Lucent Technologies
Bell Labs Innovations

DEFINITY® Wireless Business System
Maintenance

Federal Communications Commission Statements
Part 15D: Unlicensed Personal Communications.
This equipment has been certified to comply with the regulations governing unlicensed Personal Communication devices pursuant to Subpart D of Part 15 of the FCC rules. This subpart set out the regulations for devices operating in the 1920-1930 MHz frequency band.
Part 68: Network Registration Number. This equipment is registered with the FCC in accordance with Part 68 of the FCC Rules. It is identified by FCC registration number AS593M-13283-MF-E.
Part 68: Answer-Supervision Signaling. Allowing this equipment to be operated in a manner that does not provide proper answer-supervision signaling is in violation of Part 68 rules. This equipment returns answer-supervision signals to the public-switched network when:
- Answered by the called station
- Answered by the attendant
- Routed to a recorded announcement that can be administered by the CPE user
- This equipment returns answer-supervision signals on all DID calls forwarded back to the public-switched telephone network. Permissible exceptions are:
- A call is unanswered
- A busy tone is received
- A reorder tone is received

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About This Book

Introduction

This document provides instructions and supporting information needed to monitor and maintain efficient operation of the DEFINITY® Wireless Business System (DWBS). The specific subjects covered in this document include the following:

- Radio Controller (RC)
- Radio synchronization
- Wireless Fixed Based (WFB)
- Cell Antenna Unit (CAU)
- 9601 Pocket Phone (Wireless Terminal - WT)
- Firmware Upgrade

The DWBS maintenance strategy is based on current maintenance strategies for the DEFINITY ECS. This document can be thought of as a subset of overall DEFINITY ECS maintenance and escalation strategies.

Intended Audience

This manual is intended for use by the following personnel:

- field technicians
- remote service personnel
- user-assigned maintenance personnel

This document assumes that the technician has a working knowledge of telecommunications fundamentals and server maintenance practices. This document also assumes that the DWBS was initially installed and tested properly and brought into service with all faults cleared.

Typographic Conventions

The following typographic conventions are used in this book to convey information consistently and quickly.

- *This typeface* is used for references to titles of other information and for emphasis within other typefaces.

- **This typeface** emphasizes key words to help clarify meaning in a sentence or to call attention to a distinction.

- The following note icon identifies additional information pertinent to the text preceding it.

    ➡ **NOTE:**

Document Organization

- **Chapter 1, "Maintenance Architecture"** — This chapter describes the maintenance strategy for the DWBS.

- **Chapter 2, "Radio Controller Circuit Pack Maintenance"** — This chapter describes the maintenance of the Radio Control circuit pack for the DWBS. This includes a discussion of the maintenance object (MO) for this piece of hardware. Network Processing Elements are also discussed.

- **Chapter 3, "Radio Fixed Part Synchronization"** — This chapter provides a discussion of the information regarding the synchronization of the fixed part of the wireless system.

- **Chapter 4, "Wireless Fixed Base and Cell Antenna Unit Maintenance"** — This chapter describes the errors, alarms, and tests specific to the Wireless Fixed Base (WFB) and the Cell Antenna Unit (CAU).

- **Chapter 5, "Wireless Terminal Maintenance"** — This chapter describes the maintenance of the 9601 Pocket Phone.

- **Chapter 6, "Command List"** — This chapter provides supplemental Mobility Manager and DEFINITY ECS command information.

- **Chapter 7, "Firmware Upgrade"** — This chapter provides procedural and background information to load upgrade the firmware of the RC circuit pack(s), Wireless Fixed Base(s), and 9601 Pocket Phones.

This document also contains a glossary and an index.

UTAM Disablement

Federal Communication Commission (FCC) and UTAM, Inc. rules mandate that any wireless system, including the DWBS, that operates in the 1910-1930 MHz band automatically disables itself if the system is moved from the initial premises where it is installed. (This means that WFBs and CAUs may be moved within a customer building, *but they may not be moved to another customer location.*) In keeping with this requirement, the DWBS automatically disables the radio transmission if the DEFINITY ECS experiences a total loss of power. The radio transmission may be enabled only once the Lucent Technologies remote maintenance center is able to contact the DEFINITY ECS to confirm the system's location. This confirmation occurs within approximately 30 minutes after power is restored.

A power-up reset of the DEFINITY ECS generates a major power alarm, and the *DWBS will not operate until the location of the DEFINITY ECS can be verified by an authorized Lucent Technologies representative.* (However, a wired set would operate without this verification.) The radio transmission is activated only upon confirmation of the DEFINITY ECS location. Activation will occur automatically once the Lucent Technologies remote monitoring center receives the alarm and can reconnect with the DEFINITY ECS. The process normally occurs within 30 minutes of power-up. If the remote center cannot contact the switch, a technician must be dispatched to restore wireless service.

Related Information

This book serves as a maintenance tool for the DEFINITY Enterprise Communications Server Release 5 Wireless Business System. Additional books in the series are:

- *DEFINITY WBS Site Planning*, 555-232-101

- *DEFINITY WBS Installation and Test*, 555-232-102

- *DEFINITY WBS Quick Reference*, 555-232-104

- *DEFINITY WBS 9601 Pocket Phone User Guide*, 555-232-105

- *DEFINITY WBS Estimator*, 555-232-106

- *DEFINITY WBS Predictor*, 555-232-107

Related books outside the DWBS series include the following:

- *DEFINITY ECS R6 Maintenance (RISC)*, 555-230-126

- *DEFINITY ECS R6 Maintenance (VS/SI),* 555-230-127

- *DEFINITY ECS R6 Maintenance (CSI)*, 555-230-129

Maintenance Architecture

<div style="text-align: right; font-size: 4em; font-weight: bold;">1</div>

Introduction

This chapter provides an overview of the DEFINITY Wireless Business System (DWBS) maintenance strategy, which includes Maintenance Objects, Alarm and Error Reporting, and Alarm and Error Logs.

Maintenance Objects

The DWBS, in keeping with current DEFINITY maintenance strategy, is partitioned into separate entities called Maintenance Objects (MO). Each MO is monitored by the system and has its own maintenance strategy. The MOs for the DWBS are:

- RC-BD corresponds to the TN789 RC

- RFP-SYNC corresponds to the fixed part radio synchronization

- WFB corresponds to Wireless Fixed Base an internal antenna

- CAU corresponds to the external CAU

- WT-STA corresponds to the Wireless Terminal (9601)

➡ NOTE:
These MOs are specific to the DWBS. For information regarding other DEFINITY MOs, see *DEFINITY ECS Maintenance*. (Refer to the "Related Documents" section in the "About This Book" chapter for the list of available DEFINITY ECS maintenance documents.)

Relationship of Wireless Maintenance Objects

The following figure illustrates the relationship of the five wireless MOs to each other. Whenever various alarms or errors occur in one MO, they can have an effect on other MOs in the system. For example, errors in the WFB MO will affect the RC MO.
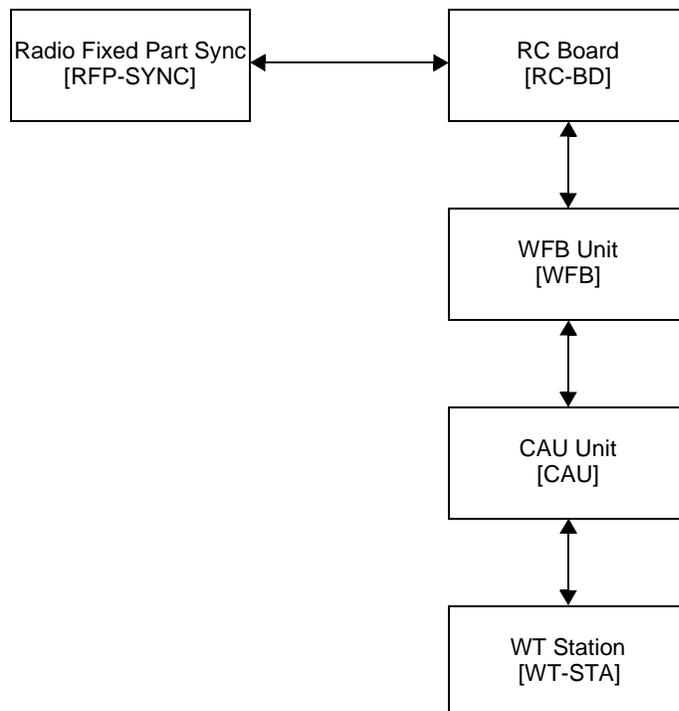
Figure 1-1. Wireless MO Relationships

Busy/Release MOs

The DWBS uses several **busyout** and **release** commands. The busyout commands are used to place a maintenance object (MO) into a maintenance busy state. The maintenance busy state causes active calls on the MO to disconnect, and it prevents DEFINITY ECS call processing from using the busied-out resource. A warning alarm is logged to indicate the busied-out status. The release commands are used to return the MO to its normal service state after a busyout command has been issued.

Alarm and Error Reporting

During normal operations, software, hardware or firmware may detect error conditions related to specific MOs. The system attempts to fix or circumvent these problems automatically, but if a hardware component incurs too many errors, based on the leaky bucket process, an alarm will be raised. Typically, the following sequence takes place in generating an alarm:

1. An error occurs on an MO during testing or normal operation.

2. The component sends an uplink control channel message to maintenance software notifying it of the error. Errors are detected in two ways:

   — For in-line errors, firmware on the component detects the occurrence of an error during ongoing operations.

   — For other types of errors, a *periodic test* or a *scheduled test* executed by software detects the error. These tests run at regular intervals administered by the **change system-parameters maintenance** command. The technician can also run these tests on demand by using the maintenance commands.

3. System software logs the error in the error log and increments the error counter for that error. Whenever an error count is *active* (greater than zero), a maintenance error record is maintained for the MO. A routine based on the strategy for maintaining that component is queued and run when resources are available.

   — For some error types, the routine executes further tests, called *analysis tests,* on the component. Error counters associated with the tests are incremented or decremented based on success or failure of these tests. If all tests pass, the maintenance record is retired.

   — In-line error counters are generally not associated with any specific test. These counters are automatically decremented over time at a rate specific to the error type. If the error occurs at a rate lower than the leak rate, the count for that error will gradually decrease. If the error does not recur for awhile (based on a predetermined threshold), the counter drops to zero and the maintenance record is retired. This is known as the *leaky bucket* mechanism. Counters can also be cleared by the command **test long clear**.

4. Whenever a counter exceeds its specific threshold value, an alarm is raised. Most alarms are raised by specific test failures.

   — The alarm is logged in the alarm log. The active hardware error Log entries and the Log entries against a particular MO are not cleared from the logs until all the problems causing the alarms have been resolved. Alarm LED indicators are lit on the component (TN789) circuit pack in the case of the wireless business system. Additionally, if the alarm is at the WFB, the unit's red LED is lit.

   — For Major and Minor alarms, a notification call is made via the SYSAM-RMT port to a remote maintenance location (INADS).

— The alarm remains active until the problem is resolved. Further testing with no failures, no further errors over a period of time, or repair actions can resolve an alarm.

Alarm and Error Logs

The system keeps a record of every alarm detected in the system. This record, the alarm log, and the error log, can be displayed locally on the G3-MT or remotely by Initialization and Administration system (INADS) personnel. An alarm is classified as MAJOR, MINOR, or WARNING, depending on its effect on system operation. Alarms are also classified as ON-BOARD or OFF-BOARD.

- MAJOR alarms identify failures that cause critical degradation of service and require immediate attention. On High and Critical Reliability systems, MAJOR alarms can occur on standby components without affecting service since their active counterparts continue to function.

- MINOR alarms identify failures that cause some service degradation but does not render a crucial portion of the system inoperable.

- WARNING alarms identify failures that cause no significant degradation of service or failures of equipment external to the switch. These are not reported to INADS or the attendant console.

- ON-BOARD problems originate in circuitry on the alarmed circuit pack. In the case of a wireless business system that would be the TN789.

- OFF-BOARD problems originate in a process or component external to the circuit pack such as the WFB.

Multiple alarms against a given MO can change the level of a given alarm as it appears in the alarm log. If there is an active error against an MO that causes a MINOR alarm and an active error that causes a MAJOR alarm, then the alarm log would show two MAJOR alarms. If the MINOR alarm problem is resolved first, the error is still marked as alarmed until the MAJOR alarm problem is resolved, and the alarm log would still show two MAJOR alarms. If the MAJOR alarm problem is resolved first, the error is still marked as alarmed until the MINOR alarm problem is resolved and the alarm log would now show one MINOR alarm. Similarly, the presence of an ON-BOARD alarm will cause all alarms against that MO to report as ON-BOARD.

⇒ NOTE:
To determine the actual level and origin of each alarm when there are more than one against the same MO, you must consult the Hardware Error Log Entries table for the particular MO.

The alarm log is restricted in size. If the log is full, any new entry overwrites the oldest resolved alarm. If there are no resolved alarms, the oldest error (which is not alarmed) is overwritten. If the log consists of only active alarms, the new alarm is dropped.

INADS Alarm Reporting

All Major and Minor alarms and some downgraded Warning alarms are reported to INADS. (Some classes of alarms can be downgraded to lower levels by INADS at the customer's request.) When the system raises one of these alarms, an attempt is made to call INADS. If the call to INADS fails for whatever reason, the call is retried in seven minutes. This is repeated until four attempts have been made in a period of approximately 21 to 30 minutes. If all four attempts fail, the system waits one hour. Then it starts over again with four call attempts spaced seven minutes apart. This cycle repeats until either the call to INADS successfully completes, or until the whole cycle is repeated six times. If, at any time during this scenario, a new alarm is raised by the system that should be reported to INADS, all timers and counts are reset and the strategy is repeated from the very beginning.

During the four call attempts, the ACK lamp on the attendant console is turned off. Approximately 15 minutes into the hour interval between call attempts, the ACK lamp flashes, indicating the system is having trouble reporting alarms to INADS. At the end of the entire scenario described above, if the system could not report the alarm to INADS, the ACK lamp continues to flash.

Radio Controller Circuit Pack Maintenance

2

Introduction

This chapter provides the necessary information for the maintenance of the TN789 RC circuit pack.

RC-BD

Many of the maintenance functions for RC-BD are similar to existing DEFINITY common circuit pack maintenance; however, a substantial portion of the maintenance functions are specific to the RC circuit pack.

The RC-BD maintenance object is inserted into the system whenever the RC TN789 is administered and physically inserted into its slot. Each RC circuit pack is maintained as a separate maintenance object. Additionally, RC-BD maintenance operations are initiated in response to periodic maintenance, scheduled maintenance, demand testing, or in-line errors.

TN789 LED Indicators

Three LEDs (red, green, and amber) are visible on the faceplate of the RC circuit pack and conform to DEFINITY standards which as follows:

RED
Occupies the top position. It is lit whenever the system is powered up and remains in this state until power up diagnostics have been completed. If the diagnostics pass, this LED is turned off. During normal operation, this LED will be turned on if an on-board alarm is generated against the RC circuit pack to indicate a possible problem.

In addition, if a minor or major alarm is generated against any WFBs or CAUs connected to the RC circuit pack, the red LED will be turned on. This will alert the system administrator that a problem exists since the WFBs and CAUs are remotely located and their alarm indicators may not be readily visible.

