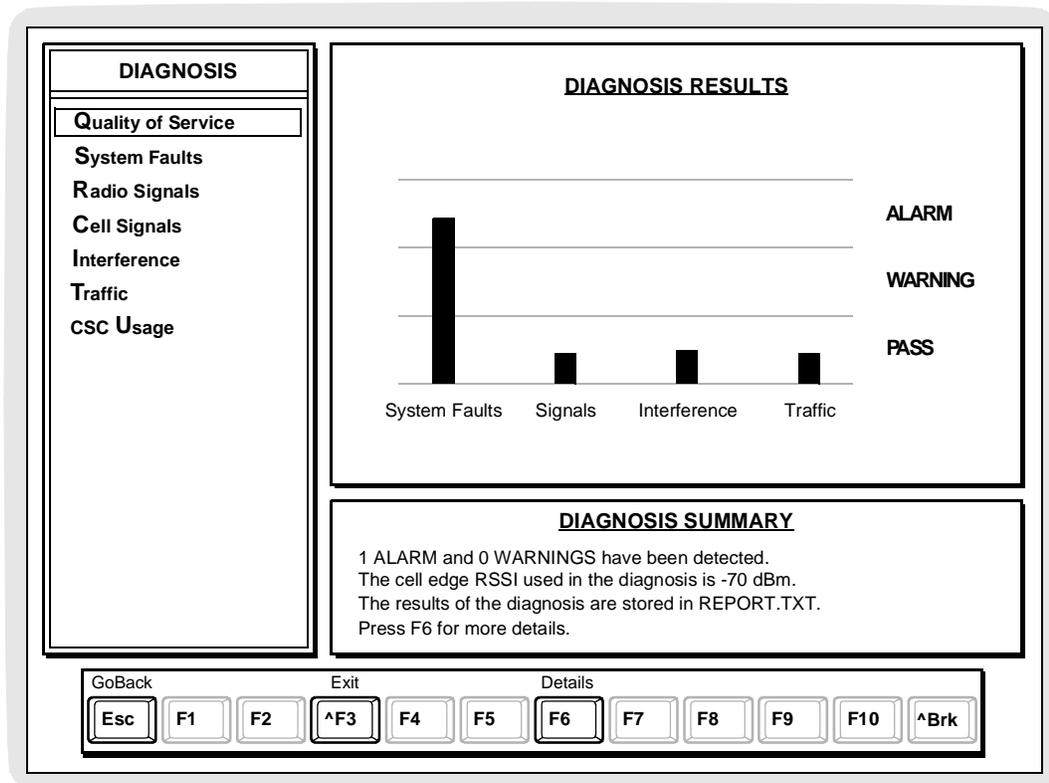
The 'DIAGNOSIS RESULTS' bar chart shown in the **data window** tells you if the system is performing within normal operating ranges.

A textual explanation is generated if any bar on the graph crosses the warning or alarm threshold lines in the graph. If any alarms or warnings have been detected, you can see more details by pressing F6. This text screen can be scrolled to provide more details and suggestions for actions you can take.To go back to the graph, press F6 again.

ALARM area

If any bar on the chart reaches into the 'ALARM' area, there are system performance faults that should be resolved. Press F6 to display details of events that caused the warnings and/or alarms and the recommended actions (see Figure 12).

WARNING area

If any bar on the chart reaches into the 'WARNING' area there is sub-standard system performance. You can toggle to the text screen with F6 to see details of events that caused the warnings and/or alarms and the recommended actions.

PASS area

Bars on the chart in the 'PASS' area indicate that there were no problems found in the diagnosis.

Text Screen Controls

If there is more than one page of information, you can scroll through the text using the Up and Down softkeys or the page-up and page-down keys in the PC keypad.

Note: The results of the diagnosis will be recorded in REPORT.TXT.

Figure 11: Diagnosis Text

```
┌─────────────────────────────────────────────────────────────────────────┐
│  ┌─────────────────────────┐  ┌────────────────────────────────────────┐ │
│  │      DIAGNOSIS          │  │  System Faults       1 Alarm(s) 0 Warning(s) │
│  │ ┌─────────────────────┐ │  │                                        │ │
│  │ │ Quality of Service  │ │  │  ALARM C202                            │ │
│  │ └─────────────────────┘ │  │                                        │ │
│  │  System Faults          │  │  Evaluation:    Base Station 0106 reset 1 time. │
│  │  Radio Signals          │  │                 The reset was softtrap 703. │
│  │  Cell Signals           │  │                                        │ │
│  │  Interference           │  │  Action:        Refer to Appendix in the CDS User Guide. │
│  │  Traffic                │  │                                        │ │
│  │  CSC Usage              │  │                                        │ │
│  │                         │  │                                        │ │
│  │                         │  └────────────────────────────────────────┘ │
│  │                         │  ┌────────────────────────────────────────┐ │
│  │                         │  │          DIAGNOSIS SUMMARY             │ │
│  │                         │  │  1 ALARM and 0 WARNINGS have been detected. │
│  │                         │  │  The cell edge RSSI used in the diagnosis is -70 dBm. │
│  │                         │  │  The results of the diagnosis are stored in REPORT.TXT. │
│  └─────────────────────────┘  │  Press F6 to return to diagnosis display. │
│                               └────────────────────────────────────────┘ │
│  ┌──────────────────────────────────────────────────────────────────────┐ │
│  │ GoBack        Exit        Display  Up   Down                         │ │
│  │ Esc  F1  F2  ^F3  F4  F5  F6  F7  F8  F9  F10  ^Brk                  │ │
│  └──────────────────────────────────────────────────────────────────────┘ │
└─────────────────────────────────────────────────────────────────────────┘
```

> *Note:* The CDS Automatic System Diagnosis carries out diagnosis on all available samples. For sample sizes less than 100, the amount of data is insufficient for meaningful diagnosis and no warning is issued.

> *Note:* For every alarm and warning, you should consult Appendix B for more details.

Diagnosis Menu Options

In most cases the Automatic System Diagnosis will meet your needs. However, if you need detailed statistics on a particular aspect of system operation, you can access the level 2 commands available under the Diagnosis menu. A series of diagnosis charts and tables is available, showing various operating statistics.

Quality of Service

Quality of Service (QOS) indicates overall wireless system status.

Figure 12: Quality of Service display screen
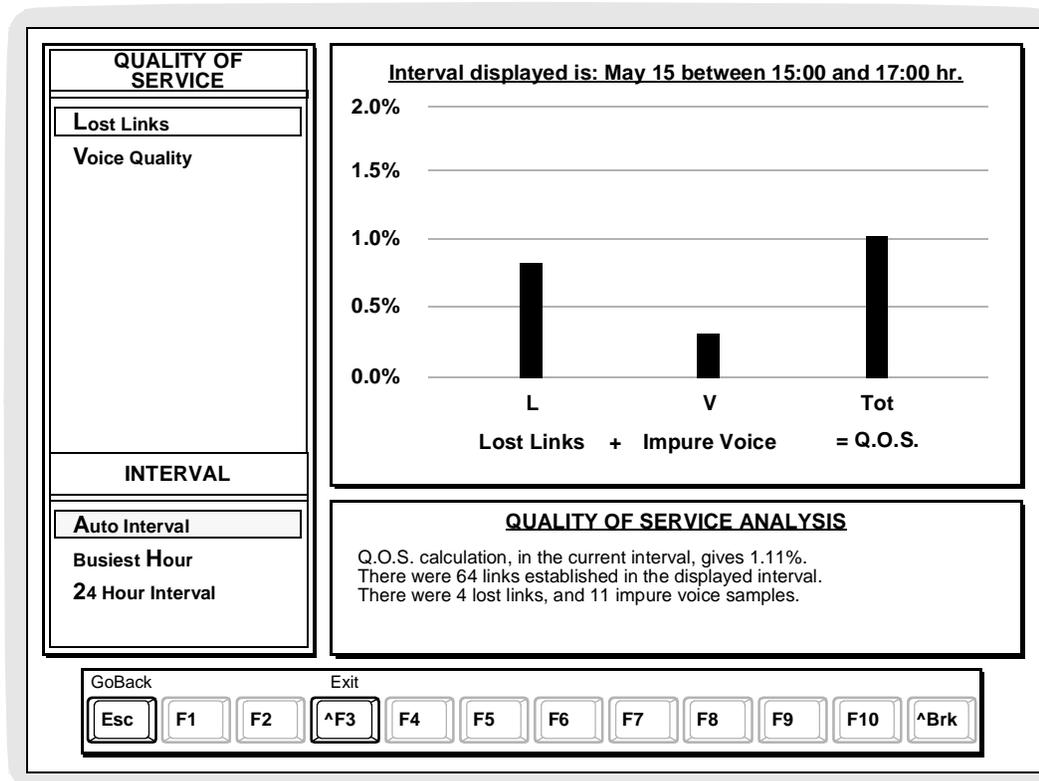
The **data window** presents a bar chart showing the overall quality of service percentage, and percentages for each of the components over the selected time interval. Lower percentages indicate better quality of service. The specific time interval is indicated above the bar graph.

Note: The maximum height of a bar presented in the data window is 2.0% because the majority of percentages fall well within the 0.0% to 2.0% range. If a bar height is at this maximum, see the dialogue window to determine the actual percentage.

By selecting from the Interval subcommand menu, you can view QOS data for the following:

- Auto Interval

  This interval is the sustained period of above average traffic in the last 24 hours. It is the default.

- Busiest Hour

  This interval is the busiest hour in the last 24 hours.

- 24 Hour Interval

  This interval is the last 24 hours.

The total QOS percentage over the selected time interval is currently calculated as follows:

$$\text{Total QOS\%} = \left(\frac{\text{\# of Lost Links}}{\text{\# of Links Established}} + \frac{\text{\# of Impure Voice Samples}}{\text{\# of Voice Samples}} \right) \times 10$$

The **dialogue window** gives the total QOS percentage, the actual incidence for each component and the total number of links established over the selected time interval.

Quality of Service components

You can view detailed information on any of the available QOS components by selecting from the level 3 commands under the QOS menu. The Interval subcommands are also available on these level 3 command display screens.

Lost Links

Lost Links is a measure of the number of breaks in an established communication link between the portable and the radio. Lost links are a normal part of wireless system operation, but acceptable levels will vary from site to site.

Figure 13: Lost Links display screen
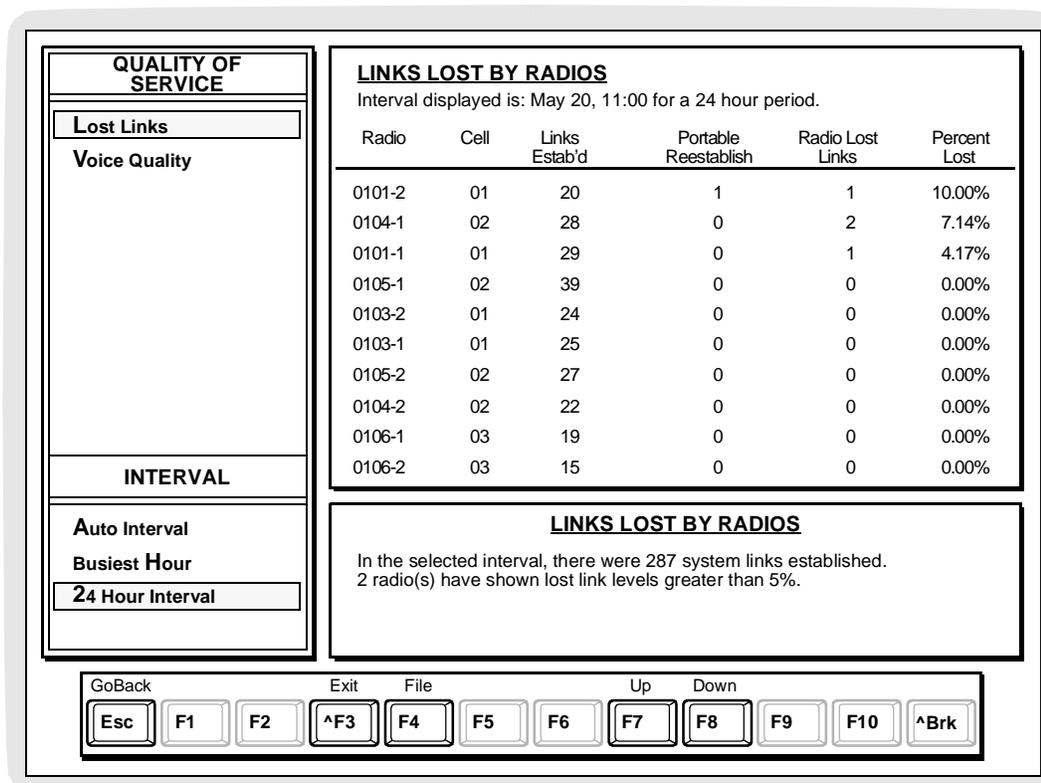
Either the portable or the radio can be the source of the lost link. Attempts to reestablish links are generally successful. A brief interruption in communication occurs before the link is reestablished. A dropped call results if the attempt to reestablish the link fails.

The **data window** presents, in table format, the number of both sources of lost links for each radio over the selected time interval. The specific time interval is indicated above the table. The

percentage of lost links for each radio is also presented. It is the total of lost links divided by the number of links established over the selected time interval. Radios are listed in order of the percentage of lost links, with the radio having the highest percentage of lost links placed first.

The number of links established over the selected time interval for each radio is also presented in the data window. Sample size is an important consideration when judging the validity of the statistics. The larger the sample size, the more meaningful the data.

The two sources of lost links are as follows:

Portable Reestablish

A portable may attempt to reestablish a link on a different channel when it identifies interference or signal loss on the current channel. The portable sends a reestablish message to the radio that results in the loss of the original link. If the attempt is successful a short voice break is experienced before a link is reestablished with the portable on a new channel.

Radio Lost Links

Links may also be lost when a radio cannot receive the portable's signal or when it cannot decipher the portable's signal. The portable attempts to reestablish the link after this radio link is lost. If the attempt is successful a short voice break is experienced before a link is reestablished on a new channel.
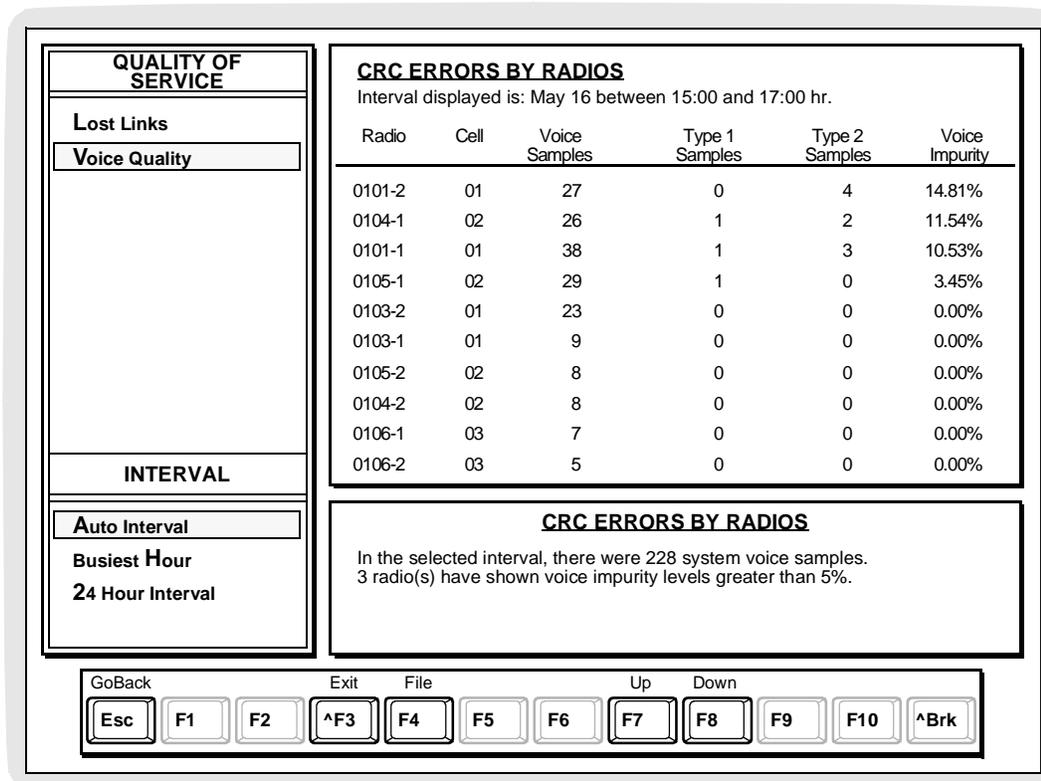
The **dialogue window** gives the number of system links established and the number of radios with lost link levels greater than 5% over the selected time interval.

Contents of the displayed screen may be filed in REPORT.TXT and R_RESULT.LOG by pressing F4. A **standard text editor (e.g., edit on DOS 5.0)** can be used to view this stored data.

Voice Quality

Voice Quality is the ratio of the number of impure voice transmissions over the number of transmission samples taken. Voice transmission sample quality is determined by counting Cyclic Redundancy Check (CRC) errors.

Figure 14: Voice Quality display screen.

QUALITY OF SERVICE		
CRC ERRORS BY RADIOS		
Interval displayed is: May 16 between 15:00 and 17:00 hr.		

Radio	Cell	Voice Samples	Type 1 Samples	Type 2 Samples	Voice Impurity
0101-2	01	27	0	4	14.81%
0104-1	02	26	1	2	11.54%
0101-1	01	38	1	3	10.53%
0105-1	02	29	1	0	3.45%
0103-2	01	23	0	0	0.00%
0103-1	01	9	0	0	0.00%
0105-2	02	8	0	0	0.00%
0104-2	02	8	0	0	0.00%
0106-1	03	7	0	0	0.00%
0106-2	03	5	0	0	0.00%

Left panel:
QUALITY OF SERVICE
Lost Links
Voice Quality

INTERVAL
Auto Interval
Busiest Hour
24 Hour Interval

CRC ERRORS BY RADIOS

In the selected interval, there were 228 system voice samples.
3 radio(s) have shown voice impurity levels greater than 5%.

GoBack			Exit	File			Up	Down			
Esc	F1	F2	^F3	F4	F5	F6	F7	F8	F9	F10	^Brk

The **data window** presents, in table format, the number of Type 1 and Type 2 voice samples, and the percentage of voice impurity for each radio over the selected time interval. The specific time interval is indicated above the table. Radios are listed in order of the percentage of voice impurity starting from the highest percentage.

The number of voice samples collected for each radio over the selected time interval is also presented in the data window. Sample size is an important consideration when judging the validity of the statistics. The larger the sample size, the more meaningful the data.

Voice impurities are a normal occurrence and are to be expected in the operation of a wireless system. The extent to which these levels of voice impurity are found to be disruptive will vary with each individual wireless system user.

The level of voice impurity increases with greater distance between the portable and the radio and higher radio traffic. Impure voice samples are categorized by level of severity as Type 1 or Type 2. These categories are described as follows:

Type 1 Samples

The human ear is just capable of discerning the lower levels of a Type 1 sample. User perception increases at the upper levels of a Type 1 sample and may be manifested as clicks, pops or muted intervals.

Type 1 Samples contain at least one instance of a detected CRC Packet Error Rate greater than 1.3 per second and less than or equal to 3.6 per second. This sample of digitally encoded voice is taken from a 15 second interval and corresponds to an average bit error rate greater than two in 1000 bits and less than or equal to seven in 1000 bits.

Type 2 Samples

Type 2 samples are readily perceived by the user and may be heard as hissing or garbled speech in addition to the Type 1 sample manifestations.

Type 2 Samples contain at least one instance of a detected CRC Packet Error Rate greater than 3.6 per second. This sample of digitally encoded voice is taken from a 15 second interval and corresponds to an average bit error rate greater than seven in 1000 bits.

Voice Impurity

Voice Impurity is a percentage calculated for each radio by adding the radio's Type 1 and Type 2 samples and dividing by the number of voice samples collected over the selected time interval.

The **dialogue window** gives the number of system voice samples taken and the number of radios with voice impurity levels greater than 5% over the selected time interval.

Contents of the displayed screen may be filed in REPORT.TXT and R_RESULT.LOG by pressing F4. A **standard text editor (e.g., edit on DOS 5.0)** can be used to view this stored data.

