DEFINITY Wireless Business System Maintenance

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- Answered by the attendant
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This document was prepared by
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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 following subjects are covered in this document:

- Radio Controller (RC)
- Radio synchronization
- Wireless Fixed Based (WFB)
- Cell Antenna Unit (CAU)
- 9601 Wireless Terminals (WTs) and 9630 Series WTs
- Firmware upgrade

The DWBS maintenance strategy is based on current maintenance strategies for the DEFINITY Enterprise Communications Server® (ECS). Therefore, this document is a subset of overall DEFINITY ECS maintenance and escalation strategies.

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. It is also used to identify the names of fields within forms.
- **This typeface** emphasizes key words to help clarify meaning in a sentence or to call attention to a distinction. It is also used to identify maintenance commands.
- The following note icon identifies additional information pertinent to the text preceding it.

  NOTE:

Document Organization

The remainder of the document is organized as follows:

- **Chapter 1, "UTAM Disablement,"** discusses the general requirements and caveats for installing and moving the DWBS.
- **Chapter 2, "Command List,"** provides supplemental Mobility Manager and DEFINITY ECS command information.
- **Chapter 3, "Maintenance Architecture,"** describes the maintenance strategy for the DWBS.
- **Chapter 4, "Radio Controller Circuit Pack Maintenance,"** describes the maintenance of the RC 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 5, "Radio Fixed-Part Synchronization,"** provides a discussion of the information regarding the synchronization of the fixed part of the DWBS.
- **Chapter 6, "Wireless Fixed Base and Cell Antenna Unit Maintenance,"** describes the errors, alarms, and tests specific to the Wireless Fixed Base (WFB) and the Cell Antenna Unit (CAU).
- **Chapter 7, "Wireless Terminal Maintenance,"** describes the maintenance for the 9601 WTs and 9630 Series WTs.

- **Chapter 8, “Firmware Upgrade,”** provides procedural and background information on how to load and upgrade the firmware of the RC circuit pack(s), WFB(s), and WTs.

This document also contains a glossary and an index.

Related Information

This book serves as a maintenance tool for the Release 1.1 DEFINITY Wireless Business System. Additional books in the series are as follows:

- *DEFINITY Wireless Business System Installation and Test*, 555-232-102
- *DEFINITY Wireless Business System 9630 Series Wireless Terminal Quick Reference*, 555-232-702
- *DEFINITY Wireless Business System 9630 Series Wireless Terminal User Guide*, 555-232-701

Getting Help

If you have any questions regarding the information in this book, call technical support at (800) 248-1234.

UTAM Disablement

1

Introduction

NOTE:
The rules of the Federal Communications Commission (FCC) apply only to the United States. In the US, do not activate the DWBS until you receive the installation package and UTAM clearance for the site from the DEFINITY Wireless Design Team (DWDT).

Systems in Canada follow the same UTAM disablement rules as in the US as specified by Industry Canada (IC) and the Industry Advisory Group (IAG).

For disablement rules in other countries, contact the International Offer Manager.

The rules of the FCC and UTAM, Inc. (designated by the FCC as a frequency coordinator for the unlicensed band) 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 after the Avaya 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 Avaya 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 Avaya 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 the wireless service.

Command List

2

Introduction

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

Administration Commands

Table 2-1. DWBS Administration Commands

Action	Object	Qualifier	Purpose
-- download	**firmware**	***tape***	Transfer a file containing RC, WFB, or WT firmware from the Initialization and Administration System (INADS) center to the Mass Storage Subsystem (MSS) of the customer's switch.
-- list configuration		***all***	View circuit packs in the system, along with their associated location, code, vintage, and assigned ports.
--change --display	**alias station**		Alias a station (WT).
-- list configuration	**board**	***PPCSS***	View identified circuit pack.
-- list	**bridged-extension**	***principal extension***	List all stations where the principal appears as a bridged call appearance.
-- status	**card-mem**		Display the format of the flash card.
-- change -- display	**carrier-frequencies**		Administer or view customer-administrable carrier frequencies.
-- change -- display	**circuit-packs**	***cabinet number***	Administer or view the existing circuit pack data. Also, administer the RC circuit pack logically.
-- upgrade	**firmware radio-controller**	***PPCSS all schedule***	Upgrade the firmware for one or more RCs.
-- upgrade	**firmware WFB**	***PPCSS all schedule***	Upgrade the firmware for one or more WFBs.
-- list configuration	**firmware-versions**		Display the firmware version, size, and checksum of DWBS components.
-- add -- change -- list configuration -- remove -- status -- upgrade firmware -- status	**radio-controller**	***PPCSS all override schedule***	Administer or identify parameters associated with, or upgrade the firmware of, one or more RCs (TN789).

Table 2-1. DWBS Administration Commands *(continued)*

Action	Object	Qualifier	Purpose
-- test	**radio-sync**	***all port-network***	Access or display the inter-port network radio synchronization plan.
-- add **-- change** **-- display** **-- remove**	**station**	***extension***	Administer or view a station on the system.
-- list **-- status** **-- test**	**station**	***extension*** ***port <wt>*** ***type <9601>***	List all stations that conform to the port or type search criteria.
-- change **-- display**	**system-parameters**	***customer-options***	Administer or view optional feature administration.
-- change **-- display**	**system-parameters**	***features***	Administer or view the radio card download servers.
-- change **-- display**	**system-parameters**	***wireless***	Administer or view system-wide wireless data.
-- test	**WFB**	***PPCSS*** ***long schedule***	Test one or more WFBs.
-- enable **-- disable** **-- list configuration**	**WT-stations**	***extension***	Enable or disable the WT. Display the hardware and firmware of one or all WTs in the system along with the last time access rights were invoked.
-- enable* **-- disable**** **-- status*****	**wt-upgrade**	***PPCSS*** ***all***	*Transfer WT firmware file from the MSS to the designated RCs. **Deactivate the communications port on the RCs previously enabled for WT download. ***Display the status of the RCs designated to be download servers for a WT firmware upgrade.

NOTE:
The ***schedule*** qualifier is valid only when the system printer is connected and administered. See your system administrator.

Maintenance Architecture

3

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 ECS 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 as follows:

- RC-BD corresponds to the TN789 RC
- RFP-SYNC corresponds to the fixed-part radio synchronization
- WFB corresponds to Wireless Fixed Base
- CAU corresponds to the external CAU
- WT-STA corresponds to the WT (9601, 9601+, or 9630 Series)

NOTE:
These MOs are specific to the DWBS. For information regarding other DEFINITY MOs, see the appropriate DEFINITY ECS Maintenance document. (Refer to the “Related Documents” section in the “About this Book” chapter for the list of available DEFINITY ECS maintenance documents.)

Relationship of Wireless MOs

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 affect other MOs in the system. For example, errors in the WFB MO will affect the RC MO.

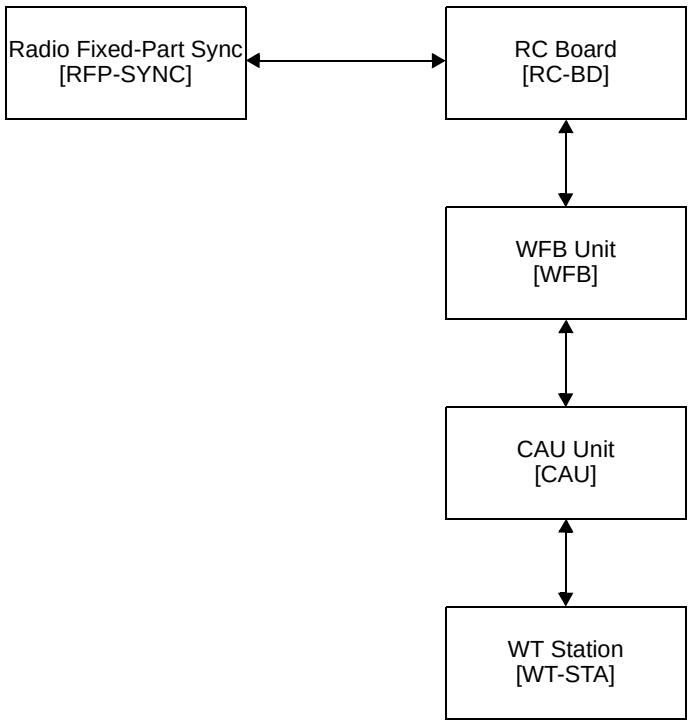


Figure 3-1. Wireless MO Relationships

Busy/Release MOs

The DWBS uses several **busyout** and **release** commands. The busyout commands are used to place an 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 **test <object> long clear** command.
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 light-emitting diode (LED) indicators for the DWBS are lit on the component (TN789) circuit pack. 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 to a remote maintenance location (INADS).

- The alarm remains active until the problem is resolved. Further testing with no failures, no additional 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 the circuitry on the alarmed circuit pack. For the DWBS, this is the TN789 circuit pack.
- OFF-BOARD problems originate in a process or component external to the circuit pack, such as the wiring.

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 hardware error log is accessible using the **display errors** command.

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 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

4

Introduction

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

RC-BD MO

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

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

LED Indicators

Three LEDs (red, green, and amber) are visible on the faceplate of the RC circuit pack and conform to the DEFINITY ECS standards, including the following:

RED
Occupies the top position. It is lit whenever the system is powered up, and it remains in this state until power-up diagnostics are completed. If the diagnostics pass, this LED is turned off. During normal operation, this LED is 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 is turned on. This alerts 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 is logged against the circuit pack. The specific error/alarm text indicates that the problem is located in the WFB or CAU and not in the RC circuit pack itself.

The alarm against the RC circuit pack is resolved only when all error/alarm(s) against the connected WFB/CAU are resolved. At this point, the red LED is 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. This LED is turned on whenever a WT is active on a call or the circuit pack is in use.

System Technician Commands

This section describes the commands associated with the RC circuit pack (RC-BD) that can be executed by the service technician. These commands include **busyout board**, **reset board**, and **release board**. The following table provides the error codes and corresponding descriptions and recommendations for these commands.

Table 4-1. Error Codes for the Busyout/Reset/Release Board Commands

Error Code	Test Result	Description/Recommendation
0	ABORT	Internal system error. 1. Retry the command at one-minute intervals for a maximum of five times. 2. If the command continues to abort, escalate the problem.
1010	ABORT	An attempt was made to busy out an object that was already busied out.
1011	ABORT	An attempt was made to release an object that was not first busied out.
1026	ABORT	The Time-Division Multiplexing (TDM) Bus cannot be busied out because the control channel or the system tones are present.
2012 2500	ABORT	Internal system error.
2100	ABORT	System resources are unavailable. 1. Retry the command at one-minute intervals for a maximum of five times. 2. If the command continues to abort, escalate the problem.
62524 62525 62526	ABORT	System resources required to begin maintenance activity on this MO are unavailable. Maintenance is currently active on the maximum number of MOs that the system can support. A typical reason for this condition is that the system contains a large number of stations and/or trunks that have been administered but are not physically connected. However, the circuit packs on which the stations and/or trunks have been administered are physically present in the system. 1. Resolve as many alarms as possible on the station and trunk MOs, or busy out these MOs to stop maintenance activity on them. 2. Rerun the test.

Table 4-1. Error Codes for the Busyout/Reset/Release Board Commands *(continued)*

Error Code	Test Result	Description/Recommendation
	NO BOARD	Circuit pack has been removed. Cannot busy out, reset, or release the object.
	FAIL	Object could not be busied out, reset, or released.
	PASS	Object successfully busied out, reset, or released.
	EXTRA BD	Only a specific number of certain circuit packs can be in the system or port network. Only one TN771 Maintenance Test circuit pack per port network is allowed. A maximum of 10 TN748D Tone Detector circuit packs are allowed in each system. A maximum of 10 TN744 Call Classifier circuit packs are allowed in each system. All additional circuit packs return “EXTRA-BD” and should be removed.

Busyout Board

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

The **busyout board** command unconditionally places the selected RC circuit pack into an out-of-service state. A busied-out RC circuit pack also causes any connected WFBs and CAUs to be busied out. Except for demand testing, maintenance activity 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 neither directs nor accepts 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.

Once this command is issued, error type 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 from the DEFINITY ECS management terminal (MT) 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                               PASS
01A0501    CAU                               PASS
01A0501    CAU                               PASS
01A0501    CAU                               PASS
01A0502    WFB                               PASS
01A0502    CAU                               PASS
01A0502    CAU                               PASS
01A0502    CAU                               PASS
01A0502    CAU                               PASS
```

Figure 4-1. Busyout Board Screen

Fields:

- *Port*—The location of the target board ("01A05" in the previous screen).
  - — ***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 slot within the carrier in the port network.
  - — ***w*** is a single alphabetic character (***a*** or ***b***) that identifies the WFB.
  - — ***c*** is a single digit number (***1*** through ***4***) that identifies the CAU.
- *Maintenance Name*—The MO name as it appears in the system.
- *Alt. Name*—Alternate means of identifying the MO. In the previous example, the CAU (if present) is identified.
- *Result*—Values are **PASS**, **FAIL**, or **ABORT**.
- *Error Code*—Numerical code for problem evaluation. (See the test tables in this document for examples.)

Reset Board

The **reset board** command reinitializes the RC circuit pack. Executing the **busyout board**, **reset board**, and **release board** commands, respectively, has the same effect as physcially removing and then reinserting the RC circuit pack.

This command allows a technician to reinitialize an RC circuit pack remotely without having to reboot the entire switch. The ***repeat*** option allows the technician to reset the RC circuit pack continuously for a maximum of 100 times with a single command line.

Entering the **reset board <*PPCSS*>** command from the DEFINITY ECS MT 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 4-2. Reset Board Screen

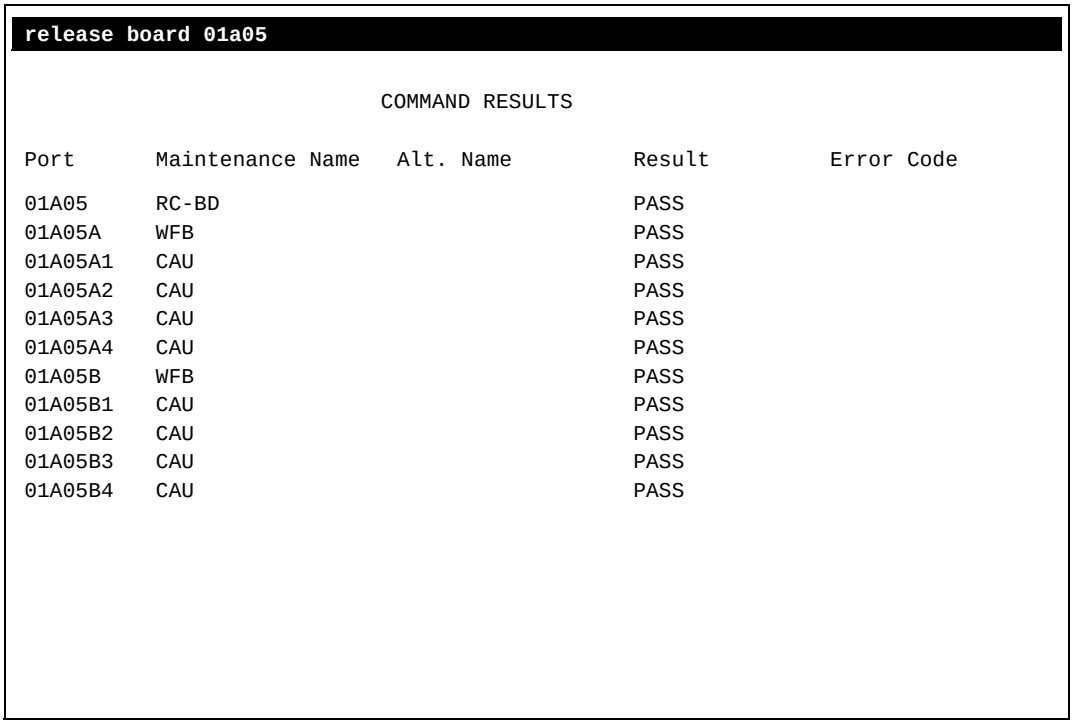
Fields:

- *Port*—The location of the target board (“01B09” in the previous screen).
  - — ***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 slot within the carrier in the port network.
- *Maintenance Name*—The MO name as it appears in the system.
- *Alt. Name*—Alternate means of identifying the MO.
- *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 in this document for examples.)

Release Board

The **release board** command is used to release (that is, return to service) the MOs that have been busied out by the previous command. If the target RC circuit pack is not installed and this command is issued, the “board not assigned” message is displayed. When service operation resumes via the command, the warning alarm previously generated for each of the affected MOs is resolved.

Entering the **release board <*PPCSS*>** command from the DEFINITY ECS MT generates the following (sample) screen.