In these situations, an error/alarm will be logged against the circuit pack. The specific error/alarm text will indicate that the problem is located in the WFB or CAU and not the RC circuit pack itself.

The alarm against the RC circuit will be resolved only when all error/alarm(s) against the connected WFB/CAU have been resolved. At this point, the red LED will be turned off.

GREEN
Occupies the middle position. It is turned off at power-up. This LED is turned on whenever maintenance testing that has been requested by the Switch Processing Element (SPE) is being performed.

AMBER
Occupies the bottom position. It is turned off at power-up. The LED is turned on whenever a pocket phone is active on a call and the circuit pack is in use.

System Technician Commands

This section describes those commands associated with the RC circuit pack (RC-BD) that can be executed by the service technician.

Reset Board

The reset board command re-initializes the RC circuit pack. Executing this command has the same effect as if the RC circuit pack were physically removed and then re-inserted.

This command allows a technician to remotely re-initialize an RC circuit pack without rebooting the entire switch. The *repeat* option allows the technician to continuously reset the RC circuit pack up to 100 times with a single command line.

Entering the *reset board <PPCSS>* command on the DEFINITY management terminal generates the following (sample) screen.

```
┌──────────────────────────────────────────────────────────────────────┐
│ reset board 01b09                                                      │
│                                                                        │
│                          TEST RESULTS                                  │
│                                                                        │
│ Port        Maintenance Name   Alt. Name Test No. Result       Error Code │
│                                                                        │
│ 01B09       RC-BD                         53       PASS                 │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
│                                                                        │
└──────────────────────────────────────────────────────────────────────┘
```

Figure 2-**1.   Reset Board Screen**

Fields:

- *Port* —The location of the target board, in the above example 01B09.

  — PP is the 2-digit number that identifies the port network.

  — C is an alphabetic character that identifies the carrier within the port network.

  — SS is a 2-digit number that identifies the carrier within the port network.

- *Maintenance Name* —The Maintenance Object name as it appears in the system.

- *Alt. Name* —Alternate means of identifying the maintenance object. In the previous example, it identifies the CAU if present.

- *Test No.*—RC removed/SAKI Sanity Test (#53).

- *Result* —Values are **PASS**, **FAIL**, or **ABORT**.

- *Error Code* —Numerical code for problem evaluation. (See the Test tables further along in this document for examples.)

Busyout Board

Any RC circuit pack that is administered and physically inserted can be busied-out. If the circuit is not physically installed and an attempt is made to busy it out, the message *board not inserted* will be displayed on the screen message line.

The command unconditionally places the selected RC circuit pack into an out-of-service state. A busied-out RC circuit pack also results in any connected WFBs and CAUs being busied out also. Maintenance activity, except for demand testing, is suspended on these resources until the RC circuit pack is released.

While busied-out, these resources may not be used for call processing. Any present calls are dropped and the Mobility Manager will neither direct nor accept call-related requests to and/or from the RC circuit pack. Furthermore, while connected WFBs/CAUs are busied-out, they are placed into a mode such that they do not transmit over the air.

Upon issuing this command, an error type of 18 is logged against the RC circuit pack and all connected WFBs and CAUs. In addition, a warning is generated against each of these objects.

Entering the **busyout board <PPCSS>** command on the DEFINITY management terminal generates the following (sample) screen.
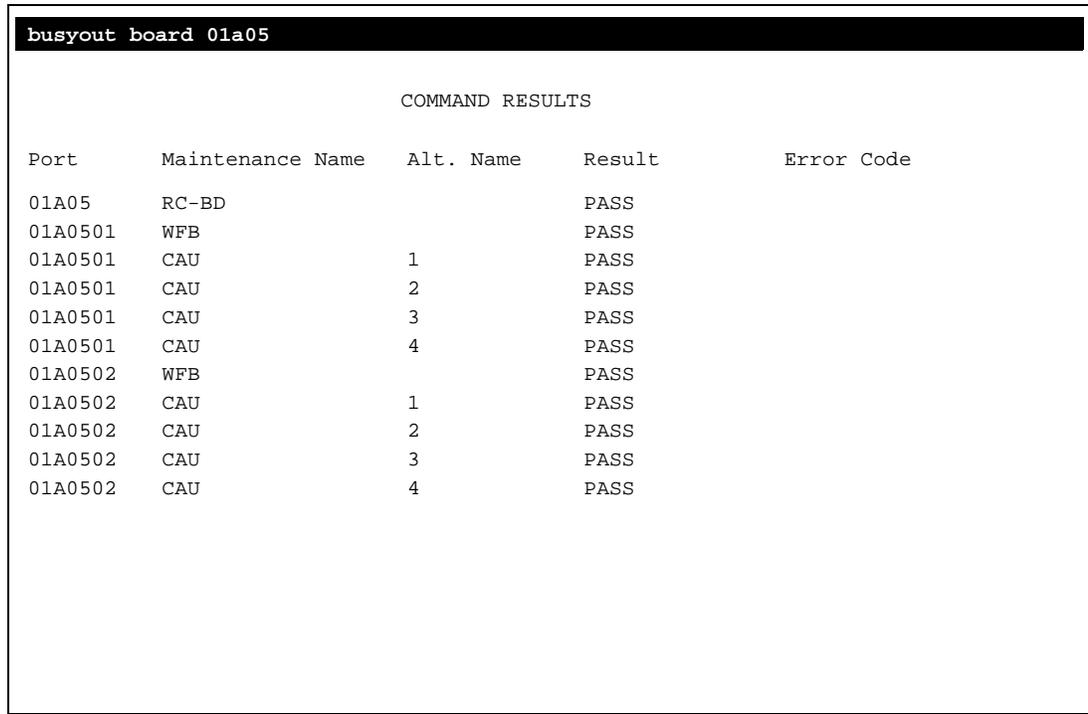
```
busyout board 01a05


                     COMMAND RESULTS

Port        Maintenance Name   Alt. Name    Result          Error Code

01A05       RC-BD                            PASS
01A0501     WFB                              PASS
01A0501     CAU                1             PASS
01A0501     CAU                2             PASS
01A0501     CAU                3             PASS
01A0501     CAU                4             PASS
01A0502     WFB                              PASS
01A0502     CAU                1             PASS
01A0502     CAU                2             PASS
01A0502     CAU                3             PASS
01A0502     CAU                4             PASS
```

Figure 2-2.   Busyout Board Screen

Fields:

- *Port* —The location of the target board, in the above example 01A05.

    — PP is the 2-digit number that identifies the port network.

    — C is an alphabetic character that identifies the carrier within the port network.

    — SS is a 2-digit number that identifies the carrier within the port network.

- *Maintenance Name* —The Maintenance Object name as it appears in the system.

- *Alt. Name* —Alternate means of identifying the maintenance object. In the above example, it identifies the CAU if present.

- *Result* —Values are **PASS**, **FAIL**, or **ABORT**.

- *Error Code* —Numerical code for problem evaluation. (See the Test tables further along in this document for examples.)

Release Board

This command is used to release (return to service) the MOs busied-out by the previous command. If the target RC circuit pack is not installed and this command is issued, the message, *board not assigned* will be displayed. Upon successful completion of the return to service operation (release board), the warning alarm previously generated for each of the affected MOs is resolved.

Entering the **release board <PPCSS>** command on the DEFINITY management terminal generates the following (sample) screen.

```
release board 01a05

                    COMMAND RESULTS

Port       Maintenance Name   Alt. Name      Result          Error Code

01A05      RC-BD                             PASS
01A0501    WFB                               PASS
01A0501    CAU                1              PASS
01A0501    CAU                2              PASS
01A0501    CAU                3              PASS
01A0501    CAU                4              PASS
01A0502    WFB                               PASS
01A0502    CAU                1              PASS
01A0502    CAU                2              PASS
01A0502    CAU                3              PASS
01A0502    CAU                4              PASS
```

Figure 2-3.   Release Board

Fields:

- *Port* —The location of the target board, in the above example 01A05.

  — PP is the 2-digit number that identifies the port network.

  — C is an alphabetic character that identifies the carrier within the port network.

  — SS is a 2-digit number that identifies the carrier within the port network.

- *Maintenance Name* —The Maintenance Object name as it appears in the system.

- *Alt. Name* —Alternate means of identifying the maintenance object. In the above example, it identifies the CAU if present.

- *Result* —Values are **PASS**, **FAIL**, or **ABORT**.

- *Error Code* —Numerical code for problem evaluation. (See the Test tables further along in this document for examples.)

Status RC

This command provides current status for the RC circuit pack as well as all connected WFBs and CAUs, plus any active pocket phones.

Entering the **status rc <PPCSS>** command on the DEFINITY management terminal generates the following (sample) screen.

```
status radio-controller 1b12                              Page  1 of  2

                          RADIO CONTROLLER STATUS

     RC Location: 01B12          Busied-out?: n          Connected WFBs: 1

                                ACTIVE WTs

            WFB A                                    WFB B

     WT Ext  CAU     WT Ext CAU              WT Ext  CAU     WT Ext CAU


     _____  _____   _____  _____            _____  _____   _____  _____
     _____  _____   _____  _____            _____  _____   _____  _____
     _____  _____   _____  _____            _____  _____   _____  _____
     _____  _____   _____  _____            _____  _____   _____  _____
     _____  _____   _____  _____            _____  _____   _____  _____
```

Figure 2-4.   Radio Controller Status Screen (1 of 2)

Fields (page 1):

- *RC Location* —The location of the target board, in the above example 01B12.

- *Busied-out* —The target board is currently in a state-of-service.

- *Connected WFBs* —Currently, there is one WFB connected to the target radio controller.

- *ACTIVE WTS* —This section refers to any currently active pocket phones assigned to the target RC. This is broken down further by WFB, pocket phone extension (WT Ext) and the CAU to which it is "connected."

```
status radio-controller 1b12                              Page  2 of  2

                        RADIO CONTROLLER STATUS

   RC Location: 01B12          Service State: in-service       Busied-out?: n
 No. Active WTs: 0           Connected WFBs: 1


 WFB A STATUS: Port: 01B12A     Int. Antenna?: n   Service State: in-service
           Conn?: y            Busied-out?: n  No. Active WTs: 0


             Conn?    Service State      Busied-out?    No. Active WTs
     CAU 1:    y      in-service             n              0
     CAU 2:    n      _____         _             _
     CAU 3:    n      _____         _             _
     CAU 4:    n      _____         _             _

 WFB B STATUS: Port: 01B12B     Int. Antenna?: _   Service State: _____
           Conn?: n            Busied-out?: _  No. Active WTs: _


             Conn?    Service State      Busied-out?    No. Active WTs
     CAU 1:    n      _____         _             _
     CAU 2:    n      _____         _             _
     CAU 3:    n      _____         _             _
     CAU 4:    n      _____         _             _
```

Figure 2-5.   Radio Controller Status Screen (2 of 2)

The second screen of this report provides a greater level of status detail for the target Radio Controller and its associated WFB(s), CAU(s) and pocket phones.

Radio Controller Error Codes and Testing

Table 2-1.   Radio Controller MO

MO Name As it Appears In Alarm Log	Alarm Level	Initial Craft Command To Run (a)	Full Name of MO
RC-BD	MAJOR	test board PPCSS 1	Radio Controller Circuit Pack
RC-BD	MINOR	test board PPCSS 1	Radio Controller Circuit Pack
RC-BD	WARNING	test board PPCSS 1	Radio Controller Circuit Pack

(a) where PP is the port network number, C is the carrier number (A, B, C, D, or E); and SS is the address of the slot in the carrier where the circuit pack is located (01,02,..., etc.).

The following table provides a list and information for error types in the Wireless Business system associated with the TN789 circuit pack.

Table 2-2.   RC-BD Error Log Entries

Error Type	Aux. Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
1	0	RC removed/SAKI Sanity Test (#53)	MINOR	ON	reset board PPCSS
18	0	RC is busied-out	WARNING	OFF	release board PPCSS
23(a)		RC not installed/incorrect xltns	WARNING	OFF	
60		Tone clock board not valid for DWBS	WARNING	OFF	
61(b)	Any	RC power-up test(s) failed	MINOR	ON/OFF	
62(c)		Downloading xltns to RC failed	MINOR	ON/OFF	
63		Downloading thresholds to RC failed	MINOR	ON	
64		Inter-RC sync init failed	MINOR	OFF	
65(d)		Wireless feature option is disabled	MINOR	ON	
257	Any	CC Loop Test (#52)	MINOR	ON	test board PPCSS sh 1 r 20
513	4352	Board error (external RAM failure)	MINOR	ON	
513	4353	Board error (internal RAM failure)	MINOR	ON	
513	4355	Board error (ROM checksum failure	MINOR	ON	
513	4356	Board error (message corruption)	MINOR	ON	
513	46086	Downlink buffer corruption	MINOR	ON	
513	46087	Uplink buffer corruption	MINOR	ON	
515	46080	UMAC sanity	MINOR	ON	
769(e)	46083	Angel-UMA DL DPR overflow	N/A	N/A	
769(e)	46084	Angel-UMAC UL DPR overflow	N/A	N/A	
769(e)	4096	Inconsistent DL msg (bad header)	N/A	N/A	
769(e)	4097	Inconsistent DL msg (bad port #)	N/A	N/A	
769(e)	4098	Inconsistent DL msg (bad data)	N/A	N/A	
769(e)	4099	Inconsistent DL msg (bad qualifier)	N/A	N/A	
769(e)	4xxx	Inconsistent DL msg (other)	N/A	N/A	
1025	Any	NPE Audit (#50)	N/A	N/A	
1281	1-24	RC NPE Xtalk Test (#1315)	MINOR	ON	test board PPCSS 1 r 2
1538		Hyperactive RC	MINOR	ON	
1793	46085	DECT protocol/RC Tone Loop Test (#1343)	MINOR	ON	
2049	1-24	RC NPE Loop Test (#1316)	MINOR	ON	test board PPCSS 1 r 2

Table 2-2.   RC-BD Error Log Entries — *Continued*

Error Type	Aux. Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
2304 (f)	Any	FW Checksum Test (pwrup only)	MINOR	ON	
2561(g)	Any	FW Upgrade Operation	MINOR	ON	upgrade firmware radio controller PPCSS
2817	Any	RC HW Xltn Audit (#1317)	WARNING	OFF	test board PPCSS sh r 2
3073(h)	46088	Loss of SYSCLOCK	MINOR	ON	upgrade firmware radio controller PPCSS
3329	46089	Loss of HSCLOCK	MINOR	OFF	
358(i)	Any	Fail to Support WT Firmware Upgrade	WARNING	OFF	enable wt-upgrade PPCSS
3840	46208	In-line error - RC detects WT firmware upgrade error			
3999		Lots of messages	WARNING	ON	

Notes:

a. The RC is not administered via the *add radio-controller PPCSS* command, or the RC is not physically installed, or the RC resides in a Port Network other than the Master Port Network, or the wireless feature is disabled on the *system-parameters customer-options* form. Ensure that the Radio Controller has been physical installed. Issue the *display radio-controller PPCSS* command and verify that the Radio Controller has been administered. If not, use the *add radio-controller PPCSS* command to administer it. All Radio Controllers must reside in the Master Port Network. The Master Port Network is administered on the *system-parameters wireless* form. Issue the *display system-parameters wireless* command and verify that Wireless is set to **y**.

b. When the Radio Controller is physically installed or reset via the *reset board PPCSS* command, a battery of power-up tests is automatically run. This error indicates that one or more of these power-up tests did not pass. The *Aux Data* value identifies which test(s) did not pass and can be interpreted as follows:

2012	An internal system error occurred.
2100	Testing aborted due to the inability to obtain the necessary system resources.
01xx-15xx	One or more power-up tests related to the RC LMAC 1 circuitry failed. WFB A (if installed) will not be brought into service. Assuming xx is 00, WFB B service is not affected. To resolve the problem, replace the RC circuit pack.
xx01-xx15	One or more power-up tests related to the RC LMAC 1 circuitry.
4001-4255	On or more power-up tests related to the RC Angel/UMAC circuitry failed. The RC WFB A (if installed), and WFB B (if installed) will not be brought in-service. To resolve the problem, replace the RC circuit pack.

c. As part of Radio Controller circuit pack initialization, pertinent translations are downloaded from the SPE to the board, for example, eligible frequencies, system ID, etc. In addition, thresholds associated with the onboard error counters are downloaded to the Radio Controller

circuit pack during the initialization process.