System Faults

System Faults is an overall view of detected system faults as indicated by the number of:

• Base Station Resets

• Radio Resets

• Synchronization (Synch.) Failures

• Lost Integrity

Figure 15: System Faults display screen.
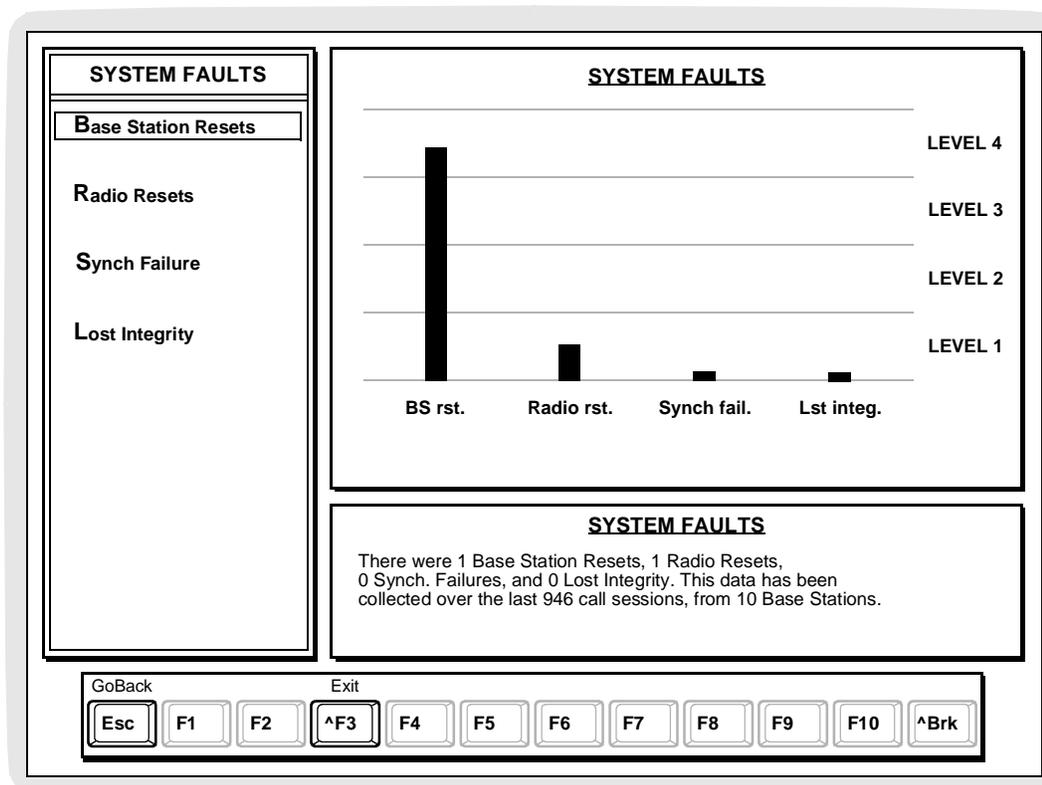
The **data window** presents a bar graph that classifies each of these four components by performance level. Performance levels are based on the number of system fault occurrences since the last wireless system power up. The criterion for each level is listed below. Base Station Resets are only classified as Level 1 or Level 4.

Level 1

Level 1 indicates perfectly or near perfectly functioning hardware:

- Base Station Resets   0
- Radio Resets   ≤1
- Synch. Failure   ≤1
- Lost Integrity   ≤1

Level 2

Level 2 indicates that there have been two problem counts for an applicable component:

- Radio Resets   2
- Synch. Failure   2
- Lost Integrity   2

Level 3

Level 3 indicates that there have been three problem counts for an applicable component:

- Radio Resets   3
- Synch. Failure   3
- Lost Integrity   3

Level 4

Level 4 indicates that there have been enough problem counts to warrant concern:

- Base Station Resets   ≥1
- Radio Resets   ≥4
- Synch. Failure   ≥4
- Lost Integrity   ≥4

The **dialogue window** gives the actual incidence of each of the four components and the number of call sessions and Base Stations from which the data was collected.

System Faults components

You can view detailed information on the four System Faults components in table format by selecting from the level 3 commands available under the System Faults menu.

Note: System fault counters can be reset to zero manually or by power interruptions. Selecting the Clear Counters level 2 command from the Monitor menu resets these and all other counters to zero. Interruption of power to a Base Station resets all counters to zero for the affected Base Station. Interruption of power to the wireless system resets all Base Station counters across the system to zero except for Base Station Resets.

Base Station Resets

Base Station Resets gives the number of times each Base Station in the system has been reset since the last Base Station power-up.

Figure 16: Base Station Resets display screen
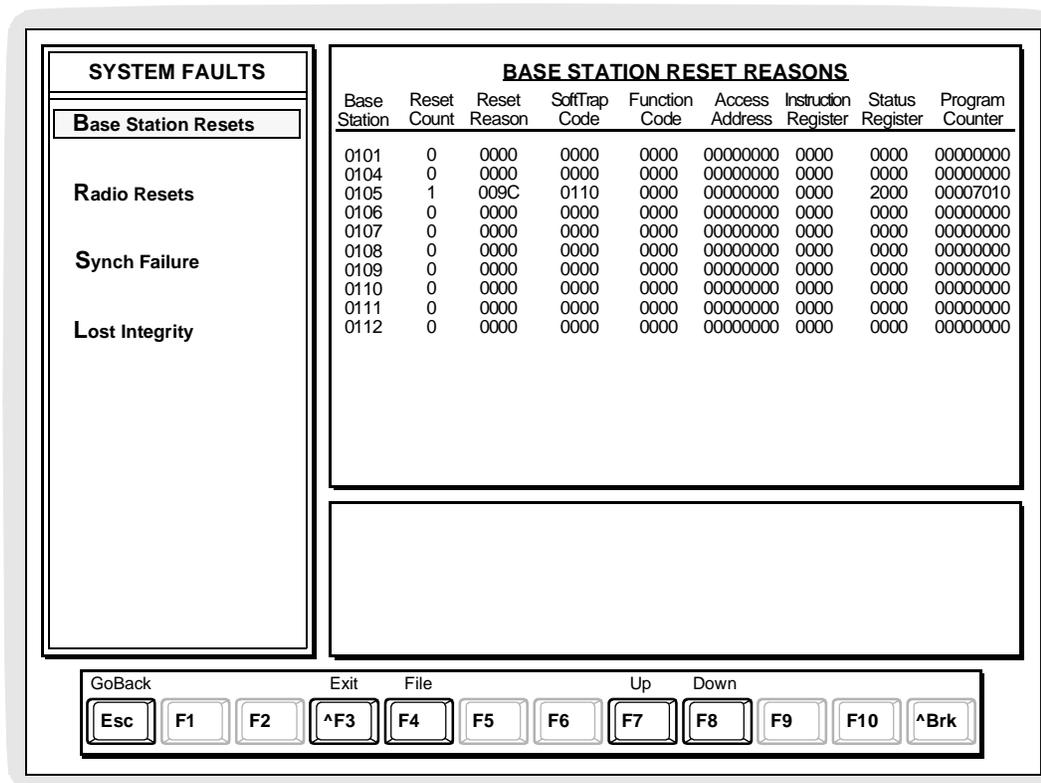
The **data window** presents the number of Base Station resets since the last Base Station power up. Codes indicating the reason for each reset and information necessary should the Base Station require servicing are also presented.

The most common causes of Base Station resets are manual disconnection of the TCM cable connecting the Base Station and the Controller, and interruption in the power supply to the Controller.

Both these causes of Base Station resets result in a Reset Reason 9C and a Softtrap Code 110.
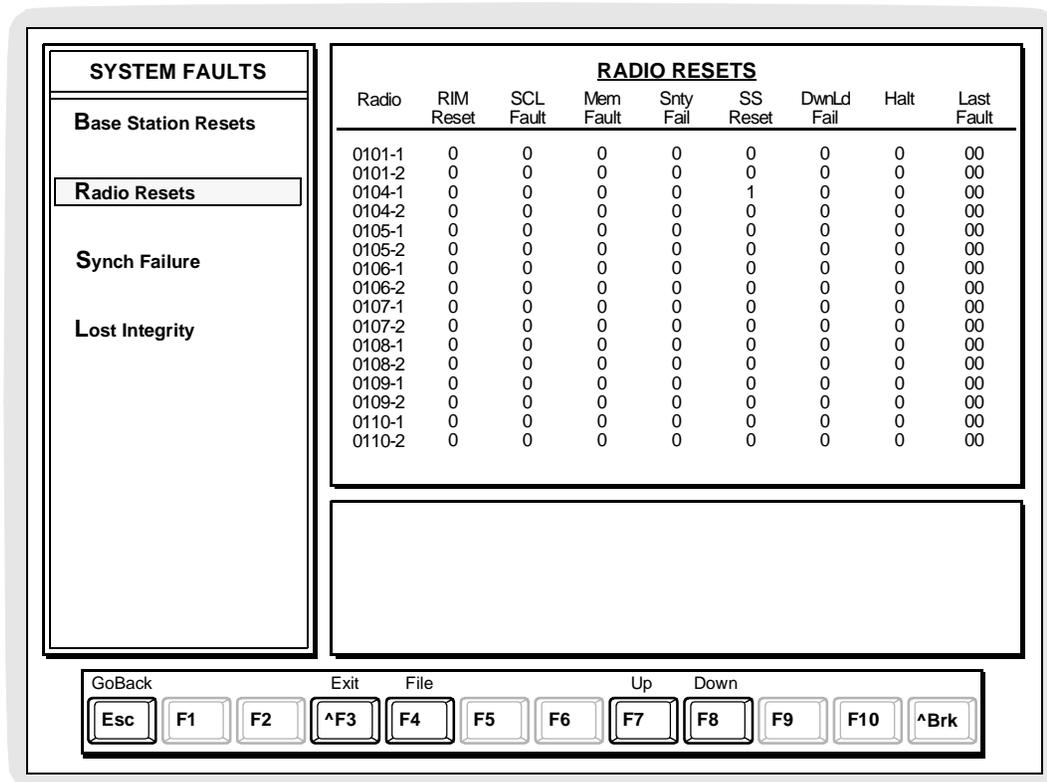
Note: When the 9C reason code is given and the reset did not result from either of these common causes, the RJ-11 connectors and TCM cable should be examined and replaced if necessary.

All other reasons indicate hardware problems for which the wireless system supplier should be consulted.

Radio Resets

Radio resets disable the radio. Any active calls are dropped. The other radio sharing the Base Station is not affected.

Figure 17: Radio Resets display screen

Radio	RIM Reset	SCL Fault	Mem Fault	Snty Fail	SS Reset	DwnLd Fail	Halt	Last Fault
0101-1	0	0	0	0	0	0	0	00
0101-2	0	0	0	0	0	0	0	00
0104-1	0	0	0	0	1	0	0	00
0104-2	0	0	0	0	0	0	0	00
0105-1	0	0	0	0	0	0	0	00
0105-2	0	0	0	0	0	0	0	00
0106-1	0	0	0	0	0	0	0	00
0106-2	0	0	0	0	0	0	0	00
0107-1	0	0	0	0	0	0	0	00
0107-2	0	0	0	0	0	0	0	00
0108-1	0	0	0	0	0	0	0	00
0108-2	0	0	0	0	0	0	0	00
0109-1	0	0	0	0	0	0	0	00
0109-2	0	0	0	0	0	0	0	00
0110-1	0	0	0	0	0	0	0	00
0110-2	0	0	0	0	0	0	0	00

Note: If a radio consistently malfunctions, the entire Base Station must be replaced.

The **data window** presents, for each radio, the number of times each type of radio reset has occurred since the last Base Station reset. The

data window also presents the most recent type of radio reset, and information necessary should the Base Station require servicing or replacement. The seven types of radio resets tracked by the Base Station, and their corresponding fault type codes, are as follows:

RIM Reset

A Radio Interface Module (RIM) Reset indicates that a spontaneous reset of the radio's RIM has occurred. Power fluctuations, high static discharges or intermittent hardware failure may be responsible. If power supply voltage is steady, and RIM resets persist, replace the Base Station.

SCL Fault

A Serial Communications Link (SCL) Fault indicates a failure in communication between the RIM and the Line Interface Module (LIM). An intermittent or complete failure of hardware, such as the internal connector between the RIM and the LIM, may be responsible. If this type of radio reset persists, replace the Base Station.

Memory Fault

A Memory Fault indicates that a problem reading or writing RIM memory exists. An intermittent problem, such as static discharge, or complete hardware failure may be responsible. If this type of radio reset persists, replace the Base Station.

Sanity Failure

When a Sanity Failure occurs, a RIM or LIM software problem is likely. Disconnect and then reconnect the power to the Base Station to ensure that the software load is not corrupt.

Note: If this type of radio reset persists, contact the wireless system supplier.

Station Set Reset

A Station Set (SS) Reset indicates that a problem exists either within the Controller or with the hardware connection between the Base Station and the Controller. Examine the Synch. Failure and Integrity Lost display screens to determine if the RJ-11 connectors or TCM cable are defective. If you confirm that a defective connection between the Controller and the Base Station is the source of the problem, replace the TCM cable and RJ-11 connectors.

Note: If the connection is not the problem, contact the wireless system supplier concerning a possible Controller malfunction.

Download Failure

A Download Failure indicates an intermittent hardware or software problem, which occurs only during Base Station or RIM initialization. This type of radio reset does not cause any problems for the user during normal wireless system operation. Notify the wireless system supplier at your convenience. If this type of radio reset is severe enough to cause a problem, it will be identified as a Halt Count.

Halt Count

A Halt Count indicates that persistent download failures or complete hardware failures have caused the Base Station to go out of service.

Note: A count of one for this type of radio reset is cause for alarm. Disconnect and then recondite the power to the Base Station. If the halt count persists, replace the Base Station.

Last Fault

If there is more than one type of radio reset for a radio, the Last Fault column indicates the most recent radio reset type by code as follows:

- RIM Reset   01
- SCL Fault   02, 03
- Memory Fault   04
- Sanity Failure   05
- SS Reset   06
- Download Failure   07
- Halt Count   08, 09, 0A

Synch. Failure

Synch Failure (Synchronization Failure) occurs when a Base Station experiences a problem with digital frame synchronization on the TCM cable connecting it to the Controller. The Base Station or the Controller receives incomplete frames from the other, and the shared frame reference point is lost. Automatic resynchronization occurs upon detection of a synchronization failure. Information being transmitted during the synchronization failure may be corrupted or lost.

Figure 18: Synch Failure display screen

The **data window** presents the number of times each Base Station has experienced synchronization failure since the last wireless system power-up.

Note: If the count for a particular Base Station is greater than four, examine the RJ-11 connectors and TCM cable, and replace them if necessary.

Lost Integrity

Lost Integrity occurs when corrupted data is received by the Base Station from the Controller. Lost integrity is transient and is usually caused by a problem with the connection between the Base Station and the Controller.

Figure 19: Lost Integrity display screen

The **data window** presents the number of times each Base Station has experienced lost integrity since the last wireless system power-up.

Note: If the count for a particular Base Station is greater than four, examine the RJ-11 connectors and TCM cable, and replace them if necessary.

Radio Signals

Radio Signals display screens may be used to examine the performance of individual radios on the wireless system. When you select a level 3 command from the Radio Signals menu, RSSI measures for regular radio traffic collected since the last Base Station reset are displayed.

A sufficient number of random samples must be taken for a radio before its performance can be properly judged. Generally, the wireless system should be running for a number of days, typically a week, before the Radio Signals display screens can be used to provide meaningful data. Seldom used radios may require an even longer period over which to collect random samples.

The three level 3 commands available under the Radio Signals menu to select the particular RSSI data of interest are:
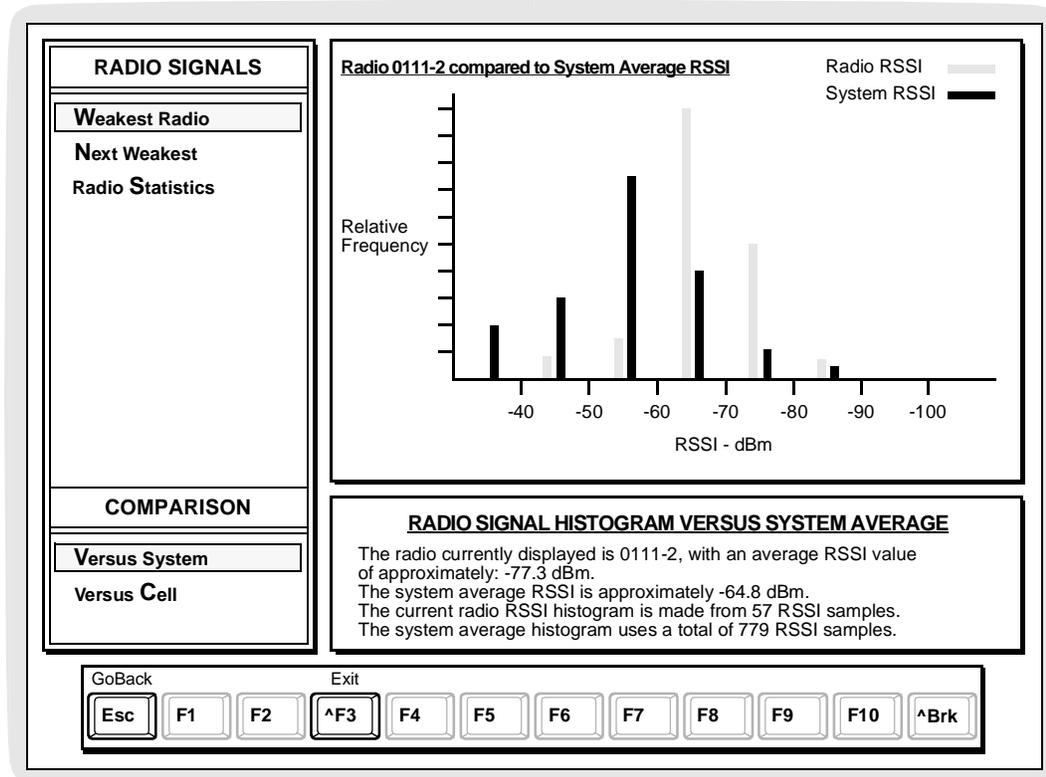
- Weakest Radio
- Next Weakest
- Radio Statistics

The Versus System or Versus Cell subcommands under the Comparison menu are currently used to compare the RSSI measures of an individual radio to the average system RSSI or the average cell RSSI.

Weakest Radio

The Weakest Radio level 3 command shows the RSSI data collected for the radio with the weakest average RSSI measure since the last Base Station reset.

Figure 20: Weakest Radio by System display screen

The Versus System comparison option of the Radio Signals display shows the weakest radio RSSI value compared with the average RSSI value of the **system**.

The **data window** presents a histogram plotting the RSSI distribution for the identified weakest radio against the system average RSSI distribution. The white or yellow bars, shown as hatched lines above, represent the radio RSSI; the black bars represent the RSSI of the whole system.

The **dialogue window** identifies the weakest radio and gives the average RSSI value and sample size for that radio. The average system RSSI value and system sample size are also given.

When the Versus Cell comparison option is chosen, the comparison is made against the average RSSI value of the cell to which the weakest radio belongs.

Next Weakest Radio

The Next Weakest level 3 command, upon initial selection, shows the RSSI data collected for the radio with the second weakest average RSSI measure since the last Base Station reset. Repeated selection of the Next Weakest level 3 command provides detail on each radio successively from the second weakest average RSSI to the strongest.

Figure 21: Next Weakest Radio display screen

The **data window** presents a histogram plotting the RSSI distribution for the identified radio against the system average RSSI distribution. The white or yellow bars, shown as hatched lines above, represent the radio RSSI, and the black bars represent the RSSI of the whole system.
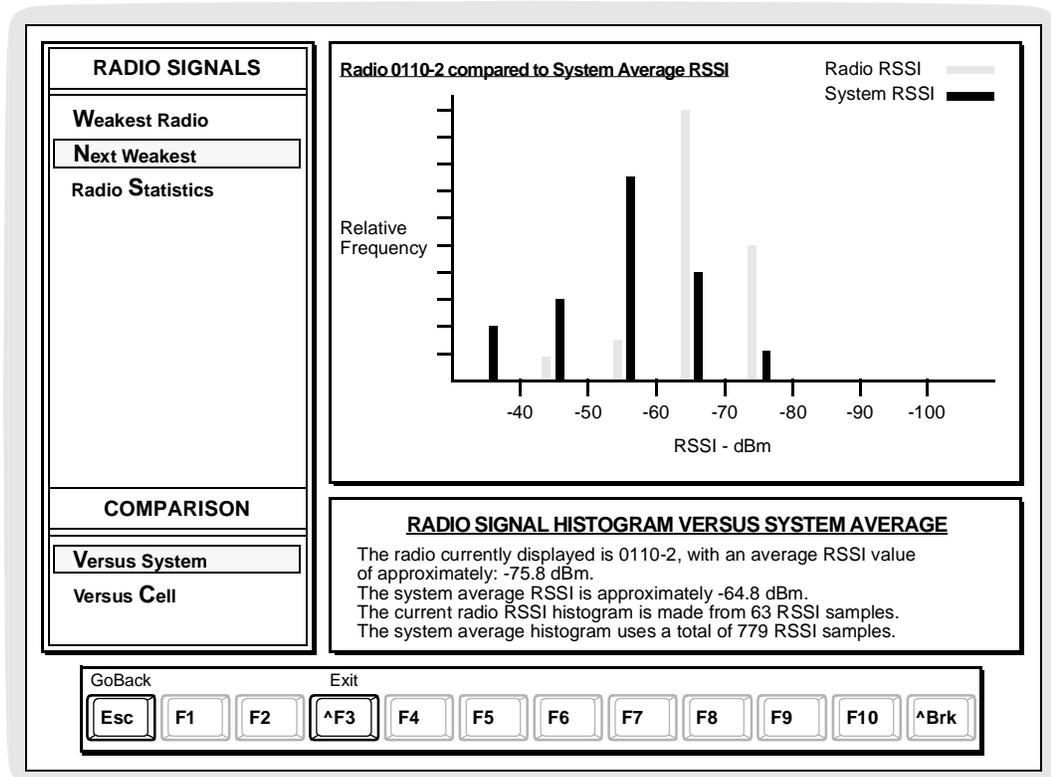
The **dialogue window** identifies the radio and gives the average RSSI value and sample size for that radio. The average system RSSI value and system sample size are also given.

