



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

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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.

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

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.

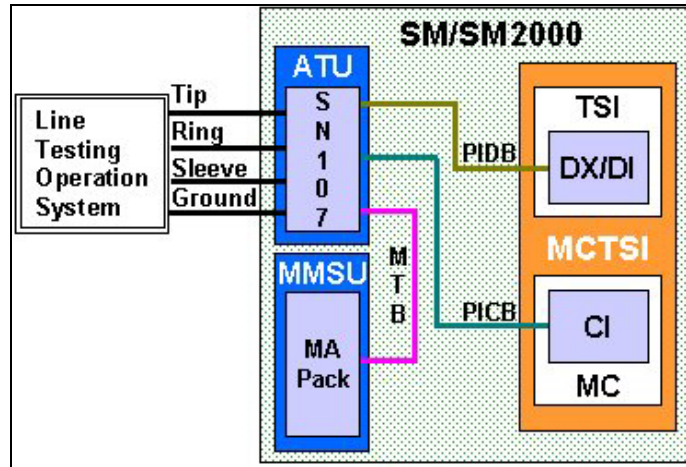


Fig. 1

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.

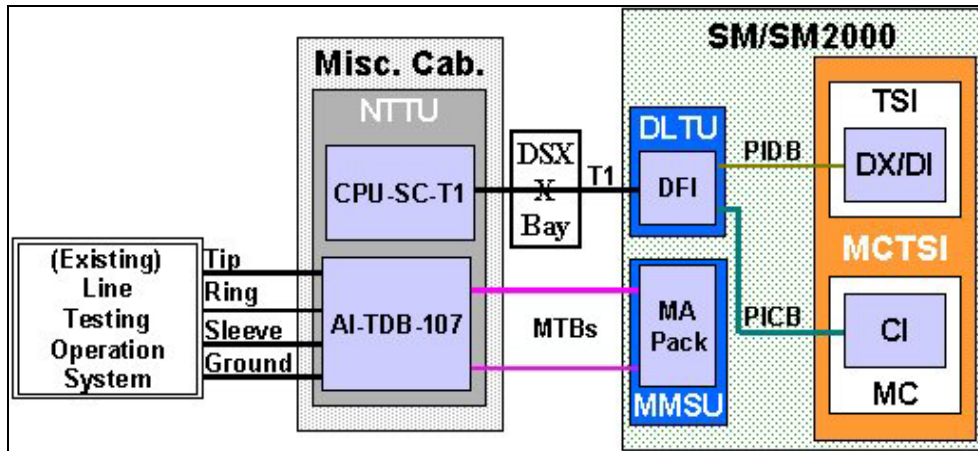


Fig. 2

► * 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*).

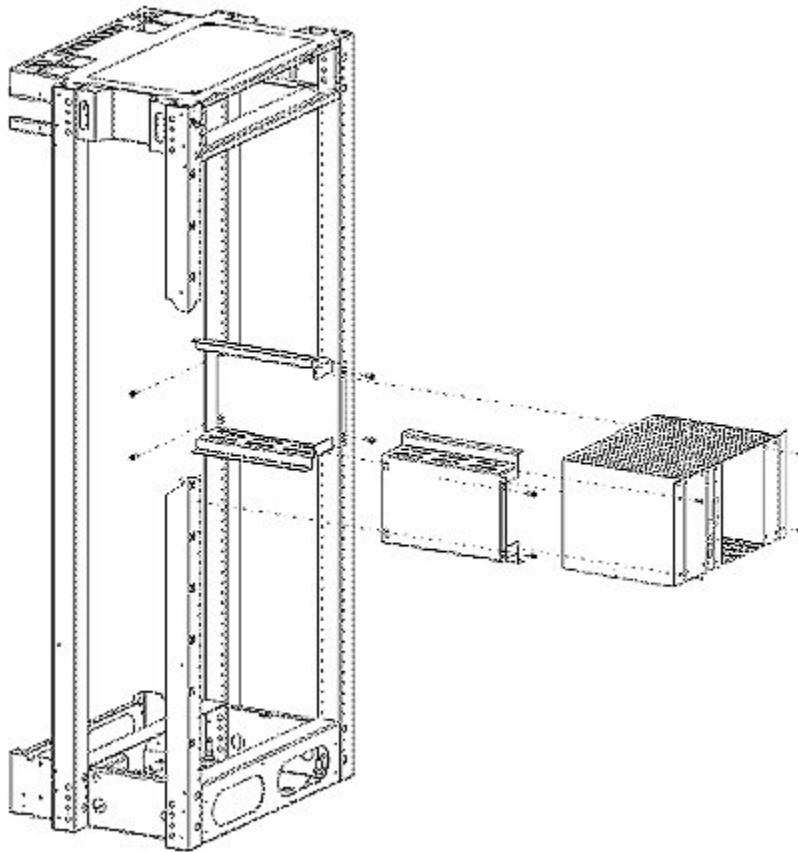


Fig. 3

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.