This error indicates that RC initialization failed either because an error was encountered while attempting to download translations (Error Type 62) or because an error was encountered while attempting to download the on-board error counter thresholds (Error Type 63).

If this error occurs, most likely it is **NOT** indicative of a Radio Controller problem. Rather, it is probable that there is some sort of system-wide problem.

Determine if any system-wide errors/alarms are present. If so, take the appropriate action to resolve these. If no system-wide errors are present, wait five minutes and attempt to re-initialize the Radio Controller circuit pack by either physically re-seating the board or resetting the board via the *reset board PPCSS* command. If the error persists, escalate the problem.

d. RC initialization aborted since the *Wireless* option on the *system-parameters customer-options* form is disabled. A Regional Customer Service Associate must be contacted to enable or re-enable the wireless feature.

➡ **NOTE:**
Federal Communication Commission (FCC) and UTAM, Inc. rules mandate that any wireless system, including the DWBS, that operates in the 1910-1930 MHz band automatically disables itself if the system is moved from the initial premises where it is installed. (This means that WFBs and CAUs may be moved within a customer building, *but they may not be moved to another customer location.*) In keeping with this requirement, the DWBS automatically disables the radio transmission if the DEFINITY ECS experiences a total loss of power. The radio transmission may be enabled only once the Lucent Technologies remote maintenance center is able to contact the DEFINITY ECS to confirm the system's location. This confirmation occurs within approximately 30 minutes after power is restored.

A power-up reset of the DEFINITY ECS generates a major power alarm, and the *DWBS will not operate until the location of the DEFINITY ECS can be verified by an authorized Lucent Technologies representative.* (However, a wired set would operate without this verification.) The radio transmission is activated only upon confirmation of the DEFINITY ECS location. Activation will occur automatically once the Lucent Technologies remote monitoring center receives the alarm and can reconnect with the DEFINITY ECS. The process normally occurs within 30 minutes of power-up. If the remote center cannot contact the switch, a technician must be dispatched to restore wireless service.

e. These errors are for Lucent Technologies R&D purposes only. No alarms are generated in response to these errors. Technicians should ignore these errors.

f. One or more checksum tests related to the RC firmware failed. This indicates that the resident RC firmware is either incomplete or corrupted. See the Firmware upgrade procedure (*upgrade firmware radio-controller PPCSS)* to reload the RC firmware from the SPE (MSS) to the Radio Controller circuit pack.

g. The firmware upgrade operation on this RC failed. The existing firmware codes in RC circuit pack have been erased and the re-program of new firmware release failed. This RC cannot perform any radio service to the coverage area. Repeat the upgrade procedure to resolve the possible transient problem. If the second attempt returns a failure again, this RC circuit pack may have defective components on board. Replace the RC circuit pack.

The *Aux Data* field contains the reason why the firmware upgrade operation failed. This error code is for Lucent R&D purposes.

h. This is a catastrophic sync error. If it occurs, the RC will be taken out of service.

First, check for system wide errors and alarms related to the Tone Clock circuit pack. If there are not system wide errors/alarms present, replace the RC circuit pack.

i. This error indicates that the RC that has been administered as a WT firmware upgrade server cannot be enabled at this time. The *Aux Data* field contains the reason why the RC fails to support this function. This error code is for Lucent Technologies R&D purposes.

To resolve the possible transient problem, the craft command: *enable wt-upgrade PPCSS* can be re-tried. If the RC still cannot be enabled, it shall not be used as a server for WT firmware upgrade operations. The normal radio services of this RC circuit pack remain functional.

Radio Controller Circuit Pack Maintenance

Craft-Demanded Test Descriptions and Error Codes

Always review the tests in the order in which they are presented in the following table when inspecting errors in the system. By clearing error codes associated with the NPE Audit for example, you may also clear errors generated from other tests in the testing sequence.

Table 2-3.   Investigation Order of Tests

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND*
NPE Audit (#50)		X		ND
RC Hardware Translation Audit (#1317)	X	X		ND
Control Channel Loop Test (#52)	X	X		ND
SAKI Sanity Test (#53)			X	D
RC NPE Port Crosstalk Test (#1315)		X		ND
RC NPE Port Loop Test (#1316)		X		ND
RC Tone Loop Test (#1343)		X		D
RC NPE Port Allocation Audit (#1336)	X	X		ND

* **D =** Destructive
ND = Non-destructive

Network Processing Elements Audit

The system sends messages to the Radio Controller circuit pack to update the network connectivity translation for all Network Processing Elements (NPEs) on the circuit pack.

Table 2-4.   NPE Audit Test #50

Error Code	Test Result	Description/Recommendation
2100	ABORT	System resources required for this test are not available.
1019	ABORT	Test already in progress: 1. Retry the command at one-minute intervals a maximum of five times. 2. If the test continues to abort, escalate the problem.
2030	ABORT	Test not run on standby Processor Element (PE).
any	FAIL	Internal System Error: 1. Retry the command at one-minute intervals a maximum of five times. 2. If the test continues to abort, escalate the problem.
	PASS	Network connectivity for all Radio Controller NPEs successfully updated.
any	NO BOARD	This is normal if the test is being done when (a) the board is not physically in the system or (b) the system is booting up or (c) the Radio Controller has not been administered via the *add radio-controller< PPCSS>* command. 1. Verify that the board is physically in the system. 2. Verify that the system is not in a stage of booting up. 3. Issue the *display radio-controller <PPCSS>* command and verify that the Radio Controller has been administered. 4. Retry the above command at one-minute intervals for a maximum of five times. 5. If the test continues to return NO BOARD, escalate the problem.

Radio Controller Hardware Translation Audit
(#1317)

Pertinent translation data is downloaded to the RC circuit pack when it is initialized. This data includes the Radio Controller cluster ID, available radio frequencies, and the DWBS System ID.

This test audits the data previously downloaded to the RC circuit pack against the currently administered translations. This is a non-destructive test.

Table 2-5.   RC Hardware Translation Audit Test #1317

Error Code	Test Result	Description/Recommendation
2000	ABORT	The Radio Controller circuit pack failed to respond to a downlink CCMS message. 1. Retry the command at one-minute intervals a maximum of five times. 2. Re-initialize the RC circuit pack by either physically re-seating the board or by issuing the *reset board <PPCSS>* command. 3. If the test continues to abort, escalate the problem.
2100	ABORT	System resources required for this test are not available. 1. Retry the command at one-minute intervals a maximum of five times. 2. If the test continues to abort, escalate the problem.
1	FAIL	Radio Controller has incorrect radio frequencies.
2	FAIL	Radio Controller has incorrect cluster ID.
3	FAIL	Radio Controller has incorrect DWBS System ID.
4	FAIL	Radio Controller has incorrect radio data.
5	FAIL	Radio Controller has incorrect radio data.
6	FAIL	Radio Controller has the incorrect modem operating parameters. 1. If the currently administered translations are incorrect, issue the *change carrier-frequencies* and/or the *change system-parameters wireless* command and modify as needed. Go to step 2. 2. Re-initialize the RC circuit pack by either reseating the board or by issuing the *reset board <PPCSS>* command. **Note:** In order to reset the RC board via the reset command, the board must first be busied out via the *busyout board <PPCSS>* command. Once the rest command has completed, issue the *release board <PPCSS>* command to restore the RC to an in-service state.

Table 2-5. RC Hardware Translation Audit Test #1317 — *Continued*

Error Code	Test Result	Description/Recommendation
2012	FAIL	Internal system error. 1. Retry the command at one-minute intervals a maximum of five times. 2. If the test continues to abort, escalate the problem.
	PASS	The currently administered translations match what was previously downloaded to the RC circuit pack.
any	NO BOARD	This is normal if the test id is being done when (a) the board is not physically in the system or (b) the system is booting up or (c) the RC circuit pack has not been administered via the *add radio-controller <PPCSS>* command. 1. Verify that the board is physically in the system. 2. Verify that the system is not in a stage of booting up. 3. Issue the *display radio-controller <PPCSS>* command and verify that the RC circuit pack has been administered. 4. Retry the command at one-minute intervals a maximum of five times. 5. If the test continues to return NO BOARD, escalate the problem.

Control Channel Loop Test (#52)

This test validates that the Radio Controller circuit pack can send or receive messages over the control channel. The test consists of querying the circuit pack for its code and vintage and verifying the accuracy of the returned data. This is a non-destructive test.

Table 2-6.   Control Channel Loop Test #52

Error Code	Test Result	Description / Recommendation
2100	ABORT	System resources required for this test are not available. 1. Retry the command at one-minute intervals a maximum of five times. 2. If the test continues to abort, escalate the problem.
2030	ABORT	Test not run on standby Processor Element (PE).
any	FAIL	The circuit pack failed to return its circuit pack code or vintage. 1. Retry the command a maximum of five times. 2. If the problem continues, replace the Radio Controller circuit pack. 3. Retry the command a maximum of five times. 4. If the test continues to fail, escalate the problem.
	PASS	Communications with the Radio Controller over the control channel are successful.
any	NO BOARD	This is normal if the test is being done when (a) the board is not physically in the system or (b) the system is booting up or (c) the Radio Controller has not been administered via the *add radio-controller <PPCSS>* command. 1. Verify that the board is physically in the system. 2. Verify that the system is not in a stage of booting up. 3. Issue the *display radio-controller <PPCSS>* command and verify that the Radio Controller has been administered. 4. Retry the command at one-minute intervals for a maximum of five times. 5. If the test continues to return NO BOARD, escalate the problem.

SAKI Sanity Test #53

This test reset the Radio Controller circuit pack. This test is executed via the *reset board <PPCSS>* command. This is a destructive test.

Table 2-7.   SAKI Sanity Test #53

Error Code	Test Result	Description / Recommendation
1015	ABORT	Radio Controller circuit pack is not busied-out. The Radio Controller circuit pack can be reset only if it is busied-out. 1. Busyout the Radio Controller circuit pack via the *busyout board <PPCSS>* command. 2. Execute the reset command again.
2100	ABORT	System resources required for this test are not available. 1. Retry the command at one-minute intervals a maximum of five times. 2. If the test continues to about, escalate the problem.
1	FAIL	The Radio Controller circuit pack failed to reset.
2	FAIL	The Radio Controller circuit pack failed to restart. 1. Execute the reset command again. 2. If the problem persists, replace the circuit pack.
	PASS	The circuit pack reset correctly. 1. After the Radio Controller circuit pack completes its initialization, issue the *test board <PPCSS>* command to run the short test sequence.
any	NO BOARD	This is normal if the test is being done when (a) the board is not physically in the system (b) the system is booting up or (c) the Radio Controller has not been administered via the *add radio-controller <PPCSS>* command. 1. Verify that the board is physically in the system. 2. Verify that the system is not in a stage of booting up. 3. Issue the *display radio-controller <PPCSS>* command and verify that the Radio Controller has been administered. 4. Retry the command at one-minute intervals a maximum of five times. 5. If the test continues to return NO BOARD, escalate the problem.

Radio Controller Port Crosstalk Test (#1315)

Each Radio Controller circuit pack has 24 NPEs; 12 of the NPEs are allocated to WFB A, and 12 of the NPEs are allocated to WFB B. Each NPE has a TDM Bus interface and is needed to complete a Wireless Terminal (WT) call circuit. In addition, each NPE controls gain and provides some conferencing functions.

As such, an NPE is allocated to a WT whenever the WT is active on a call. This NPE-to-WT association is dynamic in nature. The NPE is allocated during call setup and de-allocated during call tear-down. As such, the NPE ports can be viewed as a resource that is shareable by all WTs within the coverage area of a particular Wireless Fixed Base (WFB).

The RC NPE Port Crosstalk Test verifies that a given NPE channel talks on the selected time slot and never crosses over to time slots reserved for other connections. If the NPE is not working correctly, one-way and noisy connections may be observed.

As stated previously, the Radio Controller circuit pack has 24 NPEs. However, since it is not normally necessary to test all 24 NPE ports and since to test all 24 NPE ports would take an excessive amount of time, each invocation of the RC NPE Port Crosstalk Test tests just one NPE. The test remembers the last NPE tested and each subsequent invocation tests the next NPE. In other words, the first invocation of this test will test NPE 1, the next invocation will test NPE 2, and so on in a round-robin fashion. If all 24 NPE ports must be tested, simply specify 24 as the **repeat** option on the **test** command line (for example, **test board PPCSS long repeat 24**).

This is a non-destructive test.

Table 2-8.   RC NPE Port Crosstalk Test #1315

Error Code	Test Result	Description / Recommendation
2100	ABORT	System resources required for this test are not available. 1. Retry the command at one-minute intervals a maximum of five times. 2. If the test continues to abort, escalate the problem.
1-24	ABORT	The RC NPE Crosstalk Test aborted. The error code identifies the NPE for which the test aborted. The abort is most likely due to the NPE currently being allocated for a WT call. The abort could also be due to some needed system resources not being available. 1. Check to see if the NPE is in use on a WT call. 2. Retry the command at one-minute intervals a maximum of five times. 3. If the test continues to abort, escalate the problem.

Table 2-8.   RC NPE Port Crosstalk Test #1315

Error Code	Test Result	Description / Recommendation
1-24	FAIL	The RC NPE Port Crosstalk Test failed. The error code identifies the NPE for which the test failed. 1. Issue the *test board <PPCSS> long repeat 24* command. If any test invocations fail, replace the Radio Controller circuit pack. 2. If the test continues to fail, escalate the problem.
	PASS	The NPE is correctly using its allocated time slots. 1. To be sure that there is not an intermittent problem, repeat the test up to a maximum of 10 times and verify that the test continues to pass.
any	NO BOARD	This is normal if the test is being done when (a) the board is not physically in the system or (b) the system is booting up or (c) the Radio Controller has not been administered via the *add radio-controller <PPCSS>* command. 1. Verify that the board is physically in the system. 2. Verify that the system is not in a stage of booting up. 3. Issue the *display radio-controller <PPCSS>* command and verify that the Radio Controller has been administered. 4. Retry the command at one-minute intervals a maximum of five times. 5. If the test continues to return NO BOARD, escalate the problem.

Radio Controller NPE Port Loop Test (#1316)

Each Radio Controller circuit pack has 24 NPEs; 12 of the NPEs are allocated to WFB A, and 12 of the NPEs are allocated to WFB B. Each NPE has a TDM Bus interface and is needed to complete a Wireless Terminal (WT) call circuit. In addition, each NPE controls gain and provides some conferencing functions.