Radio Statistics

Radio Statistics shows the radio signal data collected for all radios on the wireless system.

Figure 22: Radio Statistics display screen

Radio	Cell	Average RSSI	Sample Size	24 hr Links Estab'd	24hr Links Reestab	24hr Lost Links
0107-2	02	-75.0 dBm	18	12	5	0
0110-2	03	-70.0 dBm	59	6	3	0
0306-1	15	-69.3 dBm	115	15	9	0
0123-2	12	-68.3 dBm	23	6	8	0
0307-1	16	-66.4 dBm	89	12	4	0
0115-1	06	-65.0 dBm	92	8	3	0
0120-2	09	-65.0 dBm	123	15	10	0
0124-1	12	-64.8 dBm	95	16	7	0
0118-1	07	-64.7 dBm	245	18	14	0
0304-1	13	-63.5 dBm	167	19	12	0
0305-1	14	-61.6 dBm	65	13	5	0
0122-2	11	-61.4 dBm	93	7	7	0
0119-1	08	-60.7 dBm	74	17	4	0
0122-1	11	-60.6 dBm	145	14	10	0
0119-2	08	-60.0 dBm	64	10	9	0

The **data window** presents a table showing average RSSI values for each radio since the last Base Station reset. Radios are listed in order from weakest average RSSI value to strongest. The link information described below is collected for each radio and presented in the table as well.

The number of RSSI samples for each radio is also presented in the data window. Sample size is an important consideration when judging the validity of the statistics. The larger the sample size the more meaningful the data.

24hr Links Established

This column lists the number of links established by the radio over the last 24 hours.

24hr Links Reestablished

This column lists the number of times the radio handed off an established link due to mobility over the last 24 hours.

This type of hand-off occurs when a portable user moves from one cell to another during an active call. A voice break is experienced for a fraction of a second before the link is reestablished on the same channel.

24hr Lost Links

This column lists the number of times the radio handed off an established link due to interference over the last 24 hours.

This type of hand-off occurs when either the radio or the portable forces the loss of the established link on the current channel. The radio is the source of the lost link when it cannot decipher the portable's signal. The portable is the source of the lost link when it identifies interference or signal loss.

Regardless of the source of the lost link, a short voice break is experienced before the link is reestablished on another channel.

The **dialogue window** gives, for comparison, the average system RSSI value and the number of samples for the system. The dialogue window also identifies the radio with the weakest RSSI, and that radio's sample size.
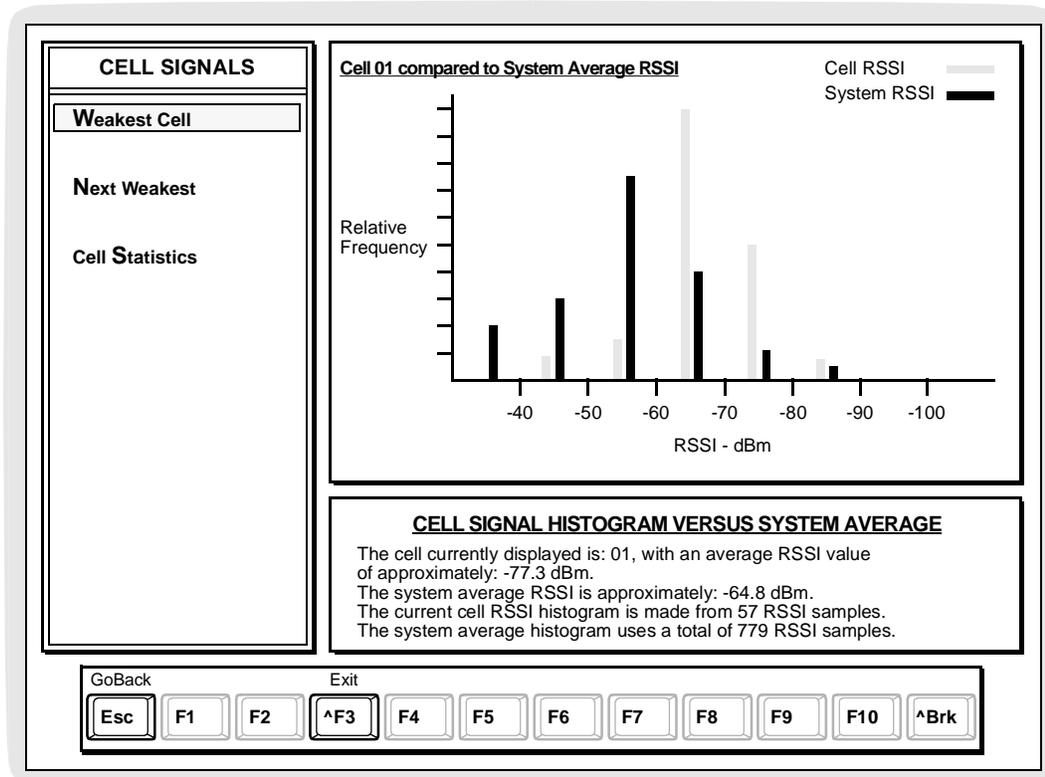
The 'Versus System' and 'Versus Cell' options are disabled on the Radio Statistics Display Screen.

Cell Signals

Weakest Cell

The Weakest Cell level 3 command shows the RSSI data collected for the cell with the weakest average RSSI measure.

Figure 23: Weakest Cell display screen

The **data window** presents a histogram plotting the RSSI distribution for the identified weakest cell against the system average RSSI distribution. The white or yellow bars, shown as hatched lines in the figure above, represent the cell RSSI. The black bars represent the RSSI of the whole system.

The **dialogue window** identifies the weakest cell and gives the average RSSI value and sample size for that cell. The average system RSSI value and system sample size are also given.

Next Weakest

The Next Weakest level 3 command, upon initial selection, shows the RSSI data collected for the cell with the second weakest average RSSI measure. Repeated selection of the Next Weakest level 3 command provides detail on each cell successively from the second weakest average RSSI to the strongest.

Cell Statistics

Cell Statistics shows the cell signal data collected for all the cells on the wireless system.

Figure 24: Cell Statistics display screen
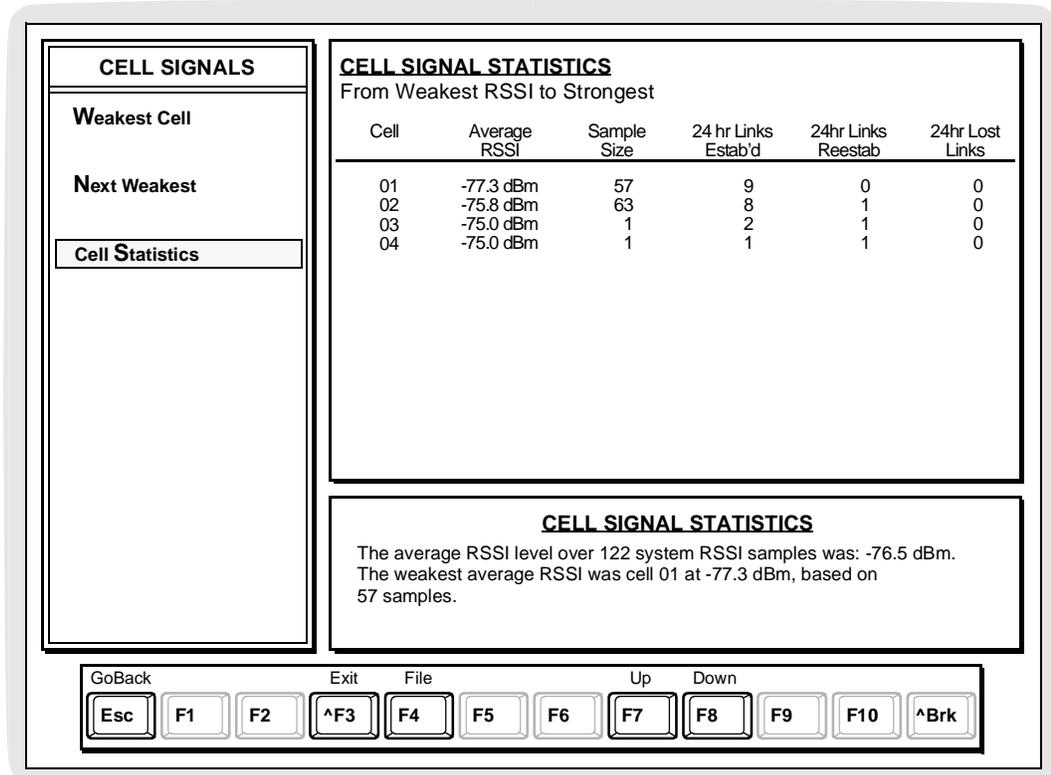
The **data window** presents a table showing average RSSI values for each cell. Cells are listed in numerical order. The link information described below is collected for each cell and presented in the table as well.

The number of RSSI samples for each cell is also presented in the data window. Sample size is an important consideration when judging the validity of the statistics. The larger the sample size the more meaningful the data.

24hr Links Established

This column lists the number of links established by the radios in the cell over the last 24 hours.

24hr Links Reestablished

This column lists the number of times the radios in the cell handed off an established link due to mobility over the last 24 hours.

This type of hand-off occurs when a portable user moves from one cell to another during an active call. The user experiences a voice break for a fraction of a second before the link is reestablished on the same channel.

24hr Lost Links

This column lists the number of times the radios in the cell handed off an established link due to interference over the last 24 hours.

This type of hand-off occurs when a radio or a portable forces the loss of the established link on the current channel. A radio is the source of a lost link when it cannot decipher the portable's signal. A portable is the source of a lost link when it identifies interference or signal loss.

The **dialogue window** gives, for comparison, the average system RSSI value and the number of samples for the system. The dialogue window also identifies the cell with the weakest average RSSI, and that cell's sample size.

Interference

Interference may be external or internal to the wireless system. The level 3 commands available under the Interference menu aid in the identification of these types of interference. Once identified, all sources of interference should be minimized.

Interference data is generally collected from all Base Stations on a per radio basis since the last wireless system reset. Individual Base Stations, and radios, may be reset in the interim.

Lost Link RSSI

Lost Link RSSI measures aid in the detection of internal interference and cell layout problems. These problems may be indicated by examining the range of RSSI levels at which links are lost with respect to the wireless system's normal cell boundary value. The cell boundary value is the RSSI level that defines the perimeter of the cell.

Figure 25: Lost Link RSSI display screen
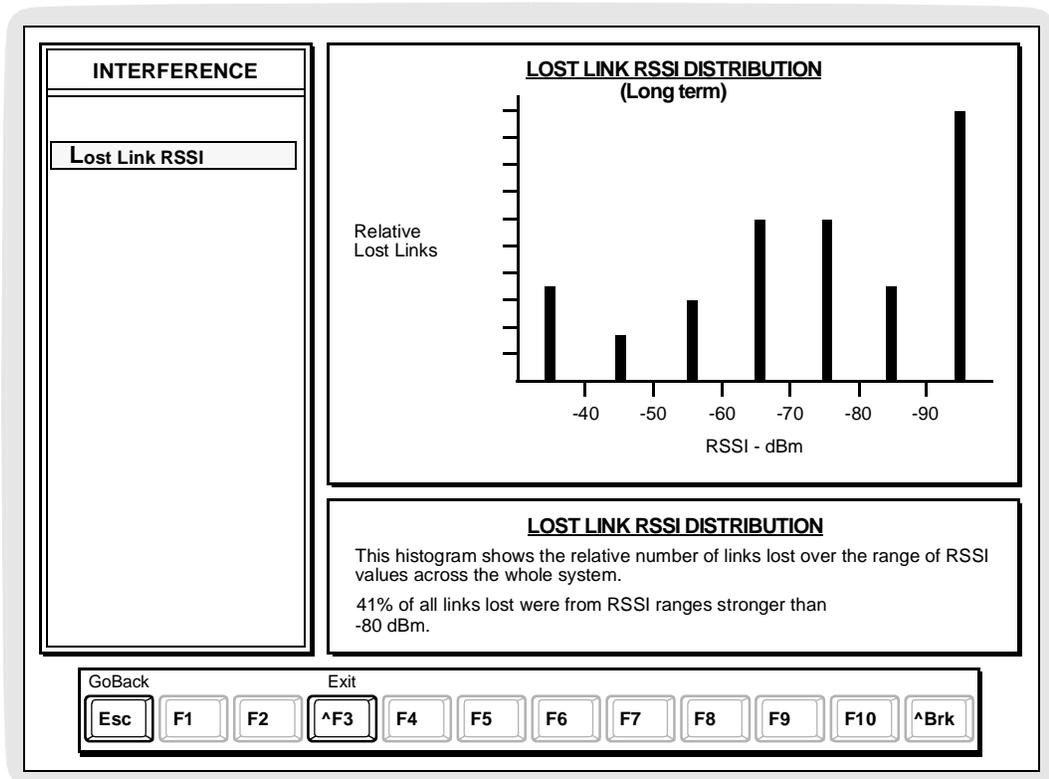
The **data window** presents a bar chart that plots the relative number of lost links across the typical range of system RSSI levels since the last wireless system reset. RSSI measurement units, dBm, are

negative numbers. The larger the RSSI measure, the stronger the radio signal (for example, -55 dBm is stronger than -80 dBm).

Links lost in RSSI ranges stronger than the normal RSSI cell boundary value may indicate internal interference caused by links established on the same channel in nearby cells.

When links are lost from ranges below the normal RSSI cell boundary value, the indication is that cell layout is ineffective or that users are attempting to go outside the bounds of the area covered by the wireless system.

The **dialogue window** gives commentary on the strength of the RSSI range from which most links were lost.

Traffic

Traffic measurements help identify problems with cell layout. If traffic is too high across all radios in a cell, the incidence of blocked calls will increase. Calls are blocked when links cannot be established because all radios in the cell are already in use.

Two subcommand menus are available under Traffic display screens. You can select either the Busiest Hour statistics or the Next Busiest hour statistics from the HOUR subcommand menu. You can also select either Bar Chart or Statistics from the Display subcommand menu.

Radio Occupancy

The Radio Occupancy Bar Chart measures how well radio traffic is distributed across the wireless system.

Figure 26: Radio Occupancy Bar Chart
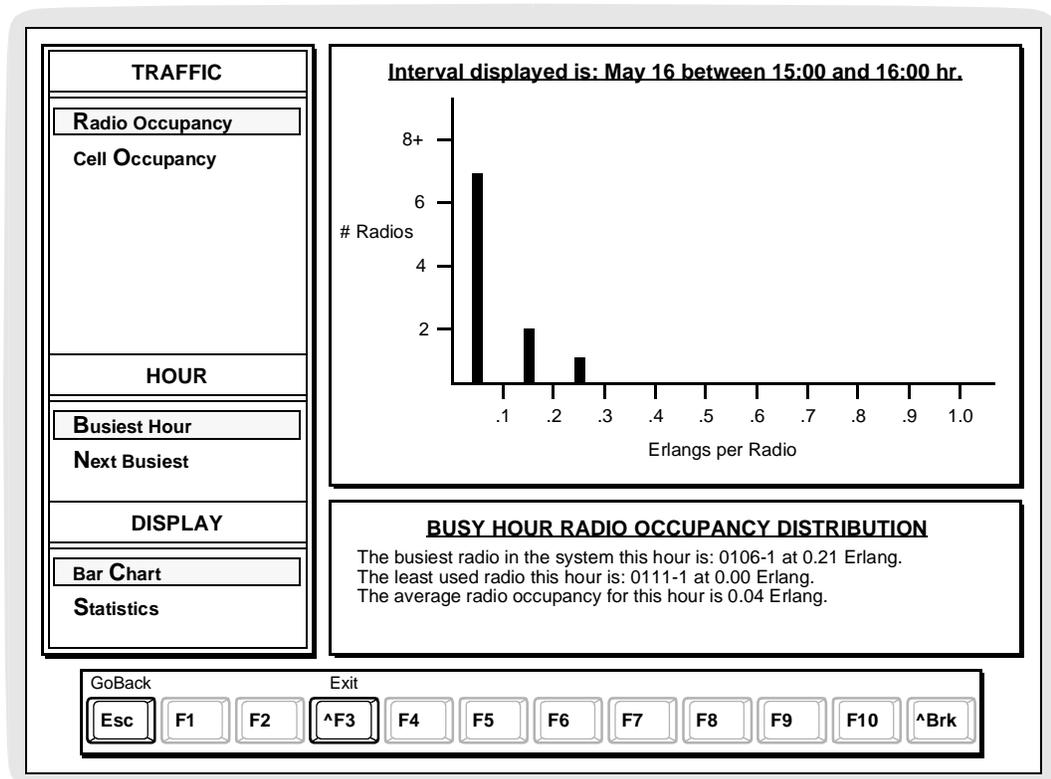
The **data window** presents a bar chart showing the number of radios plotted against Erlangs per radio over the selected time interval. The specific time interval is indicated above the bar chart. An Erlang is a ratio of the amount of time a radio is in use over a given time

interval. A radio occupancy measure of 1.0 Erlang indicates that the radio was in use for 100% of the selected time interval.

The **dialogue window** identifies the busiest and least used radios over the selected time interval and gives their respective occupancies in Erlangs. The system average radio occupancy is also given.

The Radio Occupancy Statistics screen provides traffic measures for each radio. You can use these statistics to examine cell occupancy measures by collecting data on each radio.

Figure 27: Radio Occupancy Statistics
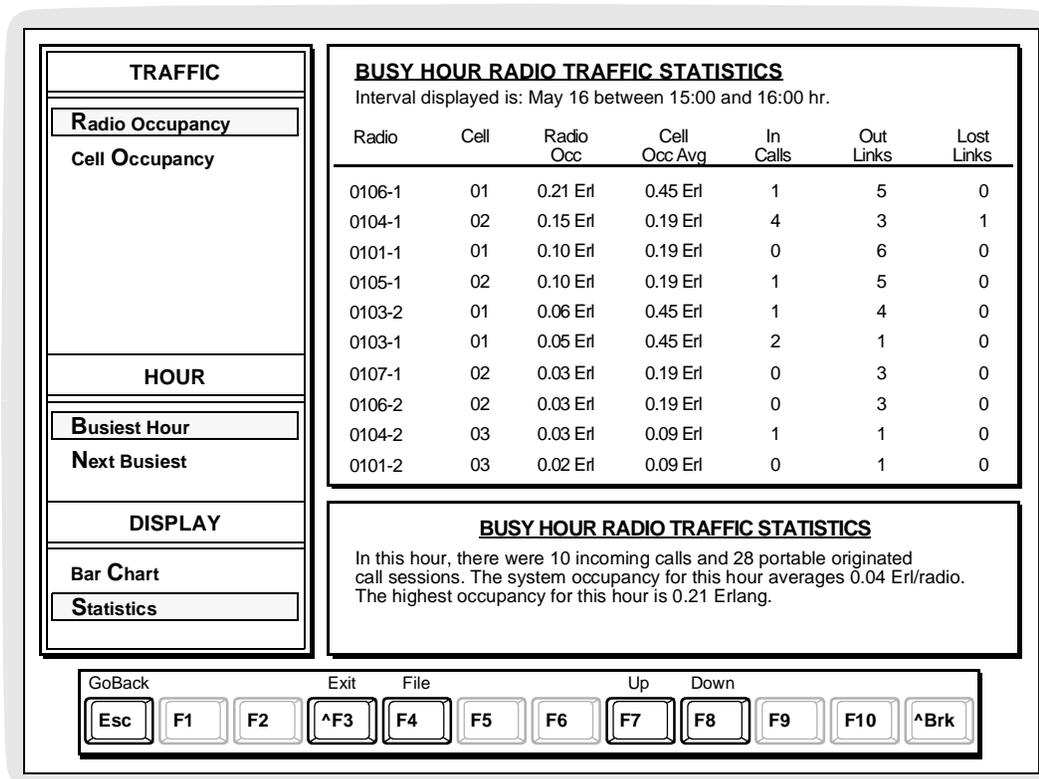
Occupancy measures must be examined on a per cell basis in order to determine if a traffic problem exists. A large number of radios in one cell with high Erlang values indicates a traffic problem. High traffic on one radio in a cell does not necessarily mean that calls are being blocked. A user may maintain an established link for the entire sample hour, but calls will not be blocked in that cell if other radios are available.