```
release board 01a05

                          COMMAND RESULTS

Port      Maintenance Name   Alt. Name          Result          Error Code

01A05     RC-BD                                 PASS
01A05A    WFB                                   PASS
01A05A1   CAU                                   PASS
01A05A2   CAU                                   PASS
01A05A3   CAU                                   PASS
01A05A4   CAU                                   PASS
01A05B    WFB                                   PASS
01A05B1   CAU                                   PASS
01A05B2   CAU                                   PASS
01A05B3   CAU                                   PASS
01A05B4   CAU                                   PASS
```

Figure 4-3. Release Board Screen

Fields:

- *Port*—The location of the target board (“01A05” in the previous screen).
  - — ***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 slot within the carrier in the port network.
  - — ***w*** is a single alphabetic character (***a*** or ***b***) that identifies the WFB.
  - — ***c*** is a single digit number (***1*** through ***4***) that identifies the CAU.
- *Maintenance Name*—The MO name as it appears in the system.
- *Alt. Name*—Alternate means of identifying the MO.
- *Result*—Values are **PASS**, **FAIL**, or **ABORT**.
- *Error Code*—Numerical code for problem evaluation. (See the test tables in this document for examples.)

Status Radio-Controller

The **status radio-controller** command provides the current status of the RC circuit pack, all connected WFBs and CAUs, and any active WTs.

Entering the **status radio-controller <*PPCSS*>** command from the DEFINITY ECS MT generates the following (sample) screen.

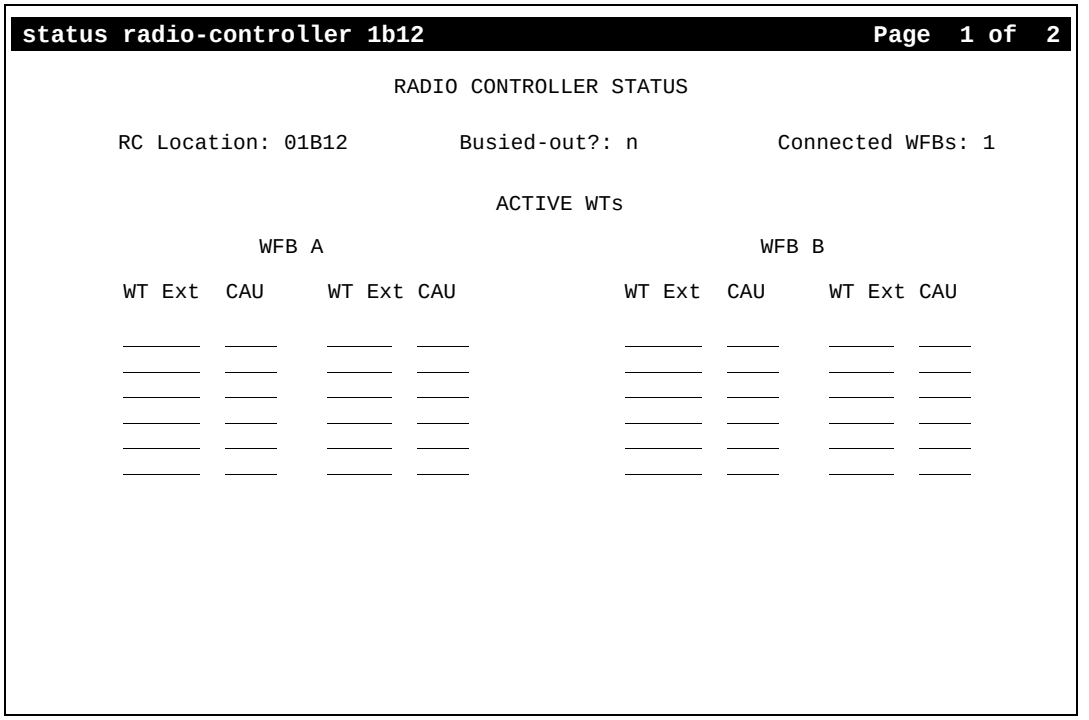


Figure 4-4. Radio Controller Status Screen (1 of 2)

Fields (page 1):

- *RC Location*—The location of the target board (“01B12” in the previous example).
- *Busied-out*—The target board is currently in a state of service.
- *Connected WFBs*—Currently, there is one WFB connected to the target RC.
- *ACTIVE WTS*—This section refers to any currently active WTs that are assigned to the target RC. This is qualified further by WFB, WT extension, and the CAU to which it is “connected.”

```
status radio-controller 6a09                                  Page  2 of  2

                          RADIO CONTROLLER STATUS

   RC Location: 06A09          Service State: in-service        Busied-out?: n
No. Active WTs: 0             Connected WFBs: 1


WFB A STATUS: Port: 06A09A     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:      y      in-service               n               0
     CAU 3:      y      in-service               n               0
     CAU 4:      y      in-service               n               0

WFB B STATUS: Port: 06A09B     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 4-5. Radio Controller Status Screen (2 of 2)

Fields (page 2):

- *RC Location*—The physical location of the RC (“06A09” in the previous example).
- *Service State*—The operating status of the RC. Values include **in-service** and **out-of-service**.
- *Busied-out?*—Indicates whether or not the RC has been placed out of service by a maintenance command. Values include **y** and **n**.

- *No. Active WTs*—The total number of WTs that are active on a call to the RC.
- *Connected WFBs*—The number of WFBs that are administered on the RC.

The following fields are included within the *WFB A Status* and *WFB B Status* areas. The fields starting with *Conn* are associated with the appropriate CAU.

- *Port*—The physical designation for the WFB (“06A09A” in the previous example).
- *Int. Antenna?*—Indicates whether or not the WFB with an internal antenna is being used for radio transmission instead of external CAUs. Values include **y** and **n**.
- *Service State*—The operating status of the WFB. Values include **in-service** and **out-of-service**.
- *Conn?*—Indicates whether or not the WFB is administered. Values include **y** and **n**.
- *Busied-out?*—Indicates whether or not the WFB has been placed out of service by a maintenance command. Values include **y** and **n**.
- *No. Active WTs*—The total number of WTs that are active on a call to the WFB.
- *Conn?*—Indicates whether or not the CAU is administered. Values include **y** and **n**.
- *Service State*—Indicates whether or not the CAU is in service. Values include **in-service** and **out-of-service**.
- *Busied-out?*—Indicates whether or not the CAU was placed out of service by a maintenance command. Values include **y** and **n**.
- *No. Active WTs*—The number of WTs that are active on a call to the CAU.

Radio Controller Error Codes and Testing

Table 4-2. 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	Radio Controller Circuit Pack
RC-BD	MINOR	test board PPCSS	Radio Controller Circuit Pack
RC-BD	WARNING	test board PPCSS	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.).

NOTE:
The UTAM disablement of radio transmission causes a “no board” message to be displayed whenever the **test board** command is issued. Check the *Radio Transmission* option in the Wireless-Related System-Parameters form. This option can be changed only at the INADS level or higher after the switch location is verified. See Error Type 65 in the following table.

The following table provides a list and information for error types in the DWBS system that are associated with the TN789 RC circuit pack.

Table 4-3. RC-BD Error Log Entries

Error Type	Aux. Data	Associated Test	Alarm Level	On/Off Board	Action/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)	Any	RC not installed/incorrect translations.	WARNING	OFF	See Note a.
60	Any	Tone-clock board not valid for DWBS.	WARNING	OFF	TN756 circuit pack cannot be used.
61(b)	Any	RC power-up test(s) failed.	MINOR	ON/OFF	See Note b.
62(c)	Any	Downloading translations to RC failed.	MINOR	ON/OFF	See Note c.
63	Any	Downloading thresholds to RC failed.	MINOR	ON	See Note c.
64	Any	Inter-RC sync init failed.	MINOR	OFF	
65(d)	Any	Radio transmission is disabled.	MINOR	ON	See Note d.
257	Any	Control Channel Loop Test (#52)	MINOR	ON	test board PPCSS short 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	test board PPCSS long
1281	1-24	RC NPE Cross-Talk Test (#1315)	MINOR	ON	test board PPCSS long r 2

Table 4-3. RC-BD Error Log Entries *(continued)*

Error Type	Aux. Data	Associated Test	Alarm Level	On/Off Board	Action/Test to Clear Value
1538	Any	Hyperactive RC	MINOR	ON	Replace the circuit pack. Escalate if the problem is not corrected.
1793	46085	DECT protocol	MINOR	ON	test board PPCSS long r 2
1793	1-4002	RC Tone Loop Test (#1343)	MINOR	ON	busyout board PPCSS, test board PPCSS long, release board PPCSS
2049	1-24	RC NPE Loop Test (#1316)	MINOR	ON	test board PPCSS long r 2
2304 (f)	Any	FW Checksum Test (pwrup only)	MINOR	ON	See Note f.
2561(g)	Any	FW Upgrade Operation	MINOR	ON	upgrade firmware radio controller PPCSS
2817	Any	RC HW Translation Audit (#1317)	WARNING	OFF	test board PPCSS short r 2
3073(h)	46088	Loss of SYSCLOCK	MINOR	ON	See Note h.
3329	46089	Loss of HSCLOCK	MINOR	OFF	See Note h.
3585(i)	Any	Fail to Support WT Firmware Upgrade	WARNING	OFF	enable wt-upgrade PPCSS See Note i.
3840	46208	In-line error - RC detects WT firmware upgrade error			Try the upgrade again.
3999	Any	RC is very active.	WARNING	ON	See Note j.

Notes:

a. One of the following is true: the RC is not administered via the **add radio-controller *PPCSS*** command; the RC is not physically installed; the RC resides in a port network other than one administered for wireless; or the wireless feature is disabled on the Customer Options form. Ensure that the RC has been physically installed. Issue the **display radio-controller *PPCSS*** command and verify that the RC has been administered. If not, use the **add radio-controller *PPCSS*** command to administer it. The port networks are administered via the Wireless-Related System-Parameters form. Issue the **display system-parameters wireless** command and verify that *Wireless* is set to **y** and that the correct port networks are administered for wireless.

b. Whenever the RC 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	One 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 into service. To resolve the problem, replace the RC circuit pack.

c. As part of RC circuit pack initialization, pertinent translations are downloaded from the SPE to the circuit pack; for example, eligible frequencies, system ID, etc. In addition, thresholds associated with the on-board error counters are downloaded to the RC 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 an RC 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 reinitialize the RC circuit pack by either physically reseating the circuit pack or resetting it via the **reset board *PPCSS*** command. If the error persists, escalate the problem.

d. RC initialization aborted since the *Radio Transmission* option on the Wireless-Related System Parameters form is disabled. A Regional Customer Service Associate must be contacted to enable or re-enable the wireless feature.

   NOTE:

   The rules of the FCC and UTAM, Inc. 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 after the Avaya 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 Avaya 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 Avaya 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 the wireless service.

e. These errors are for Avaya 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. Issue the **busyout board**, **reset board**, and **release board** commands. If one or more checksum tests fail again, see the firmware upgrade procedure later in this document (use the **upgrade firmware radio-controller *PPCSS*** command*)* to reload the RC firmware from the SPE (MSS) to the RC circuit pack.

g. The firmware upgrade operation on this RC failed. The existing firmware codes in the RC circuit pack have been erased and the reprogram of the 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 Avaya R&D purposes only.

h. This is a catastrophic synchronization 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 no 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 is failing to support this function. This error code is for Avaya R&D purposes only.

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

j. This error is for Avaya R&D purposes only. Switch technicians should ignore this error.

Craft-Demanded Test Descriptions and Error Codes

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

Table 4-4. Investigation Order of Tests

Order of Investigation	Page Reference	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND*
NPE Audit Test (#50)	4-18		X		ND
RC Hardware Translation Audit Test (#1317)	4-26	X	X		ND
Control Channel Loop Test (#52)	4-19	X	X		ND
SAKI Sanity Test (#53)	4-20			X	D
RC NPE Port Cross-Talk Test (#1315)	4-21		X		ND
RC NPE Port Loop Test (#1316)	4-24		X		ND
RC Tone Loop-Back Test (#1343)	4-30		X		D
RC NPE Port Allocation Audit Test (#1336)	4-28	X	X		ND

* **D =** Destructive test; **ND =** Nondestructive test.

Network Processing Elements Audit Test #50

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

Table 4-5. 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 for a maximum of five times. 2. If the test continues to abort, escalate the problem.
2030	ABORT	Test not run on SPE.
any	FAIL	Internal system error. 1. Retry the command at one-minute intervals for a maximum of five times. 2. If the test continues to fail, escalate the problem.
	PASS	Network connectivity for all RC NPEs successfully updated.
any	NO BOARD	The UTAM disablement of radio transmission causes a “no board” message to be displayed whenever the **test board** command is issued. 1. Check the *Radio Transmission* option in the Wireless-Related System-Parameters form. This option can be changed only at the INADS level or higher after the switch location is verified. 2. Verify that the board is physically in the system. 3. Verify that the system is not in a stage of booting up. 4. Issue the **display radio-controller <*PPCSS*>** command and verify that the RC has been administered. 5. Retry the above command at one-minute intervals for a maximum of five times. 6. If the test continues to return NO BOARD, escalate the problem.

Control Channel Loop Test #52

This test validates that the RC circuit pack can send or receive messages over the control channel. The test queries the circuit pack for its code and vintage and verifies the accuracy of the returned data. This is a nondestructive test.

Table 4-6. 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 for 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 for a maximum of five times. 2. If the problem continues, replace the RC circuit pack. 3. Retry the command for a maximum of five times. 4. If the test continues to fail, escalate the problem.
	PASS	Communication with the RC over the control channel is successful.
any	NO BOARD	The UTAM disablement of radio transmission causes a “no board” message to be displayed whenever the **test board** command is issued. 1. Check the *Radio Transmission* option in the Wireless-Related System-Parameters form. This option can be changed only at the INADS level or higher after the switch location is verified. 2. Verify that the board is physically in the system. 3. Verify that the system is not in a stage of booting up. 4. Issue the **display radio-controller <*PPCSS*>** command and verify that the RC has been administered. 5. Retry the above command at one-minute intervals for a maximum of five times. 6. If the test continues to return NO BOARD, escalate the problem.

