No-Test Trunk Unit - NTTU
OAM&P and Differences for ATU-SN107

Issue 1, Mar 2003
Copyright © 2002 Lucent Technologies. All Rights Reserved.

The copyright and trade secret laws of the United States and other countries protect this electronic information product. The complete information product may not be reproduced, distributed, or altered in any fashion. Selected sections may be copied or printed with the utilities provided by the viewer software as set forth in the contract between the copyright owner and the licensee to facilitate use by the licensee, but further distribution of the data is prohibited.

For permission to reproduce or distribute, please contact the Product Development Manager:
1-888-LUCENT8 (1-888-582-3688) (from inside the continental United States)
1-317-322-6847 (from outside the continental United States).

Notice
Every effort was made to ensure that the information in this information product was complete and accurate at the time of publication. However, information is subject to change. This information product describes certain hardware, software, features, and capabilities of Lucent Technologies products. This information product is for information purposes; therefore, caution is advised that this information product may differ from any configuration currently installed. This 5ESS® switch document may contain references to the 5ESS® switch, the 5ESS®-2000 switch, and the 5ESS® AnyMedia® Switch. The official name of the product has been changed back to the 5ESS® switch. The documentation will not be totally reissued to change these references. Instead, the changes will be made over time, as technical changes to the document are required. In the interim, assume that any reference to the 5ESS®-2000 switch or the 5ESS® AnyMedia® Switch is also applicable to the 5ESS® switch. It should be noted that this name change may not have been carried forward into software-influenced items such as input and output messages, master control center screens, and recent change/verify screens.

Mandatory Customer Information

Interference Information: Part 15 of FCC Rules - Refer to the 5ESS® Switch Product Specification information product.

Trademarks
5ESS is a registered trademark of Lucent Technologies in the United States and other countries.
AnyMedia is a registered trademark of Lucent Technologies in the United States and other countries.
ANSI is a registered trademark of American National Standards Institute, Inc.
FLUKE is a registered trademark of Fluke Corporation.
KEYSTONE is a registered trademark of Laser Magnetic Storage International Company.
OneLink Manager is a trademark of Lucent Technologies in the United States and other countries.
UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company Limited.
Limited Warranty
Warranty information applicable to the 5ESS® switch may be obtained from the Lucent Technologies Account Management organization. Customer-modified hardware and/or software is not covered by this warranty.

Ordering Information
This information product is distributed by the Lucent Learning Organization (formerly, Lucent Technologies Customer Information Center) in Indianapolis, Indiana. The order number for this information product is 235-105-220. To order, call: 1-888-LUCENT8 (1-888-582-3688) or fax to 1-800-566-9568 (from inside the continental United States) 1-317-322-6847 or fax to 1-317-322-6699 (from outside the continental United States).

Support Information
Information Product Support: To report errors or ask non-technical questions about this or other information products produced by Lucent Technologies, contact the Lucent Technologies Learning Organization by using one of the following methods:
Use the comment form at http://www.lucent-info.com/comments/
Send e-mail to ctiphotline@lucent.com
Please include with your comments the title, ordering number, issue number, and issue date of the information product, your complete mailing address, and your telephone number.
Technical Support Telephone Numbers: For technical assistance, call Technical Support Services (TSS) at:
1-866-LUCENT8 (1-866-582-3688) (from inside the continental United States)
1-630-224-4672 (from outside the continental United States).
Technical Support Services is staffed 24 hours a day, 7 days a week.

Acknowledgment
Developed by the Lucent Technologies Learning Organization.
# Table of Contents

- Feature Description ........................................................................................................... 2
- Synopsis ............................................................................................................................... 2
- Definition ............................................................................................................................ 2
- Documentation .................................................................................................................... 2
- Detailed ............................................................................................................................... 3

## Hardware
- Hardware Documentation and Drawings ............................................................................. 4
- NTTU Cabinet ..................................................................................................................... 4
- NTTU Shelf ......................................................................................................................... 5
- NTTU Shelf Equippage ....................................................................................................... 6
- CPU-SC-T1 (Central Processing Unit, Signaling Converter and T1) ................................... 7
- CPU-SC-T1: ALARMS ........................................................................................................ 8
- AI-TDB-107 ....................................................................................................................... 9
- AI-TDB-107: OK ................................................................................................................ 10
- AI-TDB-107: NTT TYPE .................................................................................................. 10
- AI-TDB-107: TRUNK STATUS ....................................................................................... 11

## Cabling
- Documentation and Drawings ......................................................................................... 13
- NTTU Cabling ................................................................................................................... 13
- NTTU Shelf: Backplane ..................................................................................................... 14
- Power ................................................................................................................................... 15
- T1 ......................................................................................................................................... 15
- Analog Connector Block (ACB) .......................................................................................... 16
- Analog Connector Block: LTOS Interface ........................................................................... 17
- Analog Connector Block: MTBs ........................................................................................ 18
- Alarm ................................................................................................................................... 19

## Provisioning
- Reference Documents ........................................................................................................ 21
- Provisioning Requirements ............................................................................................... 21
- DLTU – Pack Assignment ................................................................................................. 22
- DNUS – Virtual Tributary Assignment .............................................................................. 23
- DLTU/DNUS – Signaling Converter Control Trunk - Trunk Group .................................... 24
- DLTU – Signaling Converter Control Trunk - Trunk Member ............................................. 25
- DNUS – Signaling Converter Control Trunk - Trunk Member ............................................. 26
- DLTU/DNUS Incoming Test Trunk - Trunk Group .............................................................. 29
- Incoming Test Trunk - Trunk Member ................................................................................ 30
- DLTU/DNUS Outgoing Test Trunk - Trunk Group ............................................................... 32
- Outgoing Test Trunk - Trunk Member ............................................................................... 33
- Test Trunk DLTU/DNUS Assignment Table .................................................................... 35
- OAU Alarm ........................................................................................................................ 35

## Maintenance
- MCC Page (NTTU Alarm) .................................................................................................. 36
- MCC Page (MTBs) ............................................................................................................. 37

## Summary
- Lesson Summary ................................................................................................................ 39

## Addendums
- DS1 Alarm Conditions ....................................................................................................... 41
- Trunk Pack Failure ............................................................................................................ 45
- MTB Assignments .............................................................................................................. 48
- Alarm Strapping (OAU) ..................................................................................................... 49
Feature Description

Synopsis

This document contains the following:

- Feature Description
- Hardware, Cabling and Provisioning

For feature:

Semi-Integrated No-Test Trunk 99-5E-7303

Definition

The Semi-Integrated No-Test Trunk feature introduced the No Test Trunk Unit (NTTU) in the 5ESS® Switch. For this feature the NTTU is equipped and provisioned to replace the functions performed by the discontinued SN107-LTD Test Trunk Ckt. which was equipped in the analog Trunk Unit.

Availability

5E15 Software Release

Documentation

The following Lucent Technologies documentation is available.