The **data window** presents a table that lists the occupancy measure for each radio in Erlangs over the selected time interval. The specific time interval is indicated above the table. Radios are listed in order, starting from the busiest as determined by the highest Erlang value.

The following information is collected for each radio and is also presented in the data window.

In Calls

This column lists the number of calls received by portables from the radio listed.

Out Links

This column lists the total number of links established by the portables to initiate call setup, plus the total number of links reestablished by portables due to interference or mobility hand-off (on the radio listed).

Lost Links

This column lists the total number of established links that were lost from the radio listed.

The **dialogue window** gives the number of incoming calls and the number of portable originated call sessions for the system over the selected time interval. The number of portable originated call sessions is the number of links established by portables less the number of links reestablished by portables less the number of links lost. The average system occupancy and the highest occupancy by a single radio are also given in Erlangs.

Cell Occupancy

The Cell Occupancy Bar Chart measures how well radio traffic is distributed across the wireless system at the cell level.

**Figure 28: Cell Occupancy Bar Chart**
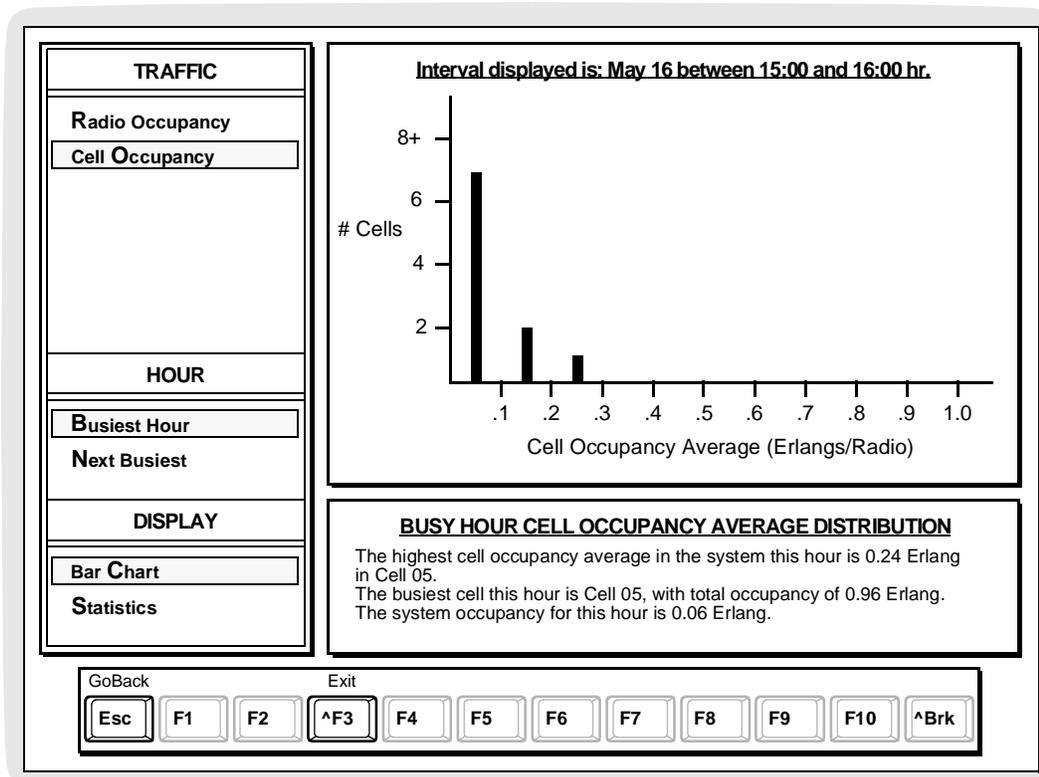
The **data window** presents a bar chart showing the number of cells plotted against the Cell Occupancy average over the selected time interval. The Cell Occupancy average is the total radio occupancy in the cell averaged over the total number of radios in that cell. The specific time interval is indicated above the bar chart. Radio occupancy is measured in Erlangs. An Erlang is a ratio of the amount of time a radio is in use over a given time interval. 1.0 Erlang indicates the radio was in use for 100% of the selected time interval.

The **dialogue window** identifies the busiest cells over the selected time interval and gives their respective occupancies in Erlangs. The system average cell occupancy is also given.

Cell Occupancy Statistics provide traffic measures for each cell. The total cell occupancy is the total radio occupancy in that cell. The Cell Occupancy average is the total cell occupancy divided by the total number of radios in the cell. You can use these statistics to find heavily used cells, under-provisioned cells and under-used cells, and to determine the overall cell traffic pattern.

Figure 29: Cell Occupancy Statistics
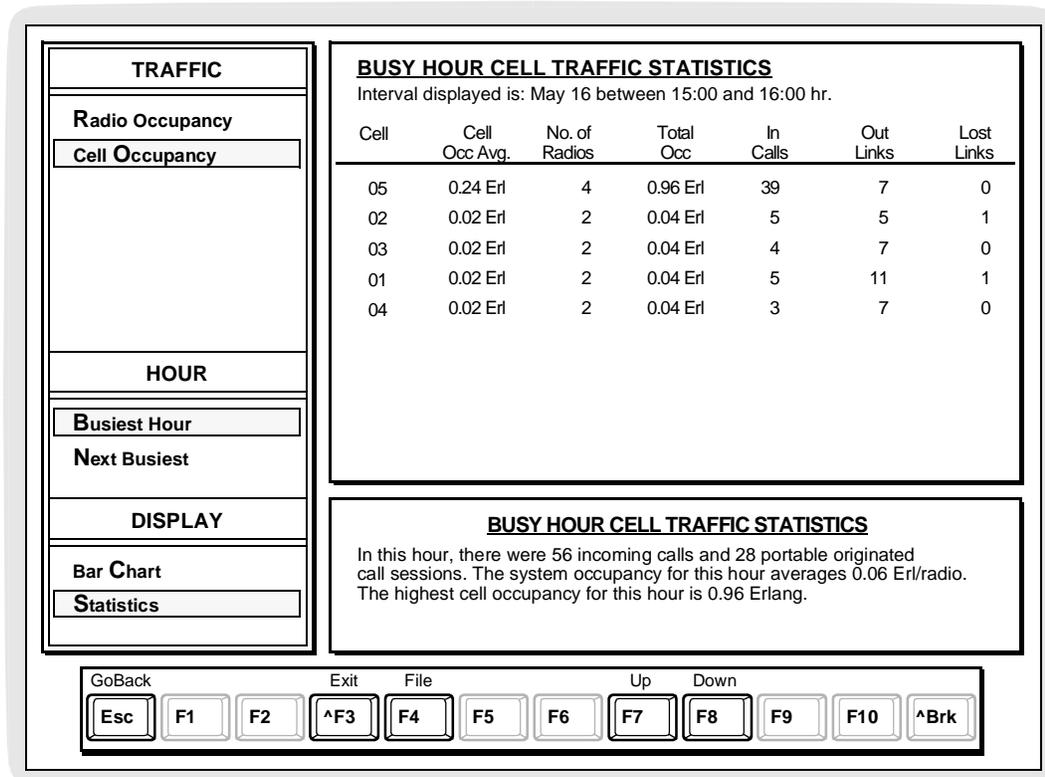
The **data window** presents a table that lists both the total and average occupancy measure of each cell in Erlangs over the selected time interval. The specific time interval is indicated above the table. Cells are listed in order, starting from the busiest as determined by the cell occupancy average. The following information is collected for each cell and is also presented in the data window.

In Calls

This column lists the number of calls received by portables from the radios in that cell.

Out Links

This column lists the total number of links established by the portables to initiate call setup plus the total number of links

reestablished by portables due to interference or mobility hand-off (for radios in the cell indicated).

Lost Links

This column lists the total number of established links that were lost.

The **dialogue window** gives the number of incoming calls and the number of portable-originated call sessions for the system over the selected time interval. The number of portable-originated call sessions is the number of links established by portables less the number of links reestablished by portables less the number of lost links. The average system occupancy and the highest occupancy by a single cell are also given in Erlangs.

CSC Usage

The CSC usage menu displays the CSC radio usage in terms of either cell statistics or radio statistics. This information can be looked at for the busiest hour or any subsequent hour. The default selections for this screen are cell statistics and busiest hour.

Figure 30: CSC Usage Cell Statistics Display Screen

```
         CSC USAGE              CELL CSC USAGE STATISTICS
                               Interval displayed is June 2 between 13:00 and 14:00 hr.
   Cell Statistics
                                 Cell      Number of          Percentage of time
   Radio Statistics                      Radios in Cell       CSC is available

                                  02          2                     55
                                  03          4                     61
                                  15          2                     68
                                  12          4                     76
                                  16          4                     76
                                  06          4                     83
                                  09          4                     83
                                  04          6                     85
                                  07          4                     86
                                  13          4                     90
                                  14          6                     90
                                  11          4                     95
                                  01          4                     97
                                  05          8                    100
                                  08          6                    100

           HOUR

   Busiest Hour
   Next Busiest


   GoBack              Exit    File              Up    Down
   Esc    F1     F2    ^F3     F4    F5    F6    F7    F8    F9    F10    ^Brk
```
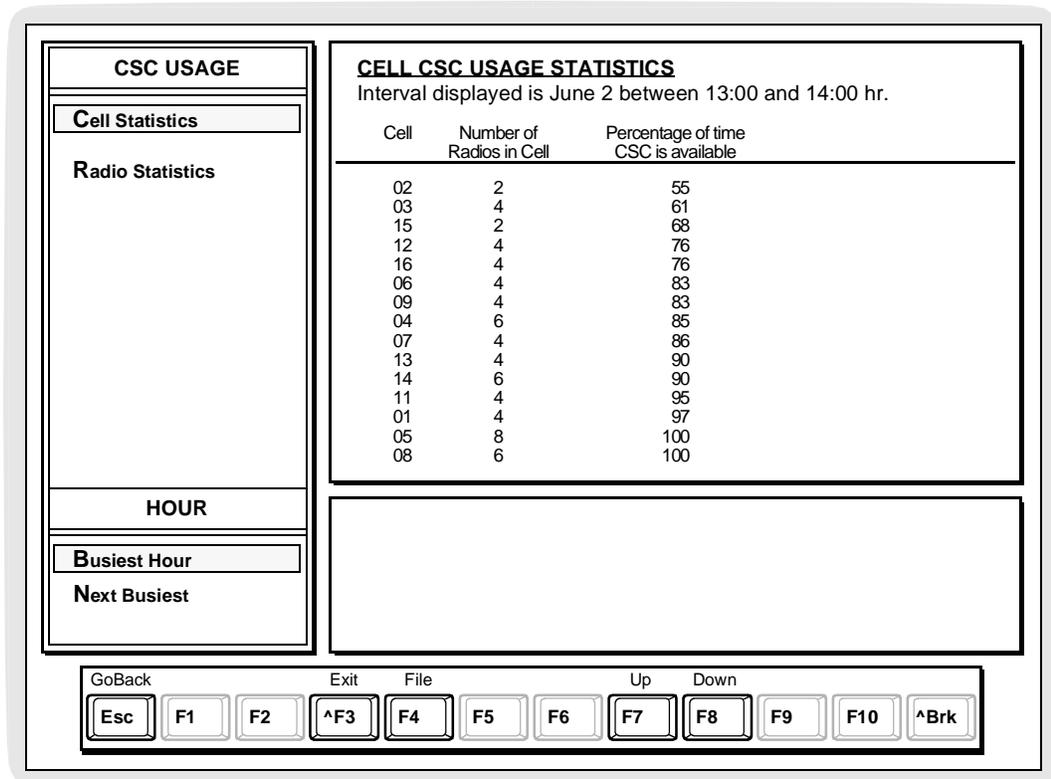
Cell statistics shows, for each cell, the percentage of time a CSC radio is available for the chosen hour.

The **data window** presents a table showing the cells, the number of radios in the cell, and the percentage of time a CSC radio is available in each cell. The data is displayed in order of increasing CSC radio availability.

Radio Statistics shows the percentage of time each radio serves as a CSC radio.

Figure 31: CSC Usage Radio Statistics Display Screen
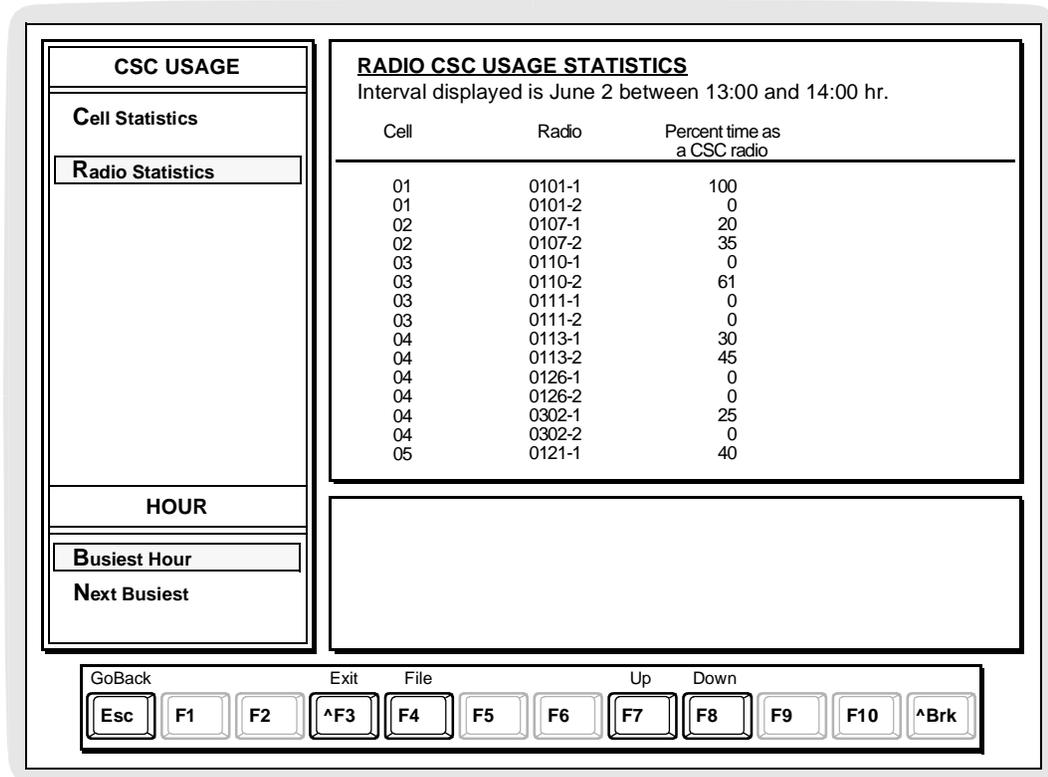
The **data window** presents a table showing each radio grouped into cells, the percentage of time each radio serves as a CSC radio, and the number of portable registrations. Data is displayed in order of increasing cell number.

Monitor

The Monitor display screen offers a choice of five different level 2 command paths. The Monitor display screens examine specific parts of the wireless system in real time, and aid in the detection of individual malfunctioning radios, poor cell layout, and interference problems.

Figure 32: Monitor display screen
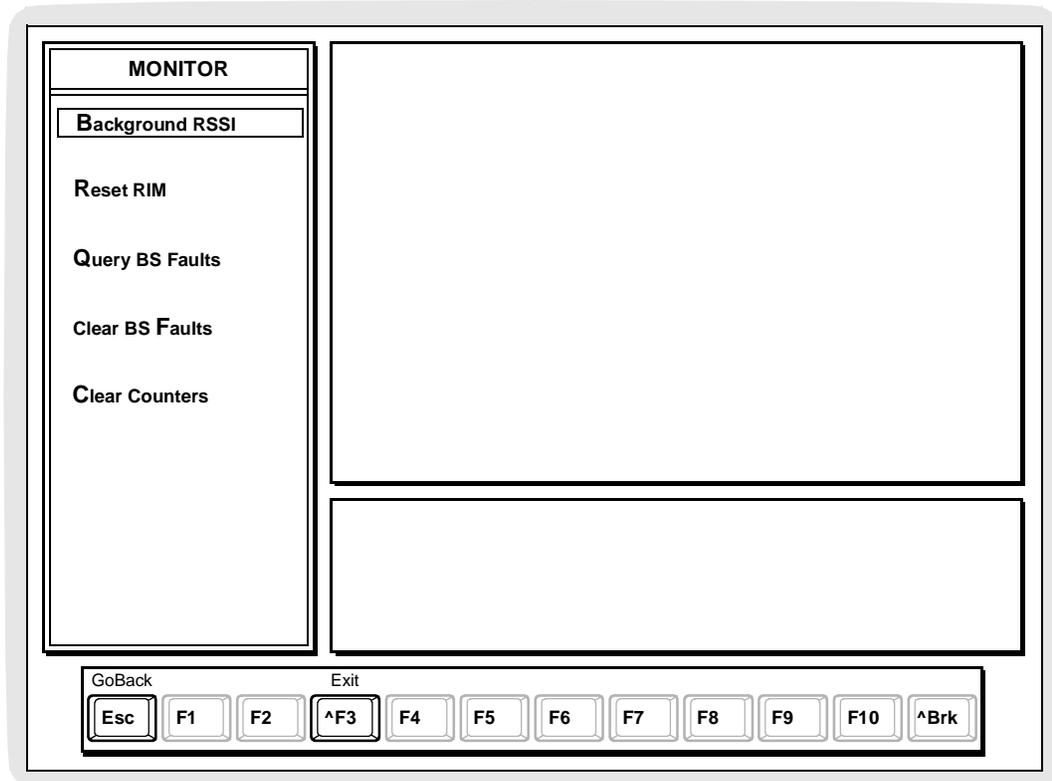
Note: If you select a saved dataset for your current CDS session, the Monitor display screens are not available.

Background RSSI

After you select Background RSSI from the Monitor menu, a screen prompts you to select the radio you wish to monitor. CDS identifies radios by a four-digit port number followed by a hyphen and a single digit radio number (for example, 0101-2).

Figure 33: Background RSSI radio selection
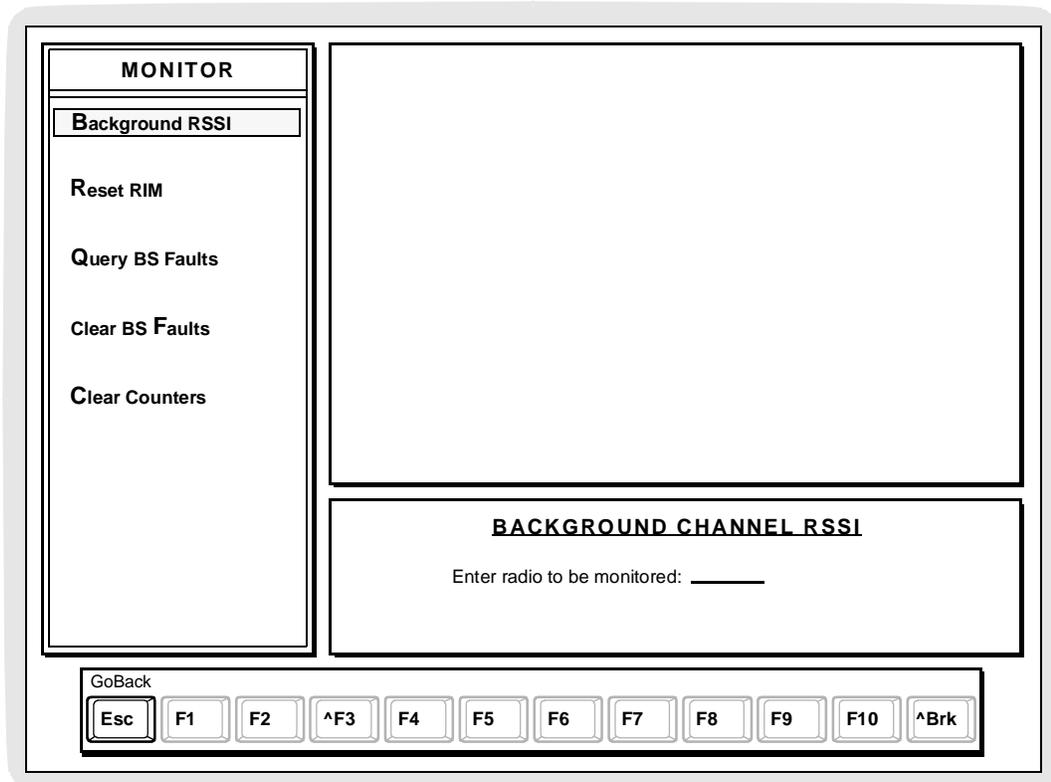
1. Type the radio identification and press:

   Enter

The radio you specify must be taken out of service to be monitored. A screen prompts you to confirm your request. In the **data window** a warning is given that the selected radio will be disabled while monitoring is taking place. Calls are not dropped because CDS waits until the radio is inactive before disabling it. The radio will be reactivated after monitoring is completed.