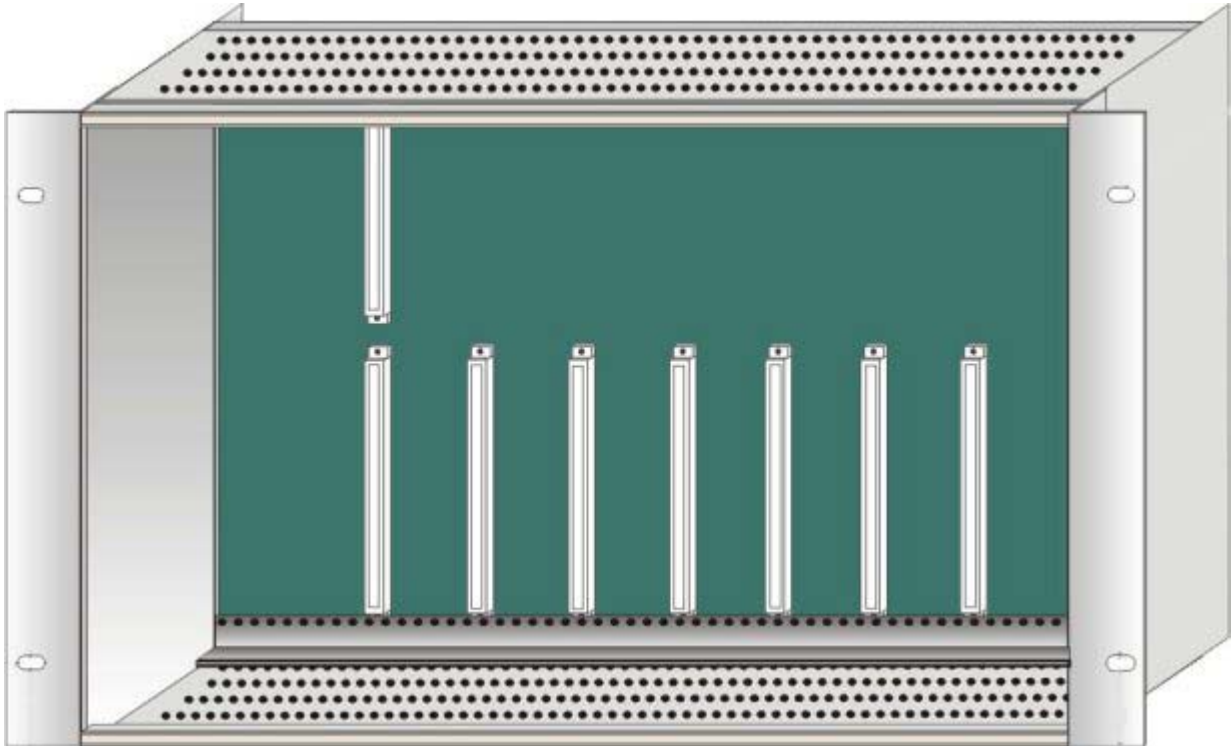


Fig. 4

Hardware (cont.)

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).

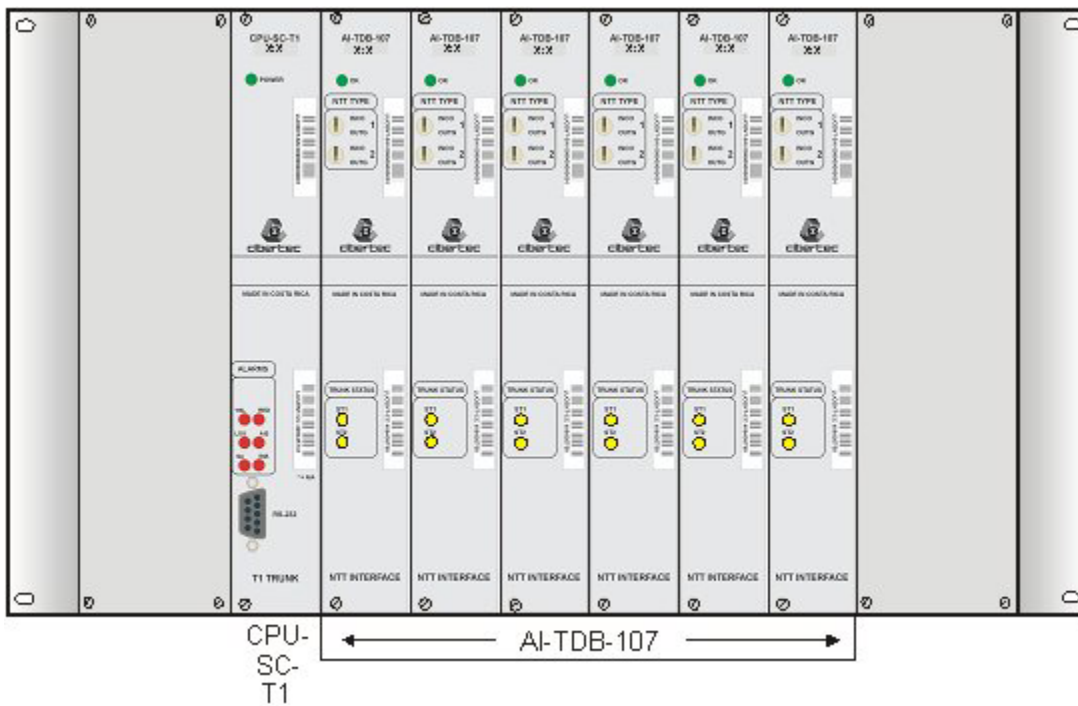


Fig. 5

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.

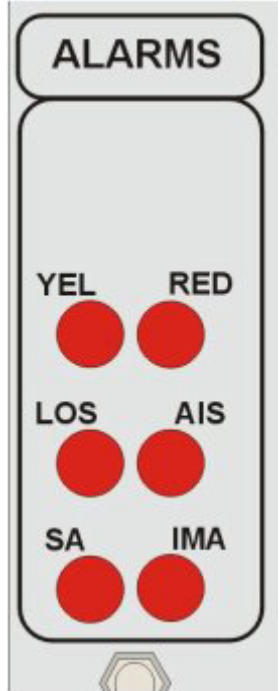
Faceplate Elements	Description	Picture
Circuit Pack name/version	CPU-SC-TX:X X= version number (ie: 2.2 – version 2: Backward compatible with version 2)	
Power On	Green LED.	
Serial number Label	This is a barcode label as per Lucent KS-23490 Specification Issue 9 on Barcode, Serial and Comcode.	
Manufacturer's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

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.