<table>
<thead>
<tr>
<th>Doc. /Drwg. Number</th>
<th>Document Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>235-080-100</td>
<td>Translation Guide - TG5</td>
</tr>
<tr>
<td>235-118-256</td>
<td>Recent Change Reference 5E15</td>
</tr>
<tr>
<td>ED5D500-21</td>
<td>Intercabinet Cabling for 5ESS Switch</td>
</tr>
<tr>
<td>ED5D896-30</td>
<td>5ESS Switch Specification - NTTU</td>
</tr>
</tbody>
</table>

Continued on next page
Feature Description (cont.)

Detailed

The Analog Trunk Unit (ATU) SN107 Circuit (Fig. 1) provided a Line Testing Operation System (LTOS*) Analog Test Circuit interface used to perform 2-wire line testing. The ATU and its packs are no longer available or supported by Lucent Technologies.

The NTTU installed and provisioned with the AI-TDB-107 pack (Fig. 2) provides transparency to the user. It uses the existing LTOS interface (T, R, S, Grd & MTBs) and a T1 connection to the switch.

* LTOS Examples: Local Test Desk (LTD), Trunk Test Set (TTS), Mechanized Loop Testing (MLT)
Hardware

Hardware Documentation and Drawings

The following Drawings and Documents are used for this feature:

- ED5D500-21 – Intercabinet Cabling for 5ESS Switch
- ED5D896-30 - 5ESS Switch Specification - NTTU

NTTU Cabinet

The NTTU is housed in a 5ESS Switch Miscellaneous (M) Cabinet (Fig. 3).

Fig. 3

Continued on next page
Hardware (cont.)

NTTU Shelf

The NTTU Shelf (Fig. 4), which is also referred to as the ATU-RCK, is 18.34" long, 10.5" tall and 15.75" deep. The ATU-RCK houses the circuit boards and provides termination points for the Power, T1, MTB and Alarm cables on its backplane.

Fig. 4
NTTU Shelf Equippage

The NTTU is equipped with (Fig. 5):

- 1 NTTU Subrack assembly (ATU-RCK).
- 1 Central Processing Unit (CPU-SC-T1).
- A maximum of 6 Analog Interface Test Boards (AI-TBD-107).
Hardware (cont.)

CPU-SC-T1 (Central Processing Unit, Signaling Converter and T1)

The CPU-SC-T1 board is the NTTU controller card equipped in the first slot. It performs analog-to-digital and digital-to-analog conversions for the Test Trunk interface and the PCM T1 channel framing and PCM T1 channel de-framing for the T1 interface. It also performs power conversion and supplies power to all equipped boards.

<table>
<thead>
<tr>
<th>Faceplate Elements</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit Pack name/version</td>
<td>CPU-SC-Tx:X X= version number (ie: 2.2 – version 2: Backward compatible with version 2)</td>
</tr>
<tr>
<td>Power On</td>
<td>Green LED.</td>
</tr>
<tr>
<td>Serial number Label</td>
<td>This is a barcode label as per Lucent KS-23490 Specification Issue 9 on Barcode, Serial and Comcode.</td>
</tr>
<tr>
<td>Manufacturer’s Name and Logo</td>
<td>Cibertec Int.</td>
</tr>
<tr>
<td>Extraction handle</td>
<td>Aluminum extruded handle.</td>
</tr>
<tr>
<td>Country of origin information</td>
<td>Made in Costa Rica.</td>
</tr>
<tr>
<td>Comcode label</td>
<td>This is a barcode label as per Lucent KS-23490 Specification Issue 9 on Barcode, Serial and Comcode. Assigned comcode is 408435741.</td>
</tr>
<tr>
<td>RS-232 port</td>
<td>This is a serial communication port. Use is reserved for special maintenance purposes.</td>
</tr>
<tr>
<td>Alarm LEDs</td>
<td>Six LEDs are provided to indicate Alarm/Failure conditions.</td>
</tr>
<tr>
<td>Circuit pack description</td>
<td>T1 Trunk</td>
</tr>
<tr>
<td>Screws</td>
<td>Fixing screws at top and bottom of the faceplate. They firmly attach the circuit pack to the subrack assembly.</td>
</tr>
</tbody>
</table>

Continued on next page
Hardware (cont)

### CPU-SC-T1: ALARMS

A group of 6 LEDs are used to indicate alarm/failure conditions in the Signaling Converter (SC), as shown in the table below.

<table>
<thead>
<tr>
<th>Alarm</th>
<th>Description</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>YEL</td>
<td><strong>Yellow Alarm</strong>: This is equivalent to the Remote Alarm Indication (RAI). An alarm indication is being received from the far end of the DS1 trunk (from the 5ESS Switch).</td>
<td><img src="image" alt="ALARMS" /></td>
</tr>
<tr>
<td>RED</td>
<td><strong>Red Alarm</strong>: This is equivalent to the Out Of Frame (OOF) condition. The NTTU signaling converter is receiving signal on the DS1 port, but is unable to find frame information in the incoming digital stream.</td>
<td><img src="image" alt="ALARMS" /></td>
</tr>
<tr>
<td>LOS</td>
<td><strong>Loss of Signal</strong>: This is to indicate the loss of incoming signal on the DS1 port of the NTTU signaling converter.</td>
<td><img src="image" alt="ALARMS" /></td>
</tr>
<tr>
<td>AIS</td>
<td><strong>Alarm Indication Signal</strong>: This is an all-ones alarm condition being received on the DS1 port from the far end.</td>
<td><img src="image" alt="ALARMS" /></td>
</tr>
<tr>
<td>SA</td>
<td><strong>Service Alarm</strong>: The NTTU requires service. This LED indicator is also linked to a dry contact relay that can be connected to a scanpoint for centralized alarm systems. Activation of NTTU alarm relay will bring in a 5ESS Switch Major Alarm indication located on MCC Page 105 (Alarm cabling and assignment is described later in this lesson).</td>
<td><img src="image" alt="ALARMS" /></td>
</tr>
<tr>
<td>IMA</td>
<td><strong>Immediate Maintenance Alarm</strong>: The NTTU signaling converter requires immediate maintenance action.</td>
<td><img src="image" alt="ALARMS" /></td>
</tr>
</tbody>
</table>

Continued on next page
Hardware (cont.)

AI-TDB-107

The Analog Interface Test Board 107 (AI-TDB-107) provides the No-Test Trunk (NTT) interface for two(2) test trunks. This board is the functional replacement for the SN-107 circuit pack.