Figure 34: Background RSSI radio disable warning
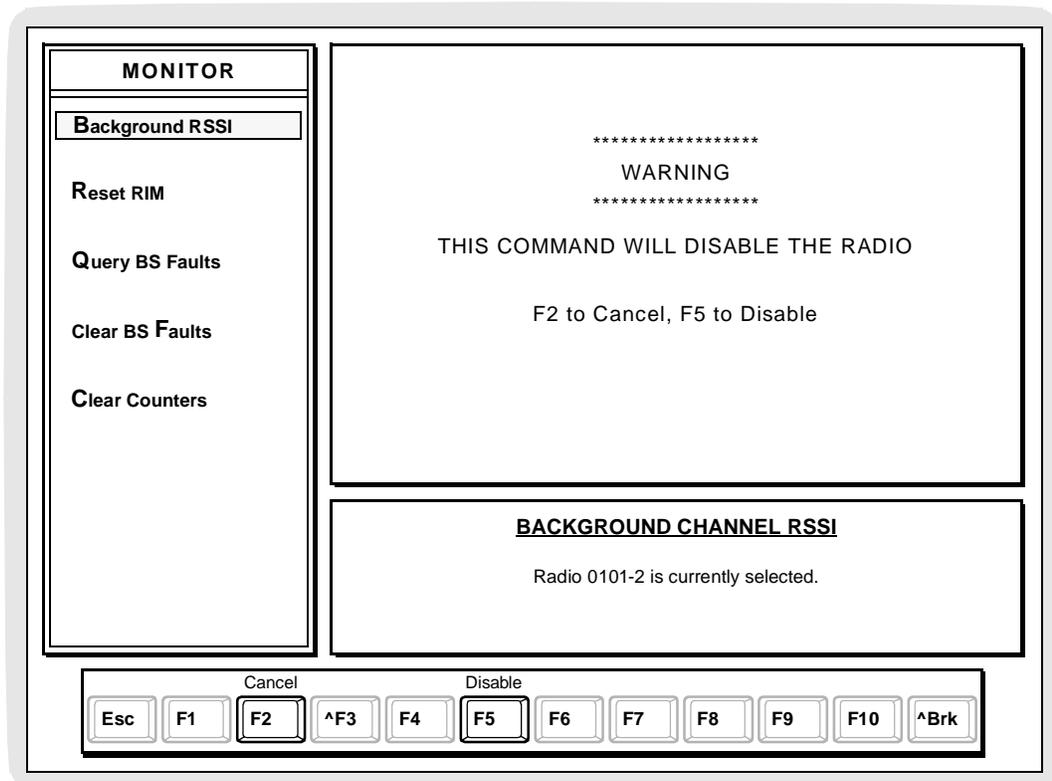
1. To continue, and to disable the radio, press:

   F5

   OR

   To cancel your request and return to the Monitor display screen, press:

   F2

Background RSSI allows you to monitor the RSSI readings of channels 1–99 from the perspective of the radio selected.

Figure 35: Background RSSI display screen
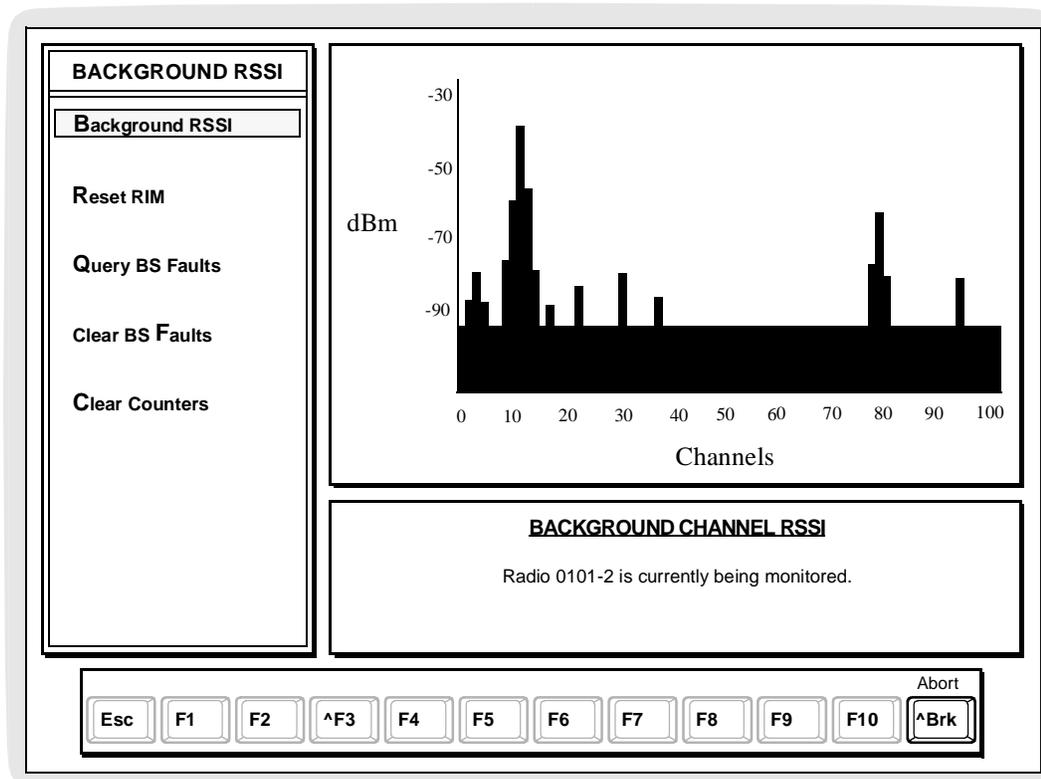
The **data window** displays a bar chart of data resulting from the channel monitoring. The signal level is indicated by the height of the channel RSSI bar. Internal or adjacent channel interference is indicated by an increase in the height of a bar next to an occupied channel.

You can also use this display screen to find external sources of interference. When there are no calls active on the wireless system (you may have to restrict access for a test period), the bar chart should be relatively flat at RSSI levels between -95 dBm and -110 dBm. If you do not observe this behavior, it is most likely that external interference is hindering the operation of the wireless system. Once identified, all sources of external interference should be eliminated if possible.

Note: If a call is active on the other radio of the Base Station associated with the selected radio, the RSSI of the channel on which the other radio's call is active is displayed as -35 dBm regardless of its true value. For example, if you are

monitoring a call on radio 0101-2 and there is also an active call on radio 0101-1, the RSSI level of the channel currently being used by radio 0101-1 is displayed as -35 dBm.

The **dialogue window** identifies the radio being monitored.

Reset RIM

After you select Reset RIM from the Monitor menu, a screen prompts you to select the radio whose RIM you wish to reset. CDS identifies radios by a four digit port number followed by a hyphen and the single digit radio number (for example, 0109-1).

Figure 36: Reset RIM radio selection

1.   Type the radio identification and press:

   Enter

The radio you specify must be taken out of service to be reset. A screen prompts you to confirm your request.

Figure 37: Reset RIM radio disable warning
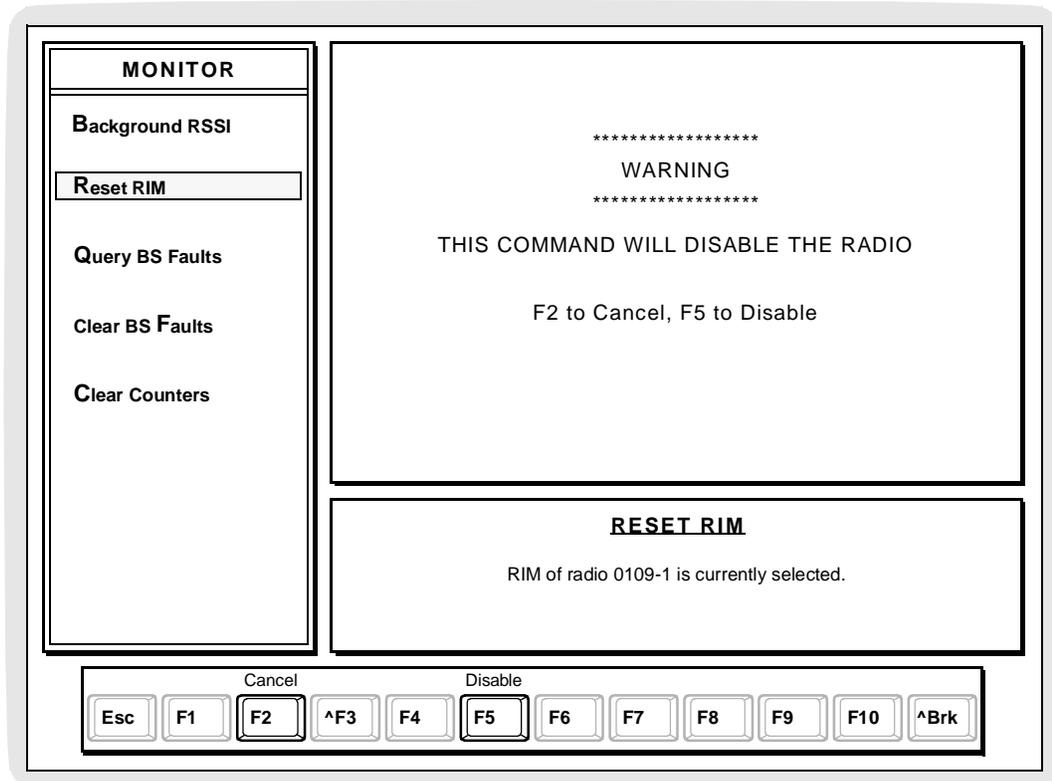
1. To continue, and disable the radio, press:

   F5

   OR

   To cancel your request and return to the Monitor display screen, press:

   F2

   If there is an active call on the selected radio, you cannot reset the radio. If you try, you see an error message saying, "Radio not suspended; either it is busy or it is missing."

The Reset RIM command resets the RIM of the selected radio.

Figure 38: Reset RIM display screen

```
+---------------------------------------------------------------+
|  +-------------------+  +------------------------------------+ |
|  |    MONITOR        |  |                                    | |
|  |                   |  |                                    | |
|  | Background RSSI   |  |                                    | |
|  |                   |  |                                    | |
|  | Reset RIM         |  |                                    | |
|  |                   |  |        RIM reset successful!       | |
|  | Query BS Faults   |  |                                    | |
|  |                   |  |                                    | |
|  | Clear BS Faults   |  |                                    | |
|  |                   |  |                                    | |
|  | Clear Counters    |  |                                    | |
|  |                   |  +------------------------------------+ |
|  |                   |  +------------------------------------+ |
|  |                   |  |           RESET RIM                | |
|  |                   |  | RIM of radio 0109-1 is being reset.| |
|  |                   |  | Please wait 30 seconds...          | |
|  +-------------------+  +------------------------------------+ |
|  GoBack                                                        |
|  +-----+ +---+ +---+ +----+ +---+ +---+ +---+ +---+ +---+ +---+ +----+ +-----+ |
|  | Esc | |F1 | |F2 | |^F3 | |F4 | |F5 | |F6 | |F7 | |F8 | |F9 | |F10 | |^Brk | |
|  +-----+ +---+ +---+ +----+ +---+ +---+ +---+ +---+ +---+ +---+ +----+ +-----+ |
+---------------------------------------------------------------+
```
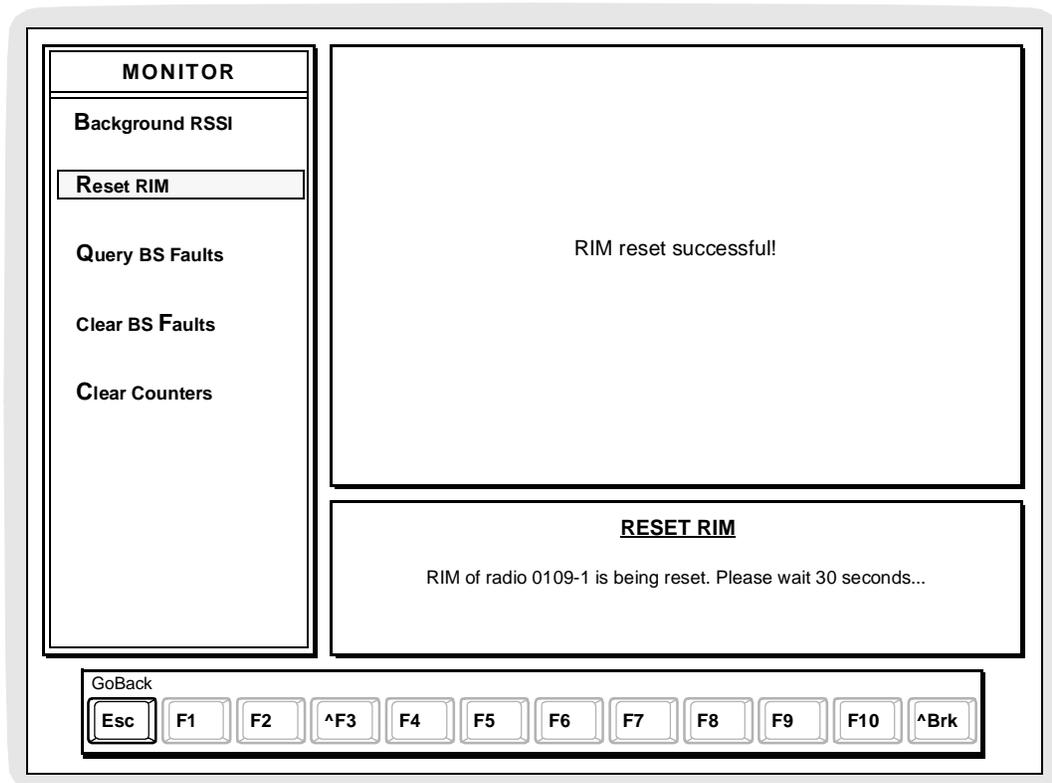
The **dialogue window** identifies the radio whose RIM is being reset.

The **data window** displays a message when the RIM Reset has been successfully executed, after which you are automatically returned to the Monitor display screen.

Query BS Faults

After you select Query Base Station (BS) Faults from the Monitor menu, a screen prompts you to select the Base Station you wish to monitor. CDS identifies a Base Station by a four-digit port number (for example, 0104).

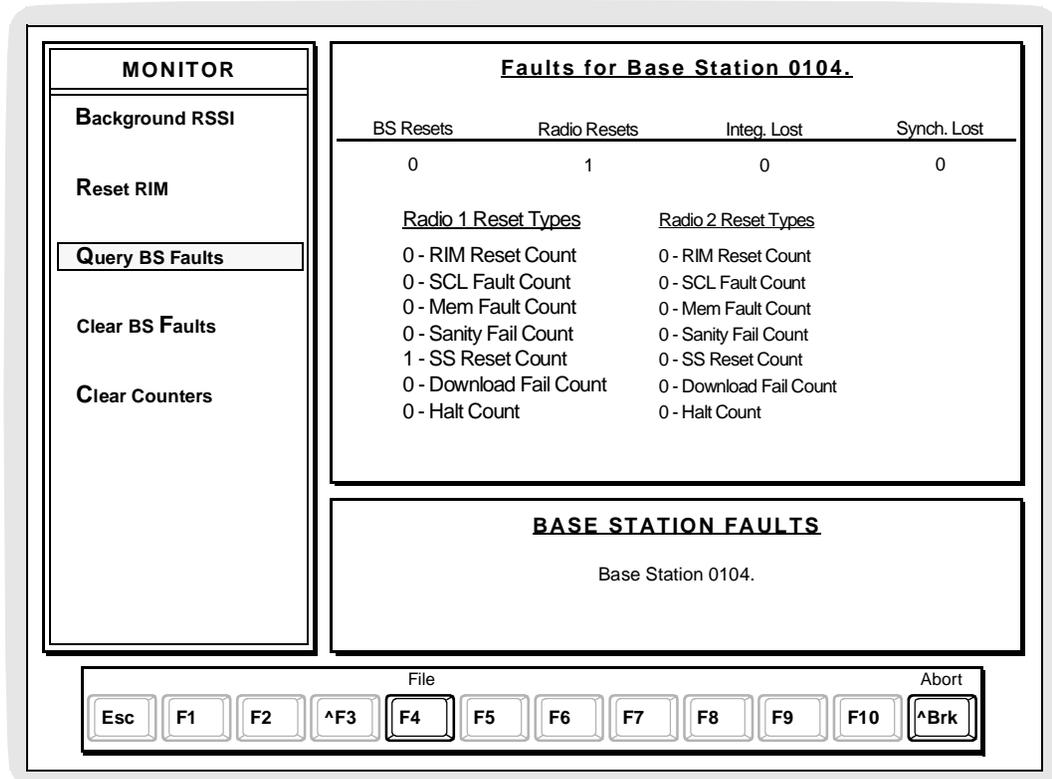**Figure 39: Query BS Faults Base Station selection**

1. Type the Base Station identification and press:

Enter

Query BS Faults summarizes the detected system faults for the selected Base Station.

Figure 40: Query BS Faults display screen

```
┌─────────────────────────────────────────────────────────────────────┐
│  ┌──────────────────┐   ┌────────────────────────────────────────┐   │
│  │    MONITOR       │   │     Faults for Base Station 0104.       │   │
│  │                  │   │                                         │   │
│  │ Background RSSI  │   │ BS Resets   Radio Resets  Integ. Lost  Synch. Lost │
│  │                  │   │    0            1             0            0       │
│  │ Reset RIM        │   │                                         │   │
│  │                  │   │  Radio 1 Reset Types    Radio 2 Reset Types │
│  │ Query BS Faults  │   │  0 - RIM Reset Count    0 - RIM Reset Count │
│  │                  │   │  0 - SCL Fault Count    0 - SCL Fault Count │
│  │ Clear BS Faults  │   │  0 - Mem Fault Count    0 - Mem Fault Count │
│  │                  │   │  0 - Sanity Fail Count  0 - Sanity Fail Count │
│  │ Clear Counters   │   │  1 - SS Reset Count     0 - SS Reset Count │
│  │                  │   │  0 - Download Fail Count 0 - Download Fail Count │
│  │                  │   │  0 - Halt Count         0 - Halt Count   │
│  │                  │   └────────────────────────────────────────┘   │
│  │                  │   ┌────────────────────────────────────────┐   │
│  │                  │   │       BASE STATION FAULTS               │   │
│  │                  │   │         Base Station 0104.              │   │
│  └──────────────────┘   └────────────────────────────────────────┘   │
│  ┌──────────────────────────────────────────────────────────────┐    │
│  │              File                                    Abort     │    │
│  │ Esc  F1  F2  ^F3  F4  F5  F6  F7  F8  F9  F10  ^Brk           │    │
│  └──────────────────────────────────────────────────────────────┘    │
└─────────────────────────────────────────────────────────────────────┘
```

The **data window** presents the number of system faults experienced by the selected Base Station since it was last reset. The system fault counts are categorized under the following columns:

- BS Resets
- Radio Resets
- Integrity Lost
- Synch. Lost

These categories correspond to the System Faults display screens available under the Diagnosis menu. See 'System Faults components' in the Diagnosis section of this guide for more information on the categories listed.

Radio Reset Types are also presented for each radio of the selected Base Station. See 'Radio Resets' in the Diagnosis section of this guide for definitions of the types of radio resets listed.

If you require more detailed data on a system fault experienced by the selected Base Station, select the corresponding display screen from the System Faults menu.

The **dialogue window** identifies the Base Station for which system faults are being displayed.

In Query BS Faults the contents of the displayed screen may be filed in R_RESULT.LOG by pressing F4. A standard text editor (e.g., edit on DOS 5.0) can be used to view this stored data.

Clear BS Faults

The Clear BS Faults command clears all Base Station fault data. Calls in progress are not affected.