Alarm	Description	Picture
YEL	YEL (<u>Yellow Alarm</u>): 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).	
RED	RED (<u>Red Alarm</u>): 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..	
LOS	LOS (<u>Loss of Signal</u>): This is to indicate the loss of incoming signal on the DS1 port of the NTTU signaling converter.	
AIS	AIS (<u>Alarm Indication Signal</u>): This is an all-ones alarm condition being received on the DS1 port from the far end.	
SA	SA (Service Alarm): 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).	
IMA	IMA (<u>Immediate Maintenance Alarm</u>): The NTTU signaling converter requires immediate maintenance action.	

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.

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

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.



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*).

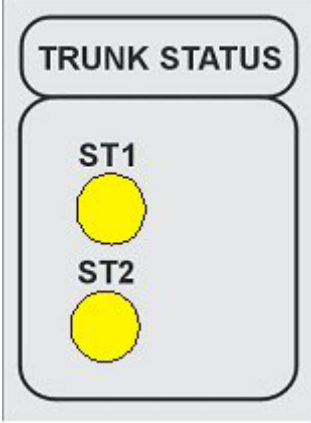
Mode	Description	Picture
<p>INCO (toggle switch up)</p>	<p>Incoming: Test calls are initiated at the LTOS side. MF Signaling is sent to the 5ESS to address the called subscriber line to be tested.</p>	
<p>OUTG (toggle switch down)</p>	<p>Outgoing: Test calls are terminated at the LTOS side. The test is initiated using MF Signaling at the subscriber side.</p>	

Continued on next page

Hardware (cont)

AI-TDB-107: TRUNK STATUS

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

State	Description	Picture
Lit	Indicates an Analog trunk is seized.	
Blinking	Indicates a blocked condition (test calls cannot be made in the blocking condition). Blinking also occurs during power up.	

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](#)

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Cabling

Documentation and Drawings

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

NTTU Cabling

The following cables are common:

New Cables:

- Power [-48V & -48V RTN]
Location: NTTU back plane
Cabled to: Assigned Fuse located in cabinet Fuse Panel (MFFU/FFU)
- Alarm [NC, CM, NO]
Location: NTTU back plane
Cabled to: Distributing Frame and cross-connected to assigned OAU Scan Point
- T1 Span [T, R, T1, R1]
Location: NTTU back plane
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]
Location: NTTU back plane
Cabled to: Distributing Frame and cross-connected to existing LTOS Analog Test Ckt.
- Metallic Test Bus [MTB0T, MTB0R, MTB1T, MTB1R for Trk 1 or 2]
Location: NTTU back plane
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.

Loc.	Connection	Cables
1	Power Connection	-48V & -48V RTN
2	T1(DS1) Connection Block	T1 Span
3	Analog Connection Block (ACB)	LTOS Analog Test Ckt. Metallic Test Bus [MTB]
4	Alarm Connection	Normally Closed (NC), Common (CM), Normally Open (NO)