SAKI Sanity Test #53

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

Table 4-7. SAKI Sanity Test #53

Error Code	Test Result	Description / Recommendation
1015	ABORT	RC circuit pack is not busied out. The RC circuit pack can be reset only if it is busied out. 1. Busy out the RC 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 for a maximum of five times. 2. If the test continues to about, escalate the problem.
1	FAIL	The RC circuit pack failed to reset.
2	FAIL	The RC 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 RC circuit pack completes its initialization, issue the **test board <*PPCSS*>** command to run the short test sequence.
any	NO BOARD	The UTAM disablement of radio transmission causes a “no board” message to be displayed whenever the **test board** command is issued. 1. Check the *Radio Transmission* option in the Wireless-Related System-Parameters form. This option can be changed only at the INADS level or higher after the switch location is verified. 2. Verify that the board is physically in the system. 3. Verify that the system is not in a stage of booting up. 4. Issue the **display radio-controller <*PPCSS*>** command and verify that the RC has been administered. 5. Retry the above command at one-minute intervals for a maximum of five times. 6. If the test continues to return NO BOARD, escalate the problem.

Radio Controller Port Cross-Talk Test #1315

Each RC 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 Time Division Multiplex (TDM) Bus interface and is needed to complete a WT call circuit. In addition, each NPE controls gain and provides some conferencing functions.

Therefore, 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 Cross-Talk 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 RC circuit pack has 24 NPEs. However, since it is not usually necessary to test all 24 NPE ports, and since testing all 24 NPE ports takes a long time, each invocation of the RC NPE Port Cross-Talk 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 tests NPE 1, the next invocation tests NPE 2, etc., in a round-robin fashion. If all 24 NPE ports must be tested, simply specify ***24*** as the ***repeat*** option within the **test** command line (for example, **test board *PPCSS repeat 24***).

The “long” version of this test is destructive.

Table 4-8. RC NPE Port Cross-Talk 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 for a maximum of five times. 2. If the test continues to abort, escalate the problem.
1-24	ABORT	The RC NPE Cross-Talk Test aborted. The error code identifies the NPE for which the test aborted. The abort occurred probably because the NPE is currently being allocated for a WT call. The abort can also occur because some needed system resources are not available. 1. Check to see if the NPE is in use on a WT call. 2. Retry the command at one-minute intervals for a maximum of five times. 3. If the test continues to abort, escalate the problem.

Table 4-8. RC NPE Port Cross-Talk Test #1315 *(continued)*

Error Code	Test Result	Description / Recommendation
1-24	FAIL	The RC NPE Port Cross-Talk 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 RC 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 for a maximum of 10 times and verify that the test continues to pass.
any	NO BOARD	The UTAM disablement of radio transmission causes a “no board” message to be displayed whenever the **test board** command is issued. 1. Check the *Radio Transmission* option in the Wireless-Related System-Parameters form. This option can be changed only at the INADS level or higher after the switch location is verified. 2. Verify that the board is physically in the system. 3. Verify that the system is not in a stage of booting up. 4. Issue the **display radio-controller <*PPCSS*>** command and verify that the RC has been administered. 5. Retry the above command at one-minute intervals for a maximum of five times. 6. If the test continues to return NO BOARD, escalate the problem.

Radio Controller NPE Port Loop Test #1316

Each RC 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 WT call circuit. In addition, each NPE controls gain and provides some conferencing functions.

Therefore, 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 an RC 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 from running the two tests. If any test fails or aborts, the sequence is stopped.

As stated previously, the RC circuit pack has 24 NPEs. However, since it is usually not necessary to test all 24 NPE ports, and since testing all 24 NPE ports takes a long 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 tests NPE 1, the next invocation tests NPE 2, etc., in a round-robin fashion. If all 24 NPE ports must be tested, simply specify ***24*** as the ***repeat*** option within the **test** command line (for example, **test board *PPCSS long repeat 24***).

This is a nondestructive test.

Table 4-9. 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 for 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 occurred probably because the NPE is currently being allocated for a WT call. The abort can also occur because some needed system resources are not available. 1. Issue the **status radio-controller** command to verify that there are no active calls on the RC. 2. Retry the command at one-minute intervals for a maximum of five times. 3. If the test continues to abort, escalate the problem.

Table 4-9. 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 RC 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 verify that there is no intermittent problem, repeat the test for a maximum of 10 times and verify that the test continues to pass.
any	NO BOARD	The UTAM disablement of radio transmission causes a “no board” message to be displayed whenever the **test board** command is issued. 1. Check the *Radio Transmission* option in the Wireless-Related System-Parameters form. This option can be changed only at the INADS level or higher after the switch location is verified. 2. Verify that the board is physically in the system. 3. Verify that the system is not in a stage of booting up. 4. Issue the **display radio-controller <*PPCSS*>** command and verify that the RC has been administered. 5. Retry the above command at one-minute intervals for a maximum of five times. 6. If the test continues to return NO BOARD, escalate the problem.

Radio Controller Hardware Translation Audit Test #1317

Pertinent translation data is downloaded to the RC circuit pack when it is initialized. This data includes the RC 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 nondestructive test.

Table 4-10. RC Hardware Translation Audit Test #1317

Error Code	Test Result	Description/Recommendation
2000	ABORT	The RC circuit pack failed to respond to a downlink Common Channel Message Set (CCMS) message. 1. Retry the command at one-minute intervals for a maximum of five times. 2. Busy out the RC circuit pack by issuing the **busyout board <*PPCSS*>** command. 3. Reinitialize the RC circuit pack by either physically reseating the board or by issuing the **reset board <*PPCSS*>** command. 4. 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 for a maximum of five times. 2. If the test continues to abort, escalate the problem.
1	FAIL	RC has incorrect radio frequencies.
2	FAIL	RC has incorrect cluster ID.
3	FAIL	RC has incorrect DWBS System ID.
4	FAIL	RC has incorrect radio data.
5	FAIL	RC has incorrect radio data.
6	FAIL	RC 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. Reinitialize the RC circuit pack by either reseating the board or by issuing the **reset board <*PPCSS*>** command. To reset the RC circuit pack via the **reset** command, the circuit pack must first be busied out via the **busyout board <*PPCSS*>** command. Once the **reset** command has completed, issue the **release board <*PPCSS*>** command to restore the RC to an in-service state.

Table 4-10. 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 for 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	The UTAM disablement of radio transmission causes a "no board" message to be displayed whenever the **test board** command is issued. 1. Check the *Radio Transmission* option in the Wireless-Related System-Parameters form. This option can be changed only at the INADS level or higher after the switch location is verified. 2. Verify that the board is physically in the system. 3. Verify that the system is not in a stage of booting up. 4. Issue the **display radio-controller <*PPCSS*>** command and verify that the RC has been administered. 5. Retry the above command at one-minute intervals for a maximum of five times. 6. If the test continues to return NO BOARD, escalate the problem.

Radio Controller NPE Port Allocation Audit Test #1336

RC NPE allocation data is maintained on the RC circuit pack as well as within the switching fabric of the DEFINITY ECS. 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 that are detected are resolved by the audit. Therefore, this audit never reports a failure.

This is a nondestructive test.

Table 4-11. RC NPE Port Allocation Audit Test #1336

Error Code	Test Result	Description / Recommendation
2000	ABORT	The circuit pack is busied out. 1. Issue the **release board <*PPCSS*>** command.
2100	ABORT	System resources required for this test are not available.
2012	ABORT	Internal system error. 1. Retry the command at one-minute intervals for 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	The UTAM disablement of radio transmission causes a “no board” message to be displayed whenever the **test board** command is issued. 1. Check the *Radio Transmission* option in the Wireless-Related System-Parameters form. This option can be changed only at the INADS level or higher after the switch location is verified. 2. Verify that the board is physically in the system. 3. Verify that the system is not in a stage of booting up. 4. Issue the **display radio-controller <*PPCSS*>** command and verify that the RC has been administered. 5. Retry the above command at one-minute intervals for a maximum of five times. 6. If the test continues to return NO BOARD, escalate the problem.

Radio Controller Tone Loop-Back Test #1343

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

This loop-back test is actually executed 24 times (once for each RC circuit pack NPE port). This ensures that all six digital signal processors (DSPs) and both Application-Specific Intergrated Circuits (ASICs) on the RC are exercised.

This test does not exercise the far-end RC circuitry, which sends or receives over the Category 3 4-pair twisted links (the links to WFBs). The Category 3 4-pair twisted circuitry is exercised by other tests. Refer to the discussion of the WFB maintenance object in Chapter 6 for details.

This is a very destructive test. Therefore, this test aborts with error code 1362 if the RC circuit pack is not first busied out via the **busyout board <*PPCSS*>** command.

Table 4-12. RC Tone Loop-Back Test #1343

Error Code	Test Result	Description/Recommendation
1362	ABORT	The test aborted because the RC has not been busied out. 1. Busy out 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 for 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: Replace the RC circuit pack.
3001	FAIL	One or more of the tone loop-back tests failed. Replace the RC.
3002	FAIL	One or more of the tone loop-back tests failed. Replace the RC.
3003	FAIL	One or more of the tone loop-back tests failed. Replace the RC.
3004	FAIL	One or more of the tone loop-back tests failed. Replace the RC.
3005	FAIL	One or more of the tone loop-back tests failed. Replace the RC.
3006	FAIL	One or more of the tone loop-back tests failed. Replace the RC.

Table 4-12. RC Tone Loop-Back Test #1343 *(continued)*

Error Code	Test Result	Description/Recommendation
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), a malfunction has probably occurred 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.).
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), a malfunction has probably occurred 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 RC circuit pack.
	PASS	All 24 tone loop-back tests passed.
	NO BOARD	The UTAM disablement of radio transmission causes a "no board" message to be displayed whenever the **test board** command is issued. 1. Check the *Radio Transmission* option in the Wireless-Related System-Parameters form. This option can be changed only at the INADS level or higher after the switch location is verified. 2. Verify that the board is physically in the system. 3. Verify that the system is not in a stage of booting up. 4. Issue the **display radio-controller <*PPCSS*>** command and verify that the RC has been administered. 5. Retry the above command at one-minute intervals for a maximum of five times. 6. If the test continues to return NO BOARD, escalate the problem.

Radio Fixed-Part Synchronization

5

Introduction

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

Each RC operates on a 100 Hz frame clock and a 6.25 KHz multi-frame clock. For the DWBS system to operate correctly, the clocks in all of the RCs in the system must be synchronized.

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

Radio Fixed-Part Synchronization MO

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

Since the SYSCLK and HSCLOCK leads are local to a port network, all RCs in contiguous coverage areas must reside in the same port network.

At initialization time, the DWBS makes the first initialized RC the Sync-Master RC. The Sync-Master RC 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 causes an automatic attempt by the DWBS to designate another RC as the new Sync-Master.

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

For all RFP-SYNC-related failures, the ***PPCSS*** of the Sync-Master RC (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 5-1. RFP-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 long	Radio Fixed-Part Synchronization
RFP-SYNC	MINOR	test radio-sync long	Radio Fixed-Part Synchronization
RFP-SYNC	WARNING	test radio-sync long	Radio Fixed-Part Synchronization

Radio Fixed-Part Synchronization Error Log Entries

Table 5-2. RFP-SYNC Error Log Entries

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

* 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 RC 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 RC. The synchronization switching algorithm works as follows.

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

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

b. As detailed in (a), the system automatically attempts to select a new Sync-Master RC. Therefore, it is most likely that 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 RCs in the system by issuing the **list configuration radio-controller all** command.
   2. Busy out all RCs in the system via the **busyout board *PPCSS*** command.
   3. After all RCs have been busied out, release all the RCs via the **release board *PPCSS*** command.

      NOTE:
      The first RC released will become the Sync-Master RC.

      If the problem continues, escalate the problem.

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

   Associated HSCLOCK errors are logged against the RC-BD MO for the Sync-Slave RCs that reported the HSCLOCK errors.

   If HSCLOCK errors are present for most or all of the Sync-Slave RCs, the Sync-Master RC 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 RCs, the Sync Slave RCs associated with HSCLOCK errors are most likely not healthy and need to be replaced.

d. The Sync-Master RC 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 RC or an unhealthy system Tone-Clock circuit pack.

   Investigate/resolve any Tone-Clock errors. If the problem persists, replace the Sync-Master RC circuit pack. If the problem still persists, escalate the problem.

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

Table 5-3. Investigation Order of Tests

Order of Investigation	Page Reference	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND*
Wireless Sync Audit Test (#1323)	5-5	X	X		ND
Sync Reference Query Test (#1324)	5-7	X	X		ND

* D = Destructive Test; ND = Nondestructive Test.

Wireless Sync Audit Test (#1323)

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

If this test fails, RFP-SYNC maintenance attempts to designate another RC circuit pack to act as the Sync-Master RC.

This test is nondestructive.

Table 5-4. Wireless Sync Audit Test #1323

Error Code	Test Result	Description / Recommendation
2100	ABORT	System resources required for this test are not available.
2012	ABORT	Internal system error. 1. Retry the command at one-minute intervals for 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.
4	FAIL	The Sync-Master RC is not in Sync-Master mode.
5	FAIL	One or More Sync-Slave RC(s) are not in Sync-Slave mode. 1. The system automatically attempts to clean up any data discrepancies and/or recover from RCs that may have been operating in an improper sync mode. 2. Retry the command at one-minute intervals for a maximum of five times. 3. If the test continues to fail, list the RCs in the system by issuing the **list configuration radio-controller** command. Then busy out each RC via the **busyout board *<PPCSS>*** command. After all RCs have been busied out, release the RCs via the **release board *<PPCSS>*** command. Wait three minutes to give all the RCs a chance to reinitialize. 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 synchronization reference clock on the HSCLOCK lead.

Under normal conditions, the Sync-Master RC provides a sync reference on the HSCLOCK lead in its port network. All other RCs 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 RC can provide its sync reference on the HSCLOCK lead, the test passes.

If this test fails, RFP-SYNC maintenance attempts to designate another RC circuit pack to act as the Sync-Master RC.

This test is nondestructive.

Table 5-5. Sync Reference Query Test #1324

Error Code	Test Result	Description / Recommendation
2100	ABORT	System resources required for this test are not available.
2012	ABORT	Internal system error. 1. Retry the command at one-minute intervals for 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 RC is not physically installed. 1. Retry the command at one-minute intervals for a maximum of five times. 2. If the test continues to abort, escalate the problem.
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 for 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-RC synchronization may have been compromised if this RC remains as the Sync-Master. 1. The system automatically attempts to designate another RC circuit pack to act as the Sync-Master. 2. Retry the command at one-minute intervals for 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

6

Introduction

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

WFB LED Indicators

The WFB has three light-emitting diodes (LEDs). These LEDs help to indicate the WFB's 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.

Flashing LEDs on CAUs

A flashing LED on a CAU should be investigated.

Maintaining WFBs

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 CAUs.

Maintenance Commands

The following sections describe various commands for determining 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 WTs active on a bearer channel per WFB provided. To display WFB status, enter the **status radio-controller <*PPCSS*>** command.

Displaying WFB Information With the Associated Circuit Pack

The **list configuration radio all** and **list configuration radio <*PPCSS*>** commands produce the System Configuration report. If **all** is specified, all the circuit packs installed and their associated WFBs are displayed. Displayed RC circuit pack information includes the hardware vintage and firmware version of the RCs and 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 details on commands.