<table>
<thead>
<tr>
<th>Faceplate Elements</th>
<th>Description</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuit Pack name/version</td>
<td>AI-TDB-107 X:X</td>
<td></td>
</tr>
<tr>
<td></td>
<td>X= version number (ie: 2.2 – version 2: Backward compatible with version 2)</td>
<td></td>
</tr>
<tr>
<td>OK Status</td>
<td>Green LED.</td>
<td></td>
</tr>
<tr>
<td>NTT Type Selection Switches</td>
<td>Two switches are provided to select the operation mode of each analog trunk. (Described on the next page.)</td>
<td></td>
</tr>
<tr>
<td>Serial number Label</td>
<td>This is a barcode label as per Lucent KS-23490 Specification Issue 9 on Barcode, Serial and Comcode.</td>
<td></td>
</tr>
<tr>
<td>Manufacturer’s Name and Logo</td>
<td>Cibertec Int.</td>
<td></td>
</tr>
<tr>
<td>Extraction handle</td>
<td>Aluminum extruded handle.</td>
<td></td>
</tr>
<tr>
<td>Country of origin information</td>
<td>Made in Costa Rica.</td>
<td></td>
</tr>
<tr>
<td>Comcode label</td>
<td>This is a barcode label as per Lucent KS-23490 Specification Issue 9 on Barcode, Serial and Comcode. Assigned comcode is 408435758.</td>
<td></td>
</tr>
<tr>
<td>Trunk Status LEDs</td>
<td>Two LEDs are provided to indicate the channel status.</td>
<td></td>
</tr>
<tr>
<td>Circuit pack description</td>
<td>“NTT Interface”.</td>
<td></td>
</tr>
<tr>
<td>Screws</td>
<td>Fixing screws at top and bottom of the faceplate. They firmly attach the circuit pack to the subrack assembly.</td>
<td></td>
</tr>
</tbody>
</table>

Continued on next page
Hardware (cont)

**AI-TDB-107: OK**

When power is supplied from the CPU-SC-T1 board and there is no failure the OK LED is green. Whenever there is a failure or alarm condition in any of the analog trunk channels in the board, the OK LED will go off to signal the alarm/failure condition.

![OK LED](image)

**AI-TDB-107: NTT TYPE**

The NTT Type has a toggle switch for provisioned Analog Test Ckt. Test Trunk (1 or 2). The toggle switch is set to INCO (Incoming) or OUTG (Outgoing) per the value of Field ‘TRK DIR’ on the 5.5 RC/V View for the specific Test Trunk (This is described in the Provisioning topic of this lesson).

<table>
<thead>
<tr>
<th>Mode</th>
<th>Description</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>INCO (toggle switch up)</td>
<td><strong>Incoming:</strong> Test calls are initiated at the LTOS side. MF Signaling is sent to the 5ESS to address the called subscriber line to be tested.</td>
<td>![Image]</td>
</tr>
<tr>
<td>OUTG (toggle switch down)</td>
<td><strong>Outgoing:</strong> Test calls are terminated at the LTOS side. The test is initiated using MF Signaling at the subscriber side.</td>
<td>![Image]</td>
</tr>
</tbody>
</table>

*Continued on next page*
Hardware (cont)

**AI-TDB-107: TRUNK STATUS**

Two Trunk Status LEDs are provided to indicate the channel status.

<table>
<thead>
<tr>
<th>State</th>
<th>Description</th>
<th>Picture</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lit</td>
<td>Indicates an Analog trunk is seized.</td>
<td></td>
</tr>
<tr>
<td>Blinking</td>
<td>Indicates a blocked condition (test calls cannot be made in the blocking condition). Blinking also occurs during power up.</td>
<td></td>
</tr>
</tbody>
</table>

Addendum 2 contains the following information on the AI-TDB-107:

- *CPU to AI-TDB-107 communications*
- *AI-TDB-107 Status Information used for Self-Diagnostics*
- *AI-TDB-107 Error Conditions and Failure Modes*
- *Quick Troubleshooting Guide*
Cabling

Documentation and Drawings

- ED5D500-21 – Intercabinet Cabling for 5ESS\textsuperscript{®} Switch
- ED5D896-30 - 5ESS Switch Specification - NTTU

NTTU Cabling

The following cables are common:

New Cables:

- Power [-48V & -48V RTN]
  \textit{Location}: NTTU back plane
  \textit{Cabled to}: Assigned Fuse located in cabinet Fuse Panel (MFFU/FFU)

- Alarm [NC, CM, NO]
  \textit{Location}: NTTU back plane
  \textit{Cabled to}: Distributing Frame and cross-connected to assigned OAU Scan Point

- T1 Span [T, R, T1, R1]
  \textit{Location}: NTTU back plane
  \textit{Cabled to}: DSX bay and patched to assigned T1(DS1) (ex: DLTU Circuit)

The following are cabled on per Analog Test Circuit basis:

- LTOS Analog Text Circuit interface (ex: LTD) [T, R, Slv & Grd]
  \textit{Location}: NTTU back plane
  \textit{Cabled to}: Distributing Frame and cross-connected to existing LTOS Analog Test Ckt.

- Metallic Test Bus [MTB\textsubscript{0}T, MTB\textsubscript{0}R, MTB\textsubscript{1}T, MTB\textsubscript{1}R for Trk 1 or 2]
  \textit{Location}: NTTU back plane
  \textit{Cabled to}: Assigned MTBs location (MMSU in LTP cabinet)

Continued on next page
Cabling (cont.)

NTTU Shelf: Backplane

All cables are run and connected on the backplane (Fig. 6) of the NTTU Shelf. The Backplane of the NTTU has 4 main cable termination areas.

<table>
<thead>
<tr>
<th>Loc.</th>
<th>Connection</th>
<th>Cables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Power Connection</td>
<td>-48V &amp; -48V RTN</td>
</tr>
<tr>
<td>2</td>
<td>T1(DS1) Connection Block</td>
<td>T1 Span</td>
</tr>
<tr>
<td>3</td>
<td>Analog Connection Block (ACB)</td>
<td>LTOS Analog Test Ckt. Metalic Test Bus [MTB]</td>
</tr>
<tr>
<td>4</td>
<td>Alarm Connection</td>
<td>Normally Closed (NC), Common (CM), Normally Open (NO)</td>
</tr>
</tbody>
</table>

Fig. 6

Continued on next page
Cabling (cont.)

Power

The power block has two terminals. The following graphic details the two connections.

```
<table>
<thead>
<tr>
<th>POWER</th>
<th>Within Misc. Cab.</th>
</tr>
</thead>
<tbody>
<tr>
<td>-48V</td>
<td>NTTU Backplane</td>
</tr>
<tr>
<td>GND BATT</td>
<td>Assigned Fuse</td>
</tr>
<tr>
<td>-48 RTN</td>
<td>(NFFU/FFU)</td>
</tr>
</tbody>
</table>
```

T1

The following graphic details the CN1 (T1 Interface) connector blocks. The CN2 (T1 Monitoring) connector block has the same layout as the CN1.

```
<table>
<thead>
<tr>
<th>CN1/CN2</th>
<th>CN1 Connections – NTTU Backplane</th>
</tr>
</thead>
<tbody>
<tr>
<td>RX</td>
<td>DSX</td>
</tr>
<tr>
<td></td>
<td>R1</td>
</tr>
<tr>
<td></td>
<td>T1</td>
</tr>
<tr>
<td>TX</td>
<td>R</td>
</tr>
<tr>
<td></td>
<td>T</td>
</tr>
</tbody>
</table>

Patched to DFI Ckt. or Demultiplexed DNUS DS1 (T1)
```

Continued on next page
Cabling (cont.)