As such, an NPE is allocated to a WT whenever the WT is active on a call. This NPE-to-WT association is dynamic in nature. The NPE is allocated during call setup and de-allocated during call tear-down. As such, the NPE ports can be viewed as a resource that is shareable by all WTs within the coverage area of a particular WFB.

The RC NPE Port Loop Test checks the information (that is, bearer) channel between the Switch Processing Element (SPE) and a Radio Controller NPE port. The SPE sends a message to loop around the information channel for the NPE

port. The test is performed by sending a digital count from the Tone-Clock circuit pack on the information channel time slot and receiving the same digital count with a general purpose Tone Detector.

A Conference Test is done next for the information channel. This test is the same as Conference Test #6.

Only one value (Pass, Fail, or Abort) is generated as a result of the two tests run. If any test fails or aborts, the sequence is stopped.

As stated previously, the Radio Controller circuit pack has 24 NPEs. However, since it is not normally necessary to test all 24 NPE ports and since to test all 24 NPE ports would take an excessive amount of time, each invocation of the RC NPE Port Loop Test tests just one NPE. The test remembers the last NPE tested and each subsequent invocation tests the next NPE. In other words, the first invocation of this test will test NPE 1, the next invocation will test NPE 2, and so on in a round-robin fashion. In the event that all 24 NPE ports must be tested, simply specify 24 as the **repeat** option on the **test** command line (for example, **test board PPCSS long repeat 24**).

This is a non-destructive test.

Table 2-9. RC NPE Port Loop Test #1316

Error Code	Test Result	Description / Recommendation
2100	ABORT	System resources required for this test are not available. 1. Retry the command at one-minute intervals a maximum of five times. 2. If the test continues to abort, escalate the problem.
1-24	ABORT	The RC NPE Port Loop Test aborted. The error code identifies the NPE for which the test aborted. The abort is most likely due to the NPE currently being allocated for a WT call. The abort could also be due to some needed system resources not being available. 1. Check to see if the NPE is in use on a WT call. 2. Retry the command at one-minute intervals a maximum of five times. 3. If the test continues to abort, escalate the problem.

Table 2-9.   RC NPE Port Loop Test #1316 — *Continued*

Error Code	Test Result	Description / Recommendation
1-24	FAIL	The RC NPE Port Loop Test failed. The error code identifies the NPE for which the test failed. 1. Issue the *test board PPCSS long repeat 24* command. If any test invocations fail, replace the Radio Controller circuit pack. 2. If the test continues to fail, escalate the problem.
	PASS	The RC NPE Port Loop Test passed. The NPE channel tested is transmitting properly. 1. To be sure that there is not an intermittent problem, repeat the test up to a maximum of 10 times and verify that the test continues to pass.
any	NO BOARD	This is normal if the test is being done when (a) the board is not physically in the system or (b) the system is booting up or (c) the Radio Controller has not been administered via the *add radio-controller <PPCSS>* command. 1. Verify that the board is physically in the system. 2. Verify that the system is not in a stage of booting up. 3. Issue the *display radio-controller <PPCSS>* command and verify that the Radio Controller has been administered. 4. Retry the command at one-minute intervals a maximum of five times. 5. If the test continues to return NO BOARD, escalate the problem.

Radio Controller Tone Loop Back Test (#1343)

This test validates the Radio Controller circuitry by looping a tone provided by the SPE to the far end of the Radio Controller circuit pack and then back to the SPE. The SPE determines pass/fail by comparing the tone received to the tone sent.

This loop back test is actually executed 24 times (once for each Radio Controller circuit pack NPE port). This ensures that all six DSPs and both ASICs on the Radio Controller are exercised.

This test does not exercise the far-end Radio Controller circuitry, which sends/receives over the I2 links (the links to WFBs). The I2 circuitry is exercised by other tests. Refer to the WFB maintenance object for details.

This is a very destructive test. Therefore, this test will abort with error code 1362 if the Radio Controller circuit pack has not first been busied-out via the *busyout board <PPCSS>* command.

Table 2-10.   RC Tone Loop Back Test #1343

Error Code	Test Result	Description/Recommendation
1362	ABORT	The test aborted because the Radio Controller has not been busied-out. 1. Busyout the Radio Controller via the *busyout board <PPCSS >*command. 2. Retry the test command. 3. If the test continues to abort, escalate the problem.
2100	ABORT	System resources required for this test are not available.
2021	ABORT	Internal System error: 1. Retry the command at one-minute intervals, a maximum of five times. 2. If the test continues to abort, escalate the problem.
1-63	FAIL	One or more of the 24 tone loop back tests failed. The failure could not be pinpointed to a particular DSP or ASIC. The error code (1-63) contains a bit map of the DSPs that failed. The bit map can be interpreted as follows: **xxxxxb** If b=1, one or more of the tone loop back tests that utilize DSP 1 (NPE ports 1, 2, 3, and/or 4) failed. **xxxxbx** If b=1, one or more of the tone loop back tests that utilize DSP 2 (NPE ports 5, 6, 7, and/or 8) failed. **xxxbxx** If b=1, one or more of the tone loop back tests that utilize DSP 3 (NPE ports 9, 10, 11, and/or 12) failed. **xxbxxx** If b=1, one or more of the tone loop back tests that utilize DSP 4 (NPE ports 13, 14, 15, and/or 16) failed. **xbxxxx** If b=1, one or more of the tone loop back tests that utilize DSP 5 (NPE ports 17, 18, 19, and/or 20) failed. **bxxxxx** If b=1, one or more of the tone loop back tests that utilize DSP 6 (NPE ports 21, 22, 23, and/or 24) failed. Replace the Radio Controller circuit pack.

Table 2-10.   RC Tone Loop Back Test #1343 — *Continued*

Error Code	Test Result	Description/Recommendation
3001	FAIL	One or more of the tone loop back tests that utilize DSP 1 (NPE ports 1, 2, 3, and/or 4) failed. All other tone loop back tests passed.
3002	FAIL	One or more of the tone loop back tests that utilize DSP 2 (NPE ports 5, 6, 7, and/or 8) failed. All other tone loop back tests passed.
3003	FAIL	One or more of the tone loop back tests that utilize DSP 3 (NPE ports 9, 10, 11, and/or 12) failed. All other tone loop back tests passed.
3004	FAIL	One or more of the tone loop back tests that utilize DSP 4 (NPE ports 13, 14, 15, and/or 16) failed. All other tone loop back tests passed
3005	FAIL	One or more of the tone loop back tests that utilize DSP 5 (NPE ports 17, 18, 19, and/or 20) failed. All other tone loop back tests passed.
3006	FAIL	One or more of the tone loop back tests that utilize DSP 6 (NPE ports 21, 22, 23, and/or 24) failed. All other tone loop back tests passed.
4001	FAIL	The tone loop back tests that utilize DSP 1, DSP 2, and DSP 3 failed. Since these DSPs all utilize ASIC 1 (LMAC A), this is most likely indicative of a malfunction within ASIC 1. All of the tone loop back tests associated with ASIC 2 (LMAC B) passed. WFB A call processing services will most likely be compromised (that is, calls may be dropped, etc.).

Table 2-10.   RC Tone Loop Back Test #1343 — *Continued*

Error Code	Test Result	Description/Recommendation
4002	FAIL	The tone loop back tests that utilize DSP 4, DSP 5, and DSP 6 failed. Since these DSPs all utilize ASIC 2 (LMAC B), this is most likely indicative of a malfunction within ASIC 2. All of the tone loop back tests associated with ASIC 1 (LMAC A) passed. WFB B call processing services will most likely be compromised (that is, calls may be dropped, etc.). Replace the Radio-Controller circuit pack.
	PASS	All 24 tone loop back tests passed.
	NO BOARD	This is normal if the test is being done when (a) the board is not physically in the system or (b) the system is booting up or (c) the Radio Controller has not been administered via the *add radio-controller <PPCSS>* command. 1. Verify that the board is physically in the system. 2. Verify that the system is not in a stage of booting up. 3. Issue the *display radio-controller PPCSS* command and verify that the Radio Controller has been administered. 4. Retry the command at one-minute intervals a maximum of five times. 5. If the test continues to return NO BOARD, escalate the problem.

Radio Controller NPE Port Allocation Audit (#1336)

Radio Controller NPE allocation data is maintained both on the Radio Controller circuit pack as well as within the switching fabric of DEFINITY. This audit compares this NPE allocation data.

Due to the dynamic nature of this data, data discrepancies are not necessarily indicative of system errors. Any discrepancies detected are resolved by the audit. Therefore, this audit never reports fail.

This is a non-destructive test.

Table 2-11.   RC NPE Port Allocation Audit Test #1336

Error Code	Test Result	Description / Recommendation
2100	ABORT	System resources required for this test are not available
2012	ABORT	Internal System error: 1. Retry the command at one-minute intervals a maximum of five times. 2. If the test continues to abort, escalate the problem.
	PASS	The audit ran successfully. Any NPE allocation data discrepancies were appropriately resolved.
any	NO BOARD	This is normal if the test is being done when (a) the board is not physically in the system or (b) the system is booting up or (c) the Radio Controller has not been administered via the *add radio-controller <PPCSS>* command. 1. Verify that the board is physically in the system. 2. Verify that the system is not in a stage of booting up. 3. Issue the *display radio-controller PPCSS* command and verify that the Radio Controller has been administered. 4. Retry the command at one-minute intervals a maximum of five times. 5. If the test continues to return NO BOARD, escalate the problem.

Radio Fixed Part Synchronization

<div style="text-align: right; font-size: 3em;">3</div>

Introduction

This section provides the necessary information regarding the Radio Fixed Part Synchronization maintenance object (RFP-SYNC).

Each Radio Controller operates on a 100 Hz frame clock and a 6.25 Hz multiframe clock. For the DWBS system to operate correctly, the clocks in all Radio Controllers in the system must be synchronized.

The implementation of inter-Radio Controller clock synchronization is based upon the SYSCLK and HSCLOCK leads on the TDM bus of each port network. The System Tone Clock board provides a 2.048 clock on the SYSCLK lead. SYSCLK is used to drive the local radio clocks in each Radio Controller circuit pack. However, since the local clocks in each Radio Controller circuit pack operate independently, one of the Radio Controllers is selected to be the Sync-Master Radio Controller. The Sync-Master Radio Controller provides its timing signal on the HSCLOCK lead. All other Radio Controllers in the system are referred to as Sync-Slave Radio Controllers. The Sync-Slave Radio Controllers reference the timing signal on HSCLOCK to phase synchronize their local radio clocks to that of the Master-Sync Radio Controller.

Radio Fixed Part Synchronization MO

The Radio Fixed Part Synchronization MO (RFP-SYNC) is responsible for selecting the Sync-Master Radio Controller and testing/maintaining the integrity of inter-Radio-Controller clock synchronization.

Since the SYSCLK and HSCLOCK leads are local to a Port Network, all Radio Controllers in the system must reside in the same Port Network. The port network in which Radio Controllers can reside is referred to as the Master Port Network.

At initialization time, the DWBS makes the first initialized Radio Controller the Sync-Master Radio Controller. The Sync-Master Radio Controller remains the Sync-Master until it is physically removed, busied-out, taken out-of-service, or until the RFP-SYNC MO is alarmed. Any of these events will cause the DWBS to attempt automatically to designate another Radio Controller as the new Sync-Master.

The current Sync-Master Radio Controller can be found by issuing the *test radio-sync* command. The board address (PPCSS) listed in the Port column is the board address containing the current Sync-Master Radio Controller.

For all RFP-SYNC-related failures, the PPCSS of the Sync-Master Radio Controller (at the time the error occurred) is logged in the error/alarm log. See the following alarm and error logs.

RFP-SYNC Error and Testing

Table 3-1. REP-SYNC MO

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name of MO
RFP-SYNC	MAJOR	test radio-sync 1	Radio Fixed Part Synchronization
RFP-SYNC	MINOR	test radio-sync 1	Radio Fixed Part Synchronization
PFP-SYNC	WARNING	test radio-sync 1	Radio Fixed Part Synchronization

Radio Fixed Part Synchronization Error Log Entries

Table 3-2. RFP-SYNC Error Log Entries

Error Type	Aux Data	Associated Test	Alarm Level	On/Off Board	Test to Clear Value
0*	0	Any	Any	Any	test radio-sync sh r 1
1(a)	Any	Sync Ref. Query Test (#1324)	MINOR	ON	test radio-sync 1 r 5
769(a,b)	Any	Wireless Sync Audit (#1323)	MINOR	OFF	test radio-sync 1 r 5
1025(a,c)	0	Loss of HSCLOCK	MINOR	ON	
1281(a,d)	0	Loss of SYSCLK	MINOR	ON	

* Run the short test sequence first. If all tests pass, run the long test sequence. Refer to the appropriate test description and follow the recommended procedures.

Major or Minor alarms on this MO may have been downgraded to Warning alarms based on the values used in the *set options* command.

Notes:

  a. Whenever the current Sync-Master Radio Controller is physically removed or busied-out and/or whenever the RFP-SYNC MO is alarmed, the system automatically attempts to switch to a new Sync-Master Radio Controller. The sync switching algorithm works as follows.

  If an unalarmed, initialized Sync-Slave Radio Controller is found, it is designated as the new Sync-Master Radio Controller.

  If this search fails, initialized but alarmed Sync-Slave Radio Controllers are considered. If the alarm level associated with an alarmed Sync-Slave Radio Controller is less severe than that associated with the current Sync-Master Radio Controller, the Sync-Slave Radio Controller is made the new Sync-Master Radio Controller.

b. As detailed in (a), the system automatically attempts to select a new Sync-Master Radio Controller. Therefore, it is most likely the system will clean things up automatically.

Wait 10 minutes. If after this time period the system has not recovered, take the following steps.

1. List all Radio Controllers in the system by issuing the *list configuration radio-controller all* command.

2. Busyout all Radio-Controllers in the system via the *busyout board PPCSS* command.

3. After all Radio Controllers have been busied-out, release all the Radio Controllers via the *release board PPCSS* command.

⮕ **NOTE:**
The first Radio Controller released will become the Sync-Master Radio Controller.

If the problem continues, escalate the problem.

c. This is due to either the Sync-Master Radio Controller not correctly providing its timing signal on the HSCLOCK lead or one or more Sync-Slave Radio Controllers not correctly receiving the timing signal being provided on HSCLOCK.

Associated HSCLOCK errors will be logged against the RC-BD MO for the Sync-Slave Radio Controllers that reported the HSCLOCK errors.

If HSCLOCK errors are present for most/all of the Sync-Slave Radio Controllers, the Sync-Master Radio Controller is most likely not functioning correctly and should be replaced.

If HSCLOCK errors are present for only a small subset of all the Sync-Slave Radio Controllers, the Sync Slave Radio Controllers with associated HSCLOCK errors are most likely not healthy and need to be replaced.

d. The Sync-Master Radio Controller is not able to drive its local clock from the clock on the SYSCLK lead.

This could be indicative of either an unhealthy Sync-Master Radio Controller or an unhealthy system TONE-CLOCK board.

Investigate/resolve any TONE-CLOCK errors.

If the problem persists, replace the Sync-Master Radio Controller circuit pack.