General WFB MO Information

The following table provides general WFB MO information.

Table 6-1. WFB MO

MO Name As it Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name of MO
WFB	MINOR	**test wfb *PPCSSw*** (Loss of WFB Query Test)	Wireless Fixed Base MO_WFB
WFB	MINOR	**test wfb *PPCSSw*** (WFB Out of Sync Query Test)	Wireless Fixed Base MO_WFB
WFB	MINOR	**test wfb *PPCSSw*** (WFB Power Query Test)	Wireless Fixed Base MO_WFB
WFB	MINOR	**test wfb *PPCSSw*** (WFB Auxiliary Power Test)	Wireless Fixed Base MO_WFB
WFB	MINOR	**test wfb *PPCSSw*** (CAU Connection Audit Test)	Wireless Fixed Base MO_WFB

PP represents the port network number, ***C*** provides carrier information, ***SS*** indicates the slot of the RC circuit pack, and ***w*** contains the WFB identifier (**a** or **b**).

The RC circuit pack (TN789) plugs into a port carrier of a DEFINITY ECS. A maximum of two WFBs can be connected to a TN789 circuit pack via twisted pair. The WFB contains the radio. Each WFB can be configured to have an internal antenna or a maximum of four external antennas (CAUs) that are connected to the WFB via coaxial cable.

WFB Error Log Entries

The following table provides a list of error types in the DWBS associated with the TN789 RC circuit pack.

Table 6-2. WFB Error Log Entries

Error Type	Aux Data	Associated Test/In-Line Error	Alarm Level	On/Off Board	Action/Test to Clear Value
1	Any	Loss of WFB	MINOR	OFF	See Note a.
18	Any	WFB busied out.	WARNING	OFF	release wfb PPCSSw
257	Any	WFB out of sync.	MINOR	OFF	See Note b.
513	Any	WFB transmitting power.	MINOR	OFF	See Note c.
927		WFB Initialization Failure	MINOR	OFF	See Note d.
	1000	Release of WFB failed.	MINOR	OFF	See Note d.
	1001 to 1015	Lower Media Access Control (LMAC) test results failed.	MINOR	OFF	See Note d.
	2000	WFB Activation Failure	MINOR	OFF	See Note d.
	2001	Reset of LMAC failed.	MINOR	OFF	See Note d.
	2002	Sync Failure	MINOR	OFF	See Note d.
	2003	Delay Calculation Failure	MINOR	OFF	See Note d.
	2004	Delay Compensation Failure	MINOR	OFF	See Note d.
	2012	Internal System Error	MINOR	OFF	See Note d.
	2100	System resources are currently not available.	MINOR	OFF	See Note d.
	2600	Internal antenna is administered with a CAU connected.	MINOR	OFF	See Note d.
	2700	No CAUs are connected.	MINOR	OFF	See Note d.
	3000	WFB cell initialization failed.	MINOR	OFF	See Note d.
1024	34816	WFB reinserted	N/A	N/A	Log Only
1281	Any	Lock Detect Error	N/A	N/A	See Note e.
1537	12	Cyclic Redundancy Checksum-12 (CRC-12) error (downlink to WFB)	N/A	N/A	See Note f.
1538	4	CRC-4 error (uplink from WFB)	N/A	N/A	See Note f.
1793	Any	LMAC Lost Sanity Error	N/A	N/A	Log Only
2049	Any	CAU Connection Audit Test	MINOR	OFF	See Note g.
2305	Any	WFB auxiliary power was lost.	MINOR	OFF	See Note h.
2561	Any	WFB firmware upgrade operation failed.	MINOR	OFF	See Note i.

Notes:

a. One of the following is true: the WFB is disconnected, there is a wiring fault, or there is a severe hardware failure in the WFB.

   Check the wiring and connections with a digital port tester. If the wiring is okay, replace the WFB. The system detects when a WFB is connected and automatically initializes it.

b. Refer to the 5000/FAIL actions for test #1328.

c. Refer to the 5000/FAIL actions for test #1329.

d. Busy out and release the WFB, and refer to the Release Code table. The auxiliary data corresponds to Release Failure Codes.

e. The synthesizer in the WFB is defective.

   1. Replace the WFB.
   2. Busy out the WFB.
   3. Release the WFB.
   4. If the release fails, examine the release code table and resolve that error.
   5. If the problem continues to persist, follow normal escalation procedures.

f. A large number of these errors (200 or more per hour) indicates poor I2 line quality. If a WFB is performing poorly, and if this error is present, check the I2 cable with a digital port tester.

g. Execute the **test wfb PPCSSw** command, and examine the results for test #1341 (CAU connection audit).

h. WFB auxiliary power was lost. Execute the **test wfb PPCSSw** command and examine the results of test #1345 (auxiliary power query).

i. The firmware upgrade operation on this WFB failed. The existing firmware codes in the WFB have been erased and the reprogramming of the new firmware release failed. This WFB cannot perform any radio service to the coverage area.

   Repeat the **upgrade firmware WFB <*PPCSSw*>** command to resolve the possible transient problem. If the second attempt returns failure again, this WFB may have defective components on board. Replace the WFB.

Table 6-3. Aux Data Codes for Error Code 927

Aux Data Code	Test Result	Description/Recommendation
1011	ABORT	WFB is already released.
2100	ABORT	System resources are currently not available. 1. Busy out the RC. 2. Remove the RC translation. 3. Add the RC translation. 4. If the release continues to fail with this error condition, escalate the problem.
1000 to 1015	FAIL	LMAC release failure. This indicates a problem with the RC circuit pack. 1. Busy out and release the WFB. 2. If the release continues to fail with this error condition, replace the RC. 3. If the release continues to fail with a new RC, escalate the problem.
2000 to 2004	FAIL	WFB activation failure. This indicates a problem with the I2 line, WFB, or I2 port on the RC. 1. Check the wiring and connections with the digital port tester. 2. Busy out and release the WFB. 3. If the release continues to fail with this error condition, replace the WFB. 4. Busy out and release the WFB. 5. If the release continues to fail with a new WFB, escalate the problem.
2012	FAIL	Internal system error. 1. Retry the release at one-minute intervals a maximum of five times. 2. If the release continues to fail with this error condition, replace the RC. 3. If the release continues to fail with this error condition, escalate the problem.

Table 6-3. Aux Data Codes for Error Code 927

Aux Data Code	Test Result	Description/Recommendation
2600	FAIL	WFB with an internal antenna is administered with a CAU physically connected. 1. Disconnect the external CAUs, or correct the administration. 2. Busy out and release the WFB. 3. If the release continues to fail, escalate the problem.
2700	FAIL	None of the administered CAUs were detected. 1. Check the connection for the administered CAUs. 2. Check the auxiliary power to the WFB. 3. Busy out and release the WFB. 4. If the release continues to fail, escalate the problem.
3000	FAIL	Cell initialization failure. 1. Check the auxiliary power to the WFB. 2. Retry the release at one-minute intervals a maximum of five times. 3. If the release continues to fail with this error condition, replace the WFB. 4. If the release continues to fail with a this error condition, escalate the problem.
	PASS	WFB initialized successfully.

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

Table 6-4. Investigation Order of Tests

Order of Investigation	Page Reference	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND*
I2 Loopback Test (#1344)	6-21		X		D
Loss of WFB Query Test (#1327)	6-10	X	X		ND
WFB Out-of-Sync Query Test (#1328)	6-14	X	X		ND
WFB Transmit Power Query Test (#1329)	6-16	X	X		ND
WFB Auxiliary Power Query Test (#1345)	6-16	X	X		ND
CAU Connection Audit Test (#1341)	6-18	X	X		ND
WFB Read and Clear Error Counters (#1326)	6-9	X	X		ND

*D = Destructive test; ND = Nondestructive test.

WFB Read and Clear Error 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 nondestructive test. The test is run due to in-line errors, during periodic maintenance, as part of initialization testing and on demand.

Table 6-5. 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. 2. If the test continues to fail with this error condition, replace the RC. 3. If the test continues to fail with this error condition, escalate the problem.
	PASS	WFB Read and Clear Counters test passed. All counters are cleared. No error to be reported.

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 Category 3 4-pair twisted line. Whenever loss of WFB is detected by the RC (that is, 12 consecutive Category 3 4-pair twisted status packets are not detected), the RC sends a LOSS-WFB alarm uplink 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 (which does not allow for radio transmission).

When the alarm is cleared, the RC circuit pack up-links a CLEAR-LOSS-OF-WFB.

This test can fail only if maintenance is disabled for either the system or WFB MO. Under normal conditions, the inline error handling places the WFB out of service; this results in error code 4000 (ABORT) being reported.

This is a nondestructive test. The test is run due to in-line errors, during periodic maintenance and initialization testing, and on demand.

Table 6-6. Loss of WFB Query Test #1327

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary resources to run this test. 1. Retry the command at one-minute intervals for a maximum of five times. 2. If the test continues to abort, escalate the problem to the next tier.
4000	ABORT	WFB is out of service. 1. Busy out the WFB. 2. Release the WFB. 3. If the release fails, examine the release code table and resolve the error. 4. If the problem persists after a successful release, follow normal escalation procedures.
2012	FAIL	Internal system error. 1. Retry the test at one-minute intervals for a maximum of five times. 2. If the test continues to fail with this error condition, replace the RC. 3. If the test continues to fail with this error condition, escalate the problem.
5000+n	FAIL	Loss of WFB still exists. Value **n** is the number of times this error has occurred. 1. Check the I2 wiring and connections with a digital port tester. 2. Busy out the WFB. 3. Release the WFB. 4. If the release fails, examine the release code table and resolve the error. 5. If the problem persists after a successful release, follow normal escalation procedures.
	PASS	Loss of WFB test passed. No errors to be reported. WFB is in service.

Port Tester LA85

Port Tester LA85 (comcode 105138424) is the standard digital port tester for testing DWBS wiring. To use this port tester, ensure that the D8W cord at the WFB is inserted into the other jack of the port tester and that the RC is translated and on line.

The following table lists the various conditions that the digital port tester can indicate along with the corresponding lamp indicators (for adjunct power and the LEDs).

NOTE:
The LEDs stay lit for several seconds, cycle off, and are then relit.

Table 6-7. Conditions Indicated by the Digital Port Tester LA85

	Lamp Indicators					
Condition	**Adjunct Power**	**LED 1**	**LED 2**	**LED 3**	**LED 4**	**LED 5**
Normal	**green**	**green**	**green**	**green**	**green**	**off**
Power reverse	red	off	off	off	off	off
Power open	off	off	off	off	off	off
Receiver tip/ring reverse	green	green	green	green	green	off
Transmit tip/ring reverse	green	green	green	green	green	off
Transpose transmit and receive	green	red	red	red	red	off
One-half pair off	green	green	red	green	off	off
Open tip of receive	green	green	green	green	off	off
Open ring of receive	green	green	green	green	green	off
Open tip of transmit	green	green	off	green	green	off
Open ring of transmit	green	off	green	green	green	off
Short on tip/ring of transmit	green	green	green	green	green	off
Short on tip/ring of receive	green	green	green	green	green	off

NOTE:
Reversing tip/ring of transmit/receive does not affect service on Version 17 of the RC.

Error Code 4000 (ABORT) occurs on a transmit or receive for all WFB tests whenever testing with a short across a transmit or receive pairs.

Testing Wiring Without a Digital Port Tester

If you do not have a digital port tester, you can partially test the wiring at the equipment room wiring block. To this purpose, complete one of the following procedures:

1. Set the meter at 200v direct current (DC), and measure receive to transmit. A measurement of -48v indicates a normal reading; a measurement of +48v indicates that the power is reversed. If the reading is normal, go to Step 3.
2. Set the meter at 20v DC, and measure receive to transmit. A reading of +5v indicates that the RC is busied out.
3. Busy out the RC, back it out, and then test for continuity. Measure the receive tip and ring; then measure the transmit tip and ring. If receive is 0.5 ohms greater than transmit, the pairs are polled properly.

Measuring Auxiliary Power

You cannot measure power at the WFB from the equipment room. To measure this, go to the WFB and measure punchings 7 and 8 at the 103 connector block. Consider the white/brown pair going to the WFB.

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

An 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 Category 3 4-pair twisted delays. Once the alarm is transmitted, the WFB automatically shuts down (that is, the modem and radio are disabled). As soon as the Out-of-Sync Alarm is detected by the RC circuit pack, an Out-Of-Sync alarm is uplinked to the Mobility Manager (MM) software.

When the SPE receives an Out-Of-Sync alarm, it initiates an Out-Of-Sync Alarm Query. When the alarm is cleared, the RC circuit pack up-links a Clear-Out-Of-Sync, and all error alarms are reset.

This is a nondestructive test. The test is run due to in-line errors, during periodic maintenance and initialization testing, and on demand.

Table 6-8. WFB Out-of-Sync Test #1328

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary resources to run this test. 1. Retry the command at one-minute intervals for a maximum of five times. 2. If the test continues to abort, escalate the problem to the next tier.
4000	ABORT	WFB is out of service. 1. Busy out the WFB. 2. Release the WFB. 3. If the release fails, examine the release code table and resolve the error. 4. If the problem persists after a successful release, follow normal escalation procedures.
2012	FAIL	Internal system error. 1. Retry the test at one-minute intervals for a maximum of five times. 2. If the test continues to fail with this error condition, replace the RC. 3. If the test continues to fail with this error condition, escalate the problem.
5000+n	FAIL	WFB is still out of sync. Value **n** is the number of times this error has occurred. 1. Check the I2 wiring and connections with a digital port tester. 2. Busy out the WFB. 3. Release the WFB. 4. If the release fails, examine the release code table and resolve the error. 5. If the problem persists after a successful release, replace the WFB. 6. If the problem continues to persist, 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, the radio and modem are disabled, and the red alarm is turned on). As soon as the Transmit Power Alarm is generated by the RC circuit pack, an Xmit-Power alarm is up-linked to the SPE.

When the SPE receives an Xmit-Power alarm, it initiates a Transmit Power Alarm Query. When the 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 circuit pack up-links a Clear-Xmit-Power and all error alarms are reset.

This is a nondestructive test. The test is run due to in-line errors, during periodic maintenance and initialization testing, and on demand.

Table 6-9. WFB Transmit Power Query Test #1329

Error Code	Test Result	Description / Recommendation
2100	ABORT	Could not allocate the necessary resources to run this test. 1. Retry the command at one-minute intervals for a maximum of five times. 2. If the test continues to abort, escalate the problem to the next tier.
4000	ABORT	WFB is out of service. 1. Busy out the WFB. 2. Release the WFB. 3. If the release fails, examine the release code table and resolve the error. 4. If the problem persists after a successful release, follow normal escalation procedures.
2012	FAIL	Internal system error. 1. Retry the test at one-minute intervals for a maximum of five times. 2. If the test continues to fail with this error condition, replace the RC. 3. If the test continues to fail with this error condition, escalate the problem.
5000+n	FAIL	WFB transmit power problem still exists. Value **n** is the number of times this error has occurred. 1. Replace the WFB. 2. Busy out the WFB. 3. Release the WFB. 4. If the release fails, examine the release code table and resolve the error. 5. If the problem persists after a successful release, follow normal escalation procedures.
	PASS	WFB Transmit Power Query test passed. No errors to be reported. WFB is in service.