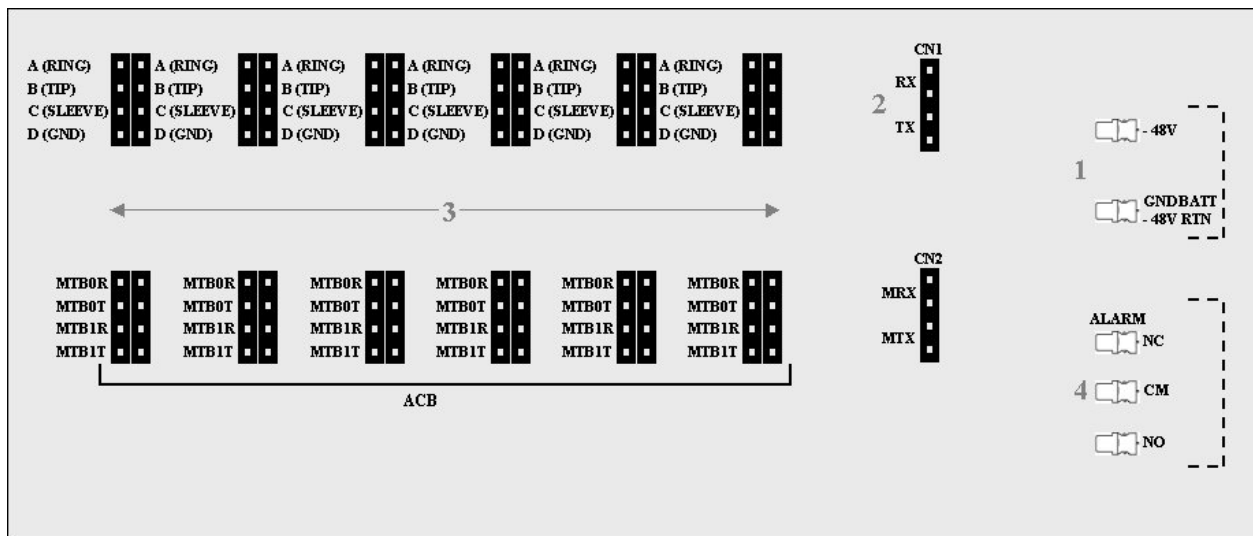


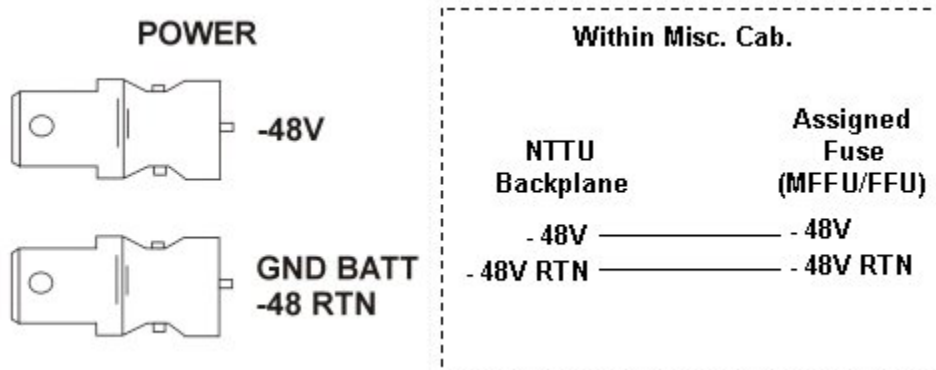
Fig. 6

Continued on next page

Cabling (cont.)

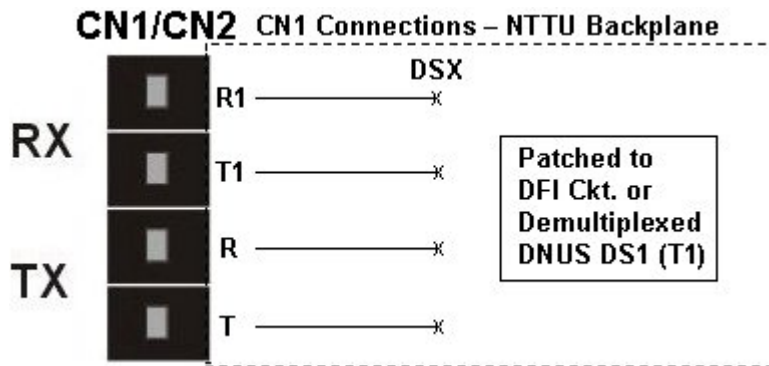
Power

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



T1

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



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.