If the problem persists, escalate the problem.

Craft-Demanded Test Descriptions and Error Codes

Always investigate tests in the order presented in the table below when inspecting errors in the system. By clearing error codes associated with the *Wireless Sync*

Audit Test for example, you may also clear errors generated from other tests in the testing sequence.

Table 3-3.   Craft-Demanded Testing

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND
Wireless Sync Audit Test (#1323)	X	X		ND
Sync Reference Query Test (#1324)	X	X		ND

* D = Destructive

ND = Non-destructive

Wireless Sync Audit Test (#1323)

This audit verifies the integrity of internal data structures related to inter-Radio Controller synchronization. In addition, this audit verifies that the Master-Sync Radio Controller is in Master-Sync mode and that all other Radio Controllers are in Sync-Slave mode.

If this test fails, RFP-SYNC maintenance will attempt to designate another Radio Controller circuit pack to act as the Sync-Master.

This test is non-destructive.

Table 3-4.   Wireless Sync Audit Test #1323

Error Code	Test Result	Description / Recommendation
2100	ABORT	System resources required for this test are not available.
2012	ABORT	An internal system error occurred. 1. Retry the command at one-minute intervals a maximum of five times. 2. If the test continues to abort, escalate the problem.
1	FAIL	The Sync-Master RC has not been found in internal data structures.
2	FAIL	Have initialized RCs but no designated Sync-Master RC.
3	FAIL	The designated Sync-Master RC is not physically installed.

Table 3-4. Wireless Sync Audit Test #1323 — *(continued)*

Error Code	Test Result	Description / Recommendation
4	FAIL	The Sync-Master RC is not in Sync-Master mode.
5	FAIL	One or More Sync-Slave RC(s) is not in Sync-Slave mode.
		1. The system will automatically attempt to clean up any data discrepancies and/or recover from Radio Controllers that may have been operating in an improper sync mode.
		2. Retry the command at one-minute intervals a maximum of five times.
		3. If the test continues to fail, list the Radio Controllers in the system by issuing the *list configuration radio-controller* command. Then busyout each Radio Controller via the *busyout board <PPCSS>* command. After all Radio Controllers have been busied-out, release the Radio Controllers via the *release board <PPCSS>* command. Wait three minutes to give all the Radio Controllers a chance to re-initialize.
		4. If the test continues to fail, escalate the problem.
	PASS	The Wireless Sync Audit passed. The integrity of all associated internal data structures has been verified. The Master-Sync RC is in Master-Sync mode. All other RCs are in Sync-Slave mode.

Sync Reference Query Test (#1324)

This test verifies the sanity of the sync reference clock on the HSCLOCK lead.

Under normal conditions, the Sync-Master Radio Controller provides a sync reference on the HSCLOCK lead in its port network. All other Radio Controllers in the port network sync to this sync reference on HSCLOCK.

This test verifies the sanity of the sync reference on the HSCLOCK lead. If the current Sync-Master Radio Controller can provide its sync reference on the HSCLOCK lead, the test passes.

If this test fails, RFP-SYNC maintenance will attempt to designate another Radio Controller circuit pack to act as the Sync-Master.

This test is non-destructive.

Table 3-5.   Sync Reference Query Test #1324

Error Code	Test Result	Description / Recommendation
2100	ABORT	System resources required for this test are not available.

2012	ABORT	An internal system error occurred.
		
		    1. Retry the command at one-minute intervals a maximum of five times.
		    2. If the test continues to abort, escalate the problem.

1	ABORT	None of the RCs have been designated to be the Sync-Master RC.

2	ABORT	The Sync-Master Radio Controller is not physically installed.
		
		    1. Retry the command at one-minute intervals a maximum of five times.
		    2. If the test continues to abort, escalate the problem.

Table 3-5. Sync Reference Query Test #1324 — *(continued)*

Error Code	Test Result	Description / Recommendation
4	ABORT	The Sync-Master RC circuit pack was not able to run the Sync Reference Query Test. 1. Retry the command at one-minute intervals a maximum of five times. 2. If the test continues to abort, replace the Master-Sync RC circuit pack. 3. If the test continues to abort, escalate the problem.
3	FAIL	The Sync-Master RC circuit pack ran the Sync Reference Query Test and failed. Inter-Radio Controller synchronization may have been compromised if this RC remains as the Sync-Master. 1. The system will automatically attempt to designate another RC circuit pack to act as the Sync-Master. 2. Retry the command at one-minute intervals a maximum of five times. 3. If this test does not consistently pass, replace the Sync-Master RC circuit pack. 4. If the problem persists, escalate the problem.
	PASS	The Sync Reference Query Test passed. The Sync-Master RC is correctly sending its timing signal over the HSCLOCK lead.

Wireless Fixed Base and Cell Antenna Unit Maintenance

4

Introduction

This chapter describes the commands, tests, and error reporting for the Wireless Fixed Base (WFB) and Cell Antenna Unit (CAU).

Wireless Fixed Base Maintenance

The WFB is the base station radio of a cell in the DWBS. It is a component of the fixed part of the DWBS having the ability to operate with up to four external cell antenna units.

WFB LED Indicators

The WFB has three LEDs, which can help provide an indication regarding its operational health. The green LED indicates that the WFB is receiving power. The amber LED indicates that there is currently an active call. The red LED indicates an alarm situation that should be investigated immediately.

Maintenance Commands

The following section describes various commands that can be used to determine the operational health of the WFB and, by extension, any connected external CAUs.

Displaying WFB Status

The system can display the WFB status, including the connected ports and pocket phones active on a bearer channel per WFB provided. To display WFB status, enter the **status wfb *<PPCSS>*** command.

Displaying WFB Information With Associated Circuit Pack

The **list configuration all** and **list configuration board *<PPCSS>*** commands produce the System Configuration report. If **all** is specified, all the circuit packs installed (RC and non-RC) are displayed. The displayed RC circuit packs provide information (hardware vintage and firmware version) regarding their associated WFB(s).

Busyout and Release Maintenance States

The WFB and CAU can be put in a busied-out state; this makes them unavailable to receive or transmit any signals until each MO is returned to operation by the release command. See Chapter 2 for command details.

WFB Error Codes and Testing

The following section provides error/alarm and test information regarding the WFB.

Table 4-1. Wireless Fixed Base MO

MO Name As it Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name of MO
WFB	MINOR	test board PPCSSpp (Loss of WFB Query Test #1327)	Wireless Fixed Base MO-WFB
WFB	MINOR	test board PPCSSpp (WFB Out of Sync Query Test #1328)	Wireless Fixed Base MO-WFB
WFB	MINOR	test board PPCSSpp (WFB Power Query Test #1329)	Wireless Fixed Base MO-WFB
WFB	MINOR	test wfb PPCSSpp (CAU Connection Audit Test #1341)	Wireless Fixed Base MO-WFB

PP represents the port network number, *C* provides carrier information, *SS* indicates the slot of the Radio Controller circuit pack and *pp* contains the WFB identifier.

WFB Error Log Entries

The following table provides a list and information for error types in the Wireless Business System associated with the TN789 circuit pack.

Table 4-2. WFB Error Log Entries

Error Type	Aux Data	Associated Test/In-Line Error	Alarm Level	On/Off Board	Test to Clear Value
1	Any	Loss of WFB	MINOR	ON	test wfb PPCSSpp test 1327
18	Any	WFB Busied out	WARNING	ON	release wfb PPCSSpp
23		WFB Not Administered properly	N/A	N/A	N/A
257	Any	WFB Out of Sync.	MINOR	ON	test wfb PPCSSpp test 1328
513	Any	WFB Transmitting too much power	MINOR	ON	test wfb PPCSSpp test 1329
927		WFB Initialization Failure	MINOR	ON	busyout, reset and release RC board
	1000	Release of WFB Failed	MINOR	ON	busyout, reset and release RC board
	1001 to 1015	LMAC Test results failed	MINOR	ON	busyout, reset and release RC board
	2000	WFB Activation Failure	MINOR	ON	busyout, reset and release RC board
	2001	Reset of LMAC failed	MINOR	ON	busyout, reset and release RC board
	2002	Sync. Failure	MINOR	ON	busyout, reset and release RC board
	2003	Delay Calculation Failure	MINOR	ON	busyout, reset and release RC board
	2004	Delay Compression Failure	MINOR	ON	busyout, reset and release RC board
	2005	CAU initialization Failed	MINOR	ON	busyout, reset and release RC board
	2006	I2 is operational	MINOR	ON	busyout, reset and release RC board
	2007	Internal Failure	MINOR	ON	busyout, reset and release RC board
	2008	Reset of LMAC Passed	MINOR	ON	busyout, reset and release RC board
	2012	Internal System Error	MINOR	ON	busyout, reset and release RC board

Table 4-2. WFB Error Log Entries — *Continued*

Error Type	Aux Data	Associated Test/In-Line Error	Alarm Level	On/Off Board	Test to Clear Value
	2100	System Resources are currently not available	MINOR	ON	busyout, reset and release RC board
	2500	CAU is not Detected	MINOR	ON	busyout, reset and release RC board
	2600	Internal Antenna admin with CAU connected	MINOR	ON	busyout, reset and release RC board
	2700	CAU is not Connected	MINOR	ON	busyout, reset and release RC board
	3000	WFB Cell Initialization Failed	MINOR	ON	busyout, reset and release RC board
	3100	WFB Hardware Failure	MINOR	ON	busyout, reset and release RC board
	4000	WFB Initialization Failed	MINOR	ON	busyout, reset and release RC board
	5000 + x	WFB Query Failed. x = counter value	MINOR	ON	busyout, reset and release RC board
	6000	CAU Port Occp. Failed	MINOR	ON	busyout, reset and release RC board
	7000	RC is Not Initialized	MINOR	ON	busyout, reset and release RC board
	8000	CAU out-of-service	MINOR	ON	busyout, reset and release RC board
1024	34816	WFB Re-inserted	N/A	N/A	Log Only
1281	Any	Lock Detect Error	N/A	N/A	Log Only
1537	12	CRC-12 error	N/A	N/A	Log Only
1538	4	CRC-4 error	N/A	N/A	Log Only
1793	Any	LMAC Lost Sanity Error	N/A	N/A	Log Only
2049	Any	CAU Connection Audit Test	MINOR	ON	test wfb PPCSSpp test 1341
2561 (a)	Any	WFB Firmware Upgrade Operation Failed	MINOR	ON	upgrade firmware wfb PPCSSpp

Notes:

a. The firmware upgrade operation on this WFB failed. The existing firmware codes in WFB have been erased and the re-program of new firmware release failed. This WFB cannot perform any radio service to the coverage area. Repeat the craft command *upgrade firmware wfb PPCSSpp* to resolve the possible transient problem. If the second attempt returns failure again, then this WFB may have defective components on board. Replace the WFB.
The Aux Data field contains the reason why the firmware upgrade operation failed. This error code is for Lucent Technologies R&D purposes.

Craft-Demanded Test Descriptions and Error Codes

Always investigate tests in the order presented in the following table when inspecting errors in the system. By clearing error codes associated with the *Loss of WFB* for example, you may also clear errors generated from other tests in the testing sequence.

Table 4-3.   Order of Investigation

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND*
Loss of WFB Query Test (#1327)	X	X		ND
WFB Out of Sync Query Test (#1328)	X	X		ND
WFB Xmit Power Query Test (#1329)	X	X		ND
CAU Connection Audit Test (#1341)	X	X		ND
Clear Error Counters (#1326)	X	X		ND

*D = Destructive Test

ND = Non-destructive Test

Loss of WFB Query Test (#1327)

Loss of WFB means that the RC cannot derive timing information from the received WFB signal due to signal absence or degradation of the I2 line. Whenever loss of WFB is detected by the RC (that is, 12 consecutive I2 status packets are not detected), the RC sends a LOSS-WFB alarm up-link to the SPE.

When the SPE receives a LOSS-WFB alarm, it initiates a Loss WFB Query. When the alarm has been confirmed, SPE places the WFB as well as the affected CAUs into an out-of-service state (a state that does not allow for radio transmission).

When the alarm is cleared, the RC board will uplink a CLEAR-LOSS-OF-WFB.

This is a non-destructive test. The Loss of WFB Query is run due to in-line errors, during periodic maintenance and initialization testing, and on demand.

Table 4-4.   Loss of WFB Query Test #1327

Error Code	Test Result	Description / Recommendation
2012	FAIL	Internal System Error. 1. Escalate the problem to the next tier.
2100	ABORT	Could not allocate the necessary resources to run this test. 1. Retry the command at one-minute intervals a maximum of five times. 2. If the test continues to abort, escalate the problem to the next tier.
4000	FAIL	WFB is out of service: 1. Busyout the WFB. 2. Release the WFB. 3. If the problem persists, follow normal escalation procedures.
5000+n	FAIL	Loss of WFB still exists. n is the number of times this error has occurred. 1. Busyout the WFB 2. Release the WFB 3. If the problem persists, follow normal escalation procedures.
	PASS	Loss of WFB test passed. No errors to be reported. WFB is in service.

WFB Out-of-Sync Query Test (#1328)

Out of Sync Alarm is generated by the WFB whenever the WFB fails to reset, derive clock from the RC, or adjust internal timing due to I2 delays. Once the alarm is transmitted, the WFB automatically shuts down (WFB disables modem and radio). As soon as the Out-Of-Sync Alarm is detected by the RC circuit pack, an OUT-OF-SYNC alarm is up-linked to the MM software.

When the SPE receives an OUT-OF-SYNC alarm, it initiates a Out-Of-Sync Alarm Query. When the alarm has been confirmed, it places the WFB as well as the affected CAUs into an out-of-service state.

When the alarm is cleared, the RC board will uplink a CLEAR-OUT-OF-SYNC, and all error alarms are reset.

This is a non-destructive test. The Out-Of-Sync Query is run due to in-line errors, during periodic maintenance and initialization testing, and on demand.

Table 4-5.   WFB Out of Sync #1328

Error Code	Test Result	Description / Recommendation
2012	FAIL	Internal System Error. 1. Escalate the problem to the next tier.
2100	ABORT	Could not allocate the necessary resources to run this test. 1. Retry the command at one-minute intervals a maximum of five times. 2. If the test continues to abort, escalate the problem to the next tier.
4000	FAIL	WFB is out of service: 1. Busyout the WFB. 2. Release the WFB. 3. If the problem persists, follow normal escalation procedures.
5000+n	FAIL	WFB is still out of sync. n is the number of times this error has occurred. 1. Busyout the WFB. 2. Release the WFB. 3. If the problem persists, follow normal escalation procedures.
	PASS	WFB Out-of-Sync test passed. No errors to be reported. WFB is in service.

WFB Transmit Power Query Test (#1329)

Transmission of too much power is generated by the WFB whenever the WFB signal is in violation of the FCC requirements. Once this alarm is transmitted to the RC, the WFB shuts itself down (that is, radio and modem are disabled, and the red alarm is turned on). As soon as the Xmit Power Alarm is generated by the RC circuit pack, an XMIT-POWER alarm is up-linked to the SPE.

When the SPE receives a XMIT-POWER alarm, it initiates a Xmit Power Alarm Query. When SPE confirms an XMIT-POWER alarm, it places the WFB as well as the affected CAUs into an out-of-service state.

When the alarm is cleared, the RC board will uplink a CLEAR-XMIT-POWER and all error alarms are reset.