CAU Connection Audit Test (#1341)

A 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 indicates which CAUs are in dispute. These CAUs are placed out of service and do not provide any coverage.

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

NOTE:
In G3V6 and earlier releases, this test only reports the connection status that was present at initialization. It does not report the current state if it has changed since initialization. In G3V7 and later releases, this test reports the current state at all times.

This is a nondestructive test. The test is run due to in-line errors, during periodic maintenance and initialization testing, and on demand.

.

Table 6-10. CAU Connection Audit Test #1341

Error Code	Test Result	Description/Recommendation
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	ABORT	WFB is out of service. 1. Check the error log for an active error 927/2600. If the error exists, follow the suggested action for that error. If the problem persists, continue with the next step. 2. Busy out the WFB. 3. Release the WFB. 4. If the release fails, examine the release code table and resolve the error. 5. If the problem persists after a successful release, follow normal escalation procedures.
2012	FAIL	Internal system error. 1. Retry the test at one-minute intervals a maximum of five times. 2. If the test continues to fail with this error condition, replace the RC. 3. If the test continues to fail with this error condition, escalate the problem.

Table 6-10. CAU Connection Audit Test #1341 ***(continued)***

Error Code	Test Result	Description/Recommendation
n	FAIL	There is a discrepancy between what was administered for the CAUs and the physically connected CAUs. Value **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 that the number and position of administered CAUs matches the number and position of physically connected CAUs. 2. Busy out the WFB. 3. Release the WFB. 4. If the release fails, examine the release code table and resolve the error. 5. Repeat the test. 6. If the problem persists, follow normal escalation procedures.
	PASS	There is a perfect match between the administered CAUs and the physically connected CAUs.

I2 Loopback Test (#1344)

This test checks the presence and condition of the Category 3 4-pair twisted line. Specifically, it puts the WFB into a loopback mode, sends a bit pattern from the RC to the WFB, and checks the return values.

This is a destructive test. The I2 Loop Back test is run on demand and only if the WFB is in an out-of-service state.

Table 6-11. I2 Loopback Test #1344

Error Code	Test Result	Description / Recommendation
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.
4100	ABORT	WFB is not busied out. **NOTE**: Due to the destructive nature of this test, you cannot execute this test whenever the WFB is in service. First, place the WFB out of service; then try the test again. 1. Busy out the WFB. 2. Retry the test. 3. If the problem persists, follow normal escalation procedures.
2012	FAIL	Internal system error. 1. Retry the test at one-minute intervals a maximum of five times. 2. If the test continues to fail with this error condition, replace the RC. 3. If the test continues to fail with this error condition, escalate the problem.
Any	FAIL	The I2 Loopback test failed. 1. Check the Category 3 4-pair twisted wiring and connections with a digital port tester. 2. Retry the test. 3. If the test continues to fail with this error condition, replace the WFB. 4. Retry the test. 5. If the problem persists, follow normal escalation procedures.
	PASS	I2 Loopback test passed. The Category 3 4-pair twisted wiring and connection are okay.

WFB Auxiliary Power Query Test (#1345)

This test queries the RC to determine the status of the Loss of Auxiliary Power counter. If the test fails, the WFB is not receiving auxiliary power; this is most likely due to a power failure.

Whenever the WFB loses auxiliary power, it notifies the RC, which in turn uplinks an error message to the SPE. The SPE then logs an error and an alarm on the WFB to indicate a loss of auxiliary power.

This is a non-destructive test, and it is run on demand. This test itself does not take any corrective action; it only reports the presence or absence of auxiliary power for the tested WFB.

Table 6-12. WFB Auxiliary Power Query Test #1328

Error Code	Test Result	Description / Recommendation
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	ABORT	WFB is out of service. 1. Busy out the WFB. 2. Release the WFB. 3. If the release fails, examine the release code table and resolve the error. 4. If the problem persists after a successful release, follow normal escalation procedures.

Table 6-12. WFB Auxiliary Power Query Test #1328 *(continued)*

Error Code	Test Result	Description / Recommendation
2012	FAIL	Internal system error. 1. Retry the test at one-minute intervals a maximum of five times. 2. If the test continues to fail with this error condition, replace the RC. 3. If the test continues to fail with this error condition, escalate the problem.
5000+n	FAIL	Auxiliary power is not present. 1. Repeat the test to confirm the loss of auxiliary power. 2. Check the auxiliary power supply and resolve the power loss. 3. Once you believe auxiliary power has been restored, repeat the test three times at one-minute intervals to confirm the presence of auxiliary power. 4. If the test passes, busy out and release the WFB to resolve the alarm. 5. If the problem persists and you feel that the auxiliary power supply is functioning properly, follow normal escalation procedures.
	PASS	WFB Auxiliary Power Query test passed. Auxiliary power is present.

Maintaining CAUs

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

Each WFB can be configured to have an internal antenna or a maximum of four external antennas (CAUs) connected to the WFB via a coaxial cable. The CAU has the radio subsystem; this includes the antenna as well as a gain stage.

Table 6-13. 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 PPCSSwc CAU Port Occupancy Test	Cell Antenna Unit MO_CAU

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

The TN789 RC circuit pack plugs into a port carrier of a DEFINITY ECS. A maximum of two Wireless Fixed Bases (WFBs) can be connected to a TN789 board via twisted pair. Each WFB can be configured to have an internal antenna (special order) or a maximum of four external antennas (CAU) that are connected to the WFB via coaxial cable. The CAU has the radio subsystem; this contains the antenna as well as a gain stage.

CAU LED Interpretation

The CAU has one green LED. The following list indicates the various states for this LED and the corresponding meaning and recommended action.

- **Off**—No power is being received. Check either the connection or the WFB.
- **Steady**—Operation is normal.
- **Flashing**—Output power is not initialized to the correct value. Busy out and release the WFB. If the problem persists, replace the CAU.

CAU Error Log Entries

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

Table 6-14. CAU Error Log Entries

Error Type	Aux Data	Associated Test/In-line Error	Alarm Level	On/Off Board	Test to Clear
1	Any	CAU Initialization Failure	MINOR	ON	See Note a.
18	Any	CAU Busied out	WARNING	ON	release cau <*PPCSSppc*>
257	Any	Loss of CAU	MINOR	ON	See Note b.
769	Any	Beacon Failure	N/A	N/A	See Note c.
770	34635	Frequency Over Limit	N/A	N/A	Log Only
771	34634	Unadministered Frequency	N/A	N/A	Log Only

Notes:

a. CAU initialization failed.

1. Check the I3 wiring between the WFB and CAU.
2. Busy out and release the WFB.
3. If the CAU is still not detected, replace the CAU.
4. Busy out and release the WFB.
5. If the CAU remains undetected, escalate the problem to the next tier.

b. The CAU has been detected as lost during operation.

1. Check the I3 wiring between the WFB and CAU.
2. Busy out and release the WFB.
3. If the CAU is still not detected, replace the CAU.
4. Busy out and release the WFB.
5. If the CAU remains undetected, escalate the problem to the next tier.

c. A high frequency of this error indicates the possibility that the CAU has become disconnected or gone out of service. If there is a poor performance in an area, check for a high occurrence of this error (200 or more occurrences).

Craft-Demanded Test Description and Error Codes

Always investigate tests in the order presented in the following table when inspecting errors in the system.

Table 6-15. Investigation Order of Tests

Order of Investigation	Page Reference	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND*
CAU Port Occupancy Test (#1330)	6-28		X		D

* D = Destructive test; ND = Nondestructive test.

CAU Port Occupancy Test (#1330)

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

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

Since the RC can support multiple WFBs and CAUs, a WFB and CAU identifier is included in the test message that is 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 the 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, the CAU is not present, and maintenance takes the cell out of service.

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

Table 6-16. CAU Port Occupancy Test #1330

Error Code	Test Result	Description / Recommendation
4000	ABORT	WFB is out of service. 1. Busy out the WFB. 2. Release the WFB. 3. If the problem persists, follow normal escalation procedures.
8000	ABORT	CAU is out of service. 1. Busy out the CAU. 2. Release the CAU. 3. If the problem persists, follow normal escalation procedures.
Any	FAIL	CAU Port Occupancy Test failed. 1. Check the I3 connection between the CAU and WFB. 2. Busy out and release the WFB. 3. If the CAU remains undetected, replace the CAU. 4. Busy out and release the WFB. 5. If the problem persists, follow normal escalation procedures.
	PASS	CAU Port Occupancy Test passed. No errors to be reported.

Wireless Terminal Maintenance

7

Introduction

This chapter provides the necessary information for maintaining the DWBS wireless terminal (WT).

Testing on the WT is organized into two categories. The first category includes those tests that can be performed from the DEFINITY ECS management terminal (MT); the second category contains those tests that can be performed locally on the WT itself.

WT MO

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

System Technician Commands

The following section describes the maintenance commands for testing the WT from the DEFINITY ECS MT.

Test Station

This command performs hardware diagnostic tests on the appropriate hardware.

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

- *extension*
  The extension number of the WT 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 for 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.

  NOTE:
  To use this option, the system printer must be administered and functional. See your system administrator.

Busyout Station

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

busyout station *extension*

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

Release Station

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

release station *extension*

- *extension*
  This modifier designates the extension of the WT 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 WT. The command brings up the General Status form, which is shown in the following figure.

station status *extension*

- *extension*
  This modifier designates the extension of the WT for which the technician wishes to check the status.

```
status station 33372                                    Page   1 of   1

                                GENERAL STATUS

                  Type: 9601                Service State: in-service/on-hook
             Extension: 33372             Download Status: not-applicable
                  Port: 06A09               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:
       Message Waiting:
        Mobility State: in-system            Access Rights: yes
                                           Key Allocation: not-applicable
       Connected Ports:

           On ACD Call? no

              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
```

Figure 7-1. General Status Form

The following list identifies and explains the fields in the form.

- *Type*
  Identifies the type of equipment administered for the extension.
- *Extension*
  Identifies the extension number specified on the command line.

- *Port*
  Displays either the RC to which the WT is registered while on-hook or the WFB, RC, and CAU on which the WT is active at the moment while off-hook.The field contains **WT** for unregistered WTs.
- *Call Parked?*
  Values include **Yes** and **No**.
- *Ring Cut Off Act*
  Indicates whether the ring cut-off capability is activated.
- Message Waiting
  Identifies the location of any active messages for the station: **AUDIX**, **PMS** or **AP-SPE**.
- *Service State*
  Provides the current service status of the WT (**in-service-on-hook**, **in-service-off-hook**, **out-of-service**, or **disconnected**).
- *Download Status*
  Values include **complete**, **pending**, or **not applicable**.
- *SAC Activated?*
  Indicates whether or not the Send All Calls (SAC) feature is active for this WT.
- *User Cntrl Restr*
  Values include **none**, **total**, **stat-stat**, **outward**, and **terminate**.
- *Group Cntrl Restr*
  Values include **none**, **total**, **stat-stat**, **outward**, and **terminate**.
- *CF Destination Ext*
  Identifies the call-forwarding destination (if any) of the WT.
- *Mobility State*
  Indicates the mobility status of the WT. Values include **in-system** and **out-of-system**.
- *Access Rights?*
  Indicates whether or not the specific WT has access rights. Values include **Yes** and **No**.
- *Key Allocation States*
  Value **not-applicable** appears for the current DWBS version.
- *Connected Ports*
  Identifies the other connected ports on the call. If the WT is connected to another WT, the connected location is shown.
- *AWU Call At*
  Displays the time for which an automatic call is scheduled.

- *User DND*
  Displays the status of the Do Not Disturb (DND) feature for this WT. Values include **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*
  Displays the status of the DND feature for the group. Values for this field include **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 include **non-guest-room**, **vacant**, and **occupied**.

List Configuration

This command displays the following information for all the pocket phones in the system: hardware vintage, firmware version, International Portable Equipment Identity (IPEI), and the last time access rights were invoked.

list configuration wt-stations *[extension] [count] [print|schedule]*

- *extension*
  Identifies the starting extension number.
- *count*
  Values include **1** through **1500**.
- *print*
  Allows you to send the output to a local printer.
- *schedule*
  Allows you to schedule the execution of this command at either a later time or periodically.

  NOTE:
  The ***schedule*** qualifier is valid only when the system printer is connected and administered. See your system administrator.

This command generates the Wireless Terminal Stations form. An example of the form appears as follows.

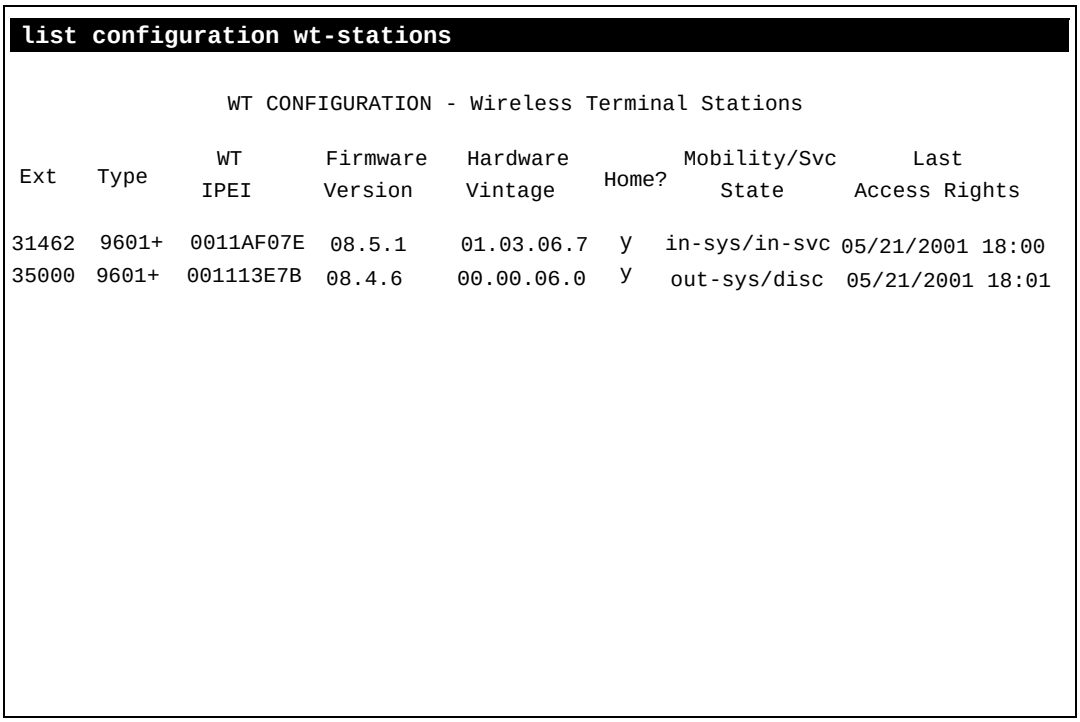


Figure 7-2. Wireless Terminal Stations Form

WT-STA Maintenance Object

WT-STA Error Codes and Testing

Table 7-1. WT-STA MO

MO Name As it Appears In Alarm Log	Alarm Level	Initial Craft Command To Run	Full Name of MO
WT-STA	WARNING (station is busied out)	release station <ext>	Wireless Terminal Station MO_WT_STA

The following table provides a list and information for error types in the DWBS associated with the WT.

Table 7-2. WT-STA Error Log Entries

Error Type	Aux. Data	Associated Test/In-Line Error	Alarm Level	On/Off Board	Action/Test to Clear Value
18	Any	WT-STA busied out	WARNING	N/A	release station <ext>
513	Any	WT firmware download	WARNING	OFF	See Note a.
1537	Any	Test Page	N/A	N/A	See Note b.