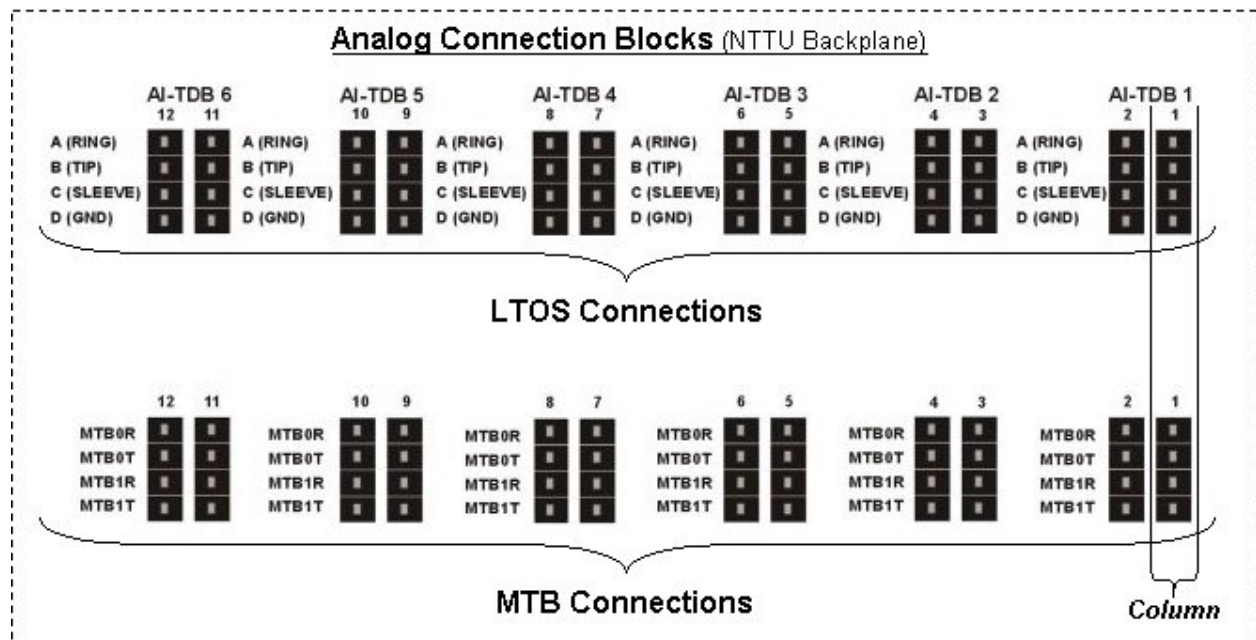


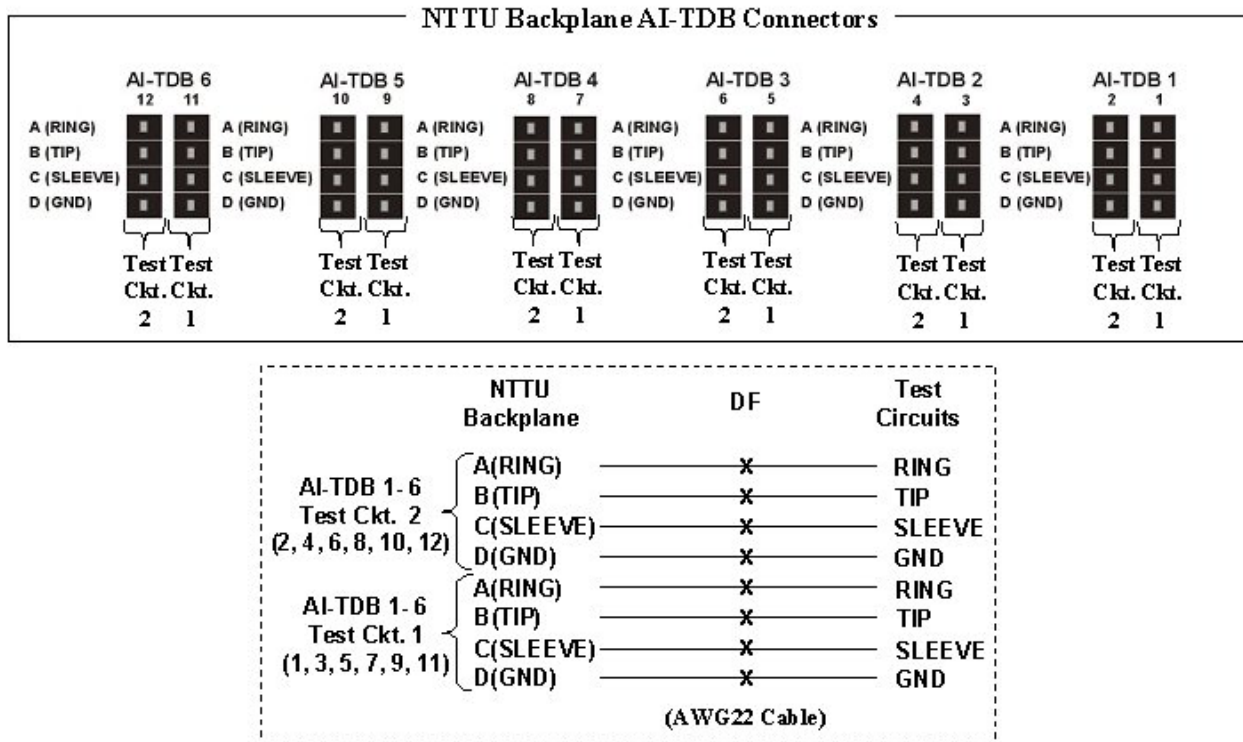
Fig. 7

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 patch has two (2) test circuits¹. 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.



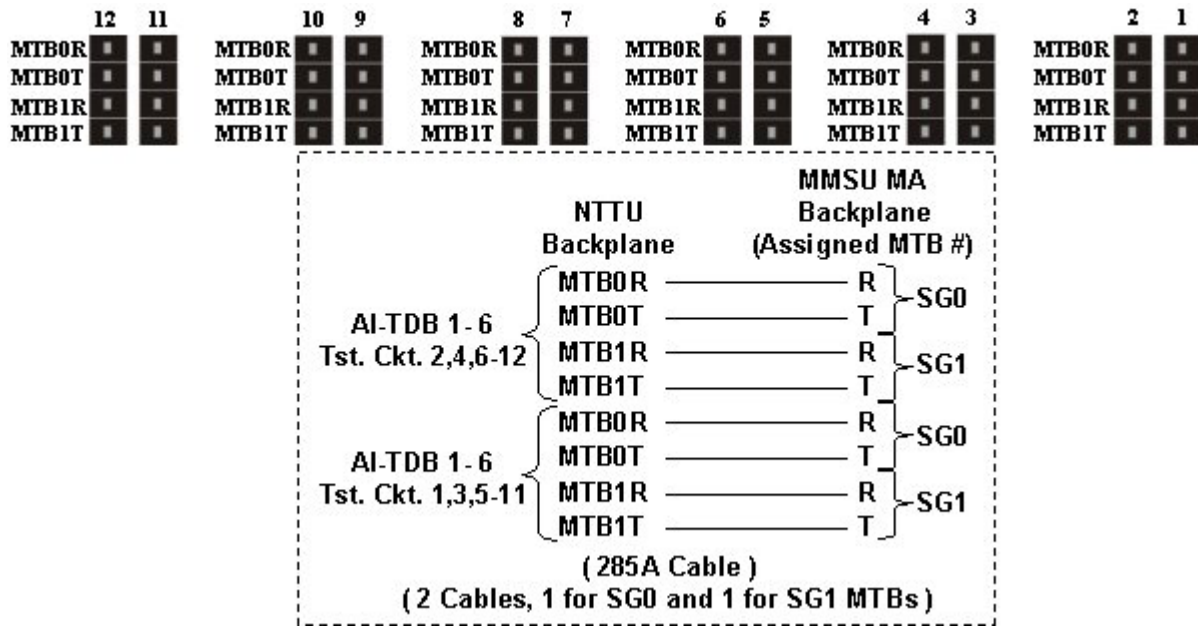
¹ Test Circuits are provisioned as Trunks (DS0s) on the DS1(T1). This is explained in the **Provisioning Section** of this lesson.

Continued on next page

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.