Figure 41: Clear BS Faults display screen
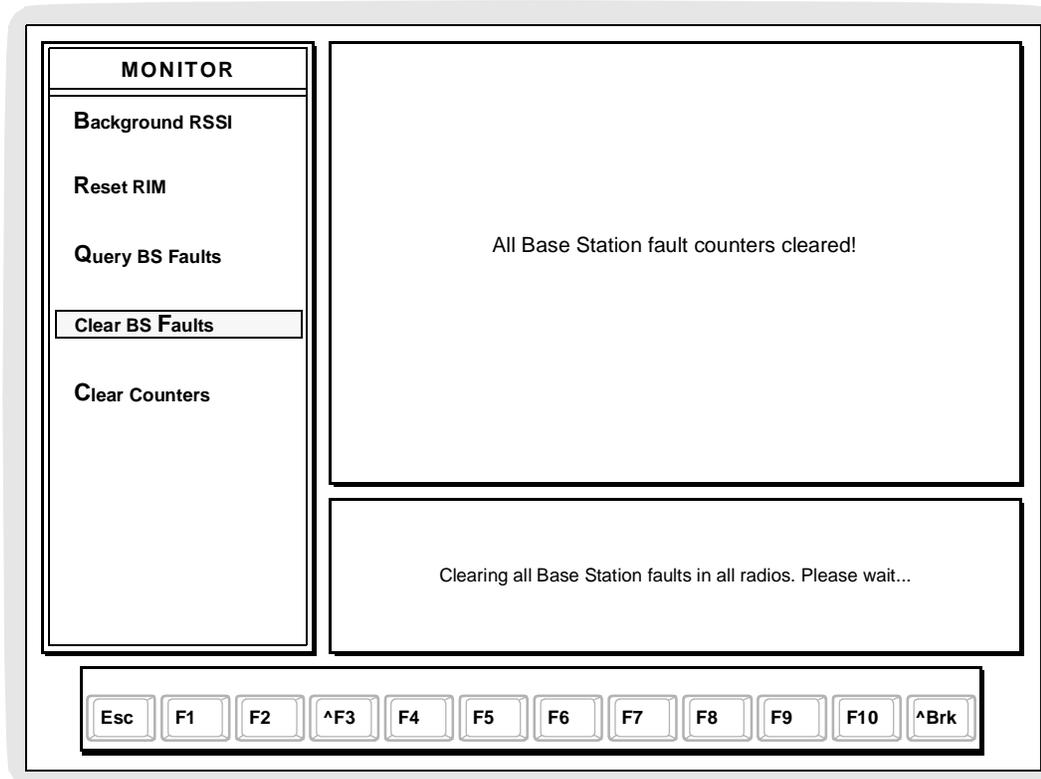
The **dialogue window** displays a message indicating that the process of clearing all Base Station fault data is in progress.
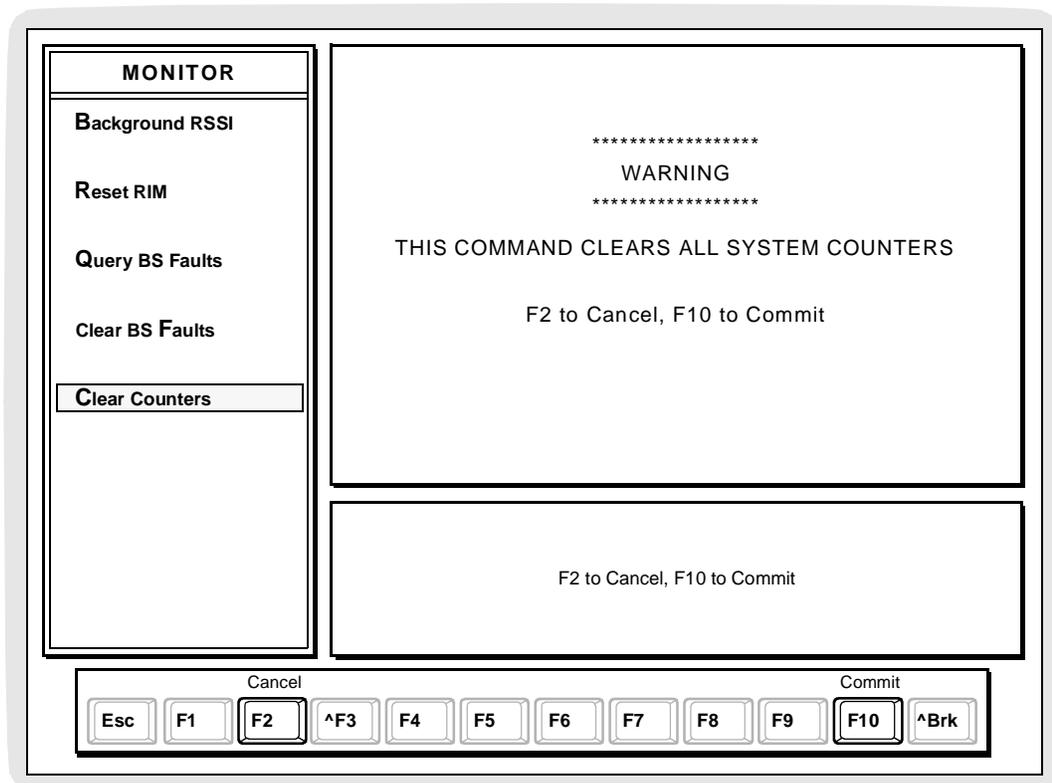
The **data window** displays a message when all Base Station fault data has been cleared, after which you are automatically returned to the Monitor display screen.

> ! **Warning**
> All Base Station fault data are permanently cleared.

Clear Counters

The Clear Counters command clears all Base Station operation and maintenance data. Calls in progress are not affected. A warning that this command clears all system counters is given first.

Figure 42: Clear Counters display screen

1. To continue, and commit to clearing the counters, press:

    F10

    OR

To cancel your request and return to the Monitor display screen, press:

F2

While the system counters are being cleared, the **dialogue window** displays a message indicating that the process of clearing all operation and maintenance data is in progress.

The **data window** displays a message when all operation and maintenance data has been cleared, after which you are automatically returned to the Monitor display screen.
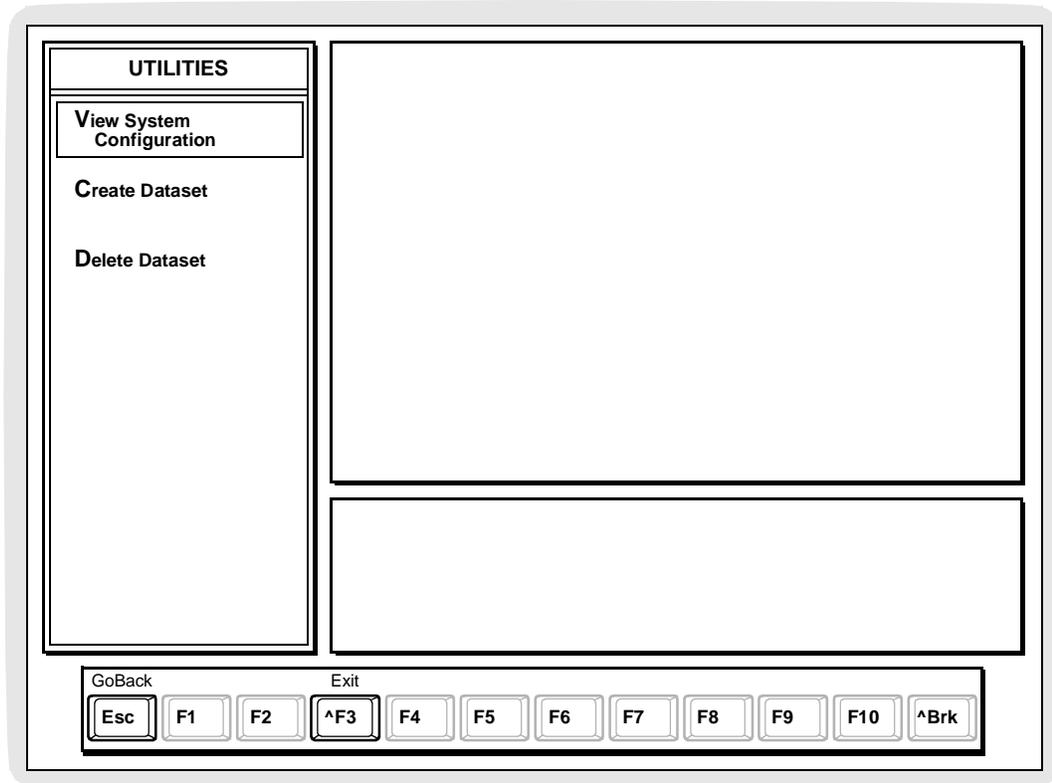

!

Warning
All operation and maintenance data are permanently cleared.

Utilities

The Utilities display screen offers a choice of three different level 2 commands. The Utilities display screens manage the data examined on the Diagnosis display screens.
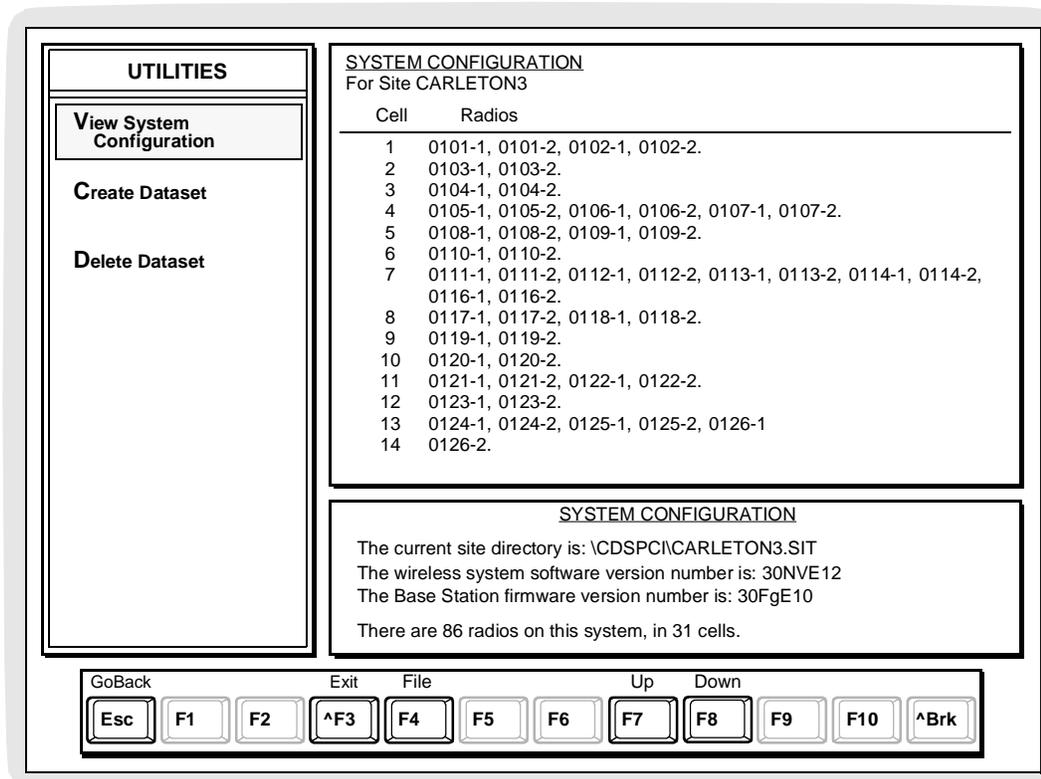
Figure 43: Utilities display screen

Note: If you select a saved dataset for your current CDS session, the Create Dataset command is not available.

View System Configuration

The System Configuration display summarizes data that has been fetched from a live system during Automatic System Configuration.

Figure 44: View system configuration display screen

```
                UTILITIES              SYSTEM CONFIGURATION
                                       For Site CARLETON3

          View System                     Cell      Radios
            Configuration
                                           1     0101-1, 0101-2, 0102-1, 0102-2.
          Create Dataset                   2     0103-1, 0103-2.
                                           3     0104-1, 0104-2.
                                           4     0105-1, 0105-2, 0106-1, 0106-2, 0107-1, 0107-2.
          Delete Dataset                   5     0108-1, 0108-2, 0109-1, 0109-2.
                                           6     0110-1, 0110-2.
                                           7     0111-1, 0111-2, 0112-1, 0112-2, 0113-1, 0113-2, 0114-1, 0114-2,
                                                 0116-1, 0116-2.
                                           8     0117-1, 0117-2, 0118-1, 0118-2.
                                           9     0119-1, 0119-2.
                                          10     0120-1, 0120-2.
                                          11     0121-1, 0121-2, 0122-1, 0122-2.
                                          12     0123-1, 0123-2.
                                          13     0124-1, 0124-2, 0125-1, 0125-2, 0126-1
                                          14     0126-2.


                                                  SYSTEM CONFIGURATION

                                       The current site directory is: \CDSPCI\CARLETON3.SIT
                                       The wireless system software version number is: 30NVE12
                                       The Base Station firmware version number is: 30FgE10

                                       There are 86 radios on this system, in 31 cells.


    GoBack              Exit    File              Up     Down
    Esc    F1    F2    ^F3    F4    F5    F6    F7    F8    F9    F10    ^Brk
```

The **data** window shows a listing of all cells in the system and the radios in each cell. Up and down keys (F7 and F8) may be used to scroll through the list, if necessary.

The **dialogue** window states the current site directory, the system version number, the Base Station firmware version number, the number of radios in the system, and the number of cells in the system.

Create Dataset

A dataset is data fetched from the wireless system and saved in a file on disk by using the Create Dataset command under the Utilities menu. All operation and maintenance data used for Diagnosis are contained in dataset files.

Figure 45: Create Dataset display screen

```
┌─────────────────────────────────────────────────────────────┐
│  ┌──────────────────────┐  ┌──────────────────────────────┐  │
│  │    UTILITIES         │  │                              │  │
│  │ ──────────────────── │  │                              │  │
│  │ View System          │  │                              │  │
│  │    Configuration     │  │                              │  │
│  │ ──────────────────── │  │                              │  │
│  │ Create Dataset       │  │                              │  │
│  │ ──────────────────── │  │                              │  │
│  │ Delete Dataset       │  │                              │  │
│  │                      │  └──────────────────────────────┘  │
│  │                      │  ┌──────────────────────────────┐  │
│  │                      │  │     SITE DATASET TITLE       │  │
│  │                      │  │  Enter a title (max. 15      │  │
│  │                      │  │  chars.):  _____ │  │
│  └──────────────────────┘  └──────────────────────────────┘  │
│  GoBack                                                       │
│  Esc  F1  F2  ^F3  F4  F5  F6  F7  F8  F9  F10  ^Brk          │
└─────────────────────────────────────────────────────────────┘
```

The Create Dataset command allows you to fetch data directly from a wireless system, and then disconnect from the system before examining the data. This reduces connection time when accessing remote sites, and preserves the data for future reference.

You can use the Create Dataset command to save a dataset file during your current CDS session if your data is fetched directly from the wireless system. The Create Dataset command is not available if your session is based on data from a dataset.

When the Create Dataset command is available, you can save all operation and maintenance data fetched directly from the wireless system by creating a dataset file in the site sub-directory. This feature allows you to re-access the information during a subsequent CDS session.

For more information on datasets, see "Files created when using CDS'".

To create a dataset:

1. Type a dataset title with a maximum of 15 characters and press:

Enter

Enter a meaningful dataset title that identifies the saved data for future access. For example, the dataset title C-290694, indicates that the saved dataset contains data from a CDS session that examined a Companion wireless system on 29 June, 1994.

The **dialogue window** displays a message when the new dataset has been successfully created, then CDS returns you to the Utilities display screen.

Delete Dataset

You can select the Delete Dataset command to delete previously saved datasets from the site sub-directory. The status of all saved datasets after the selection of this command is KEEP.

Figure 46: Delete Dataset display screen

```
┌──────────────────────────────────────────────────────────────────────┐
│                                                                        │
│  ┌────────────────────┐  ┌────────────────────────────────────────┐   │
│  │   UTILITIES        │  │        LIST OF SITE DATASETS           │   │
│  │                    │  │  Site Directory: XYZ                   │   │
│  │ View System        │  │                                        │   │
│  │   Configuration    │  │  Dataset    Time of      Dataset   Dataset │
│  │                    │  │  No.        Creation     Title     Status │
│  │ Create Dataset     │  │                                        │   │
│  │                    │  │   1    29/06/98-14:38   C - 290698  KEEP │   │
│  │                    │  │   2    10/07/98-12:01   C - 100798  KEEP │   │
│  │ Delete Dataset     │  │   3    10/08/98-21:54   C - 100898  KEEP │   │
│  │                    │  │   4    23/09/98-08:32   C - 230998  KEEP │   │
│  │                    │  │   5    25/09/98-10:47   C - 250998  KEEP │   │
│  │                    │  │                                        │   │
│  │                    │  └────────────────────────────────────────┘   │
│  │                    │  ┌────────────────────────────────────────┐   │
│  │                    │  │          DELETE SITE DATASET           │   │
│  │                    │  │ Toggle Dataset Status, DELETEs are permanent when you GoBack │
│  │                    │  │     Enter a dataset no.:   _____      │   │
│  └────────────────────┘  └────────────────────────────────────────┘   │
│  ┌──────────────────────────────────────────────────────────────┐     │
│  │ GoBack        Exit              Up     Down                   │     │
│  │ [Esc] [F1] [F2] [^F3] [F4] [F5] [F6] [F7] [F8] [F9] [F10] [^Brk] │  │
│  └──────────────────────────────────────────────────────────────┘     │
└──────────────────────────────────────────────────────────────────────┘
```

To permanently delete a dataset or datasets:

1. Change the Dataset Status to DELETE. To do this, type the dataset number and press:

    | Enter |

2. Repeat step 1 until all datasets that you want to delete are flagged.

Note: You can change the flag from DELETE back to KEEP by entering the dataset number a second time.

3. Press:

    | Esc |

The **dialogue window** displays a message when the dataset or datasets have been successfully deleted, then CDS returns you to the Utilities display screen.

> **Warning**
> The dataset or datasets are permanently deleted once you escape from the Delete Dataset display screen.

Appendix A

• Equipment requirements

Equipment requirements

CDS software

- Version 1.1 or later

PC

- IBM compatible PC (386 processor or greater)
- keyboard with function keys
- VGA, SVGA, OVGA, or MCGA display
- DOS 3.3 or higher

Note: The `config.sys` file on the boot drive must have
`Files=20` as a minimum setting.

The following figure includes graphical values that are approximate.
They represent a worst-case scenario on a system with 200 cells.

Free DOS memory required to run CDS

600K	
575K	
550K	
525K	
500K	
475K	

200   300   400   480 max

Number of radios
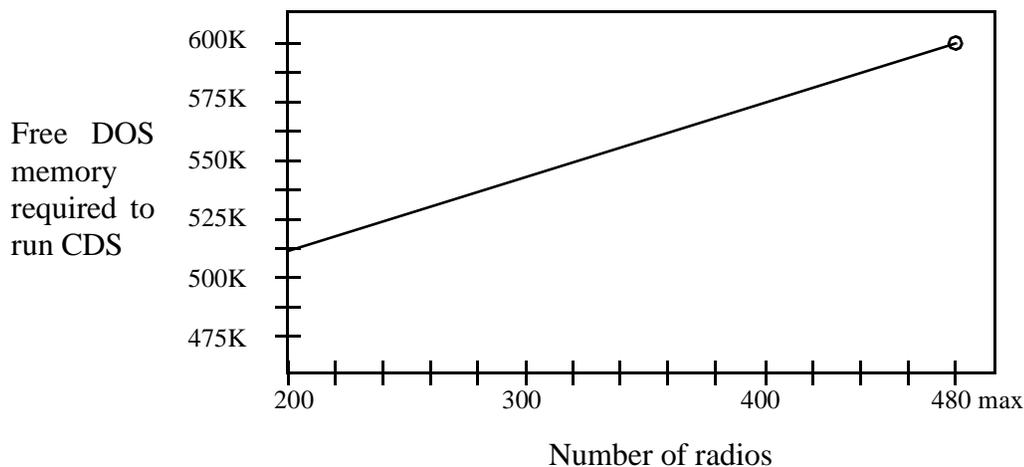
Note: With DOS 5.0 and higher the Mem command can be used to
determine the amount of working RAM. It is the same as the
largest executable program size.

RAD

- Currently, CDS PCI is fully compatible with RAD product codes NT8B80AL.

PC modem

- Hayes compatible command set
- configured by CDS software

If using the RAD internal modem under Bell specifications:

- V.22 bis/Bell 212A/Bell 103

Note: For Bell 103 (300 bps) operation the modem initialization string must be changed to include the code B1. Put B1 at the end of the initialization string.

If using the RAD internal modem under CCITT specifications:

- V.22 bis/V.22/V.21

Note: For V.21 (300 bps) operation the modem initialization string must be changed to include the code B0. Put B0 at the end of the initialization string.

RAD external modem

- must be compatible with PC modem
- configurable by jumpers or dip switches

The RAD external modem must be configured as follows:

- Auto Answer
- autobaud on line
- asynchronous mode
- modem serial port settings
    — Data Set Ready (DSR) on with answer tone
    — Data Terminal Ready (DTR) ignored
    — Carrier Detect (CD) - don't care
    — Clear to Send (CTS) - don't care
    — data bits, 1 stop bit, no parity

It is recommended that the RAD external modem also be configured as follows:

- echo off
- responses off

RS232 cable

- to connect the PC to the RAD or the PC to the PC modem
- one male and one female 25-pin connector on an RS232 cable

Note: The PC or PC modem may require another size connector. Ensure that you have a connector that matches the serial port.

RAD TCM cable

- to connect the RAD to the Controller
- RJ-11 connector on a TCM cable

RS232 null modem cable

- to connect the RAD to the RAD external modem

The cable must support the following signals:

Table 1:

Serial Port on RAD			Serial Port on RAD External Modem	
Signal	**Pin #**		**Pin #**	**Signal**
Transmit Data (TXD)	2	⟷	3	Receive Data (RXD)
Receive Data (RXD)	3	⟷	2	Transmit Data (TXD)
Data Set Ready (DSR)	6	⟷	20	Data Terminal Ready (DTR)
Data Terminal Ready (DTR)	20	⟷	6	Data Set Ready (DSR)
Signal Ground (SGND)	7	⟷	7	Signal Ground (SGND)

All other signals on the cable are not required. Their presence, or the lack of their presence, will not affect the operation of the RAD.

Note: The pin numbers above assume there is a 25-pin connector in the RAD external modem.