Notes:

a. This error is logged for information purposes, and it indicates that a WT failed to download a firmware file. This error indicates that the WT may experience degraded service. The WT should attempt to download the firmware file again.

b. This error is logged for information purposes, and it indicates that a WT did not respond to a page. This situation is normal since pocket phones can leave the system.

Craft-Demanded Test Descriptions and Error Codes

NOTE:
Always review the tests in the order in which they are presented in the following table when inspecting errors in the system.

Table 7-3. Investigation Order of Tests

Order of Investigation	Page Reference	Short Test Sequence	Long Test Sequence	Reset Board Sequence	D/ND*
WT Lamp Audit Test (#1309)	page 7-8	X	X		ND
WT Test Page Test (#1310)	page 7-9		X		ND

* **D =** Destructive test; **ND =** Nondestructive test.

WT Lamp Audit Test #1309

The WT Lamp Audit test updates the lamps for the WT.

This is a nondestructive test. The test is run during periodic maintenance and on demand.

Table 7-4. WT Lamp Audit Test #1309

Error Code	Test Result	Description/Recommendation
1952	ABORT	The WT is on a call.
1953	ABORT	The WT is out of the system.
1954	ABORT	The Radio Controller associated with the WT is too busy to process the message. 1. Retry the command at one-minute intervals for a maximum of five times. 2. If the test continues to fail, escalate the problem to the next tier.
2000	ABORT	The system is unable to allocate resources. 1. Retry the command at one-minute intervals for a maximum of five times. 2. If the test continues to fail, escalate the problem to the next tier.
2012	ABORT	The command failed due to an internal error. 1. Retry the command at one-minute intervals for a maximum of five times. 2. If the test continues to fail, escalate the problem to the next tier.
	PASS	The lamp audit was sent.

WT Test Page Test #1310

The WT Test Page Test attempts to determine if the WT is in the system.

This is a nondestructive test. The test is run due to in-line errors, during periodic maintenance, and on demand.

Table 7-5. WT Test Page Test #1310

Error Code	Test Result	Description/Recommendation
1952	ABORT	The WT is on a call.
1953	ABORT	The WT is out of the system.
1954	ABORT	The Radio Controller associated with the WT is too busy to process the message. 1. Retry the command at one-minute intervals for a maximum of five times. 2. If the test continues to fail, escalate the problem to the next tier.
2000	ABORT	The system is unable to allocate resources. 1. Retry the command at one-minute intervals for a maximum of five times. 2. If the test continues to fail, escalate the problem to the next tier.
2012	ABORT	The command failed due to an internal error. 1. Retry the command at one-minute intervals for a maximum of five times. 2. If the test continues to fail, escalate the problem to the next tier.
	PASS	The WT responded to the test page.
any	FAIL	The WT did not respond to the test page. 1. Retry the command. If an ABORT appears, see Error Code 1953.

WT User-Level Error Messages

The following table presents the user-level error messages that may appear on the WT, along with corrective actions, if required.

Table 7-6. User-Level Error Messages and Corrective Actions for the WT

User-Level Error Messages	Corrective Actions
"NO CHANNEL AVAIL"	None actually required because the problem is corrected once a channel becomes available. Try moving to another cell.
"PLEASE WAIT"	None required. The DWBS should be in service within 10 seconds.
"NO SERVICE"	See the system administrator, as prompted by the subsequent message "SEE SYS ADMIN." Also, see the following "System Administrator-Level Error Messages" section for instructions on how to access error message and for the description for these messages.

Considerations For the 9630 Series WT

If a 9630 Series WT is in range with a blank call screen, and if none of the signal strength bars are shown on the display, there is a mismatch of important system parameters. The frequency and/or system ID settings for the WT may be incorrect.

For such a case, force the access rights procedure from the Initiate Access Rights screen. If the "Phone not in range. Cannot initiate access rights" message is displayed, contact the Technical Service Center (TSC).

To access the Initiate Access Rights screen, do the following.

1. Press Menu .
2. Press Next four times.
3. Press the third call appearance from the left twice.
4. Press Next three times
5. Press Initiate.
6. Press Yes.

A message displays within 10 seconds.

System Administrator-Level Error Messages

The system administrator can access system administrator-level error messages that provide additional details regarding WT problems.

To access system administrator-level error messages on the 9601 WT, use the following key sequence:

1. Press Menu .
2. Press Next .
3. Press the **Info** soft key.
4. Press Prev .
5. Press the first soft key twice.

To access system administrator-level error messages on the 9630 Series WT, use the following key sequence:

1. Press Menu .
2. Press Next four times.
3. Press the **More** soft key twice.
4. Press the second call appearance from the left twice.

Error 0X Codes

The following table identifies and describes the error 0X codes mentioned in the previous section.

Table 7-7. Error 0X Codes

Error Codes	Meaning/Corrective Action
0x81	Access rights with unknown IPEI From the MT, readminister the WT with the correct IPEI. Use the **change station *extension*** command.
0x82	Access rights general failure For the 9630 Series WT, initiate access rights as follows: 1. Press Menu . 2. Press Next four times. 3. Press the **More** soft key twice. 4. Press Next five times. 5. Press the unlabeled third soft key twice. 6. Press Next three times. 7. Press the **Initiate** soft key 8. Press the **Yes** soft key. For the 9601 WT, initiate access rights as follows: 1. Press Menu . 2. Press Next . 3. Press the **Info** soft key. 4. Press Prev . 5. Press the unlabeled middle soft key twice. 6. Press Prev twice. 7. Press the **Initiate** soft key 8. Press the **Yes** soft key. If either of these procedures does not solve the problem, reset the WT's battery.
0x83	Location registration with unknown IPUI. Follow the corrective procedure for error code 0x82.
0x84	Location registration general failure Follow the corrective procedure for error code 0x82.

Table 7-7. Error 0X Codes *(continued)*

Error Codes	Meaning/Corrective Action
0x88	WT is busied out. From the MT, enter the **release station *extension*** command.
0x89	Radio Controller is busied out. From the MT, enter the **release board *ppcss*** command.
0x8f	WT is not registered. Administer the WT from the MT.

Firmware Upgrade

8

Introduction

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

A firmware upgrade of the RC circuit pack and the WFB can be executed usually from the management terminal (MT) 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 expedites the introduction of enhancements, new features, and functions to the DWBS in a more economical and timely fashion. A firmware upgrade of the WT, however, must be done on site either by an Avaya technician or trained customer personnel.

Firmware File Transfer Overview

NOTE:
A firmware file transfer is usually done by INADS.

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

There are two general steps for a 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 WT).

NOTE:
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 check that the firmware file is present on the mass storage subsystem (MSS), issue the **list configuration firmware** 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. Therefore, it is recommended that firmware upgrades take place during low traffic periods.

DWBS Firmware Transfer to the Mass Storage System

The DWBS firmware download procedure allows DEFINITY ECS technicians to upgrade the DWBS firmware package within the DEFINITY ECS (all platforms). The firmware for the RC circuit pack, WFB, and WT is always included in the package; however, only one component may change from package to package.

This procedure assumes that Version 5.0 of the ECS (Terranova) Communications package is used as the terminal emulator. Other terminal emulators that support the XMODEM protocol should work. Only the MSS of the active processor receives the update (.fdl) file.

Communications Setup

Perform the following communications setup:

1. Start the ECS (Terranova) Communications package.
2. At the top bar, click *File* - *Protocols*. Set the protocol to **XMODEM**. Click "OK."
3. At the top bar, click *Controls* - *Emulator*. Set the type to **4410**. Click "OK."
4. At the top bar, click *Controls* - *Line Options*. Set up the following items:
   - Dialing device or modem type to what you are using. (Most units function with setting **HAYES**.)
   - Communications port used by this device. (This is usually **COM1** for an external device or **COM2** for an internal device.)
   - *Host* = **UNIX**
   - *Duplex* = **FULL**
   - *Parity* = **NONE**
   - *Word Size* = **8**
   - *Stop Bit* = **1**

- *Baud* = **9600** or higher

Click “OK.”

5. At the top bar, click *Phones - Number*. Enter the number of the switch to be accessed. Click “OK.”
6. Log into the accessed switch via the inads login and password.
7. Set the terminal type to **4410**. (Process time to this point is four minutes.)
8. If the accessed machine is G3SI, go to the G3SI section.
9. If the accessed machine is MIPS (G3R), go to the MIPS section.

G3si Setup

NOTE:
If a specific RC circuit pack or WFB is to be upgraded, the equipment location in the format ***PPCSS*** for the RC and ***PPCSSw*** for the WFB is used instead of ***all***. The ***schedule*** option is optional.

For the location, ***PP*** is the two-digit number that identifies the port network; ***C*** is an alphabetic character that identifies the carrier within the port network; ***SS*** is a two-digit number that identifies the slot within the carrier in the port network; ***w*** (if required) is a single alphabetic character (***a*** or ***b***) that identifies the WFB; and ***c*** (if required) is a single digit number (***1*** through ***4***) that identifies the CAU.

The ***schedule*** option, which is available for some of the commands, is valid only when the system printer is connected and administered. See your system administrator.

1. Enter the **status card-mem** command to bring up the Memory Card Status report. This report displays the format of the flash card. An example of the report appears as follows:

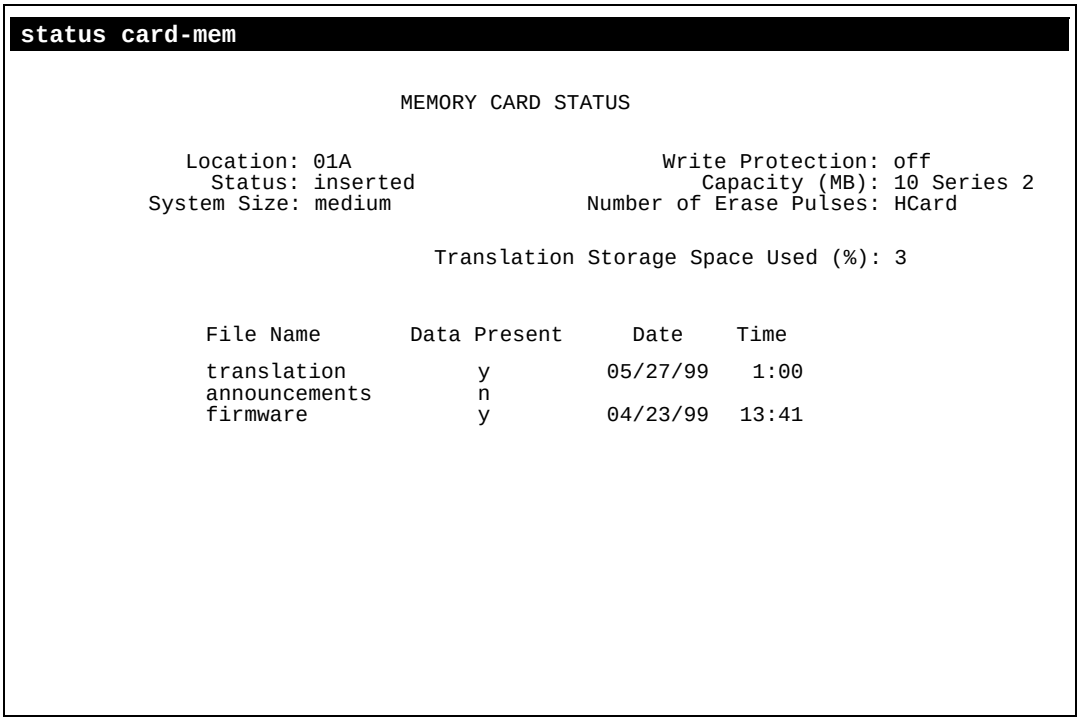


Figure 8-1. Memory Card Status Report

NOTE:
A 10-meg translation card is required for all DEFINITY G3si with the DWBS option. The 10-meg translation card should have three entries: “Translations,” “Announcements,” and “Firmware.” If the word “Firmware” is not there, you must insert a spare 10-meg flash card. Enter the **format card-mem firmware** command. Once this command is executed, enter the **save translations** command and (if announcements are included) the **save announcements** command. (This operation takes seven minutes. Processing time to this point is 11 minutes.)

2. Enter the **download firmware** command. A response will ask you to wait while the MSS is being opened. When you see “Please start file transmission now....,” go to the next step. (This takes about 50 seconds.)
3. At the top bar, click *File - File Transfer*. Select the correct file by clicking it; then click “OK.” (This takes about 23 minutes. Process time to this point is 35 minutes.)
4. Terranova alerts you when the file transfer is completed. Click *Exit*.

5. Enter the **status card-mem** command to verify that the file has transferred successfully. The firmware entry includes a date and time if the file transfer is successful. The date and time shown indicate when the file was created and not when it was transferred.

The firmware upgrade procedure starts with the next step. (This is also done by INADS.)

6. Enter the **list configuration radio-controller all** command to bring up the Radio Controller Circuit Pack Configurations report. An example of the report appears as follows:

```
list configuration radio-controller all                          Page  1


                  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

06A09   TN789      2      000011   8.1.4   000037   000017   no WFB   no WFB
06A11   TN789      3      000012   8.1.4   000017   000017   000017   000017
06A13   TN789      1      000012   8.1.4   000017   000017   000017   000017
06A15   TN789      4      000011   8.1.4   000017   000017   000017   000017
06A17   TN789      5      000012   8.1.4   000017   000017   no WFB   no WFB
06B09   TN789      14     000012   8.1.4   000017   000017   000017   000017
06B11   TN789      10     000012   8.1.4   000017   000017   000017   000017
06B13   TN789      11     000012   8.1.4   000017   000017   000017   000017
06B14   TN789      6      000012   8.1.4   000017   000017   000017   000017
06B16   TN789      9      000012   8.1.4   000017   000017   000017   000017
```

Figure 8-2. Radio Controller Circuit Pack Configurations Report

Write down the circuit pack locations, the circuit pack version, the WFB A version and, if you have it, the WFB B version.

7. Enter the **list configuration firmware-versions** command to display the firmware for each DWBS hardware component stored in the MSS. This information is displayed in the Firmware Versions report. Two examples of the report appear as follows:

```
list configuration firmware-versions                          Page  1

                              FIRMWARE VERSIONS

   Name                Version          Size       Checksum

   TN789 RC 8.1        8.1.4            37000      FAA9
   WFB v17             0.0.17           8000       4E89
   WT 9601 3CA         8.4.6            2F830      A45B
```

Figure 8-3. Firmware Versions Report (9601 WT)

```
list configuration firmware-versions                          Page  1

                              FIRMWARE VERSIONS

   Name                Version          Size       Checksum

   TN789 RC 8.1        8.1.0            37000      6629
   WFB v17             0.0.17           8000       4E89
   WT 9601 3CA         0.5.5            2C6E0      1CC9
```

Figure 8-4. Firmware Version Report (9630 Series WT)

Compare the firmware versions in the MSS to the firmware versions of the DWBS components.

NOTE:
Refer to the value in the column headed by *Version* to obtain the appropriate firmware version. For the 9601 WT, the firmware version is 7.0.0 or later; for the 9630 Series WT, the firmware version is 7.0.0 or earlier. **The corresponding value in the column headed by *Name* may or may not be correct**.