This is a non-destructive test. The Xmit Power Query is run due to in-line errors, during periodic maintenance and initialization testing, and on demand.

Table 4-6.   WFB Xmit Power Query Test #1329

Error Code	Test Result	Description / Recommendation
2012	FAIL	Internal System Error. 1. Escalate the problem to the next tier.
2100	ABORT	Could not allocate the necessary resources to run this test. 1. Retry the command at one-minute intervals a maximum of five times. 2. If the test continues to abort, escalate the problem to the next tier.
4000	FAIL	WFB is out of service: 1. Busyout the WFB. 2. Release the WFB. 3. If the problem persists, follow normal escalation procedures.
5000+n	FAIL	WFB Xmit power problem still exists. n is the number of times this error has occurred. 1. Busyout the WFB. 2. Release the WFB. 3. If the problem persists, follow normal escalation procedures.
	PASS	Xmit Power Query test passed. No errors to be reported. WFB is in service.

CAU Connection Audit Test (#1341)

CAU Connection Audit alarm is generated by the WFB whenever there is a discrepancy between the administered CAUs and the physically connected CAUs. The error code will indicate the CAUs that are in dispute. These CAUs will be placed out of service and will not provide any coverage.

The alarm is cleared when there is a perfect match between the administered CAUs and physically connected CAUs.

This is a non-destructive test. The CAU Connection Audit test is run due to in-line errors, during periodic maintenance and initialization testing, and on demand.

Table 4-**7.   CAU Connection Audit Test #1341**

Error Code	Test Result	Description / Recommendation
2012	FAIL	Internal System Error. 1. Escalate the problem to the next tier.
2100	ABORT	Could not allocate the necessary resources to run this test. 1. Retry the command at one-minute intervals a maximum of five times. 2. If the test continues to abort, escalate the problem to the next tier.

Table 4-7.   CAU Connection Audit Test #1341 — *Continued*

Error Code	Test Result	Description / Recommendation
4000	FAIL	WFB is out of service: 1. Busyout the WFB. 2. Release the WFB. 3. If the problem persists, follow normal escalation procedures.
n	FAIL	There is a discrepancy between what was administered for the CAUs and the physically connected CAUs. *n* indicates the CAUs that are in dispute and remain out of service. Example: n = 1, CAU 1 in dispute. n = 2, CAU 2 in dispute. n = 3, CAU 1, CAU 2 in dispute. n = 4, CAU 3 in dispute. n = 5, CAU 1, CAU 3 in dispute. n = 6, CAU 2, CAU 3 in dispute. n = 7, CAU 1, CAU 2, CAU3 in dispute. n = 8, CAU 4 in dispute. n = 9, CAU 4, CAU 1 in dispute. n = 10, CAU 2, CAU 4 in dispute. n = 11, CAU 1, CAU 2, CAU 4 in dispute. n = 12, CAU 4, CAU 3 in dispute. n = 13, CAU 1, CAU 3, CAU 4 in dispute. n = 14, CAU 4, CAU 3, CAU 2 in dispute. n = 15, CAU 1, CAU 2, CAU 3, CAU 4 in dispute. 1. Verify the number of administered CAUs and the number of physically connected CAUs. These numbers should match. 2. Busyout the WFB. 3. Release the WFB. If the problem persists, follow normal escalation procedures.
	PASS	There is a perfect match between the administered CAUs and the physically connected CAUs.

WFB Read and Clear Counters Test (#1326)

This test reads and clears a particular WFB error counter on the RC circuit pack after receiving an uplink error message (for example CRC-12). This is done to enable the WFB to continue to report errors.

This is a non-destructive test. It is run due to in-line errors, during periodic maintenance, as part of initialization testing, and on demand.

Table 4-8. WFB Read and Counter Test (#1326)

Error Code	Test Results	Descriptions / Recommendations
2012	FAIL	Internal System Error. 1. Escalate the problem to the next tier.
	PASS	WFB Read and Clear Counters test passed. All counters are cleared. No error to be reported.

Cell Antenna Unit (CAU)

This section provides maintenance detail regarding the CAU, which is the external antenna that "hangs off" a WFB.

Table 4-9. Cell Antenna Unit MO

MO Name As It Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name Of MO
CAU	MINOR	test wfb PPCSSppc	Cell Antenna Unit
		CAU Port Occupancy Test	MO-CAU

PP represents the port network number, *C* provides carrier information, *SS* indicates the slot of the Radio Controller circuit pack and *pp* contains the WFB identifier and *c* contains the CAU identifier (values 1 through 4).

Flashing LEDs and CAUs

A flashing LED on a CAU indicates that the CAU was not initialized properly when it was first powered up. If one or more CAUs on a WFB are flashing, the proper CAU power adjustment was never made. By default, the WFB resets CAUs every 30 seconds.

To clear a flashing CAU, wait 30 minutes to allow the WFB to reset the CAU. If this does not resolve the problem, reset the WFB at least twice by twice entering the **busyout WFB** command followed by the **release WFB** command. If the CAU is still flashing, replace the CAU.

CAU Error Log Entries

The following section contains error, alarm, and test information regarding the CAU.

Table 4-10.   CAU Error Log Entries

Error Type	Aux Data	Associated Test/In-line Error	Alarm Level	On/Off Board	Test to Clear
1	Any	CAU Init. Failure	MINOR	ON	busyout and release wfb
18	Any	CAU Busied out	WARNING	ON	release cau *<PPCSSppc>*
23		Bad CAU Admin.	N/A	N/A	N/A
257	Any	Loss of CAU	MINOR	ON	busyout and release wfb
769	Any	Beacon Failure	N/A	N/A	N/A

Craft-Demanded Test Description and Error Codes

Always investigate tests in the order presented in the following table when inspecting errors in the system. By clearing error codes associated with the Loss of CAU for example, you may also clear errors generated from other tests in the testing sequence.

Table 4-11.   Order of Investigation (CAU)

Order of Investigation	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND*
CAU Port Occupancy (#1330)	X	X		ND

* D = Destructive test

ND = Non-destructive test

CAU Port Occupancy Test (#1330)

This test will measure the DC current flowing through an antenna port load (CAU) on transmit (Tx).

The CAU has Tx and Rx (receive) circuits and is powered by phantom power from the coaxial cable connected to the WFB. Measurements are made on transmit mode to determine the condition of the CAU and the coaxial cable connection. There is a DC current monitor circuit and WFB to measure current flowing through a port load that is connected to a coax and then a CAU. By switching the CAU to transmit mode and monitoring current drawn, the condition of the I3 interface is determined. If current is drawn properly, the coaxial cable connecting the CAU and WFB is considered operational.

Since the RC can support multiple WFBs/CAUs, a WFB and CAU identifier are included in the test message sent to the RC circuit pack. Upon receipt of this message, the RC sends a message to the WFB/CAU to execute the CAU Port Occupied Load Test. The WFB places the CAU in transmit mode, takes a measurement, and reports the measurement back to the RC; this is then reported back to the SPE. If the current measures zero, this indicates that the CAU is not present, and maintenance will take the cell out-of-service.

This is a non-destructive test and run only on external CAUs. The CAU Port Occupancy Test is run due to in-line errors, periodic maintenance, initialization and craft demand.

Table 4-12.   CAU Port Occupancy Test #1330

Error Code	Test Result	Description / Recommendation
	PASS	CAU Port Occupancy Test passed. No errors to be reported.

Wireless Terminal Maintenance

5

Introduction

This chapter provides the necessary information for maintaining the pocket phone (wireless terminal).

Testing on the pocket phone is basically divided into two categories. The first category includes those tests that can be performed from the DEFINITY management terminal; the second category contains those tests that can be performed locally on the pocket phone itself.

Pocket Phone Maintenance Object

To support the maintenance of the pocket phone, multiple instances of the maintenance object **WT-STA** are created in the DWBS. Each maintenance object is associated with a specific extension number.

System Technician Commands

The following section describes the maintenance commands for testing the pocket phone from the DEFINITY management terminal.

Test Station

This command performs hardware diagnostic tests on an individual port circuit assigned to the extension specified on the command line. Tests are performed on the hardware connected to the port.

test station *extension [short|long] [repeat <#>|clear] [schedule]*

- *extension*
  The extension number of the pocket phone that is to be tested.

- *short*
  This version of the test runs only the lamp updates test on the designated station. This is the default.

- *long*
  This version runs the lamp updates and the test page test.

- *repeat*
  This option allows the technician to repeat the test a designated number of times . The default is 1.

- *clear*
  This option clears the screen output values for a subsequent test.

- *schedule*
  This option enables the technician to set up the test to run either at a later time or periodically.

Busyout station

This command places the pocket phone in an out-of-service state; this indicates that the phone cannot initiate or receive calls.

busyout station *extension*

- *extension*
  This modifier designates the extension of the pocket phone that the technician wishes to place in an out-of-service state.

Release station

This command returns the pocket phone to an in-service state; this indicates that this phone can initiate or receive calls.

release station *extension*

- *extension*
  This modifier designates the extension of the pocket phone that the technician wishes to return to an in-service state.

Status station

This command is used to display the operational status associated with a pocket phone (wireless terminal).

station status *extension*

— *extension*
This modifier designates the extension of the pocket phone of which the technician wishes to check the status.

```
status station 52600
                          GENERAL STATUS

               Type: 9601A              Service State: disconnected
          Extension: 52600            Download Status: not applicable
               Port: WT                SAC Activated? no
        Call Parked? no              User Cntrl Restr: none
    Ring Cut Off Act? no            Group Cntrl Restr: none
Active Coverage Option: 1           CF Destination Ext:
     Mobility State: out-of-system    Access Rights: no
                                     Key Allocation: not applicable

     Message Waiting:
     Connected Ports:



               ACD STATUS                    HOSPITALITY STATUS
 Grp/Mod Grp/Mod Grp/Mod Grp/Mod Grp/Mod    AWU Call At:
    /       /       /       /       /           User DND: not activated
    /       /       /       /       /          Group DND: not activated
    /       /       /       /       /        Room Status: non-guest room
    /       /       /       /       /
         On ACD Call? no
```

Figure 5-1.   Status Station

— *Type*
The type of equipment administered for the extension.

— *Extension*
The extension number specified on the command line.

— *Port*
This field displays either the radio controller cluster to which the pocket phone is registered or the WFB and CAU on which the phone is active at the moment.

— *Call Parked?*
Values displayed in this field are **Yes** and **No**.

— *Ring Cut Off Activated*
Whether ring cut-off is activated.

— CF Destination Ext
The extension of the call forwarding destination, if any, of the pocket phone.

— Message Waiting
The location of any active messages for the station: **AUDIX**, **PMS** or **AP-SPE**.

— *Service State*
This field provides the current service status of the pocket phone (**in-service-on-hook**, **in-service-off-hook**, **out-of-service**, or **disconnected**).

— *Download Status*
Values displayed in the field are **complete**, **pending**, or **not applicable**.

— *SAC Activated?*
This field designates whether or not the Send All Calls feature is active for this pocket phone.

— *Ring Cut Off Act?*
Values displayed in this field are **Yes** and **No**.

— *User Cntrl Restr*
Values displayed in this field are **none**, **total**, **stat-stat**, **outward** and **terminate**.

— *Group Cntrl Restr*
Values displayed in this field are **none**, **total**, **stat-stat**, **outward**, and **terminate**.

— *CF Destination Ext*
This field displays the call forwarding destination, if any, of the pocket phone.

— *Mobility State*
This field displays the mobility status of the pocket phone. Values displayed in this field are **in-system** and **out-of-system**.

— *Access Rights?*
This field denotes whether or not the specific pocket phone has access rights. Values displayed in this field are **Yes** and **No**.

— *Key Allocation States*
This field defines whether the pocket phone has a key. Values displayed in this field are **Authorized** (the phone has a key and the SPE has stored the key) and **Unauthorized** (the phone does not have a key).

— *Connected Ports*
This field displays the other connected ports on the call. If the pocket phone is connected to another pocket phone, the connected ports will display the connected WFB.

— AWU Call At
This field displays the time for which an automatic call is scheduled.

— *User DND*
This field displays the status of the Do Not Disturb feature for this pocket phone. Values for this field are **not activated**, **button activated,** and ***deactivation at xx:xx am/pm*** (***xx:xx am/pm*** is the time the DND feature is deactivated).

— *Group DND*
This field displays the status of the Do Not Disturb feature for the group. Values for this field are **not activated**, **button activated,** and ***deactivation at xx:xx am/pm*** (***xx:xx am/pm*** is the time the DND feature is deactivated).

— *Room Status*
Values displayed for this field are **non-guest-room**, **vacant**, and **occupied**.

List Configuration

This command displays the hardware/firmware of all pocket phones in the system.

list configuration wt *[extension] [print|schedule]*

— *extension*
Extension number

— *print*
This modifier allows the user to send the output to a local printer.

— *schedule*
This modifier allows the user to schedule the execution of this command at either a later time or periodically.

DEFINITY Error Reporting for the Pocket Phone

The following section provides information or various in-line error messages that are reported to the error log. All in-line errors are reported on a per pocket phone basis.

(513) WT FW Download

This error occurs whenever the pocket phone fails to download due to parity error while accessing dynamic RAM (that is, the memory that contains the pocket phone's translations and downloadable application firmware).

(1537) WT Failed Page Event

This error indcates a failed page or failed test page; accordingly, switched services reports an error to maintenance. While maintenance is logging the error, switched services is sending a test page request to the pocket phone to determine the appropriate state. This error is for information purposes since an out-of-system state for a pocket phone user is considered normal. If problems occur, this logged event may be useful if a phone user is experiencing problems.

3840 Link Error

The lost link error is reported to indicate dropped calls for a pocket phone. Also, this error will not cause a test page to run; the assumption is made that the phone will realize that it lost a link. Whenever the pocket phone re-enters the system, the WT will have to re-register. Therefore, the SPE will not test for the WT and move it to a disconnected state.

Technician-Level Error Codes

The error codes included in the following table may appear on the pocket phone screen. It is the responsibility of the Lucent Technologies technician to troubleshoot the problems associated with these error codes.

Table 5-1.   Technician-Level Error Codes

Error Codes	Meaning
0x1	Unexpected message
0x2	Unknown trans ID
0x3	Mandatory missing
0x5	Incompatible
0x6	No service
0x8	Invalid identity
0x9	Authentication failure
0xD	Timer expired
0xE	Lost link
0xF	Unknown
0x10	No channel available
0x29	Synchronization lost
0x32	Insufficient resources
0x34	IWU congestion
0x41	Synchronization lost
0x81	Acc rts with unknown IPEI
0x82	Acc rts general failure
0x83	Location registration with unknown IPUI
0x84	Location registration general failure
0x85	Deregistration error
0x86	Key response error
0x87	Lamp refresh error
0x88	Pocket phone is busied out
0x89	Radio Controller is busied out
0x8a	Port allocation timeout
0x8b	Pocket phone is in a key allocation window
0x8c	Pocket phone is in a port allocation window

Table 5-1.   Technician-Level Error Codes — *Continued*

Error Codes	Meaning
0x8d	Pocket phone is in a port release window
0x8e	Pocket phone has no UAK
0x8f	Pocket phone is not registered
0x90	Pocket phone already has a port
0x91	There are no more NPE ports
0x92	Pocket phone is registered to the wrong Radio Controller
0x93	SPE cannot process (try again)

Command List

6

Introduction

This chapter provides supplemental Mobility Manager and DEFINITY command information that may be helpful to the technician.