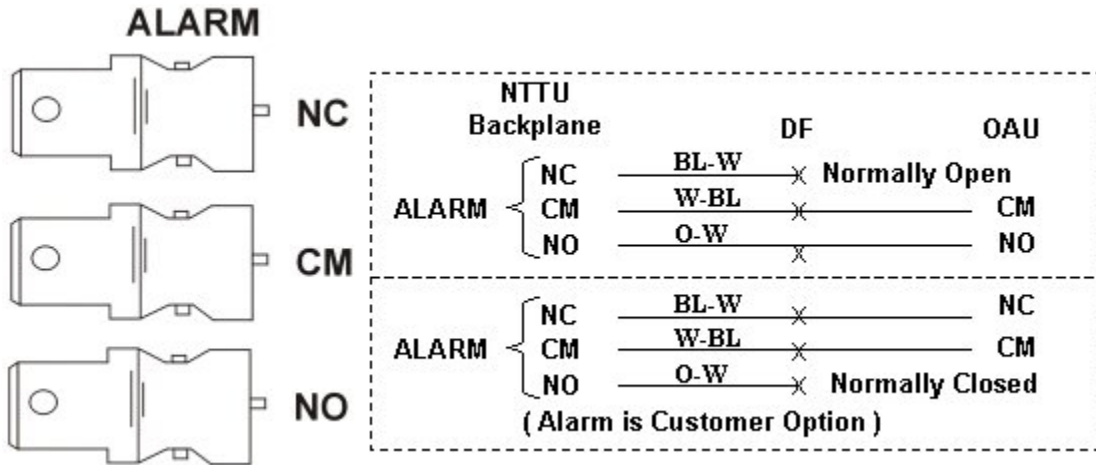


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Cabling (cont.)

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](#)).

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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 Virtual 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:

```

                    5ESS SWITCH
                RECENT CHANGE 20.4
SCREEN 1 OF 3
(57302)                DIGITAL LINE/TRUNK UNIT PACK EQUIPMENT

*1. SM                3    13. PIDB FAC 1 _____ #25. CLEI                E5M0AB3AXX
*2. DLTU              1    14. TYPE FAC 0 T1CHNL          26. MODE FAC 0        FE8Z
*3. DFI               8    15. TYPE FAC 1 _____          27. MODE FAC 1        _____
*4. FAC IND           1    16. VRBS FAC 0 N
   5. EQSTAT FAC 0 0    17. VRBS FAC 1 _____          DFI-2
   6. EQSTAT FAC 1 -    18. CLFI FAC 0 NTTU 0          28. PM GRP FAC 0 _____
   7. INTF UNIT        0    19. CLFI FAC 1 _____          29. PM GRP FAC 1 _____
#8. CI                0    20. APPL FAC 0 _____
#9. PICB              14    21. APPL FAC 1 _____
10. DI FAC 0          1    PTRN FAC 0 A
11. DI FAC 1          -    PTRN FAC 1 -
12. PIDB FAC 0       2    24. CLI                0

```

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          VT SIZE             1.5
*5. STS          1          13. DS1S EQSTAT    O
*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):

SCREEN 1 OF 13 (5200,5202,5213)			5ESS SWITCH RECENT CHANGE 5.1 TRUNK GROUP	
(*)1. TGN	86		13. CARRIER ID	_____
(*)2. TRUNK CHAR	_____		14. FEAT GRP	__
(*)3. FEND CLLI	_____		15. INC TND WNK	N
4. TRK CHAR	_____		16. ATTTN	0
5. FAR CLLI	_____		17. TERA RCVY	NOA
6. RMK	NTTU T1 TG		18. IAPT	Y
#7. TRK DIR	OUTGO		19. CALLMON INH	Y
#8. HUNT TYPE	NONE		20. INPLS	NOSIGNAL
9. SCR	0		21. OUTPLS	MF
10. GLARE ACTION	_____		22. FAR END NPA	312
11. DAS	0		23. GL ANN TGN	0
#12. TRK CLASS	TSTK		24. PBX/CPE ID	0
			25. BRCS	N
			26. FREE ANS	N
			27. PRIVACY	N
			28. INSEP	0
			29. MODULE	0
			30. BICC GRP	0
			VERIFY ONLY	
			GRP SIZ	1
			ACT SIZ	1
			SATELLITE	_
			TERM SFG	_

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):

SCREEN 1 OF 7 (5204)		5ESS SWITCH RECENT CHANGE 5.5 TRUNK MEMBER
*1. TGN	86	23. HOLD BUSY N
*2. MEMB NBR	0	24. SATELLITE N
(*)9. QTY		25. TRF SAMPLE N
#12. OE	D 0030010801	26. CAMOPTLK TEN _____
15. CLCI TRK ID		27. CAMOPTLK DEN _____
16. TRANS CLASS	0	28. CAMOPTLK NEN _____
17. SUPV	EM2	29. ACTN R
18. IDLE STATE	ON	30. OTODPN1 _____
19. IN START DIAL	NONE	31. OTODPN2 _____
20. OUT START DIAL	IMED	32. SLC OTODPN3 _____
21. STOPGO	N	33. SLC OTODPN4 _____
22. CGA SPN		34. MAXCALLS _____

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):

SCREEN 1 OF 7 (5204)		5ESS SWITCH RECENT CHANGE 5.5 TRUNK MEMBER
*1. TGN	86	23. HOLD BUSY N
*2. MEMB NBR	0	24. SATELLITE N
(*)9. QTY		25. TRF SAMPLE N
#12. OE	N 01900216101	26. CAMOPTLK TEN _____
15. CLCI TRK ID		27. CAMOPTLK DEN _____
16. TRANS CLASS	0	28. CAMOPTLK NEN _____
17. SUPV	EM2	29. ACTN R
18. IDLE STATE	ON	30. OTODPN1 _____
19. IN START DIAL	NONE	31. OTODPN2 _____
20. OUT START DIAL	IMED	32. SLC OTODPN3 _____
21. STOPGO	N	33. SLC OTODPN4 _____
22. CGA SPN		34. MAXCALLS _____

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

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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](#))

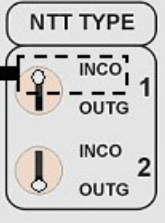
Continued on next page

Provisioning (cont.)