8. Enter the **status wt-upgrade** command to determine the WT firmware version that is residing on the RCs. This command brings up the Status of Wireless Terminal Firmware Upgrade report. An example of the report follows.

```
status wt-upgrade                                              Page   1

                STATUS OF WIRELESS TERMINAL FIRMWARE UPGRADE

Server    Server    WT Firmware  Firmware     WT        WT      State of
Location  Enabled?   in Server   Version   Connected?  IPEI     Operation

01C18     Yes       9601         0.5.7     No        000000000  Idle
01C10     Yes       9601         8.4.6     No        0011179eb  Idle
```

Figure 8-5. Status of Wireless Terminal Firmware Upgrade Report

The *Firmware Version* field in the form generated by this command indicates whether the firmware package is for a 9601 WT or 9630 Series WT. Make a note of the RC locations (***PPCSS***) that are enabled as download servers.

NOTE:
Refer to the value in the column headed by *Version* to obtain the appropriate firmware version. For the 9601 WT, the firmware version is 7.0.0 or later; for the 9630 Series WT, the firmware version is 7.0.0 or earlier. **The corresponding value in the column headed by *Name* may or may not be correct**.

If the message says “No server has been administered at system feature form,” go to the next step. Otherwise, write down the firmware version and then go to Step 10.

9. Enter the **change system-parameters features** command to bring up the Feature-Related System-Parameters form, and go to page 10. An example of page 10 of the form appears as follows:

```
change system-parameters features                              Page 10 of 10

                          FEATURE-RELATED SYSTEM PARAMETERS
LEAVE WORD CALLING PARAMETERS
  Maximum Number of Messages Per Station (when MSA not in service): 10
  Stations with System-wide 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) Enabled? n


                    Prohibit Bridging Onto Calls With Data Privacy? n
                         Enhanced Abbreviated Dial Length (3 or 4): 3
                                               Call Forward Override? y
       External Coverage Treatment for Transferred Incoming Calls? y
                       Coverage of Calls Redirected Off-Net Enabled? y
WIRELESS PARAMETERS
  Radio Controllers with Download Server Permission (enter board location)
    1: 01C10   2: 01C12   3:         4:         5:
```

Figure 8-6. Feature-Related System-Parameters Form (Page 2)

Within the “Wireless Parameters” area of the form, the *Radio Controllers with Download Server Permission* field contains five subfields to support the administration of up to five RC download servers. For each field, enter the board location according to the following components in the prescribed order:

- Port network (01 [G3si, G3vs]; 01 through 3 [G3i]; 01 through 44 [G3r])
- Carrier (A through E)
- Slot (01 through 20)

For example, “01C10.”

NOTE:
A maximum of five RCs per system can be administered as download servers. If an RC that is administered as a download server is moved, it can still be used as a download server.

10. Enter the **upgrade firmware radio-controller *[PPCSS] [all] [schedule]*** command. (This process takes four minutes.)

11. Enter the **upgrade firmware wfb *[PPCSSw] [all] [schedule]*** command. (This process takes four minutes for one WFB and seven minutes for two WFBs.)
12. Enter the **enable wt-upgrade *[9601 or 9631] [PPCSS] [all] [schedule]*** command. (This process takes 3.5 minutes per RC.) The RC is taken out of service while the file is being transferred.

    NOTE:
    Do not issue the **enable wt-upgrade *all*** command if your DWBS has both 9601 WTs and 9630 Series WTs and if it has multiple RCs. Instead, issue the appropriate **enable wt-upgrade *PPCSS*** command for each RC individually.

13. Enter the **status wt-upgrade** command. The firmware version should be the same as the one shown on the Firmware Versions form.
14. Enter the **list configuration radio-controller all** command. The data collected in Step 5 should have changed to the new RC circuit pack version and to the WFB version that is shown on the Firmware Versions form (if the versions are different).

MIPS (G3R) Setup

NOTE:
If a specific RC circuit pack or WFB is to be upgraded, the equipment location in the format ***PPCSS*** for the RC and ***PPCSSw*** for the WFB is used instead of ***all***. The ***schedule*** option is optional.

1. Enter the **download firmware** command. A response is provided indicating that you should wait while the MSS is being opened. When the message “Please start file transmission now.....” appears, go to Step 2. (This takes about five seconds.)
2. At the top bar, click *File - File Transfer*. Select the correct file by clicking it; then click “OK.” (This process takes about 48 minutes.)
3. Terranova alerts you when the file transfer is completed. Click *Exit*.

The firmware upgrade starts with the next step.

4. Enter the **list configuration radio-controller all** command. Write down the circuit pack locations, circuit pack firmware version, WFB A firmware version and, if you have it, the WFB B firmware version.

   Enter the **list configuration firmware** command to display the firmware for each DWBS hardware component that is stored in the MSS. Compare the firmware versions in the MSS to the firmware versions of the DWBS components.

NOTE:
Refer to the value in the column headed by *Version* to obtain the appropriate firmware version. For the 9601 WT, the firmware version is 7.0.0 or later; for the 9630 Series WT, the firmware version is 7.0.0 or earlier. **The corresponding value in the column headed by *Name* may or may not be correct**.

5. Enter the **status wt-upgrade** command to determine the WT firmware version that is residing on the RCs. The *Firmware Version* field in the form generated by this command indicates whether the firmware package is for a 9601 WT or 9630 Series WT. Make a note of the RC locations [PPCSS] that are enabled as download servers.

   NOTE:
   Refer to the value in the column headed by *Version* to obtain the appropriate firmware version. For the 9601 WT, the firmware version is 7.0.0 or later; for the 9630 Series WT, the firmware version is 7.0.0 or earlier. **The corresponding value in the column headed by *Name* may or may not be correct**.

   If the message says “No server has been administered at system feature form,” go to Step 7. Otherwise, write down the firmware version and then go to Step 8 or Step 10.

6. Enter **change system-parameters features** command and go to page 10. Enter the circuit pack location [***PPCSS***] of the RC to be used as a download server.

   Within the “Wireless Parameters” area of the form, the *Radio Controllers with Download Server Permission* field contains five subfields to support the administration of up to five RC download servers. For each field, enter the board location according to the following components in the prescribed order:

   - Port network (01 [G3si, G3vs]; 01 through 03 [G3i]; 011 through 44 [G3r])
   - Carrier (A through E)
   - Slot (01 through 20)

   For example, “01C10.”

   NOTE:
   A maximum of five RCs per system can be administered as download servers.

7. Enter the **upgrade firmware radio-controller *[PPCSS] [all] [schedule]*** command. (This process takes four minutes.)
8. Enter the **upgrade firmware wfb all *[PPCSSw] [all] [schedule]*** command for each WFB configured in the system.

This process takes four minutes for one WFB and seven minutes for two WFBs.

9. Enter the **enable wt-upgrade type *[9601 or 9631] [PPCSS] [all] [schedule]*** all command. (This process takes 3.5 minutes per RC.)

   NOTE:
   Do not issue the **enable wt-upgrade *all*** command if your DWBS has both 9601 WTs and 9630 Series WTs and if it has multiple RCs. Instead, issue the appropriate **enable wt-upgrade *PPCSS*** command for each RC individually.

10. Enter the **status wt-upgrade** command. The firmware version should be the same as the one that is shown on the Firmware Versions form.
11. Enter the **list configuration radio-controller all** command. The data collected in Step 4 should have changed to the new RC circuit pack version and to the WFB version that is shown on the Firmware Versions form (if the versions are different).

WT Firmware Download and Connection

The firmware for the 9601 WT or 9630 Series WT is updated via the download cable connected to a TN789 RC circuit pack that is administered as a download server. For the 9601, a 9600 baud RS232 connection is used; for the 9630 Series WT, a 38400 baud RS232 connection is used. The download cable must be within 50 feet of the RC circuit pack. For longer distances, range extension devices are required.

Determining if a Firmware Download is Required

The following procedure is required for all new, existing, or replacement WTs.

1. From the DEFINITY ECS MT, enter the **status wt-upgrade** command (for firmware that is stored in the RC).
2. Record the firmware version for the WT (if present).
3. For the 9601 WT:
   a. Ensure that the WT is powered up. Then determine the WT firmware version by pressing Menu.
   b. Press Next.
   c. Press the **Info** soft key (middle up arrow)
   d. Press Prev.

   For the 9630 Series WT:
   a. Press Menu.
   b. Press Next four times.
   c. Press the **More** soft key (first up arrow).
   d. Press Next .
4. Compare the firmware version reported in the WT with the firmware version stored in the RC. If the WT firmware version in the RC is less than or the same as the firmware version in the WT, the procedure is completed. If the WT firmware version in the RC is greater than the firmware version in the WT, a firmware download is required; therefore, proceed to the next section.

NOTE:
Enter the **list configuration wt** command to obtain the firmware version for all the pocket phones in the system. Refer to the value in the column headed by *Version* to obtain the appropriate firmware version. For the 9601 WT, the firmware version is 7.0.0 or later; for the 9630 Series WT, the firmware version is 7.0.0 or earlier. **The corresponding value in the column headed by *Name* may or may not be correct**.

Initial Operations

Complete the following initial operations.

1. Ensure that the firmware file is transferred from the INADS center to the DEFINITY MSS or to the appropriate RCs. For the DWBS firmware package download, contact the INADS center at (800) 248-1111.
2. Determine if the Radio Controller has the current version of the WT firmware and if it is enabled as a download server by entering the **status wt-upgrade** command.
3. Compare the firmware version on either the mass storage system (MSS), which is obtained via the **list configuration firmware** command, with the output of the **status wt-upgrade** command.
4. If the firmware is newer on the MSS, or if the enabled server is set to "No," enter the **enable wt-upgrade type *[9601 or 9631] [PPCSS] [all]*** command. This command takes 3.5 minutes per RC. The RC is taken out of service while the file is being transferred.

   NOTE:
   Do not issue the **enable wt-upgrade *all*** command if your DWBS has both 9601 WTs and 9630 Series WTs and if it has multiple RCs. Instead, issue the appropriate **enable wt-upgrade *PPCSS*** command for each RC individually.

Establishing Connections

At the wall field, connect the following leads from the RC cable to a 103 connector block.

Table 8-1. RC Cable Connections

Wall Field RC Cable		103 Connector Block Punching	
V-O	47	W-BL	1
O-V	22	BL-W	2
V-G	48	W-O	3
G-V	23	O-W	4
V-BR	49	W-G	5
BR-V	24	G-W	6

Thereafter, insert a D8W (four-pair mounting cord) from the 103 connector block to the WT download cable. Finally, for the 9601, plug the 902A Download Cable into the WT side jack. For the 9630 Series WT, plug the RC-To-WT Download Cable into the bottom of the handset. Refer to the following figures.

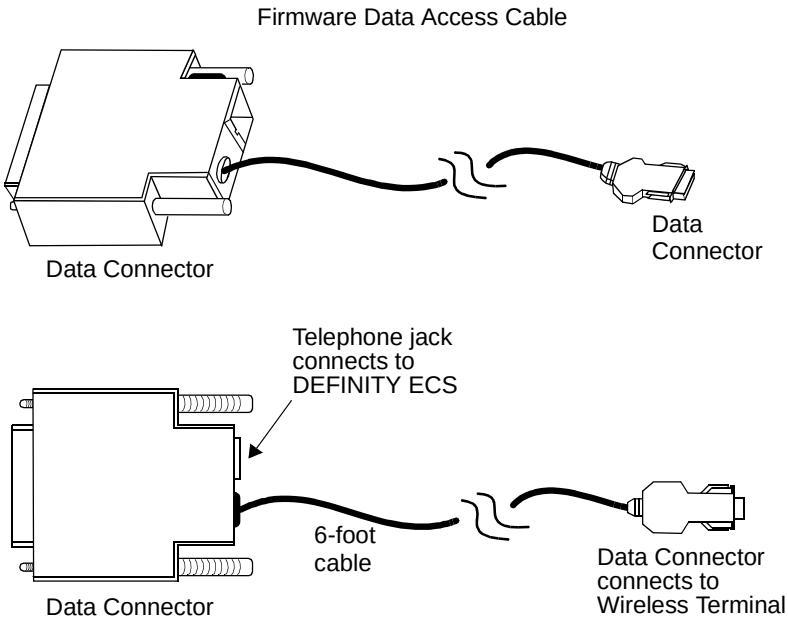


Figure 8-7. Firmware Data Access 902A Download Cable (Comcode 107583965)

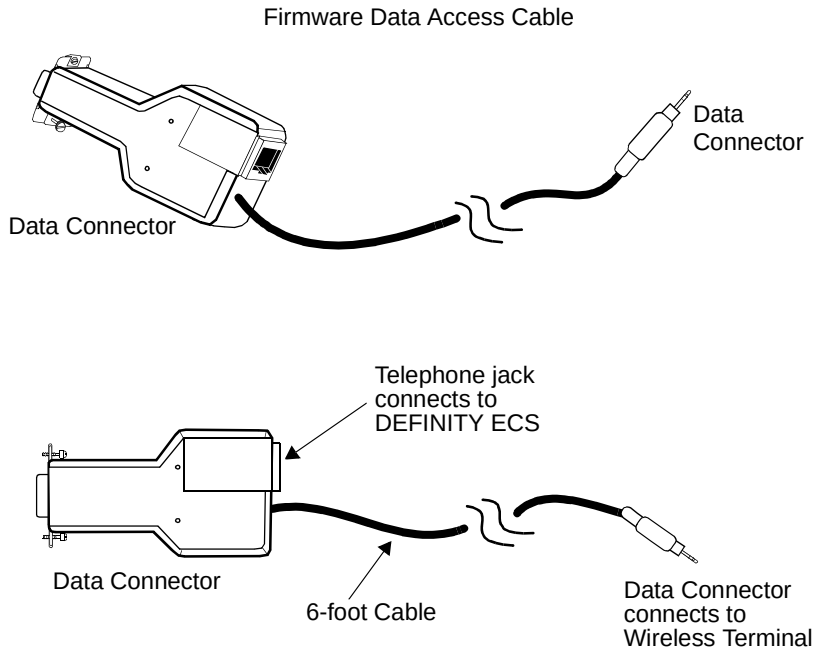


Figure 8-8. Firmware Data Access RC-To-WT Download Cable (Comcode 107583965)