**Analog Connector Block (ACB)**

The Analog Connection Block area (NTTU backplane) is divided into columns (Fig. 7). Each column is sectioned in two groups of 4 pins which are the connectors for one Analog Test Circuit. The upper group provides the termination points for LTOS interface and the lower group provides the termination points for the MTBs.

**Fig. 7**

*Continued on next page*
Cabling (cont.)

Analog Connector Block: LTOS Interface

The upper group of the Analog Connector Block corresponds to the LTOS interface termination points for the A (RING), B(TIP), C(SLEEVE) and D(GND). Each AI-TDB pach has two (2) test circuits\(^1\). These are wired from the backplane of the NTTU to the Distributing Frame (DF) and cross connected to existing Analog Test Circuits. The following graphic details these connections.

\(^1\)Test Circuits are provisioned as Trunks (DS0s) on the DS1(T1). This is explained in the Provisioning Section of this lesson.
Cabling (cont.)

Analog Connector Block: MTBs

The lower group of the Analog Connector Block corresponds to the MTB termination points. Each test circuit connects to the assigned MA MTBs (MTB) in SG 0 (MTB0R, MTB0T) and SG 1 (MTB1R, MTB1T) of MMSU. These are wire wrapped connectors and AWG26 cable is used.

Continued on next page
Cabling (cont.)

Alarm

The NTTU provides the termination points (NO-Normally Open, CM-Common & NC-Normally Closed) for an alarm. It is a dry contact relay, that can be wired/cross-connected for any alarm configuration. The following graphic details the connection.

The OAU Scan Point connections (OAU Block) on the Distributing Frame are wired to Signal Distributor Applique Circuits in the OAU unit. It is recommended that the Normally Closed condition be used for the NTTU, this will require strapping on the OAU Block (OAU).
Provisioning

Reference Documents

This lesson and the following Documents are used contain provisioning information for this feature:

- 235-080-100  Translation Guide (TG5)
- 235-118-256  Recent Change Reference 5E15 Software Release

Provisioning Requirements

The provisioning requirements for the NTTU are the following:

- DLTU DFI/DFI2 Pack: RC View 20.4 or
  DNUS Vitual Tributary: RC View 20.24
  Provides the trunk hardware for the Trunk Group and Trunk Members required for the
  NTTU.

- Signaling Converter Control Trunk Group: RC View 5.1
  Signaling Converter Control Trunk Member: RC View 5.5
  This is an outgoing trunk group and trunk member that transmits the command scheme
  that controls the test trunks and MTB pairs.

- Test Trunk - Trunk Groups: RC View 5.1
  Test Trunk - Trunk Members: RC View 5.5
  An incoming and outgoing trunk group is assigned:
  - **Incoming** – Test calls initiated from the LTOS to the subscriber line to be tested
  - **Outgoing** – Test calls originated from subscriber side to LTOS. This will require
    updating Digit Translation to route to the Outgoing Test Trunk – Trunk Group.
  Each member is dedicated to a specific Test Board and MTB pair.

Continued
Provisioning (cont.)

DLTU – Pack Assignment

The following is an example of RC View 20.4 for the DLTU2 FAC 0 (DFI2) Pack assignment for the NTTU:

<table>
<thead>
<tr>
<th>SCREEN 1 OF 3</th>
<th>DIGITAL LINE/TRUNK UNIT PACK EQUIPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>(57302)</td>
<td></td>
</tr>
<tr>
<td>1. SM</td>
<td>3</td>
</tr>
<tr>
<td>2. DLTU</td>
<td>1</td>
</tr>
<tr>
<td>3. DFI</td>
<td>8</td>
</tr>
<tr>
<td>4. FAC IND</td>
<td>1</td>
</tr>
<tr>
<td>5. EQSTAT FAC 0</td>
<td>0</td>
</tr>
<tr>
<td>6. EQSTAT FAC 1</td>
<td>1</td>
</tr>
<tr>
<td>7. INTF UNIT</td>
<td>0</td>
</tr>
<tr>
<td>8. CI</td>
<td>0</td>
</tr>
<tr>
<td>9. PICB</td>
<td>14</td>
</tr>
<tr>
<td>10. DI FAC 0</td>
<td>1</td>
</tr>
<tr>
<td>11. DI FAC 1</td>
<td>_</td>
</tr>
<tr>
<td>12. PIDB FAC 0</td>
<td>2</td>
</tr>
</tbody>
</table>

*1. PIDB FAC 1 13. PIDB FAC 1 14. TYPE FAC 0 15. TYPE FAC 1 16. VRBS FAC 1 17. VRBS FAC 1 18. CLFI FAC 0 19. CLFI FAC 1 20. APPL FAC 0 21. APPL FAC 1 22. PTRN FAC 0 23. PTRN FAC 1 24. CLI 25. CLEI 26. MODE FAC 0 27. MODE FAC 1 28. PM GRP FAC 0 29. PM GRP FAC 1

View 20.4 is populated the same as for any DLTU2 pack. The highlighted Field values for ‘TYPE FAC 0’ and ‘MODE FAC 0’ are populated with the required values. The value for ‘CLFI FAC 0’ identifies the facility on the MCC Display Page and the designation entered is a user option.
Provisioning (cont.)

DNUS – Virtual Tributary Assignment

The following is an example of RC View 20.24 for the DNUS Virtual Tributary assignment for the NTTU:

```
5ESS SWITCH
SCREEN 1 OF 2                         RECENT CHANGE  20.24
(5858) DIGITAL NETWORKING UNIT SONET VIRTUAL TRIBUTARY (SM2000)

*1. SM         19       9. VT PM GROUP         VT1DEF
*2. DNUS       0       10. VT TYPE            ASYNC
*3. DATA GROUP 0       11. VT MODE            RB
*4. STE        2           12. VT SIZE          1.5
*5. STS        1       13. DS1S EQSTAT       0
*6. VT GROUP   6       14. DS1S PM GROUP      DS1SDEF
*7. VT MEMBER  1       15. DS1S FACILITY ID   NTTU 0
8. VT EQSTAT  0      #16. APPLICATION TYPE    TRUNK

5ESS SWITCH
SCREEN 2 OF 2                         RECENT CHANGE  20.24
(5858) DIGITAL NETWORKING UNIT SONET VIRTUAL TRIBUTARY (SM2000)

DS1 SIGNALING
#17. DS1S FRAME ESF
18. DS1S ZCS    N

WIRELESS TRUNKS
19. AFAC ID _____
```

View 20.24 is populated the same as for any DNUS virtual tributary. The highlighted Field values for ‘APPLICATION TYPE’ and ‘DS1S FRAME’ are populated with the required values. The value for ‘DS1S FACILITY ID’ identifies the facility on the MCC Display Page and the designation entered is a user option.
Provisioning (cont.)

DLTU/DNUS – Signaling Converter Control Trunk - Trunk Group

Populate Signaling Converter Control Trunk - Trunk Group (Populated 5.1 View example below):

Perform an ‘insert’ operation for RC/V View 5.1 for Control Channel Trunk Group and populate following ‘fields’:

- TGN – Available TG Number (1 – 4000)
- RMK – Enter up to 16 alphanumeric characters to identify Trunk Group (Not required)
- TRK DIR – Enter ‘OUTGO’ for outgoing
- HUNT TYPE – Enter ‘NONE’
- TRK CLASS – Enter ‘TSTK’
- OUTPLS – Enter ‘MF’
- All other Fields are defaulted

Insert view.