DLTU/DNUS Incoming Test Trunk - Trunk Group

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

SCREEN 1 OF 13 (5200,5202,5213)		SESS SWITCH RECENT CHANGE 5.1 TRUNK GROUP	
(*) 1. TGN	79	13. CARRIER ID	25. BRCS N
(*) 2. TRUNK CHAR		14. FEAT GRP	26. FREE ANS N
(*) 3. FEND CLLI		15. INC TND WNK	27. PRIVACY N
4. TRK CHAR		16. ATTTN	28. INSEP O
5. FAR CLLI		17. TERA RCVY	29. MODULE 0
6. RMK	LTD	18. IAPT	30. BICC GRP 0
#7. TRK DIR	INCOM	19. CALLMON INH	
#8. HUNT TYPE	NONE	20. INPLS	MF
9. SCR	50	21. OUTPLS	NOSIGNAL
10. GLARE ACTION		22. FAR END NPA	312
11. DAS	3	23. GL ANN TGN	0
#12. TRK CLASS	TSTK	24. PBX/CPE ID	0
			VERIFY ONLY
			GRP SIZ 1
			ACT SIZ 1
			SATELLITE
			TERM SFG



(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):

SCREEN 1 OF 7 (5204)		5ESS SWITCH RECENT CHANGE 5.5 TRUNK MEMBER
*1. TGN	79	23. HOLD BUSY N
*2. MEMB NBR	0	24. SATELLITE N
(*)9. QTY		25. TRF SAMPLE N
#12. OE	N 01900216102	26. CAMOPTLK TEN _____
15. CLCI TRK ID		27. CAMOPTLK DEN _____
16. TRANS CLASS	0	28. CAMOPTLK NEN _____
17. SUPV	RB	29. ACTN R
18. IDLE STATE	ON	30. OTODPN1 _____
19. IN START DIAL	WINK	31. OTODPN2 _____
20. OUT START DIAL	NONE	32. SLC OTODPN3 _____
21. STOPGO	N	33. SLC OTODPN4 _____
22. CGA SPN		34. MAXCALLS _____

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 DEN³ or 'N' for DNUS NEN⁴
 - 2nd Field: Enter Trunk Equipment Number (OE.ENTRK1) for DEN³ or NEN⁴
(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):

SCREEN 5 OF 7 (5204)	5ESS SWITCH RECENT CHANGE 5.5 TRUNK MEMBER	
PACKET SWITCHING X75 ONLY UTILITY INDICATORS		
121. TDI BEFORE	N	127. IN RPOA BEFORE N
122. TDI AFTER	N	128. IN RPOA AFTER N
123. TDS BEFORE	N	129. OUT RPOA BEFORE N
124. TDS AFTER	N	130. OUT RPOA AFTER N
125. TARIFF BEFORE	N	131. RPOA DEL SEND N
126. TARIFF AFTER	N	132. RPOA DEL RCV N
133. TNIC CONFIG	_____	
134. X75 ID	_____	
EEC OPTION	CALEA	DIGITAL TEST TRUNKS
EEC ACTIVE N	CALEA STATE _____	137. MTB0 001000008
		138. MTB1 001010008

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.

<p>☛ Note 3: DLTU DFI: DEN DCHAN = 02 – 13 DLTU2 DFI 1: DEN DCHAN = 02 - 13 DLTU2 DFI 2: DEN DCHAN = 26 - 37</p> <p>☛ 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.) <i>(Refer to Table on page 35 for Analog Interface Test Trunk pack to DCHAN)</i></p>

Continued on next page

Provisioning (cont.)

DLTU/DNUS Outgoing Test Trunk - Trunk Group

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

SCREEN 1 OF 13 (5200, 5202, 5213)			SESS SWITCH	
(*) 1. TGN	62		RECENT CHANGE	5.1
(*) 2. TRUNK CHAR			TRUNK GROUP	
(*) 3. FEND CLLI			CARRIER ID	_____
4. TRK CHAR			FEAT GRP	_____
5. FAR CLLI			INC TND WNK	N
6. RMK	LTOS		ATTN	0
#7. TRK DIR	OUTGO		TERA RCVY	RPT
#8. HUNT TYPE	FIFO		IAPT	Y
9. SCR	0		CALLMON INH	Y
10. GLARE ACTION	0		INPLS	NOSIGNAL
11. DAS	0		OUTPLS	NOSIGNAL
#12. TRK CLASS	TSTK	21. FAR END NPA	312	
		22. GL ANN TGN	0	
		23. PBX/CPE ID	0	
		24. BRCS	N	
		25. FREE ANS	N	
		26. PRIVACY	N	
		27. INSEP	0	
		28. MODULE	0	
		29. BICC GRP	0	
		30. VERIFY ONLY	GRP SIZ 1	
			ACT SIZ 1	
			SATELLITE	
			TERM SFG	

(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):

SCREEN 1 OF 7 (5204)		5ESS SWITCH RECENT CHANGE 5.5 TRUNK MEMBER	
*1. TGN	62	23. HOLD BUSY	N
*2. MEMB NBR	0	24. SATELLITE	N
(*)9. QTY		25. TRF SAMPLE	N
#12. OE	D 0030010803	26. CAMOPTLK TEN	_____
15. CLCI TRK ID	_____	27. CAMOPTLK DEN	_____
16. TRANS CLASS	0	28. CAMOPTLK NEN	_____
17. SUPV	RB	29. ACTN	R
18. IDLE STATE	ON	30. OTODPN1	_____
19. IN START DIAL	NONE	31. OTODPN2	_____
20. OUT START DIAL	WINK	32. SLC OTODPN3	_____
21. STOPGO	N	33. SLC OTODPN4	_____
22. CGA SPN	_____	34. MAXCALLS	___

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 DEN³ or 'N' for DNUS NEN⁴
 - 2nd Field: Enter Trunk Equipment Number (OE.ENTRK1) for DEN³ or NEN⁴ (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.)