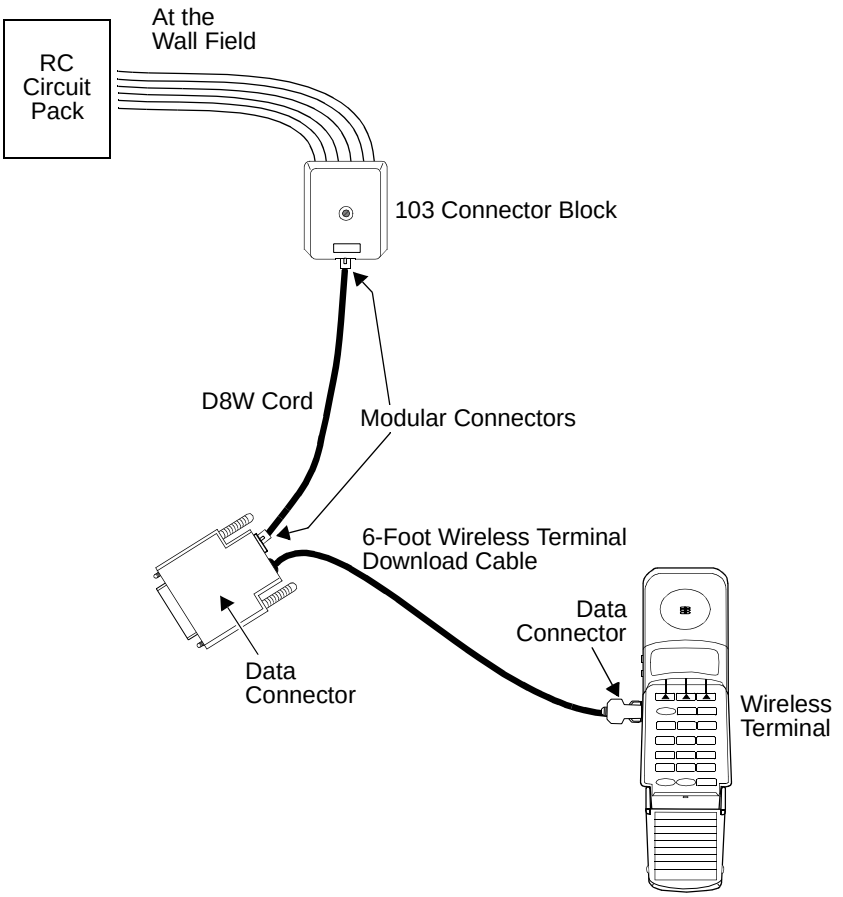


Figure 8-9. Connections For WT Firmware Download (9601 WT)

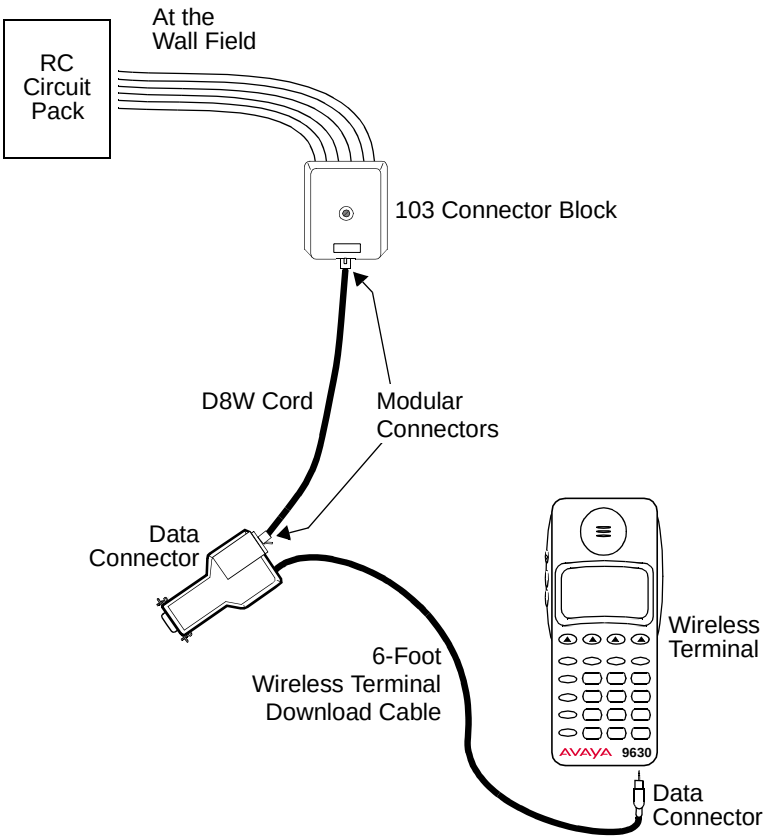


Figure 8-10. Connections For WT Firmware Download (9630 Series WT)

NOTE:
Refer to Table 8-1, “RC Cable Connections,” for details on RC pin connections with the correct download cable.

Downloading WT Firmware Via Key Presses

To perform a WT firmware download via key presses, activate the appropriate keys according to the following directions.

For a 9601 WT, do the following:

1. Insert the download cable from the RC into the side of the WT.
2. Press Menu .
3. Press Next .
4. Press the **Info** soft key.
5. Press Prev .
6. Press the center soft key (not labeled) twice.
7. Press Next .
8. Press Next again.
9. Press the **FW** soft key.
10. Press the **FromRC** soft key.
11. For “Erase Flash,” select **Yes**. Once you do this, “Loading.....” appears on the screen. As the load progresses, a series of stars (****) builds across the screen. When the loading is completed, the WT beeps and resets.
12. Remove the cable.

For a 9630 Series WT, do the following:

1. Insert the download cable from the RC into the bottom of the WT.
2. Press Menu .
3. Press Next four times.
4. Press the **More** soft key twice.
5. Press the **FW** soft key twice.
6. Press the **From RC** soft key. Once you do this, “Loading.....” appears on the screen. As the load progresses, a series of stars (****) builds across the screen. When the loading is completed, the WT beeps and resets.

   NOTE:
   If the firmware version on the RC is older than the firmware on the WT, the following question appears: “RC FW Older Than Load Old FW?” Press the accompanying **Yes** or **No** soft key, as appropriate.

7. Remove the cable.

At this point, the WT should display icons and is ready for use.

NOTE:
DO NOT USE THE disable wt-upgrade COMMAND.

WT Firmware Download Error Codes

The following table provides a list of error codes related to WT firmware download for the 9601 WT and 9630 Series WT. A low-severity error code indicates that the WT will automatically restart the firmware download process after a short delay. A high-severity error code terminates the firmware download process; in such a case, the user may have to intervene to restart the firmware download process.

NOTE:
All errors starting with “89” originate from the RC. All other errors originate from either the 9601 WT or 9630 Series WT.

Table 8-2. WT Download Error Codes

Error Code	Severity	Description / Recommendation
0x01	Low	Checksum in the received message does not match the calculated checksum of the message. For the 9601 WT, restart the download process. For the 9630 Series WT, the download automatically restarts; therefore, no user intervention is required.
0x02	Low	WT received an unknown message from the RC. For the 9601 WT, restart the download process. For the 9630 Series WT, the download automatically restarts; therefore, no user intervention is required.
0x8b	Low	WT time-out waiting for the protocol message from the RC. This error code is not supported for the 9601 WT. For the 9630 Series WT, the download automatically restarts; therefore, no user intervention is required.
0x81	Low	Illegal boot code state in the download process. For the 9601 WT, restart the download process. For the 9630 Series WT, the download automatically restarts; therefore, no user intervention is required.
0x82	Low	WT time-out waiting for the program data from the RC. For the 9601 WT, restart the download process. For the 9630 Series WT, the download automatically restarts; therefore, no user intervention is required.
0x83	High	Download cable is not connected. Connect the download cable between the RC and the WT, and restart the download process. If the cable is connected and the error continues to occur, use another download cable.

Table 8-2. WT Download Error Codes *(continued)*

Error Code	Severity	Description / Recommendation
0x84	High	Error while programming flash device. Restart the download process. If the error continues to occur, try a fully charged battery.
0x85XX	High	Flash memory erase error; reason XX. Restart the download process. If the error continues to occur, try a fully charged battery.
0x86	Low	WT time-out waiting for RC “info” message. For the 9601 WT, restart the download process. For the 9630 Series WT, the download automatically restarts; therefore, no user intervention is required.
0x87	High	RC wants to communicate at a bad baud rate. Restart the download process.
0x88	High	RC wants to send a file in an unsupported format. Restart the download process.
0x891	High	The connected RC circuit pack is not enabled or assigned as a server and is therefore disabled from allowing WT upgrades. Issue the **display system-parameters features** command, and check page 2 of the Feature-Related System Parameters form for the RC circuit pack. If the circuit pack is not listed as a download server, issue the **change system feature** command and add it to the list. Then issue the **enable wt-upgrade [*PPCSS*]** command. See page 8-8 for details.
0x892	High	RC is busy receiving a WT package from the MSS. Wait for the download from the MSS to complete. This should take about five minutes.

Table 8-2. WT Download Error Codes *(continued)*

Error Code	Severity	Description / Recommendation
0x893	High	The RC flash does not contain a WT file to use for an upgrade. Issue the **display system-parameters features** command, and check page 2 of the Feature-Related System Parameters form for the RC circuit pack. If the circuit pack is not listed as a download server, issue the **change system feature** command and add it to the list. Then issue the **enable wt-upgrade [*PPCSS*]** command. See page 8-8 for details.
0x894	High	The RC flash contains firmware for a different model WT. Download the correct firmware package. Thereafter, issue the **display system-parameters features** command, and check page 2 of the Feature-Related System Parameters form for the RC circuit pack. If the circuit pack is not listed as a download server, issue the **change system feature** command and add it to the list. Then issue the **enable wt-upgrade [*PPCSS*]** command. See page 8-8 for details.
0x895	High	The RC flash does not recognize the type of WT that is connected. The RC downloads only 9601 WTs and 9630 Series WTs.
0x897	High	RC was requested to download a 9601 WT; however, the RC has only the 9630 Series WT firmware download package to send. Download the 9601 WT package to the RC.
0x898	High	RC was requested to download a 9630 Series WT; however, the RC has only the 9601 WT firmware download package to send. Download the 9630 Series WT package to the RC.

NOTE:
The 9630 Series WT boot code firmware provides the automatic restart of the download process with low-severity errors. The download process is attempted three times if the problem continues to occur. Thereafter, the error is declared as a high-severity error, and user intervention is required.

Error Logs

If the firmware upgrade operation fails, an error event for 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:

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

WT 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 a firmware upgrade.

Table 8-3. Firmware Upgrade Error Codes

Error Code	Test Result	Description / Recommendation
2000	ABORT	Timer expires while waiting for acknowledgment from the RC circuit pack. 1. Retry the command for a maximum of five times. 2. If the upgrade operation remains aborted, escalate the problem.
2100	ABORT	System resources required for this test are not available. 1. Retry the command for a maximum of five times. 2. If the upgrade operation remains aborted, escalate the problem.
2710	ABORT	The MSS of system does not contain the firmware codes for this firmware upgrade operation. 1. Issue the **list configuration firmware** 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 the 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 the 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|PPCSSw|all override*** command. 2. If the upgrade operation remains aborted, escalate the problem.

Table 8-3. Firmware Upgrade Error Codes *(continued)*

Error Code	Test Result	Description / Recommendation
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.
2715	ABORT	Internal system software error: cannot open the firmware file at the 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 RC 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.

Table 8-3. Firmware Upgrade Error Codes *(continued)*

Error Code	Test Result	Description / Recommendation
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.
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 the “CANCEL” key at the MT to abort the current firmware upgrade operation.
2725	ABORT	The checksums of the firmware file at the MSS and the firmware code at the 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 8-3. 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 for a maximum of five times. 2. If the test continues to abort, escalate the problem.
	PASS	The targeted hardware has been reprogrammed 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, (b) the system is booting up, or (c) the RC has not been administered via the **add radio-controller *PPCSS*** command. 1. Verify that the *Radio Transmission* field in the Wireless-Related System-Parameters form is set to **y**. (See Chapter 1.) 2. Verify that the circuit pack is physically in the system. 3. Verify that the system is not in a stage of booting up. 4. Issue the **display radio-controller *PPCSS*** command and verify that the RC has been administered. 5. Retry the command at one-minute intervals for a maximum of five times. 6. 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 defective components on the RC circuit pack, a minor on-board alarm is raised, and the alarm is reported to the Avaya 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.

Firmware Download Commands

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

NOTE:
The ***schedule*** option, which is available for some of the commands, is valid only when the system printer is connected and administered. See your system administrator.

Do not issue the **enable wt-upgrade *all*** command if your DWBS has both 9601 WTs and 9630 Series WTs and if it has multiple RCs. Instead, issue the appropriate **enable wt-upgrade *PPCSS*** command for each RC individually.

Table 8-4. Firmware Download Commands

Command	Description
download firmware [***tape***]	This command transfers a file containing RC, WFB, or WT firmware from the INADS center to the MSS of the customer's switch using the XMODEM protocol.
upgrade firmware radio-controller [***PPCSS***] [***all***] [***override***] [***schedule***] [***print***]	This command upgrades the firmware of a TN789 RC circuit pack either at the port board slot (***PPCSS***) or for all the TN789 RC circuit packs within the system. The command transfers the firmware file from the MSS to the target RC circuit pack(s).
upgrade firmware wfb [***PPCSSw***] [***all***] [***override***] [***schedule***] [***print***]	This command upgrades the firmware of a WFB either at the port board slot (***PPCSSw***) or for all of the WFBs within the system. The command transfers the firmware file from the MSS to the target WFB(s).
enable wt-upgrade type *[9601 or 9631]* [***PPCSS***] [***all***] [***tape (G3r)***] [***schedule***] [***print***]	This command transfers the WT firmware file from the MSS to the designated 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 WT upgrade operation.
disable wt-upgrade [***PPCSS***] [***all***] [***schedule***] [***print***]	This command deactivates the communications port on the TN789 RC circuit pack previously enabled for a WT download. **NOTE**: This command should not be used. RCs should be left enabled for future handset upgrades.
status wt-upgrade [***PPCSS***] [***all***] [***schedule***] [***print***]	This command provides the status of the designated TN789 RC circuit pack for a WT firmware upgrade. The status information includes the location of the circuit pack, the version of the WT firmware file in the specified circuit pack, the status of the cable to the WT, any pocket phones connected to the RC server, and the status of the upgrade operation.
list configuration wt-stations [***starting extension***] [***count***] [***schedule***] [***print***]	This command provides the WT's hardware vintage and firmware version, along with an indication of the last time access rights were invoked.

Table 8-4. Firmware Download Commands *(continued)*

Command	Description
list configuration radio-controller [***PPCSS***] [***all***] [***schedule***] [***print***]	This command provides details concerning the hardware vintage and firmware version of either the designated RC or all the RCs and their associated WFBs.
list configuration firmware-version	This command provides the firmware versions contained in the MSS.
status card-mem	This command gives the status of the memory card on G3i systems.

Glossary

A

access rights
Air interface procedure that assigns a Temporary Portable User Identifier (TPUI) and its extension number to the WT. The WT 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 WT 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 WT whenever the WT repreatedly tries to access the system and fails to do so due to out-of-range conditions. This mode allows the WT to conserve battery power.

DEFINITY ECS Management Terminal
Data terminal used for the administration and maintenance of the DEFINITY ECS.

E

ECS. See **Enterprise Communications Server.**

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.

Enterprise Communications Server (ECS)
Private Branch Exchange (PBX) developed by Lucent Technologies.

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 Communications Commission.**

FDMA. See **Frequency Division Multiple Access.**

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

firmware version
Numbering scheme for identifying the software residing on the DWBS component (for example, circuit pack).

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 WT 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

INADS. See **Initialization and Administration System.**

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

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

International Portable User Identity
Number sent by the fixed part to a WT during the access rights procedure. Also, this number is sent by the WT 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 WT (for example, Silent Mode).

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

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

M

Mass Storage System (MSS)
Storage device for system data. For G3i systems, flash cards are used; for G3r systems, tapes and/or disks are used.

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

MSS. See **Mass Storage System**

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 WTs).

post-origination dialing
Dialing that occurs after a 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 WT 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 with labels that appear on an associated display; 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 WT 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 (1910-1930 MHz) and to coordinate the deployment of unlicensed devices and systems in that spectrum.

W

WFB. See **Wireless Fixed Base.**

Wireless Fixed Base (WFB)
Component that houses the fixed radio hardware. It provides the radio functions to transmit digitally to the WTs 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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