---

Continued
**Provisioning (cont.)**

**DLTU – Signaling Converter Control Trunk - Trunk Member**

Populate Signaling Converter Control Trunk - Trunk Member (Populated 5.5 View example below):

<table>
<thead>
<tr>
<th>TGN</th>
<th>MEMB NBR</th>
<th>QTY</th>
<th>OE</th>
<th>CLCI TRK ID</th>
<th>TRANS CLASS</th>
<th>SUPV</th>
<th>IDLE STATE</th>
<th>IN START DIAL</th>
<th>OUT START DIAL</th>
<th>STOPGO</th>
<th>CGA SPN</th>
</tr>
</thead>
<tbody>
<tr>
<td>86</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
<td>EM2</td>
<td>ON</td>
<td>NONE</td>
<td>IMED</td>
<td>N</td>
<td>_______</td>
</tr>
</tbody>
</table>

Perform an ‘insert’ operation for RC/V View 5.5 for Control Channel Trunk and populate following ‘fields’:

- **TGN** – Enter ‘Control Channel Trunk Group’ number
- **MEMB NBR** – Enter ‘0’ (zero)
- **OE** – OE is a structured field: 2 Fields (See Note 1)
  - 1st Field: Enter Trunk Equipment Number Type (OE.TENTYP) ‘D’ for DLTU DEN
  - 2nd Field: Enter Trunk Equipment Number (OE.ENTRK1) for DEN
  (OE.ENTRK1 layouts are found in the 235-188-25X [X = number that identifies office Software Release])
- **SUPV** – Enter ‘EM2’
- **IDLE STATE** – Enter ‘ON’
- **IN START DIAL** – Enter ‘NONE’
- **OUT START DIAL** – Enter ‘IMED’
- **All other Fields** are defaulted

Insert view.
Provisioning (cont.)

DNUS – Signaling Converter Control Trunk - Trunk Member

Populate Signaling Converter Control Trunk - Trunk Member (Populated 5.5 View example below):

<table>
<thead>
<tr>
<th>SCREEN 1 OF 7 (5204)</th>
<th>5ESS SWITCH</th>
<th>RECENT CHANGE 5.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>TGN</td>
<td>86</td>
<td>HOLD BUSY N</td>
</tr>
<tr>
<td>MEMB NBR</td>
<td>0</td>
<td>SATELLITE N</td>
</tr>
<tr>
<td>QTY</td>
<td>__</td>
<td>TRF SAMPLE N</td>
</tr>
<tr>
<td>OE</td>
<td>N 01900216101</td>
<td>CAMOPTLK TEN</td>
</tr>
<tr>
<td>CLCI TRK ID</td>
<td>0</td>
<td>CAMOPTLK DEN</td>
</tr>
<tr>
<td>TRANS CLASS</td>
<td>EM2</td>
<td>CAMOPTLK NEN</td>
</tr>
<tr>
<td>SUPV</td>
<td>ON</td>
<td>ACTN R</td>
</tr>
<tr>
<td>IDLE STATE</td>
<td>NONE</td>
<td>OTODPN1</td>
</tr>
<tr>
<td>IN START DIAL</td>
<td>IMED</td>
<td>OTODPN2</td>
</tr>
<tr>
<td>OUT START DIAL</td>
<td>N</td>
<td>SLC OTODPN3</td>
</tr>
<tr>
<td>CGA SPN</td>
<td>_________</td>
<td>MAXCALLS __</td>
</tr>
</tbody>
</table>

Perform an ‘insert’ operation for RC/V View 5.5 for Signaling Converter Control Trunk and populate following ‘fields’:

- TGN – Enter ‘Signaling Converter Control Trunk Group’ number
- MEMB NBR – Enter ‘0’ (zero)
- OE – OE is a structured field: 2 Fields (See Note 2)
  1st Field: Enter Trunk Equipment Number Type (OE.TENTYP) ‘N’ for DNUS NEN
  2nd Field: Enter Trunk Equipment Number (OE.ENTRK1) for NEN
  (OE.ENTRK1 layouts are found in the 235-188-25X [X = number that identifies office Software Release])
- SUPV – Enter ‘EM2’
- IDLE STATE – Enter ‘ON’
- IN START DIAL – Enter ‘NONE’
- OUT START DIAL – Enter ‘IMED’
- All other Fields are defaulted

Insert view.

Continued on next page
Provisioning (cont.)

Signaling Converter Control Trunk –Trunk Member (cont.)

➲ Note 1:  DLTU: DEN DCHAN = 01
           DLTU2 - FAC 0: DEN DCHAN = 01
           DLTU2 - FAC 1: DEN DCHAN = 25

( Return )

➲ Note 2:  DNUS: DS0 = 01
           (The connection to the NTTU is a T1[DS1] span. If these assignments are
           made on a DNUS STS1, the STS1 must be demultiplexed (ex: DACS) and
           the assigned T1[DS1] span cabled to the NTTU.)

( Return )

Continued on next page
Provisioning (cont.)

DLTU/DNUS Incoming Test Trunk - Trunk Group

Populate Test Trunk - Trunk Group (Populated 5.1 View example below):

(Verify View 5.1 for existing SN107 Trunk Group and print out Screen 1.)

Perform an 'insert' operation for RC/V View 5.1 for Test Trunk - Trunk Group and populate following ‘fields’:

- TGN – Available TG Number (1 – 4000)
- RMK – Enter up to 16 alphanumeric characters to identify Trunk Group (Not required)
- TRK DIR – Enter ‘INCOM’ (Set Trunk ‘Toggle Switch’ on front of NTT Interface pack to “INCO”)
- HUNT TYPE – Enter ‘NONE’ or ‘FIFO’
- SCR – Enter value used for SN107 Trunk Group assignment
- DAS – Enter value used for SN107 Trunk Group assignment
- TRK CLASS – Enter ‘TSTK’
- INPLS – Enter ‘MF’

Insert View.

Continued
Provisioning (cont.)