Public switch line cable

- to connect the PC modem and the RAD external modem to the public switch
- cable recommended or provided by the modem manufacturer

PC modem initialization string

The default PC modem initialization string is `ATE0Q0V1X4 S7=90`. Your PC modem must meet the following configuration requirements. If your modem's built-in capabilities do not meet these requirements, move the dipswitches. The configuration requirements are:

- echo off (`E0`)
- enable responses (`Q0`)
- verbose responses (`V1`)
- full responses (`X4`)
- carrier detect delay (`S7=90`); time setting is variable.

  This parameter directs the PC modem to wait the specified time (in this case 90 seconds) for the far end carrier (either the RAD or an external modem on the RAD) to answer and send carrier tone. For each ring that occurs before the far end answers, seven seconds should be added to the S7 parameter. For example, if the RAD is programmed to answer automatically after six rings, then S7 should be set to 42 (= 6 x 7) seconds. Note that modems support different upper limits for the S7 parameter, and many modems do not allow it to be more than 55 seconds. If your modem is limited to 55 seconds for example, then the RAD must be programmed to answer automatically within less than eight rings. Consult your modem manual for possible limitations on the S7 parameter.

- modem port flow control disabled (`\G0`), serial port flow control disabled(`\Q0`).

  These parameters direct the modem to disable flow control. These parameters are not currently included in the default initialization string because they are not supported by all modems. If your modem defaults to flow control enabled, or is programmed via dip switches to enable flow control, then include these parameters in the initialization string.

Note: Refer to the Hayes compatible PC modem documentation to determine the initialization string required to program a Hayes compatible PC modem for Hayes mode.

Appendix B

- System fault alarms and warnings
- Traffic warnings
- Interference warnings
- Radio Signal warnings

Diagnosis Action Recommendations

How to report a problem

1. Note the alarm or warning code.

2. Note the exact evaluation text from the display.

3. Make sure that you have a saved dataset corresponding to this CDS session.

The alarm codes, warning codes and associated text are also available on the REPORT.TXT file in the site sub-directory. You should send your supplier a printed copy of the REPORT.TXT file and/or a diskette containing the saved dataset corresponding to the CDS session that discovered the problem.

System Faults

ALARM C202

Evaluation Base Station <Base Station number> reset <count> time(s). The last reason was softtrap <softtrap number>.

Description A software problem has occurred in this Base Station. If SOFTTRAPS appear randomly, they could be caused by power fluctuations or static discharge. If they appear repeatedly, they are more likely to be Base Station software problems. The Base Station is still operational but the wireless system supplier should be contacted.

Action Record the softtrap number and contact the wireless system supplier.

ALARM C203

Evaluation Base Station `<Base Station number>` reset `<count>` time(s). The last reason was
FC: `<function code>`,
AA: `<access address>`,
IR: `<instruction reg>`,
SR: `<status reg>`,
PC: `<program counter>`

Description A hardware problem has occurred in this Base Station. It could be caused by power fluctuations on the line, static discharge, or faulty Base Station hardware. The Base Station is still operational but the wireless system supplier should be contacted.

Action Record the values that appear in the Evaluation and contact the wireless system supplier.

ALARM C220

Evaluation Radio `<radio number>` reset `<count>` time(s). The reset counts are
RR: `<RIM reset count>`,
SCL: `<SCL fault count>`,
Mem: `<memory fault count>`,
SF: `<sanity failure count>`,
SS: `<station set reset count>`,
DF: `<download fault count>`,
Hlt: `<halt count>`

Description This alarm occurs when a radio resets four or more times or when `<halt count>` is one. There are seven causes of radio resets. They are described below in the actions section.

Action The action taken depends on the source of the radio reset. Each radio reset type with a count greater than zero should be checked in the following list, and the action corresponding to that reset type should be taken.

Alarm C220 actions

R:<RIM reset count>
RIM Reset — A spontaneous reset of the radio's RIM has occurred.
Power fluctuations, high static discharges or intermittent hardware
failure may be responsible. If power supply voltage is steady, and
this type of radio reset alarm occurs, replace the Base Station.

SCL:<SCL fault count>
SCL Fault — A failure in communication between the RIM and the
LIM has occurred. An intermittent or complete failure of hardware,
such as the internal connector between the RIM and the LIM, may
be responsible. If this type of radio reset alarm occurs, replace the
Base Station.

Mem:<memory fault count>
A problem reading or writing RIM memory exists. An intermittent
problem, such as static discharge, or complete hardware failure may
be responsible. If this type of radio reset alarm re-occurs, replace the
Base Station.

SF:<sanity failure count>
A RIM or LIM software problem is most likely. Disconnect and then
reconnect the power to the Base Station to ensure that the software
load is not corrupt. If this problem persists, an alarm will be
generated, signifying a problem that should be fixed at that time.

SS:<Station Set reset count>
A problem exists either within the controller or with the hardware
connection between the Base Station and the controller. If there is a
fault with the hardware connection between the Base Station and the
Controller, it should also show up in the Synch Failure or Lost
Integrity areas (Alarms C240 and C250, and Warnings C241 and
C251). If this is the source of the problem, replace the TCM cable
and RJ-11 connectors. If the connection is not the problem, contact
the wireless system supplier.

DF:<download failure count>
An intermittent hardware or software problem exists that occurs
only during Base Station or RIM initialization. This type of radio
reset does not cause any problems for the user during normal
wireless system operation. Notify the wireless system supplier at

your convenience. If this type of radio reset alarm is severe enough to cause a problem, it will be identified as a Halt Count (see below).

Hlt:<halt count>
Persistent Download Failures or complete hardware failures have caused the Base Station to go out of service. A count of one for this type of radio reset is cause for alarm. Disconnect and then reconnect the power to the Base Station.If the halt count re-occurs, replace the Base Station.

ALARM C240

Evaluation Base Station <Base Station number> has lost synchronization <count> times.

Description This alarm occurs when synchronization has been lost four or more times. Synchronization Failure occurs when a Base Station experiences a problem with digital frame synchronization on the TCM cable connecting it to the Controller. The Base Station or the Controller receives incomplete frames from the other and the shared frame reference point is lost. Automatic resynchronization occurs upon detection of a synchronization failure. Information being transmitted during the synchronization failure may be corrupted or lost. Lost synchronization can be caused by faulty RJ-11 connectors, a TCM cable that is faulty, too long, or bridge-tapped, or a hardware problem in the Base Station.

Action

1. Check the RJ-11 connectors and the TCM cable between the Controller and the distribution block. Replace them if necessary.

2. Check the RJ-11 connectors and the TCM cable between the distribution block and the Base Station. Replace them if necessary.

3. If the problem persists, replace the Base Station.

ALARM C250

Evaluation Base Station <Base Station number> has lost integrity <count> times.

Description This alarm occurs when integrity has been lost four or more times. Lost Integrity occurs when corrupted data is received by the Base Station from the Controller. Lost integrity is transient and is usually caused by a problem with the connection between the Base

Station and the Controller. Lost integrity can be caused by faulty RJ-11 connectors, a TCM cable that is faulty, too long, or bridge-tapped, or a hardware problem in the Base Station.

Action

1. Check the RJ-11 connectors and the TCM cable between the Controller and the distribution block. Replace them if necessary.

2. Check the RJ-11 connectors and the TCM cable between the distribution block and the Base Station. Replace them if necessary.

3. If the problem persists, replace the Base Station.

WARNING C201

Evaluation Base Station `<Base Station number>` has reset `<count>` times. The last reason was due to controller communication interruption.

Description This warning occurs when the Base Station resets one or more times with softtrap number 110. The most common cause of this type of Base Station reset is either the manual disconnection of the TCM cable connecting the Base Station and the controller, or an interruption in the power supply to the controller. These types of Base Station resets may also be caused by faulty RJ-11 connectors or a TCM cable that is faulty, too long, or bridge-tapped.

Action If someone has unplugged the TCM cable from the Base Station or powered down the Controller, ignore the warning; otherwise, examine the RJ-11 connectors and the TCM cable and replace them if necessary.

WARNING C221

Evaluation Radio `<radio number>` reset `<count>` time(s).
The reset counts are
RR: `<RIM reset count>`,
SCL: `<SCL fault count>`,
Mem: `<memory fault count>`,
SF: `<sanity failure count>`,
SS: `<station set reset count>`,
DF: `<download fault count>`,
Hlt: `<halt count>`

Description This warning occurs when a radio resets fewer then four times. If the reset count is greater than four, an alarm is generated. The six types of radio resets that produce this warning are described below.

Action The action taken depends on the source of the radio reset. Each radio reset type with a count greater than zero should be checked in the following list, and the action corresponding to that reset type should be taken.

Warning C221 actions

RR:<RIM reset count>
RIM Reset—A spontaneous reset of the radio's RIM has occurred. Power fluctuations, high static discharges or intermittent hardware failure may be responsible. If this problem persists, an alarm will be generated, signifying a problem that should be attended to at that time.

SCL:<SCL fault count>
SCL Fault—A failure in communication between the RIM and the Line Interface Module (LIM) has occurred. An intermittent or complete failure of hardware, such as the internal connector between the RIM and the LIM, may be responsible. If this problem persists, an alarm will be generated, signifying a problem that should be fixed at that time.

Mem:<memory fault count>
A problem reading or writing RIM memory exists. An intermittent problem, such as static discharge, or complete hardware failure may be responsible. If this problem persists, an alarm will be generated, signifying a problem that should be fixed at that time.

SF:<sanity failure count>
A RIM or LIM software problem is most likely. Disconnect and then reconnect the power to the Base Station to ensure that the software load is not corrupt. If this problem persists, an alarm will be generated, signifying a problem that should be fixed at that time.

SS:<Station Set reset count>
A problem exists either within the controller or with the hardware connection between the Base Station and the controller. If there is a fault with the hardware connection between the Base Station and the controller, it should also show up in the Synch Failure or Lost

Integrity areas (Alarms C240 and C250, and Warnings C241 and C251). If this is the source of the problem, replace the TCM cable and RJ-11 connectors. If this problem persists, an alarm will be generated, signifying a problem that should be fixed at that time.

DF:`<download failure count>`
An intermittent hardware or software problem exists that occurs only during Base Station or RIM initialization. This type of radio reset does not cause any problems for the user during normal wireless system operation. If this problem persists, an alarm will be generated, signifying a problem that should be fixed at that time.

WARNING C241

Evaluation Base Station `<Base Station number>` has lost synchronization `<count>` time(s).

Description This warning occurs when synchronization has been lost fewer than four times. Synchronization Failure occurs when a Base Station experiences a problem with digital frame synchronization on the TCM cable connecting it to the Controller. The Base Station or the Controller receives incomplete frames from the other and the shared frame reference point is lost. Automatic resynchronization occurs upon detection of a synchronization failure. Information being transmitted during the synchronization failure may be corrupted or lost. Lost synchronization can be caused by faulty RJ-11 connectors, a TCM cable that is faulty, too long, or bridge-tapped, or a hardware problem in the Base Station.

Action

1. Check the RJ-11 connectors and the TCM cable between the Controller and the distribution block. Replace them if necessary.

2. Check the RJ-11 connectors and the TCM cable between the distribution block and the Base Station. Replace them if necessary.

3. If the problem persists, replace the Base Station.

WARNING C251

Evaluation Base Station `<Base Station number>` has lost integrity `<count>` time(s).

Description This warning occurs when integrity has been lost fewer than four times. Lost Integrity occurs when corrupted data is received by the Base Station from the Controller. Lost Integrity is transient and is usually caused by a problem with the connection between the Base Station and the Controller. Lost integrity can be caused by faulty RJ-11 connectors, a TCM cable that is faulty, too long, or bridge-tapped, or a hardware problem in the Base Station.

Action

1. Check the RJ-11 connectors and the TCM cable between the Controller and the distribution block. Replace them if necessary.

2. Check the RJ-11 connectors and the TCM cable between the distribution block and the Base Station. Replace them if necessary.

3. If the problem persists, replace the Base Station.

Traffic

WARNING C401

Evaluation Total cell traffic is high in cell `<cell number>`(`<xx>` Erlangs), on `<time and date>`.

Description This warning occurs when the total traffic in the cell for any hour exceeds the recommended threshold. The number of channels available in the cell, or the number of radios available in the cell, are too low, causing a high probability of call blocking.

Action

1. Determine if the high cell traffic persists (the present occurrence may be due to circumstances such as a meeting or conference with a large number of users). If the high cell traffic does not persist, ignore this warning.

2. If the high cell traffic persists and the cell administration is correct, check with the on-site customer contact to determine if the high traffic in this cell is acceptable (e.g., if occasional call blocking is acceptable). If the traffic level is acceptable for this cell, ignore this warning.

3. If the high cell traffic is not acceptable, the capacity of the system must be increased by following the steps below.

   a. If Warning C402 has also occurred, add another Base Station to the cell if possible.

   b. If Warning C402 has not occurred, or if another Base Station cannot be added to the cell, the system must be redeployed using the traffic value as show shown in the Evaluation. The redeployment should focus on increasing cell density in this area.

WARNING C402

Evaluation Average radio traffic is high in cell `<cell
number>`(`<xx>`Erlangs), on `<time and date>`.

Description This warning occurs when the average radio traffic in the cell for any hour exceeds the recommended threshold. In this case, the number of radios available in the cell is reduced, causing a high probability of call blocking.

Action

1. Determine if the high cell traffic persists (the present occurrence may be due to circumstances such as a meeting or conference with a large number of users). If the high cell traffic does not persist, ignore this warning.

2. If the high cell traffic persists and the cell administration is correct, check with the on-site customer contact to determine if the high traffic in this cell is acceptable (e.g., if occasional call blocking is acceptable). If the traffic level is acceptable for this cell, ignore this warning.

3. If the high cell traffic is not acceptable, the capacity of the system must be increased by following the steps below.

   a. Add another Base Station to the cell, if possible, according to deployment guidelines.

   b. If another Base Station cannot be added to the cell in accordance with deployment guidelines, the system must be redeployed using the traffic value as shown in the Evaluation. The redeployment should focus on increasing cell density in this area.

WARNING C403

Evaluation Radio `<radio number>` in cell `<cell number>` has handled a small percentage of the traffic in cell `<cell number>` over 24 hours, starting from `<time and date>`.

Description This warning occurs when the traffic on a radio is greater than the recommended threshold, the radio is not in a high traffic cell and another radio in the same cell has handled little or no traffic.

Action Check that radio `<radio number>` is operational using the directed RSSI feature. For a description of the directed RSSI feature, refer to the *Companion Installation and Maintenance Guide* or the equivalent document for your system.

Interference

WARNING C501

Evaluation   Channel(s) `<channel number(s)>` are under-utilized. Interference is suspected.

Description   This warning occurs when the spectrum has more channels occupied in the upper segments than in the lower segments. Normally the lower segments are occupied before the upper segments, but interference can cause this not to occur. Note that interference in the system is not catastrophic, it simply reduces the number of channels available for calls, and increases the probability of call blocking. If possible, interference must be eliminated or minimized to increase the number of channels available for calls.

Action   Use the Background RSSI feature (described in the "Monitor" section, Background RSSI) to detect the source of interference near the channel(s) listed, in the following manner.

1. Ensure there are no calls on the wireless system by notifying the users not to use their sets.

2. Run the background RSSI feature on one or more radios in each cell. The display on the screen should be relatively flat, with RSSI levels between -95 and -110 dBm. If this is not observed, there is a high probability of interference in or near the cell being monitored.

3. The location of the interference can be deduced by noting the cells that have a high RSSI on a given channel.

4. Eliminate or minimize (e.g., with shielding) the source of interference.

Radio Signals

WARNING C601

Evaluation Cell `<cell number>`has a low average RSSI (`<-nn>`dBm), and there are no high traffic cells.

Description This warning occurs when the radios in a cell have a low average RSSI, and there are no high traffic cells in the system. Since there are no high traffic cells in the system, the most probable cause of the low average RSSI is inadequate system deployment. The cells may be placed too far apart, or the users may be roaming outside the coverage area.

Action Check deployment for inadequate cell coverage by looking for cells placed too far apart, or areas where users are roaming outside the coverage area. For information on deployment methods, refer to *Companion Site Planning Reference Manual* or the equivalent document for your system.

WARNING C602

Evaluation Cell `<cell number>` has a low average RSSI (`<-nn>`dBm>), and there are some high traffic cells (`<cell number(s)>`).

Description This warning occurs when the radios in a cell have a low average RSSI, and there are some high traffic cells in the system. Since high traffic cells have all or most of their radios in use, subsequent call attempts in the same cell may be picked up in neighboring cells, causing these cells to exhibit a low average RSSI. This is most likely the case if the cell with the weak average RSSI is adjacent to a high traffic cell. The other cause of the low average RSSI is inadequate system deployment. The cells may be placed too far apart, or the users may be roaming outside the coverage area.

Action If the cell with the low average RSSI is adjacent to a high traffic cell (check the Provisioning Record), then disregard this warning and solve the problem associated with the high traffic cell warning. Otherwise, check deployment for inadequate cell coverage by looking for cells placed too far apart, or areas where users are roaming outside the coverage area. For information on deployment methods, refer to *Companion Site Planning Reference Manual* or the equivalent document for your system.

WARNING C603

Evaluation Radio `<radio number>` has a low average RSSI (`<-nn>` dBm>).

Description This warning occurs when one radio has a low average RSSI and the other radio on the same Base Station does not.

Action Disregard this warning if one of the radios uses an external antenna.

Use the directed RSSI feature to take measurements near the cell boundary for both of the identified radios. If the radios do not operate within 5 dB of each other, replace the Base Station. For a description of the directed RSSI feature, refer to the *Companion Installation and Maintenance Guide* or the equivalent document for your system.

Appendix C

- CDS error messages

CDS Error Messages

CDS contains the following error messages:

Table 2:

Code	Group	Message Tag	Message Text
000	XXX-	-XXXXXXXX	Unknown error - error id beyond error database range.
001	ENV-	-OPEN_FIL	File open error - wrong name/directory, no file or in use.
002	ENV-	-WRITE_RC	Unable to write a record on a file - no more disk space.
003	ENV-	-MSNGFONT	Font files missing cannot proceed.
004	ENV-	-READFAIL	File read failure.
005	ENV-	-RIM_BUSY	Radio not suspended; either it is busy or it is missing.
006	ENV-	-DISKFULL	Disk almost full; activity log to file discontinued.
007	ENV-	-INCMPADM	Cds_adm file is incompatible with current CDS release.
009	CFG-	-ZERO_CEL	All cells in system contain zero radios. Aborting.
010	CFG-	-BAD_PORT	Cannot open serial channel on specified port.
011	CFG-	-BAD_DSPL	Unsupported display adapter on this computer - Sorry!
012	CFG-	-MISNGRAD	Unable to detect the RAD/modem on specified port.
013	CFG-	-INVL_ID	Invalid RAD System ID in site access file.
015	CFG-	-BLANK_ID	RAD has forgotten its System ID.
016	CFG-	-NO_RADIO	No radios detected in this system.
017	CFG-	-MSNG_OBJ	No equipment attached for this id.
018	CFG-	-MORESUSP	Other radio still suspended.
019	CFG-	-LOST_ENT	Entity did not respond; assumed absent/defective.
020	CFG-	-MSNG_CEL	Bad or no cell information found for this radio.
021	MSC-	-NOMORMEN	No more memory left.
022	MSC-	-BADINPUT	Programming error; function called with invalid parameter.
023	MSC-	-INVTARGT	Invalid entity or not yet implemented.
028	MSC-	-LSTRADIO	Some radios have been lost since the last system access.
029	MSC-	-INVRETRN	Unexpected return value from function - BUG!
031	COM-	-COMBREAK	Communication failure - timed out.
032	COM-	-MESG2BIG	Message received is too big.
033	COM-	-COMN_ERR	NAK received; bad transmission.

Table 2:

Code	Group	Message Tag	Message Text
034	COM-	-INVRXMSG	Unexpected message received.
035	COM-	-INVTXMSG	Unexpected message being sent.
036	COM-	-COMCHOKE	Communication failure - channel choked.
037	COM-	-COMFAILR	Communication failure.
038	COM-	-MODMFAIL	Communication failure with modem.
041	DAT-	-OUTRANGE	Data out of expected range; truncated.
042	DAT-	-WRONGID	Radio id not found in internal lists.
043	DAT-	-WRONGCEL	Cell ID not found in internal lists.
044	DAT-	-VOIDCELL	Cell has no radios in internal lists.
050	MOD-	- NOCONNCT	Modem connection not made.
051	MOD-	- NODIALTN	Modem connection not made - NO DIALTONE.
052	MOD-	- NOCARIER	Modem connection not made - NO CARRIER.
053	MOD-	- NOANSWER	Modem connection not made - NO ANSWER.
054	MOD-	- LINEBUSY	Modem connection not made - LINE BUSY.
060	CCV-	- NOCVFILE	RADIOS.CEL config file does not exist.
061	CCV-	- CVCELNOT	Configuration is not correct for a cell.
062	CCV-	- VERABORT	Cell verification has been aborted.
063	CCV-	- MANUVRFY	Config was manually verified for all cells.
064	CCV-	- AUTOVRFY	Config was automatically verified for all cells.
065	CCV-	- AUTOVNOT	Config is not correct for all cells.
066	CCV-	- MNYRADIO	Cell has too many radios.
071	PDM-	- BAD FILE	Invalid dataset id; not a true dataset file.
072	PDM-	- NO_FILES	No valid dataset files found at site.
073	PDM-	- INVLDSET	Invalid dataset choice. Please see the list.
074	PDM-	- CANTPPLT	Failed to populate database structure.
075	PDM-	- ISCORUPT	This dataset file has been corrupted.
080	SIT-	-NOSITES	No sites found. Use CDS-ADM to create a site file.