Administration Commands

Table 6-1.   **DEFINITY Wireless Business System Administration Commands**

Action	Object	Qualifier	Purpose
change display	carrier-frequencies		Access or display customer administrable carrier frequencies.
change display	circuit-packs	cabinet number	Access or display the existing circuit packs data.
change remove add status	radio-controller	PPCSS	Access or remove an existing radio controller circuit pack (TN789).
test	radio-sync		Access or display the inter-port network radio synchronization plan.
add change display remove	station	extension	Add, access, display, or remove a station on the system.
list status	station	extension port <wt> type <9601>	List all stations that conform to the port or type search criteria.
change display	system-parameters	customer-options	Access or view optional feature administration.
change display	system-parameters	features	Administer or view the radio card download servers.
change display	system-parameters	wireless	Access or view system wide wireless data.

Firmware Upgrade

7

Introduction

This chapter provides you with the background and procedural information to perform firmware upgrades to the RC circuit pack(s), the WFB(s), and pocket phones (wireless terminals).

Firmware upgrade of the RC circuit pack and the WFB can be executed usually from the management terminal at the Technical Service Center (TSC) or from INADS. (The INADS group can be reached at 1 800 248-1111.) This prevents the need to dispatch a service technician to the customer site. Additionally, it will expedite the introduction of enhancements, new features and functions to the DWBS in a more economical and timely fashion. Firmware upgrade of the pocket phone, however, must be done on-site either by a Lucent technician or trained customer personnel.

Firmware File Transfer Overview

Firmware upgrade is an essential part of the overall maintenance and upgrade strategy for the DWBS.

There are two general steps for firmware upgrade. The first step is transferring the firmware file into the target system. The second step is installing the on-site firmware file into its actual target component (RC, WFB or pocket phone).

⇒ NOTE:

The information and procedures contained in this chapter deal exclusively with installing the on-site firmware file into its actual target component(s). Whenever a firmware upgrade is deemed necessary, it is assumed that the correct firmware file will already be present at the customer site *before*

performing any of the procedures that follow. To ensure that the correct firmware file is present, issue the **status card memory** command and check the resulting information displayed.

Although system service is not interrupted, those components that are being upgraded are taken out of service for the duration of the upgrade. It is therefore recommended that firmware upgrades take place during low traffic periods.

Procedure: Firmware Upgrade of the TN789 Radio Controller Circuit Pack

This procedure provides you with the steps necessary to upgrade a Radio Controller circuit pack(s) from the Lucent Technical Service Center.

NOTE:
The Radio Controllers and their attached WFBs and/or CAUs will be out-of-service for the duration of the upgrade. It is recommended that firmware upgrades take place during low traffic periods.

1. Log into the customer's switch. On the DEFINITY management terminal, follow the standard procedure to log into the customer's switch. Refer to *DEFINITY ECS Maintenance* for this information, if necessary.

2. Verify the current *Board Vintage* and *Board Version* for all the RC circuit packs to be upgraded in the system. Enter the **list configuration radio-controller all** command to generate the necessary information. See the next sample screen.

```
list configuration radio controller all


                RADIO CONTROLLER CIRCUIT PACK CONFIGURATIONS

               Cluster  Board   Board    WFB A    WFB A    WFB B    WFB B
Loc      Code    ID     Vintage Version  Vintage  Version  Vintage  Version

01A03            5      no board
01B10            3      no board
01B12    TN789   1      000001  5.4.1    000001   000001   no WFB   no WFB
01B15            2      no board
01B17            4      no board
```

Figure 7-1.   Radio Controller Circuit Pack Configuration

3. Upgrade the Radio Controller circuit pack. Specifically, enter the **upgrade firmware radio-controller *<PPCSS>*** command to upgrade the firmware of the designated radio controller. Repeat this step for the remaining radio controllers that need to be upgraded.

⇒ **NOTE:**
   To upgrade all the radio controllers in the system, add the **all** option in the command line.

4. Verify the upgrade. Enter the **list configuration radio-controller all** command and check for an incremental upward change in the *Board Version* numbers.

⇒ **NOTE:**
   The firmware that you are using for the upgrade contains the correct (upgraded) version number and can be used as a reference. In the following sample, the *Board Version* number has been updated to 5.4.2.

```
list configuration radio controller all


          RADIO CONTROLLER CIRCUIT PACK CONFIGURATIONS
          Cluster   Board    Board    WFB A    WFB A    WFB B    WFB B
Loc     Code   ID   Vintage  Version  Vintage  Version  Vintage  Version

01A03          5    no board
01B10          3    no board
01B12   TN789  1    000001   5.4.2    000001   000001   no WFB   no WFB
01B15          2    no board
01B17          4    no board
```

Figure 7-2.   Radio Controller Circuit Pack Configuration (Upgraded)

> ➡ **NOTE:**
> If the upgrade was not successful, check the error logs and contact the TSC.

Wireless Fixed Base

Firmware upgrade of the WFB removes the WFB from service at the point that the firmware upgrade file is being transferred from storage to the WFB. Upgraded WFBs are automatically returned to service immediately after they are upgraded.

Procedure: Firmware Upgrade of the Wireless Fixed Base

This procedure provides you with the steps necessary to upgrade a Wireless Fixed Base(s) from the Lucent Technical Service Center.

1. Log into the customer's switch. On the DEFINITY management terminal, follow the standard procedure to log into the customer's switch. Refer to *DEFINITY ECS Maintenance* for this information, if necessary.

2. Verify the current *WFB (A or B) Vintage* and *Version* for the WFB(s) that is to be upgraded. Enter the **list configuration radio-controller all** command to generate the necessary information. See the next sample screen.

```
list configuration radio controller all


            RADIO CONTROLLER CIRCUIT PACK CONFIGURATIONS

              Cluster   Board    Board    WFB A    WFB A    WFB B    WFB B
Loc     Code    ID     Vintage  Version  Vintage  Version  Vintage  Version

01A03            5     no board
01B10            3     no board
01B12   TN789    1     000001   5.4.1    000001   000001   no WFB   no WFB
01B15            2     no board
01B17            4     no board
```

Figure 7-**3.   List Configuration Radio Controller**

3. Upgrade the Wireless Fixed Base. Enter the **upgrade firmware wfb <PPCSSw>** command to upgrade the firmware of the designated radio controller. (**PPCSS** = P (port network) C (carrier) SS (slot number) w (A or B the id of the WFB). Repeat this step for the remaining WFBs that need to be upgraded.

⟹ **NOTE:**
   To upgrade all the WFBs in the system, add the **all** option in the command line.

4. Verify the upgrade. Enter the **list configuration radio-controller all** command and check for an incremental upward change in the *WFB A or B) Version* numbers.

> ◆ **NOTE:**
> The firmware that you are using for the upgrade contains the correct
> (upgraded) version number and can be used as a reference. In the
> following sample, the *WFB A Version* number has been updated to *2*.

```
list configuration radio controller all


          RADIO CONTROLLER CIRCUIT PACK CONFIGURATIONS

            Cluster  Board    Board    WFB A    WFB A    WFB B    WFB B
Loc    Code   ID     Vintage  Version  Vintage  Version Vintage  Version

01A03          5     no board
01B10          3     no board
01B12  TN789   1     000001   5.4.1    000001   000002  no WFB   no WFB
01B15          2     no board
01B17          4     no board
```

Figure 7-4.   WFB Firmware Upgrade Results

> ◆ **NOTE:**
> If the upgrade was not successful, check the error logs and contact
> the TSC.

Pocket Phone Firmware Upgrade

Pocket phone (WT) firmware upgrade is done via one or more TN789 RC circuit
packs that have previously been administered for this purpose. A maximum of five
TN789 RC circuit packs can be administered as servers for the pocket phones by
populating the *Wireless Paramaters* field on page 2 of the Feature-Related
System Parameters form (shown in the next figure).

Procedure: Administering Radio Controllers for WT Upgrade

This procedure provides you with the steps necessary to designate those RC circuit packs that will be used for WT firmware upgrade.

➡ **NOTE:**
This procedure only needs to be done to initially establish RC circuit packs that will be used for pocket phone firmware upgrade(s) and any time you want to change those designations.

1. Log into the customer's switch. On the DEFINITY management terminal, follow the standard procedure to log into the customer's switch. Refer to *DEFINITY ECS Maintenance* for this information, if necessary.

2. Enter the **change system-parameters features** command. Move to the second page of this form as shown in the following sample.

```
change system-parameters features                          Page  2 of  8

                       FEATURE-RELATED SYSTEM PARAMETERS
 LEAVE WORD CALLING PARAMETERS
   Maximum Number of Messages Per Station (when MSA not in service): 10
   Stations with Systemwide Retrieval Permission (enter extension)
     1:         3:          5:          7:          9:
     2:         4:          6:          8:         10:

       WARNING!  SEE USER DOCUMENTATION BEFORE CHANGING TTI STATE
                 Terminal Translation Initialization (TTI) Enable? n


                   Prohibit Bridging Onto Calls With Data Privacy?
                       Enhanced Abbreviated Dial Length (3 or 4): 3
                                          Call Forward Override? n
       External Coverage Treatment for Transferred Incoming Calls? n
                   Coverage of Calls Redirected Off-Net Enabled? n
 WIRELESS PARAMETERS
   Radio Controllers with Download Server Permission (enter board location)
     1:        2:         3:         4:         5:
```

Figure 7-5.   Change System-Parameters Features

In the *WIRELESS PARAMETERS* portion of the screen, enter the location of the designated boards <PPCSS>.

> **NOTE:**
> In order to be accepted as a valid download server, the RC circuit pack must have previously been administratively added to the system (see the DWBS Installation document for more information).

Procedure: Firmware Upgrade of the Pocket Phone

This procedure provides you with the steps necessary to upgrade a pocket phone at the customer site.

1. Transfer the firmware upgrade file to the designated TN789 RC circuit pack. Enter the **enable wt-upgrade *<PPCSS>*** command to move the firmware to the RC circuit pack. (*PPCSS* = PP [port network] C [carrier] SS [slot number])

   > **NOTE:**
   > To move the firmware file to all the designated circuit packs, add the **all** option in the command line.

2. Upgrade the pocket phone. Connect the WT and the designated TN789 RC circuit pack.

   > **NOTE:**
   > The firmware data access cable is a direct cable connection between the pocket phone and the designated TN789 RC circuit pack. This imposes a limitation on performing pocket phone upgrades to approximately eight feet from the RC circuit pack. See the next figure. An alternate cable configuration increases this distance to approximately 50 ft from RC to pocket phone. See Figure 7-7.

Firmware Data Access Cable

Telephone jack
connects to
DEFINITY switch

6-foot cable

Data connector
connects to
wireless terminal
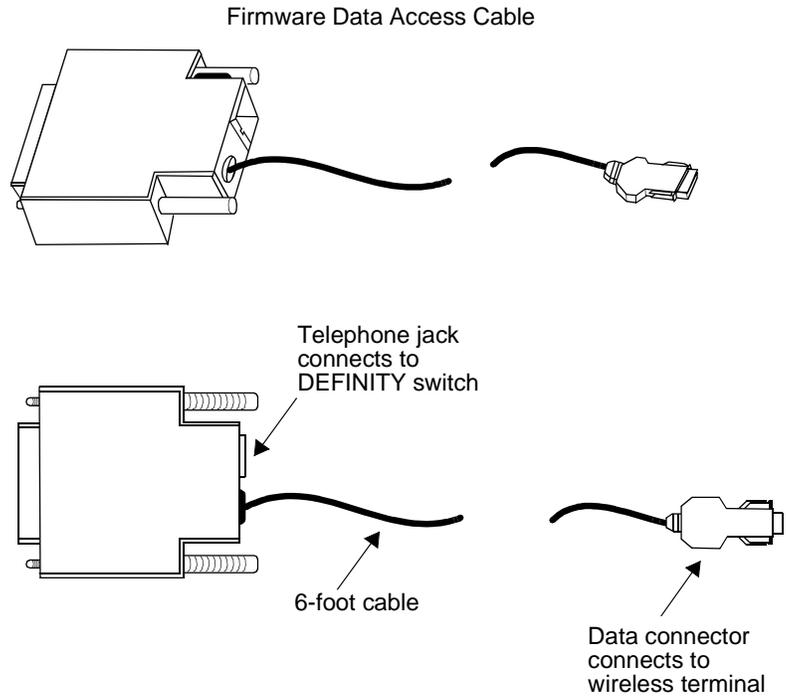
Figure 7-6.   Firmware Data Access Cable 902A (Comcode 107583965)
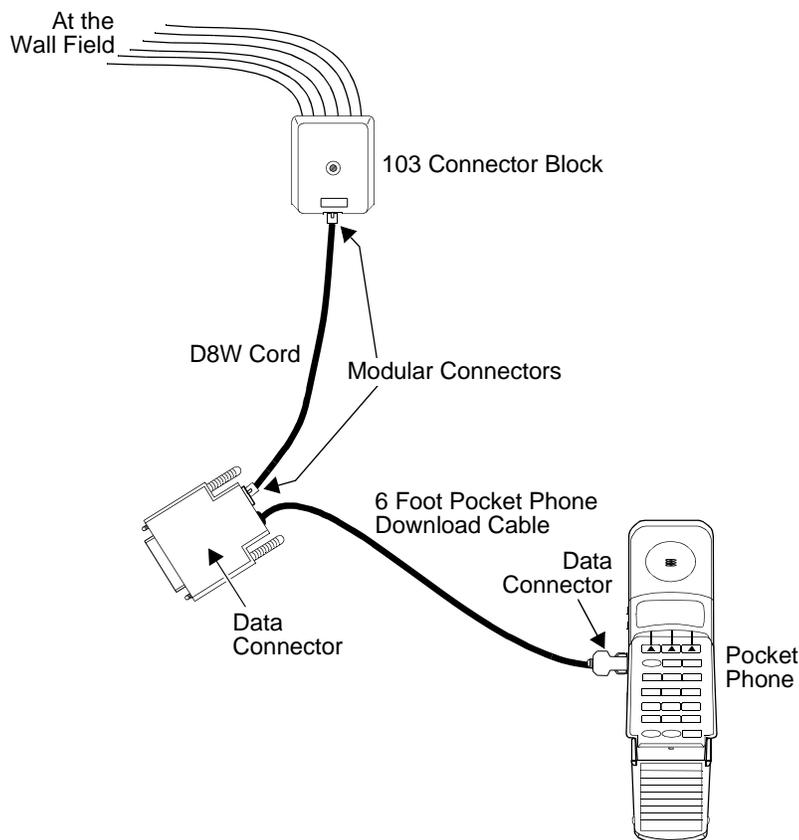
Figure 7-7. Alternative Firmware Upgrade Cabling

> **➡ NOTE:**
> The connection to the WT is located on the left side of the unit half way from the top.