Incoming Test Trunk - Trunk Member

Populate Incoming Test Trunk – Trunk Member (Populated 5.5 View example below for DNUS):

<table>
<thead>
<tr>
<th>SCREEN 1 OF 7</th>
<th>5ESS SWITCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. TGN</td>
<td>__</td>
</tr>
<tr>
<td>2. MEMB NBR</td>
<td>__</td>
</tr>
<tr>
<td>9. QTY</td>
<td>__</td>
</tr>
<tr>
<td>12. OE</td>
<td>__</td>
</tr>
<tr>
<td>15. CLCI TRK ID</td>
<td>__</td>
</tr>
<tr>
<td>16. TRANS CLASS</td>
<td>__</td>
</tr>
<tr>
<td>17. SUPV</td>
<td>__</td>
</tr>
<tr>
<td>18. IDLE STATE</td>
<td>__</td>
</tr>
<tr>
<td>19. IN START DIAL</td>
<td>__</td>
</tr>
<tr>
<td>20. OUT START DIAL</td>
<td>__</td>
</tr>
<tr>
<td>21. STOPGO</td>
<td>__</td>
</tr>
<tr>
<td>22. CGA SPN</td>
<td>__</td>
</tr>
<tr>
<td>23. HOLD BUSY</td>
<td>N</td>
</tr>
<tr>
<td>24. SATELLITE</td>
<td>N</td>
</tr>
<tr>
<td>25. TRF SAMPLE</td>
<td>N</td>
</tr>
<tr>
<td>26. CAMOPTLK TEN</td>
<td>N</td>
</tr>
<tr>
<td>27. CAMOPTLK DEN</td>
<td>N</td>
</tr>
<tr>
<td>28. CAMOPTLK NEN</td>
<td>N</td>
</tr>
<tr>
<td>29. ACTN</td>
<td>R</td>
</tr>
<tr>
<td>30. OTODPN1</td>
<td>N</td>
</tr>
<tr>
<td>31. OTODPN2</td>
<td>N</td>
</tr>
<tr>
<td>32. SLC OTODPN3</td>
<td>N</td>
</tr>
<tr>
<td>33. SLC OTODPN4</td>
<td>N</td>
</tr>
<tr>
<td>34. MAXCALLS</td>
<td>N</td>
</tr>
</tbody>
</table>

Perform an ‘insert’ operation for RC/V View 5.5 for Control Channel Trunk and populate following ‘fields’:

- TGN – Enter ‘Test Trunk, Trunk Group’ number
- MEMB NBR – Enter ‘0’ (zero)
- OE – OE is a structured field: 2 Fields
  1st Field: Enter Trunk Equipment Number Type (OE.TENTYP) ‘D’ for DLTU DEN or ‘N’ for DNUS NEN
  2nd Field: Enter Trunk Equipment Number (OE.ENTRK1) for DEN or NEN (OE.ENTRK1 layouts are found in the 235-188-25X [X = number that identifies office Software Release])
- SUPV – Enter ‘RB’
- IDLE STATE – Enter ‘ON’
- IN START DIAL – Enter ‘WINK’
- OUT START DIAL – Enter ‘NONE’

Insert of Test Trunk is continued on next page.

(Notes 3 and 4 are on next page.)

Continued on next page
Provisioning (cont.)

Incoming Test Trunk - Trunk Member (cont.)

Populate Test Trunk – Trunk Member (Populated 5.5 View example below for DNUS):

<table>
<thead>
<tr>
<th>SCREEN 5 OF 7</th>
<th>5ESS SWITCH</th>
<th>RECENT CHANGE 5.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>TRUNK MEMBER</td>
<td>PACKET SWITCHING X75 ONLY UTILITY INDICATORS</td>
<td></td>
</tr>
<tr>
<td>121. TDI BEFORE N 127. IN RPOA BEFORE N 133. TNIC CONFIG __________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>122. TDI AFTER N 128. IN RPOA AFTER N 134. X75 ID __________</td>
<td></td>
<td></td>
</tr>
<tr>
<td>123. TDS BEFORE N 129. OUT RPOA BEFORE N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>124. TDS AFTER N 130. OUT RPOA AFTER N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>125. TARIFF BEFORE N 131. RPOA DEL SEND N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>126. TARIFF AFTER N 132. RPOA DEL RCV N</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

EEC OPTION CALEA DIGITAL TEST TRUNKS
EEC ACTIVE N CALEA STATE _____ 137. MTB0 00100008
MTB0 – Enter MTB 0 equipment number
(MTB0 and MTB1 EN layouts are found in the 235-188-25X [X = number that identifies office Software Release])

MTB 1 – Enter MTB 1 equipment number

All other Fields are defaulted

Insert View.

➲ Note 3: DLTU DFI: DEN DCHAN = 02 – 13
DLTU2 DFI 1: DEN DCHAN = 02 - 13
DLTU2 DFI 2: DEN DCHAN = 26 - 37

➲ Note 4: DNUS: DS0 = 02 - 13
(The connection to the NTTU is a T1[DS1] span. If these assignments are made on a DNUS STS1, the STS1 must be demultiplexed (ex: DACS) and the assigned T1[DS1] span cabled to the NTTU.)

(Refer to Table on page 35 for Analog Interface Test Trunk pack to DCHAN)

Continued on next page
Provisioning (cont.)

DLTU/DNUS Outgoing Test Trunk - Trunk Group

Populate Test Trunk - Trunk Group (Populated 5.1 View example below):

(Verify View 5.1 for existing SN107 Trunk Group and print out Screen 1.)

Perform an ‘insert’ operation for RC/V View 5.1 for Test Trunk - Trunk Group and populate following ‘fields’:

- TGN – Available TG Number (1 – 4000)
- RMK – Enter up to 16 alphanumeric characters to identify Trunk Group (Not required)
- TRK DIR – Enter ‘OUTGO’ (Set Trunk ‘Toggle Switch’ on front of NTT Interface pack to “OUTG”)
- HUNT TYPE – Enter ‘NONE’ or ‘FIFO’
- TRK CLASS – Enter ‘TSTK’
- OUTPLS – Enter ‘MF’

Insert View.

Continued
Provisioning (cont.)

Outgoing Test Trunk - Trunk Member

Populate Test Trunk – Trunk Member (Populated 5.5 View example below for DLTU):

<table>
<thead>
<tr>
<th>SCREEN 1 OF 7</th>
<th>5ESS SWITCH</th>
<th>RECENT CHANGE 5.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>*(204)</td>
<td>TRUNK MEMBER</td>
<td></td>
</tr>
<tr>
<td>1. TGN</td>
<td>62</td>
<td>23. HOLD BUSY N</td>
</tr>
<tr>
<td>2. MEMB NBR</td>
<td>0</td>
<td>24. SATELLITE N</td>
</tr>
<tr>
<td>(*) 9. QTY</td>
<td>__</td>
<td>25. TRF SAMPLE N</td>
</tr>
<tr>
<td>#12. OE</td>
<td>D 0030010803</td>
<td>26. CAMOPTLK TEN</td>
</tr>
<tr>
<td>15. CLCI TRK ID</td>
<td>___</td>
<td>27. CAMOPTLK DEN</td>
</tr>
<tr>
<td>16. TRANS CLASS</td>
<td>0</td>
<td>28. CAMOPTLK NEN</td>
</tr>
<tr>
<td>17. SUPV</td>
<td>RB</td>
<td>29. ACTN</td>
</tr>
<tr>
<td>18. IDLE STATE</td>
<td>ON</td>
<td>30. OTODPN1</td>
</tr>
<tr>
<td>19. IN START DIAL</td>
<td>NONE</td>
<td>31. OTODPN2</td>
</tr>
<tr>
<td>20. OUT START DIAL</td>
<td>WINK</td>
<td>32. SLC OTODPN3</td>
</tr>
<tr>
<td>21. STOPGO</td>
<td>N</td>
<td>33. SLC OTODPN4</td>
</tr>
<tr>
<td>22. CGA SPN</td>
<td>___________</td>
<td>34. MAXCALLS ___</td>
</tr>
</tbody>
</table>