CDS writes the error message codes, tags and text to the CDS_ERR.LOG every time an error is encountered. Error messages are categorized as follows:

- Environment (ENV)
- Configuration (CFG)
- Miscellaneous (MSC)
- Communication (COM)
- Data (DAT)
- Modem communication (MOD)
- Site Dataset Management (PDM)

Severity codes are assigned to all error messages and indicate how the error manifests itself to the CDS user. The severity assigned to a particular error message may vary with the unique circumstances surrounding its occurrence. The severity code appears between the Group and the Message Tag. The possible error severity codes, from least to most severe, are as follows:

- L – A LOG message is not presented on your current CDS display screen. It is only written to the error log file.

- I – An INFORMATION message is presented on your current CDS display screen for five seconds. Normal operation of the application is not affected and you can continue your CDS session.

- W – A WARNING message is presented on your current CDS display screen for five seconds and is accompanied by a single beep. Normal operation of the application is not affected and you can continue your CDS session.

- E – An ERROR message is presented on your CDS display screen while two beeps are emitted. Normal operation of the application is impacted, but you can continue your CDS session.

- F – A FATAL error message is presented on your current CDS display screen while three beeps are emitted. CDS cannot recover and the application quits.

Appendix D

- Batch mode
- Macro language

RUNCDS: Running CDS in Batch Mode

RUNCDS is a program that executes CDS commands in batch mode without the need for an interactive session. Using RUNCDS, you can execute sets of CDS commands on live wireless systems, saved datasets, or both. One or more sites can be accessed and analyzed in a single RUNCDS batch mode run. You can find output of the batch run for each site, in the R_RESULT.LOG file and the report.txt file in the site's sub-directory. Recall that in each site sub-directory, output from CDS is *appended* to the end of the R_RESULT.LOG file, while the REPORT.TXT file is *overwritten*.

Note: The CD_SETUP program will place RUNCDS in the CDSPCI directory. Always execute RUNCDS from this directory.

To use RUNCDS, site files and macro files are required. See the examples at the end of this section for typical CDS macro language files. To create a site file and a macro file, and to execute CDS in batch mode, execute the following four steps:

- Create a site file.
- Create a macro file.
- Verify a macro file.
- Execute the batch CDS program, as follows:

1. **Create a site file.**

   A site file contains a list of the sites that are to be used in the batch session. A site file is created using the -n option with RUNCDS. The parameter entered after -n is a number from 1 to 999. The filename created is `site<nnn>.txt`.
   To create a site file named `SITE001.TXT`, type
   `RUNCDS -n1`
   then enter the sitenames, terminate the list with `q` or `Q`

   ```
   siteabc
   sitexyz
   Q
   ```

2. **Create a macro file.**

   A macro file contains a list of CDS macro language commands that allow a user to create a dataset, do Automatic System Diagnosis, and file data from the CDS diagnosis screens. A

macro file is created using a standard text editor (e.g., edit on DOS 5.0 or a later versions), and entering one CDS macro language command per line. Macro commands must start in column one. The batch CDS commands are defined later in this section.

To create a macro file named `<macrofile>.txt` using the DOS 5.0 edit command, type:
```
edit <macrofile>.txt
```
then enter the list of CDS macro language commands. The first command in every macro file must be `'Sitename'`. This instructs the RUNCDS program to create a CDS session with the next sitename in the site file. For the first command in the file, type:

a. Sitename

   The second command in the macro file always contains the CDS macro language command indicating the source of the data. The data can be fetched either from a live wireless system (use the `SystemAccess` command to do this), or from a previously saved dataset (use the `$dataset<n>` command for this option).

   For the next command in the file, type:

b. `SystemAccess` or `$dataset<n>`

   The third command in the macro file always contains a level 1 CDS command (e.g., `Diagnosis`, `Monitor` or `Utilities`). For the next command in the file, type:

c. `Diagnosis`, `Monitor` or `Utilities`

   Subsequent CDS macro language commands are entered one per line. The CDS macro language commands correspond to CDS menu commands and CDS softkeys. A command is only available if the corresponding CDS command (menu or softkey) is available at the current screen in CDS. The verify option (described below) can detect if a command is out of sequence.

   On the next lines of the file type:
```
<valid CDS macro language command>
<valid CDS macro language command>
```

```
<valid CDS macro language command>
<valid CDS macro language command>
```

The last command in the file must be the CDS macro language command `Exit`. Type:

```
Exit
```

3. Verify a macro file.

A macro file may be verified for correctness before batch execution by using the -v option of RUNCDS. The verification checks all commands in the macro file to ensure that the commands are not out of sequence. Also, the verification informs the user if extra parameters are required on the command line.

To verify a macro, type:

```
RUNCDS -v <macrofile>
```

4. Execute the batch CDS program.

To execute the batch CDS program using the macro `<macrofile>` on all of the sites in site file `SITE001.TXT`, type:

```
RUNCDS -s1 <macrofile>
```

RUNCDS Command Line Syntax

Usage

```
RUNCDS -n<nnn>
RUNCDS -s<nnn><macro_file> [parm2]... [parm9]
RUNCDS -v     <macro_file> [parm2]... [parm9]
```

Options

`-n-`   Create Sitename File 'nnn'.

`-s`   Execute CDS batch process using 'macro_file'
        Use
        Sitename File 'nnn'.

`-v`   Verify `macro_file`, CDS will NOT be executed.

The CDS Macro Language

The CDS macro language is comprised of syntax rules and CDS macro language commands.

Macro Language Rules

1. Start the macro language command on the first character of the line.

2. Use one instruction per line, ending each line with a carriage return (CR).

3. Enter comment statements by typing '#' as the first character on the line.

4. The macro language is **not** case sensitive, for instance, 'QualityofService' is interpreted the same as 'qualityofservice'.

CDS Macro Language Commands

There are three types of CDS macro language commands: command line parameter replacement commands, keyboard commands, and menu commands. These command types are described below.

Command Line Parameter Replacement Commands

The command line parameters (`parameter_2...` `parameter_9` shown above in the RUNCDS command line syntax) are referred to in the macro file by putting a `$` followed by `'Parameter'` in the macro file; for example, to refer to the parameter shown as [parameter_2] on the command line, you must enter the command '`$parameter2`' in the macro file.

The most common use of parameters in CDS macro files is in the creation of datasets. To create a dataset the user must make a macro file that contains the macro language commands:

```
createDataset
```

```
$parameter<n>
```

For example, the macro file MACRO1.TXT contains the following commands:

```
sitename
```

```
systemAccess
```

```
utilities
```

```
createDataset
```

```
$parameter2

exit
```

On the command line, you can type:

```
RUNCDS -s1 macro1 March151994
```

`RUNCDS` replaces the `$parameter2` in the macro file with the second parameter on the command line, `March151994`, thus naming the dataset created during this batch run as March151994. The next time the batch is run, you need to change only the parameter on the command line to create a dataset with a different name.

Keyboard Commands

Keyboard commands are included in the macro language and must be entered in the Macro_file as follows:

1. `FILE`   Write to file. Equivalent to pressing F4.

2. `EXIT`   Exit CDS. Equivalent to pressing F3 while holding down the Control key (i.e. CTRL F3).

3. `GoBack`   Back up one menu level. Equivalent to pressing the ESC key.

4. `sitename`   The current site name from the SITE**<nnn>**.TXT.

5. `$DATASET<n>`   To specify the n*th* dataset for all sites.

6. `SYSTEMACCESS`   Access data directly from the wireless system.

Menu Commands

You enter menu choices in a macro file by omitting the spaces between the CDS menu commands, as shown below. Otherwise they are exactly as they appear in the menu boxes on the screens and the menu illustrations in this manual.

Level 1 Commands	Level 2 Commands	Level 3 Commands	Subcommands
Diagnosis	Quality of Service	Lost Links Voice Quality	Auto Interval Busiest Hour 24 Hour Interval
	System Faults	Base Station Resets Radio Resets Synch Failure Lost Integrity	
	Radio Signals	Weakest Radio Next Weakest	Versus System Versus Cell
		Radio Statistics	
	Cell Signals	Weakest Cell Next Weakest Cell Statistics	
	Interference	Lost Link RSSI	
	Traffic	Radio Occupancy Cell Occupancy	Busiest Hour Next Busiest
			Bar Chart Statistics
	CSC Usage	Cell Statistics Radio Statistics	Busiest Hour Next Busiest
Monitor	Clear BsFaults Clear Counters		
Utilities	View System Configuration Create Dataset Delete Dataset		

Examples

The examples below show how to use RUNCDS to do the following:

- Create saved datasets
- Access saved datasets
- Automatic System Diagnosis
- Clear Base Station faults

The examples contain comment statements explaining the macro language program statements preceding them. The '#' in column one tells RUNCDS to treat the line as a comment.

Example Site File Creation

To create `SITE001.TXT`, type:

```
RUNCDS -n1
```

then enter the site names when prompted. Enter 'Q' when finished.

Example Macro Language Files

Example 1.

To create a dataset and perform a diagnosis enter the following into a file called `MACRO1.TXT`:

Sitename
\# Equivalent to the interactive CDS prompt for the site name. RUNCDS will provide
\# itself with site names by looping through the site names in `SITE001.TXT` (the
\# site name file in this example).

Systemaccess
\# Data will be fetched directly from the Controller rather than from a saved dataset.

Utilities
\# Access the Main Menu option 'Utilities'.

CreateDataset
\# Access the Utilities menu option to create a dataset.

$Parameter2
\# Get file name for the dataset from the command line (TEST1 in this case; see the
\# command line below).

Goback
\# Return to the Main Menu.

Diagnosis
\# Access Main Menu option 'Diagnosis'. Automatic System Diagnosis will be done.
\# `CDSPCI\<sitename>.SIT\REPORT.TXT` will contain the text output for
   the current site.

Exit
\# End of macro for this site. Go to the next site if there is one; otherwise, stop the run.

To execute this macro language file on the sites in SITE001.TXT and create a dataset named TEST1 in each site directory, enter the following command line:

Command line: RUNCDS -s1 MACRO1 TEST1

The "-s1" parameter instructs RUNCDS to access the `SITE001.TXT` file for the site names. The "MACRO1" parameter instructs RUNCDS to run the macro language program stored in the file `MACRO1.TXT`. The "TEST1" parameter is the name CDS will assign to the file created by the macro language program shown above (see the "Utilities" section in this manual for details about the CDS file system).

Example 2.

To create a dataset and clear the Base Station fault counters, enter into a file called MACRO2.TXT:

Sitename
Equivalent to the interactive CDS prompt for the site name. RUNCDS will provide
itself with site names by looping through the site names in the site file
SITE001.TXT in this example.

Systemaccess
Data will be fetched directly from the Controller rather than from a saved dataset.

Utilities
Access the Main Menu option 'Utilities'.

CreateDataset
Access Utilities menu option to create a dataset.

$Parameter2
Get file name for the dataset from the command line (TEST2 in this case; see
command line below).

Goback
Return to the Main Menu.

Monitor
Access the Main Menu option 'Monitor'.

ClearBSFaults
Clear faults of all Base Stations of system being accessed.

Exit
End of macro for this site. Go to the next site if there is one; otherwise, stop the run.

To execute this macro language file on the sites in SITE001.TXT and create a dataset named TEST2 in each site directory, enter the following command line:

Command line: RUNCDS -s1 MACRO2 TEST2

The '-s1' parameter instructs RUNCDS to access the SITE001.TXT file for the site names. The 'MACRO2' parameter instructs RUNCDS to run the macro language program stored in the file MACRO2.TXT. The 'TEST2' parameter is the name CDS will assign to the dataset created by the macro language program shown

above (see the 'Utilities' section in this manual for details about the CDS file system).

Example 3.

To perform a diagnosis on dataset number one enter the following into a file called `MACRO3.TXT`:

Sitename

\#   Equivalent to the interactive CDS prompt for the site name. RUNCDS will provide

\#   itself with site names by looping through the site names in `SITE001.TXT`.

$Dataset1

\#   Open dataset number one for the sitename (i.e. use the first stored dataset).

Diagnosis

\#   Access Main Menu option "Diagnosis". Automatic system diagnosis will be done.

\#   `CDSPCI\<sitename>.SIT\REPORT.TXT` will contain the text output
    for the current site.

Exit

\#   End of macro for this site. Go to the next site if there is one.

To execute this macro language file on the sites in the `SITE001.TXT` file, enter the following command line:

Command line: RUNCDS -s1 MACRO3

The '-s1' parameter instructs RUNCDS to access the `SITE001.TXT` file for the site names. The 'MACRO3' parameter instructs RUNCDS to run the macro language program stored in the file `MACRO3.TXT`.

Appendix E

- File management

CDS DOS Hard Drive Disk File Management

Files needed by CDS

The CDS application provides a directory called CDSPCI at the highest level on the drive that you have chosen. The following files are in the CDSPCI directory and are required to use the application:

CDS.EXE

This file is the main CDS program.

CDS_ADM.EXE

This file is the CDS Administration Utility program.

HELVB.FON

This file provides the Helvetica font used to format text on the display screens of CDS.

RUNCDS.EXE

This is the CDS batch mode program.

LNG_MSG.DAT

This is the default language file.

Files created by administering a new site

The procedure to administer CDS for a new site creates a site sub-directory with an extension of '.SIT' in the main CDSPCI directory. The main CDSPCI directory will contain one site sub-directory for each site. The following file is in each site sub-directory:

CDS_ADM.DAT

This site administration file contains the administration data pertaining to the site for which the sub-directory was created.

Files created when using CDS

CDS_ERR.LOG

Figure 47: Example of `CDS_ERR.LOG`

```
*****  New Session Started on - Thu Jun 04 16:12:36 1998   *****
SITE : ABC
*** Message logged at Thu Jun 04   16:14:18  1998 ***
Id:    0102-1
019 CFG-L-LOST_ENT Entity did not respond; assumed absent/defective.
***  Message logged at Thu Jun 04  16:14:18 1998   ***
Id:   0103-1
019 CFG-L-LOST_ENT Entity did not respond; assumed absent/defective.
***  Message logged at Thu Jun 04  16:14:22  1998   ***
Id:   0113-1
019 CFG-L-LOST_ENT Entity did not respond; assumed absent/defective.
*** Message logged at Thu Jun 04  16:14:22  1998 ***
Id:   0114-1
019 CFG-L-LOST_ENT Entity did not respond; assumed absent/defective.
***** New Session started on - Fri Jun 05  12:53:27  1998  *****
SITE : ABC
***** New Session started on - Fri Jun 05  17:04:00  1998  *****
SITE : ABC
***** New Session started on - Fri Jun 05  13:40:58  1998  *****
SITE : XYZ
*** Message logged at Mon Jun 08  13:41:15  1998 ***
013 CFG-F-INVL_ID Invalid RAD system id in site access file.
*** Message logged at Mon Jun 08  14:03:12  1998 ***
034 COM-L-INVRXMSG Unexpected message received.
```

The CDS_ERR.LOG is created when you first run CDS. This error log file is in the CDSPCI directory and is printable. A new session time stamp is added to the file every time you start CDS. The name of the site being examined is identified after the session time stamp.

Any error messages encountered during your session are appended to this file after a time stamp that indicates when the message was logged. See Appendix C in this guide for a complete listing of error messages.

Note: To ensure free disk space, you should review this file periodically. Back up any data contained in the file that you want to keep and then delete the file. A new error log file is created the next time you start CDS.

A PC editing program can be used to view, copy, print, and delete log files.

R_RESULT.LOG

Figure 48: Example of `R_RESULT.LOG`

```
    ******   New Session started on - Thu Jun 04  16:12:36  1998  *****

    ******   New Session started on - Fri Jun 05  12:53:27  1998  *****

    ******   New Session started on - Fri Jun 05  17:04:00  1998  *****

FAULTS FOR BASE STATION 0104.

  RESET      RADIO     INTEGRITY   SYNCHRONIZATION
 _COUNT_ _ _ RESETS_ _ _FAILURE_ _ _LOST_COUNT_ _ _
    0          1         0              0

 Radio 1 Reset Types           Radio 2 Reset Types
 0 - RIM Reset Count           0 - RIM Reset Count
 0 - SCL Fault Count           0 - SCL Fault Count
 0 - Mem Fault Count           0 - Mem Fault Count
 0 - Sanity Fail Count         0 - Sanity Fail Count
 1 - SS Reset Count            0 - SS Reset Count
 0 - Download Fail Count       0 - Download Fail Count
 0 - Halt Count                0 - Halt Count


   ******   New Session started on - Tue Jun 09  08:10:43  1998  *****
```

The R_RESULT.LOG is created in each site directory when you first start CDS for a new site. A new session time stamp is added to the file every time you start CDS for a particular site. Data from your current session is appended to this file when you file statistical information to disk.

To ensure free disk space you should review this file periodically. Back up any data contained in the file that you want to keep and then delete the file. A new output data file is created the next time you start CDS for that particular site.

A PC editing program can be used to view, copy, print and delete log files.

Saved Datasets

A dataset is data fetched from the wireless system and saved in a file on disk by using the Create Dataset command under the Utilities menu. All operation and maintenance data used for Diagnosis is contained in dataset files.

The Create Dataset command allows you to fetch data directly from a wireless system, and then disconnect from the system before

examining the data. This reduces connection time when accessing remote sites, and preserves the data for future reference.

A dataset file has an extension of '.PDM' and is stored in the sub-directory of the site for which it was created. Many datasets can be saved for a single site.

Dataset files are binary. You can re-access them during subsequent CDS sessions. The DOS filename is coded to reflect the time the dataset was created as follows:

- the first three digits indicate the year

- the fourth alphabetic character indicates the month (A to L corresponding to 1 to 12)

- the fifth digit or alphabetic character indicates the day (1 to 9, or A to V corresponding to 10-31)

- the sixth alphabetic character indicates the hour (A to X corresponding to 1 to 24)

- the last two digits indicate the minutes (00 to 59)

For example, the filename `194HCN38.PDM` identifies the file as having been created in
1994 (194) on August (H) the 12th (C) at 14:38 (N38).

The time of creation of a CDS dataset is the time the transfer of data to disk began. The time listed beside the DOS filename is the time the transfer of data to disk was completed. You can determine which dataset title corresponds to a specific DOS filename by relating the CDS time of creation to the DOS time of completion.

Saved datasets are always named with the suffix '.PDM'. You can list the saved datasets on your hard disk for a given site by typing

`dir C:CDSPCI\(sitename).SIT\*.PDM`

While saved datasets are not essential to the operation of CDS, they may be useful as snapshots of past operating conditions.

Saved dataset files are managed from within a CDS session by selecting from the commands available under the Utilities menu.

Note: Do not change the DOS filename. CDS cannot access the file if the name is changed.

RADIOS.CEL

The RADIOS.CEL file is created when you first run CDS Automatic System Diagnosis for a new site. This file contains the assignment of radios to cells as detected by a CDS scan of the current hardware state. If you delete this file, CDS will rebuild it by going through the configuration/verification dialogue with you the next time you run CDS for the site and select the Diagnosis option. Similarly, if any changes have been made to the wireless system hardware since the last time you performed a CDS diagnosis for the site, CDS will recreate RADIOS.CEL, using the configuration verification dialogue.

REPORT.TXT

The REPORT.TXT contains the results of Automatic System Diagnosis and is created whenever the diagnosis option is selected and completed. All the text screens produced are written to REPORT.TXT overwriting the old REPORT.TXT file in the current site directory. If you wish to keep hard copies of Automatic System Diagnosis reports, you must print the REPORT.TXT file after each Automatic System Diagnosis run.

DOS File Summary

The table below summarizes the CDS disk files under the MS-DOS operating system.

Table 3:

File	Directory	Disposition
CDS.EXE	CDSPCI	keep
RADIOS.CEL	.SIT	keep
CDS_ADM.EXE	CDSPCI	keep
RUNCDS.EXE	CDSPCI	keep
HELVB.FON	CDSPCI	keep
CDS_ADM.DAT	.SIT	keep
CDS_ERR.LOG	CDSPCI	archive and delete if file size >700k
R_RESULT.LOG	.SIT	archive and delete if file size >700k
<filename>.PDM	.SIT	archive
REPORT.TXT	.SIT	print
SITE<nnn>.TXT	CDSPCI	keep
<macro-filename>.TXT	CDSPCI	keep
LNG_MSG.DAT	CDSPCI	keep

The 'disposition' column indicates how the files are used.

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