3. Upgrade the pocket phone as follows:

   a. Release the battery.

   b. Connect the data connector to the pocket phone. In so doing, ensure that the white letters on the connector are facing either you or the phone.

   c. Press down on and hold one of the following three horizontal key sets on the phone: 1-2-3, 4-5-6, or 7-8-9.

   d. Holding down the three keys from the previous step, push in the battery. The message "erase memory 'y' or 'n'" should appear on the display. Once this happens, release the keys.

e. Press the arrow corresponding to the 'y' display message. The firmware download has now started.
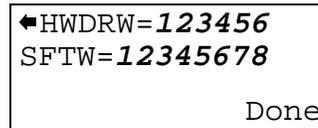
```
← HWDRW=123456
  SFTW=12345678

                Done
```

Figure 7‑8. Hardware Vintage and Software Version

4. Press the center soft key ▣ twice.

➡ **NOTE:**
   You must press the soft key twice within 3/4 of a second or you cannot progress to the key sequence.

5. Press the **Next** hard key twice to generate the Firmware Upgrade Screen. (See the following figure.)
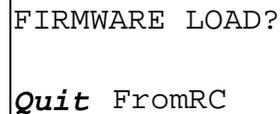
```
FIRMWARE LOAD?


Quit FromRC
```

Figure 7‑9. Firmware Upgrade (Load)

6. Begin the upgrade by pressing the **FromRC** ▣ soft key.

➡ **NOTE:**
   During the process, the following screen will be displayed.
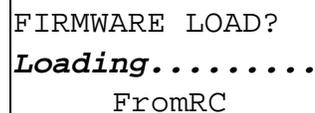
```
FIRMWARE LOAD?
Loading.........
       FromRC
```

Figure 7‑10. Firmware Upgrade (Loading) Processing

> ⇒ **NOTE:**
> If the cable has either not been connected or connected incorrectly, the following screen will be generated. Check the cable and press the **Next** key.

```
CONNECT PHONE TO
RADIO CONTROLLER
FOR FILE XFER.
```

Figure 7-11. **Firmware Upgrade (Load) Instructions**

> ⇒ **NOTE:**
> When the upgrade is complete, the pocket phone will reset itself and return to service.

Repeat these steps for all pocket phones to be upgraded.

7. Disable the communications port on the TN789 RC circuit pack(s) that has been used for the pocket phone upgrade. Enter **disable wt-upgrade**

8. Verify that the firmware version of all pocket phones in the system matches the version of the new WT firmware. Enter **list configuration wt** to verify the upgrade.

9. Check for any errors on the pocket phone display. Refer to the "Technician-Level Error Codes" section in Chapter 5 of this document.

Error Logs

If the firmware upgrade operation fails, an error event of this RC circuit pack is logged in the hardware error log. The **Aux** data field in the error log contains the detailed error code. The general types of errors that may occur include the following:

- n Firmware file in MSS cannot be accessed
- n Firmware file is not for the specified target
- n Version of the firmware file in MSS is equal to or less than the version of firmware in the target
- n Flash ROM of the RC circuit pack cannot be erased or reprogrammed

Pocket phone errors, firmware upgrade errors, and errors associated with the RC download server are logged under the RC circuit pack.

The following table provides a list of error codes related to firmware upgrade.

Table 7-1.   Firmware Upgrade Error Codes

Error Code	Test Result	Description / Recommendation
2000	ABORT	Timer expires while waiting for acknowledgment from the RC circuit pack.
2100	ABORT	System resources required for this test are not available.
2710	ABORT	The MSS of system does not contain the firmware codes for this firmware upgrade operation. 1. Issue the *list configuration* software command to find out the details of files on MSS. If the firmware codes are not available, resolve this issue first and then retry the *upgrade firmware* command again. 2. If the upgrade operation remains aborted, escalate the problem.
2711	ABORT	The firmware codes at MSS are corrupted. 1. Get another copy of firmware codes and download them to the MSS of the system. 2. Retry the command. 3. If the upgrade operation remains aborted, escalate the problem.
2712	ABORT	Firmware codes at MSS have an older version than the current firmware codes at the targeted platform. 1. To override the current firmware codes at the targeted platform, enter the *upgrade firmware radio-controller|wfb PPCSS|PPCSSpp|all override* command with the option keyword *override*. 2. If the upgrade operation remains aborted, escalate the problem.
2713	ABORT	Internal system software error: unknown maintenance action ID. 1. Retry the command. 2. If the upgrade operation remains aborted, escalate the problem.
2714	ABORT	Internal system software error: cannot place MO into out-of-service state. 1. Retry the command. 2. If the upgrade operation remains aborted, escalate the problem.

Table 7-1.   Firmware Upgrade Error Codes — *Continued*

Error Code	Test Result	Description / Recommendation
2715	ABORT	Internal system software error: cannot open the firmware file at MSS. 1. Retry the command. 2. If the upgrade operation remains aborted, escalate the problem.
2716	ABORT	Internal system software error: MSS is busy—contention error. 1. Wait five minutes and retry the command. 2. If the upgrade operation remains aborted, escalate the problem.
2717	ABORT	Targeted platform does not support this firmware code. It is possible that the Radio Controller circuit pack can return this error if there is no firmware code existing in the circuit pack. 1. Retry the command with the *override* option. 2. If the upgrade operation remains aborted, escalate the problem.
2718	ABORT	Targeted platform requests to abort the current firmware upgrade operation due to some internal errors detected at the hardware platform. 1. Retry the command. 2. If the upgrade operation remains aborted, escalate the problem.
2719	ABORT	Internal system software error: post-transfer command contains bad parameters. 1. Retry the command. 2. If the upgrade operation remains aborted, escalate the problem.
2720	ABORT	Internal system software error: file transfer commands are out of sequence. 1. Retry the command. 2. If the upgrade operation remains aborted, escalate the problem.

Table 7-1.   Firmware Upgrade Error Codes — *Continued*

Error Code	Test Result	Description / Recommendation
2721	ABORT	Internal system software error: data packet has more than 24 bytes. 1. Retry the command. 2. If the upgrade operation remains aborted, escalate the problem.
2722	ABORT	Internal system software error: file access to firmware file at MSS failed. 1. Retry the command. 2. If the upgrade operation remains aborted, escalate the problem.
2723	ABORT	Internal system software error: file transfer operation reaches the maximum number of retransfers. Transfer operation failed. 1. Retry the command. 2. If the upgrade operation remains aborted, escalate the problem.
2724	ABORT	User pressed [CANCEL] key at SAT to abort the current firmware upgrade operation.
2725	ABORT	The checksums of the firmware file at MSS and the firmware code at RC circuit pack are different. 1. Retry the command. 2. If the upgrade operation remains aborted, escalate the problem.
3001-3255	ABORT	The file transfer operation is aborted due to the errors detected at the RC circuit pack. Escalate the error codes.

Table 7-1.   Firmware Upgrade Error Codes — *Continued*

Error Code	Test Result	Description / Recommendation
Any	FAIL	The targeted hardware platform cannot be upgraded with the new firmware codes. 1. Retry the command at one-minute intervals a maximum of five times. 2. If the test continues to abort, escalate the problem.
	PASS	The targeted hardware has been re-programmed with the new version of firmware codes from the MSS of the system. The unit is reset back to in-service.
	NO BOARD	This is normal if the test is being done when (a) the board is not physically in the system or (b) the system is booting up or (c) the Radio Controller has not been administered via the *add radio-controller PPCSS* command. 1. Verify that the board is physically in the system. 2. Verify that the system is not in a stage of booting up. 3. Issue the *display radio-controller PPCSS* command and verify that the Radio Controller has been administered. 4. Retry the command at one-minute intervals for a maximum of five times. 5. If the test continues to return NO BOARD, escalate the problem.

Alarms

If the firmware of an RC circuit pack cannot be upgraded due to the defective components on the RC circuit pack, a minor on-board alarm is raised, and the alarm is reported to the Lucent Technologies TSC through INADS. However, if the error indicates a fault outside of the RC circuit pack, a warning on-board alarm is raised for service attention.

When files are being transferred to the target system from the TSC, no reporting can take place over the INADS line.

List Of Commands

The following table is a list of commands specific to firmware download.

Table 7-2.   Firmware Upgrade Commands

Command	Description
download firmware [tape]	This command enables the transfer of an RC, WFB, or WT firmware file from INADS to the memory card (RAPTOR) or Mass Storage System (MIPS) of the remote customer's switch using the XMODEM protocol.
upgrade firmware radio-controller [PPCSS] [all] [override]	This command enables the upgrade of a TN789 RC at the port board slot (PPCSS) or all TN789 RC circuit packs within the system. This command reads the firmware file from the memory card (RAPTOR) or the Mass Storage System (MIPS) and sends the file to the target board(s).
upgrade firmware wfb [PPCSSw] [all] [override]	This command enables the upgrade of a WFB through the port board slot (PPCSSw - **w** designates the specific WFB) or all WFBs within the system. This command reads the firmware file from the memory card (RAPTOR) or the Mass Storage System (MIPS) and sends the file to the target WFB(s).
enable wt-upgrade [PPCSS] [all] [tape]	This command moves the firmware upgrade file from the memory card (RAPTOR) or the Mass Storage System (MIPS) to the TN789 RC circuit pack. Upon successful transfer of the firmware file, the RS-232 communications port on the TN789 RC circuit pack is enabled for the pocket phone upgrade operation.
disable wt-upgrade PPCSS [all] [reset board PPCSS]	This command deactivates the communications port on the TN789 RC circuit pack previously enabled for pocket phone download.
status wt-upgrade [PPCSS] [all]	This command provides the status of the designated TN789 RC circuit pack for WT firmware upgrade. The status information includes the location of the circuit pack, version of WT firmware file in the specified circuit pack, status of the cable to the WT, any WTs connected to the RC server, and status of the upgrade operation.
list configuration wt	This command provides a list of the WTs that have been upgraded with the new firmware and the results of these upgrades.

Table 7-2. **Firmware Upgrade Commands** — *Continued*

Command	Description
list configuration radio-controller [cell]	This command provides a list of the TN789 RC circuit packs which have been upgraded with the new firmware and the results of these upgrade operations.
list configuration software-version	This command provides the firmware version of the TN789 RC circuit packs on the specific system.
status card-mem	This command gives the status of the memory card on G3i (RAPTOR) systems.

Glossary

A

access rights
Air interface procedure that assigns to the pocket phone a Temporary Portable User Identifier (TPUI) and its extension number. The pocket phone initiates this procedure each time it enters a system. A successful completion of the procedure includes an implicit Location Registration.

Auto-Reconnect
Feature that enables a calling party to reconnect to a called party if the latter walks out of the coverage area and then back into the coverage area within 60 seconds.

B

Bridging
Feature that allows both the pocket phone and the wired phone to ring at the same time.

C

CAU. See **Cell Antenna Unit.**

cell
Radio coverage area of a CAU or WFB with an internal antenna cluster. Also, cells supported by all the WFBs connected to one RC.

Cell Antenna Unit (CAU)
Optional remote antenna that connects to a Wireless Fixed Base. It contains a transmit power amplifier, transmit/receive switch, low-noise receive amplifier, and antenna.

D

Deep Sleep Mode
Mode assumed by the pocket phone whenever the phone repreatedly tries to access the system and fails to do so due to out-of-range conditions. This mode allows the pocket phone to conserve battery power.

DEFINITY Management Terminal
Data determinal used for the administration and maintenance of the DEFINITY system.

E

Emerging Technologies Band
20 MHz of unlicensed spectrum for Personal Communication Service (PCS) in North America. The band is isochronous (1920-1930 MHz) with eight channels of 1.25 MHz bandwidth per channel primarily for voice, and asynchronous (1910-1930 MHz) primarily for data.

Estimator
Tool within the WiSE Expert Design System that is used to gather information about the customer site. This tool is used to provide an initial price quote and to configure the DWBS.

F

FCC. See **Federal Communication Commission**

FDMA. See **Frequency Division Multiple Access**

Federal Communication Commission (FCC)
Government agency within the US that is reponsibile for assigning and regulating the radio spectrum so that it can be shared by many users without unacceptable interference.

fixed part
Part of the DWBS radio infrastructure that is not portable. This includes the Radio Controllers, Wireless Fixed Bases, and Cell Antenna Units.

Frequency Division Multiple Access (FDMA)
Radio access method for which each call uses a different carrier frequency. FDMA allows one conversation per radio.

H

hard keys
Dedicated buttons on the pocket phone that are labeled for particular functions (for example, making calls).

hardware vintage
Numbering scheme for identifying the components and physical design of a DWBS part, such as a circuit pack.

I

I2
Interface between a Radio Controller and a Wireless Fixed Base.

I3
Interface between a Wireless Fixed Base and a Cell Antenna Unit.

Initialization and Administration System
Services support system for PBX administration and maintenance.

International Portable Equipment Identity
Unique number used to identify a pocket phone for administration and through-the-air communication. This number is sent by the pocket phone to the fixed part during the access rights procedure.

International Portable User Identity
Number sent by the fixed part to a pocket phone during the access rights procedure. Also, this number is sent by the pocket phone to the fixed part during the location registration procedure.

IPEI. See **International Portable Equipment Identity**

IPUI. See **International Portable User Identity**

L

local features
Features that are supported by the pocket phone (for example, the directory).

local tones
Tones produced locally in the pocket phone. Includes the following tones: ringer, warning, error, error beep, confirmation, key click.

Location Registration
Through-the-air procedure used by the pocket phone to inform the fixed part that it has moved to a new cluster. If the pocket phone is active on a call, Location Registration is implied whenever there is an inter-RC or connection handover.

M

Mobility Manager (MM)
Software added to the DEFINITY system to control and track pocket phones as they change location within the DWBS coverage area. The Mobility Manager directs all control and voice information to the appropriate Radio Controller for each pocket phone. It is also responsible for the maintenance and administration of the DWBS and pocket phones.

P

pre-origination dialing
Dialing that occurs before dial tone is granted.

portable part
Part of the DWBS radio infrastructure that is portable (most notably, the pocket phones).

post-origination dialing
Dialing that occurs after dial tone is granted.

Predictor
Tool within the WiSE Expert Design System that uses site information as input to determine the optimal placement of the antennas within the DWBS.

R

Radio Controller (RC)
Circuit pack that provides the interface between the DEFINITY system and the radio subsystem. It controls one or more Wireless Fixed Bases.

Radio Propagation Measurement Tool (RPMT)
Tool within the WiSE Expert Design System that is used to provide basic radio measurements. The RPMT looks like a pocket phone and, once it is administered, it can also initiate and receive phone calls. The RPMT can supplement the Predictor, serve as a troubleshooting device, and be used at site surveys.

RC. See Radio Controller

RPMT. See Radio Propagation Measurement Tool

S

soft keys
Buttons whose labels appear on an associated display and whose labels and functions can change dynamically as the user performs functions and makes selections.

T

TDMA. See **Time Division Multiple Access**

Terminal Portable User Identifier (TPUI)
Number returned by the fixed part to the pocket phone during the Location Registration procedure.

Time Division Multiple Access (TDMA)
Radio access method for which each call uses a different time slot. TDMA permits multiple conversations per radio.

TPUI. See **Terminal Portable User Identifier**

U

UTAM
Group charged by the Federal Communications Commission to coordinate the relocation of microwave incumbents out of the unlicensed spectrum (1910 to 1930 MHz) and to coordinate the deployment of unlicensed devices and systems in that spectrum.

W

Wireless Fixed Base (WFB)
Component that houses the fixed radio hardware. It provides the radio functions to transmit digitally to the pocket phones and to receive digital signals from the pocket phones. A WFB can support a maximum of four external Cell Antenna Units.

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