Perform an ‘insert’ operation for RC/V View 5.5 for Control Channel Trunk and populate following ‘fields’:

- TGN – Enter ‘Test Trunk, Trunk Group’ number
- MEMB NBR – Enter ‘0’ (zero)
- OE – OE is a structured field: 2 Fields
  1st Field: Enter Trunk Equipment Number Type (OE.TENTYP) ‘D’ for DLTU DEN or ‘N’ for DNUS NEN
  2nd Field: Enter Trunk Equipment Number (OE.ENTRK1) for DEN or NEN (OE.ENTRK1 layouts are found in the 235-188-25X [X = number that identifies office Software Release])
- SUPV – Enter ‘EM2’
- IDLE STATE – Enter ‘ON’
- IN START DIAL – Enter ‘NONE’
- OUT START DIAL – Enter ‘WINK’

Insert of Test Trunk is continued on next page.

(Notes 3 and 4 are on the next page.)
Provisioning (cont.)

Outgoing Test Trunk - Trunk Member (cont.)

Populate Test Trunk – Trunk Member (Populated 5.5 View example below for DLTU):

<table>
<thead>
<tr>
<th>SCREEN 5 OF 7</th>
<th>5ESS SWITCH</th>
<th>RECENT CHANGE 5.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5204)</td>
<td>TRUNK MEMBER</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PACKET SWITCHING X75 ONLY UTILITY INDICATORS</td>
<td></td>
</tr>
<tr>
<td>121. TDI BEFORE N 127. IN RPOA BEFORE N 133. TNIC CONFIG _____</td>
<td></td>
<td></td>
</tr>
<tr>
<td>122. TDI AFTER N 128. IN RPOA AFTER N 134. X75 ID ______</td>
<td></td>
<td></td>
</tr>
<tr>
<td>123. TDS BEFORE N 129. OUT RPOA BEFORE N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>124. TDS AFTER N 130. OUT RPOA AFTER N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>125. TARIFF BEFORE N 131. RPOA DEL SEND N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>126. TARIFF AFTER N 132. RPOA DEL RCV N</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EEC OPTION</td>
<td>CALEA</td>
<td>DIGITAL TEST TRUNKS</td>
</tr>
<tr>
<td>EEC ACTIVE N</td>
<td>CALEA STATE ____</td>
<td>137. MTB0 001000009</td>
</tr>
<tr>
<td></td>
<td></td>
<td>138. MTB1 001010009</td>
</tr>
</tbody>
</table>

Populate following ‘fields’ on Screen 5 (Screen # may change in future Software Releases):

- MTB0 – Enter MTB 0 equipment number
  (MTB0 and MTB1 EN layouts are found in the 235-188-25X [X = number that identifies office Software Release])
- MTB 1 – Enter MTB 1 equipment number
- All other Fields are defaulted

Insert View.

Note 3: DLTU DFI: DEN DCHAN = 02 – 13
DLTU2 DFI 1: DEN DCHAN = 02 - 13
DLTU2 DFI 2: DEN DCHAN = 26 - 37

Note 4: DNUS: DS0 = 02 - 13
(The connection to the NTTU is a T1[DS1] span. If these assignments are made on a DNUS STS1, the STS1 must be demultiplexed (ex: DACS) and the assigned T1[DS1] span cabled to the NTTU.)

(Refer to Table on page 35 for Analog Interface Test Trunk pack to DCHAN)

Continued on Next Page
Provisioning (cont.)

Test Trunk DLTU/DNUS Assignment Table

The following table shows the recommended correlation between Slot #, Test Circuit # and DCHAN assignment. (Slot 0 is equipped with CPU pack.)

<table>
<thead>
<tr>
<th>AI-TDB</th>
<th>Test Circuit</th>
<th>DCHAN/DS0 (DFI/DFI1/STS1)</th>
<th>DCHAN (DFI2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>02</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>03</td>
<td>27</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>04</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>05</td>
<td>29</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>06</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>07</td>
<td>31</td>
</tr>
<tr>
<td>4</td>
<td>7</td>
<td>08</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>09</td>
<td>33</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>10</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>11</td>
<td>35</td>
</tr>
<tr>
<td>6</td>
<td>11</td>
<td>12</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>12</td>
<td>13</td>
<td>37</td>
</tr>
</tbody>
</table>

OAU Alarm

Assigning the OAU alarm is done by entering the following Input Message:

- CHG:ALM,a=b[[,TAG=["c"]][,LVL=d][,REPEAT=e]];

Ex: CHG:ALM,BPSC=14,TAG=NTTUx;

(LVL defaults to "MJ; REPEAT Defaults to "N"; x = any value to identify a specific NTTU if required)

⚠️ A description of this input message is found in the 235-600-700, Input Messages document.
Maintenance

MCC Page (NTTU Alarm)

MCC Page 105 displays the NTTU0 Alarm (Ex: Fig. 8).

Fig. 8

Continued on next page
Maintenance (cont.)

MCC Page (MTBs)

The Test Trunk MTBs (RC/V View 5.5) are displayed on MSU # SG 0 & 1 MA Pages (Ex: Fig. 9 & 10).

![Fig. 9](image1)

![Fig. 10](image2)
Blank page to preserve format.
Summary

Lesson Summary

This lesson provided a description of the purpose of the No-Test Trunk Unit - NTTU (also referred to as the Semi-Integrated No-Test Trunk) in the 5ESS Switch. It also went into detail on the:

- **Hardware**
  - Shelf
  - Equippage (Boards: CPU-SC-T1 & AI-TDB-107)

- **Cabling**
  - NTTU Backplane
  - Power (-48V, -48V RTN)
  - T1(DS1) connection
  - Line Test Operating System’s Analog Test Circuit connection
  - Analog Test Circuit MTB connections
  - Alarm connection

- **Provisioning**
  - Control Circuit Trunk Group
  - Control Circuit Trunk (DS1 Member 1)
  - Test Circuit Trunk Group
  - Test Circuit Trunk
  - Alarm OAU Scan Point

- **Maintenance (5ESS Switch only)**
  - MCC Page 1135/1145 MTB display
  - MCC Page 105 Alarm display
Addendums

DS1 Alarm Conditions

**LOS - Loss of Signal**
Loss of incoming signal. Triggered when the incoming PCM DS1 signal to the NTTU is removed or lost. LOS detection also involves sending a Remote Alarm Indication (RAI/YEL) to the remote end. Notice that detection of the LOS condition is accompanied by activation of the SA luminous indicator, as well as activation of the dry contact alarm relay.

![Figure 1. Loss of Incoming Signal (LOS) alarm](image1)

**AIS - Alarm Indication Signal**
AIS is an all-ones signal. AIS alarm goes off when the all-ones signal has been present for 1.5 seconds. Detection of the AIS condition is made as per ANSI T1.231-1997.

![Figure 2. Alarm Indication Signal (AIS) activation](image2)
Addendums (cont.)

DS1 Alarm Conditions (cont.)

YEL - Yellow Alarm
This is equivalent to the Remote Alarm Indication (RAI). Indicates reception of a signal from the remote end indicating it has lost the incoming signal. Detection of the RAI/YEL condition is made as per ANSI T1.231-1997.

![Figure 3. Remote Alarm Indication (RAI, also know as Yellow Alarm) condition](image)

RED - Red Alarm
This is equivalent to the Out Of Frame (OOF) condition. The NTTU signaling converter is receiving signal on the DS1 port, but is unable to find frame information in the incoming digital stream. An out-of-frame condition is present on the incoming stream for 2.55 seconds. The RED alarm is removed when the out-of-frame condition has been absent for 16.6 sec.

![Figure 4. Red alarm condition](image)
CPU Failure
The CPU failures can be classified in two groups:

**Controlled CPU failures**: Those impacting functional sections of the CPU pack, not including the microprocessor. The NTTU firmware currently (as of version NCSNR00F) includes self-diagnostic capabilities that detect an internal CPU failure. Upon detection of the failure the NTTU enters an alarm state and activates the following alarm resources available: SA LED + alarm relay, IMA LED, and additionally generates an AIS towards the 5ESS.

Functional areas that can be diagnosed under this group are:

- DSP coprocessor: in charge of decoding MF commands coming from the 5ESS in the Control Channel.
- Main microprocessor software traps for hardware failures such as: bus error, invalid opcode, spurious interrupt and others.

*Figure 5. Controlled CPU alarm condition*

Continued on next page
Addendums (cont.)

DS1 Alarm Conditions (cont.)

Uncontrolled CPU failures: Those with a direct impact on the main microprocessor of the CPU pack. This kind of failures would not allow the microprocessor to enter the alarm state in an orderly fashion, and activation of the alarm signals is not guaranteed. Examples of this type of CPU failures include:

- Unseating of the EPROM memories from its sockets due to vibration. Very unlikely, the NTTU has passed NEBS level 3 earthquake and vibration tests.

- Erasure of the contents of the programmable logic devices due to ESD discharge. Very unlikely, the NTTU has passes NEBS level 3 tests for ESD immunity. The ESD discharge could be due to mishandling during transport or installation, but the failure would be self-evident to the craftsman doing the installation at the moment of powering-up the unit.

- Watchdog reset: The CPU circuitry includes a watchdog circuit which shall reset the unit upon two conditions: power supply variation outside the ±5% tolerance or the microprocessor failed to retrigger the monostable timing circuit due to some hardware or software failure. If the failure is recurring, it would be seen as an intermittent CGA condition by the 5E and as an intermittent relay alarm activation.

![Figure 6. Uncontrolled CPU failure condition](Return)
Addendums (cont.)

Trunk Pack Failure

**CPU to AI-TDB-107 Communications:**
Communication between the CPU and the analog interface test board (AI-TDB-107) travels through the NTTU backplane system. The exchange of information uses serial TDM (time division multiplexing) digital streams. The information exchanged is:

- Operation Commands (CPU to Analog Interface Test Board)
- Status Information (Analog Interface Test Board to CPU)
  [ex: on-hook/off-hook detection, tip/ring polarity, sleeve current, etc.]

(Return)

**AI-TDB-107 Self-Diagnostics:**
In the NTTU original design there was no provision for special diagnostic or self-test capabilities of the analog linecards. That means implementing a self-test routine would have to rely on available status information being read from the linecards by the CPU.

Going into further detail, the analog linecard status information is read by the CPU in the form of an 8-bit word including the following information: tip/ring off-hook detection, tip/ring polarity sensors, sleeve current values, incoming/outgoing trunk selection, and card presence/absence indication.

The final implementation of the self-diagnostic relies on checking the linecard status word against a list of ‘valid’ bit combinations. An invalid status word would then be interpreted as a trunk pack error or failure. There will be some trunk pack failure conditions that won’t be recognized or represented by an invalid status word, and hence, won’t be indicated as an alarm condition.

(Return)

Continued on the next page
Addendums (cont.)

Trunk Pack Failure (cont.)

AI-TDB-107 Error Conditions and Failure Modes:
The expected behavior for these error conditions is as follows:

- Activation of the SA (Service Alarm LED) and associated alarm relay output
- Turn off the OK status LED indicator on the faulty trunk pack
- Generate a ‘pack absent’ indication using the CAS (Channel Associated Signaling) B bit on the affected pack. There is a provision on the 5ESS software to generate an alarm (ROP message) for detection of pack removal on provisioned NTT trunks.
- The CPU will try to reinitialize the faulty trunk pack every 3 seconds

![Figure 7. Trunk pack failure indication](image)

Other failure modes of the trunk packs

- Blown fuse on the trunk pack. The trunk pack would be seen as ‘removed’ from the NTTU backplane by the CPU. This condition will be indicated by the CAS B bit. There is a provision on the 5ESS software to generate an alarm for detection of pack removal on provisioned NTT trunks.
- Blown fuse on the tip/ring interfaces. The AI-TDB-107 includes overvoltage and overcurrent protections on the tip ring interfaces. Overcurrent protection is achieved using line fuses (1.25 A), if these fuses are blown; there is no way for the NTTU to recognize the failure. The MLT would see unsuccessful connection attempts on that trunk.
- MTB failures: No indication.

(Return)

Continued on the next page
Addendums (cont.)

Trunk Pack Failure (cont)

Quick Troubleshooting Guide
The different failure conditions of the NTTU can be identified by examining the visual LED indicators as described in the following table.

<table>
<thead>
<tr>
<th>Failure condition</th>
<th>Visual indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1 (DS1) alarm</td>
<td>SA plus one of the following: LOS, RED, YEL, AIS depending on the type of alarm</td>
</tr>
<tr>
<td>Controlled CPU failure</td>
<td>SA + IMA</td>
</tr>
<tr>
<td>Uncontrolled CPU failure</td>
<td>SA + IMA + all other LEDs</td>
</tr>
<tr>
<td>Trunk pack failure</td>
<td>SA + OK LED off at the affected trunk pack</td>
</tr>
</tbody>
</table>

Table 1. Quick troubleshooting guide using visual indicators on the NTTU

(Return)
MTB Assignments

The assigned MTBs are cabled to the MMSU shelf located in an LTP cabinet and connected to the assigned Metallic Access (MA #) MTB (#). The following graphic shows an example of the MTB connections.

- Each MTB is a 2-wire T and R connection. The pin numbers shown are lower left pin (stenciled on connector) the MTB connector plugs onto.

- MTB 15 on all MA Packs is not assignable. It is equipped with a Diode Termination Resistor (DTR) connector, which is used for MTB testing.

( Return )
Addendums (cont.)

Alarm Strapping (OAU)

The graphic below shows the strapping on the on OAU Connecting Block (Distributing Frame) for a ‘Normally Closed’ alarm.
Blank page to preserve format.