Continued

Provisioning (cont.)

Outgoing Test Trunk - Trunk Member (cont.)

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

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

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.)

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

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*).

CMD<		105/106 - BLDG/POWER & ALARM CNTRLS											
6XX INHIBIT ALARM XX <XX=02 TO 27>		800 AUTO ALARM RETIRE RETIRE MODE											
7XX ALLOW ALARM XX <XX=02 TO 27>		801 MANUAL ALARM RETIRE MANUAL											
POWER ALARMS													
COM PWR	HIGH ULTG	STBY PLNT	RECT FAIL	PDF FUSE	BAT DSCHG	ALM BAT	MISC PWR						
BUILDING ALARMS <+ = REPEATING FOR 02 TO 27>													
00	CR	01	MJ	02	MJ	03	MJ	04	MJ	05	MJ	06	MJ
FIRE		FIRE ALARM TROUBLE											
07	MJ	08	MJ	09	MJ	10	MJ	11	MJ	12	MJ	13	MJ
14	MJ	15	MJ	16	MJ	17	MJ	18	MJ	19	MJ	20	MJ
NTTU0													
21	MJ	22	MJ	23	MJ	24	MJ	25	MJ	26	MJ	27	MJ

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).

CMD<		1135 SM 001 LSM MSU 00 SG 0 MA 00	
<u>REMOVE</u>	SM 001 STAT	METALLIC TEST BUS STATUS	
2XX MTB XX	NORMAL	MTB	FAR END
250 MA	SITE 000	00 ACT	DCTUPOINT 1-0-0
<u>RESTORE</u>	MA STAT	01 ACT	DCTUPOINT 1-0-2
3XX MTB XX	ACT	02 ACT	GDXACC 1-0-0
350 MA		03 ACT	ISLUMAN 1-0-0-0
<u>DIAGNOSE</u>		04 ACT	AIUCOM 1-0-0
5XX MTB XX		05 ACT	AIUCOM 2-0-0
550 MA		06 ACT	AIUCOM 2-1-0
<u>DISPLAY</u>		07 ACT	TRCU-PT 1137 0 0 7
1130,Y MSU Y SG 0		08 ACT	NTT-NEN 01900216102
		09 ACT	UNASGND
		10 ACT	UNASGND
		11 ACT	UNASGND
		12 ACT	UNASGND
		13 ACT	UNASGND
		14 ACT	UNASGND
		15 ACT	DRPAIR

Fig. 9

CMD<		1145 SM 001 LSM MSU 00 SG 1 MA 00	
<u>REMOVE</u>	SM 001 STAT	METALLIC TEST BUS STATUS	
2XX MTB XX	NORMAL	MTB	FAR END
250 MA	SITE 000	00 ACT	DCTUPOINT 1-0-0
<u>RESTORE</u>	MA STAT	01 ACT	DCTUPOINT 1-0-2
3XX MTB XX	ACT	02 ACT	GDXACC 1-0-0
350 MA		03 ACT	ISLUMAN 1-0-0-0
<u>DIAGNOSE</u>		04 ACT	AIUCOM 1-0-0
5XX MTB XX		05 ACT	AIUCOM 2-0-0
550 MA		06 ACT	AIUCOM 2-1-0
<u>DISPLAY</u>		07 ACT	TRCU-PT 1137 0 0 7
1140,Y MSU Y SG 1		08 ACT	NTT-NEN 01900216102
		09 ACT	UNASGND
		10 ACT	UNASGND
		11 ACT	UNASGND
		12 ACT	UNASGND
		13 ACT	UNASGND
		14 ACT	UNASGND
		15 ACT	DRPAIR

Fig. 10

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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
-

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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.

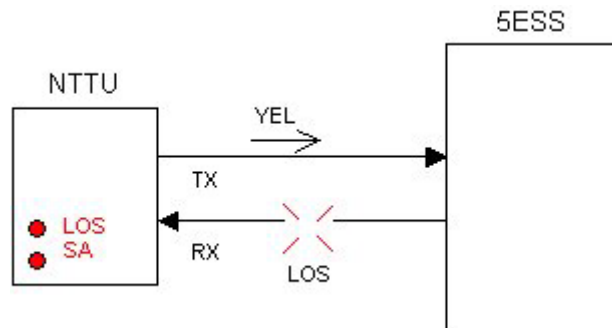


Figure 1. Loss of Incoming Signal (LOS) alarm

([Return](#))

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.

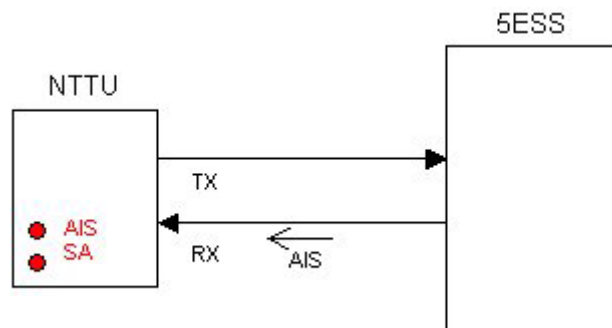


Figure 2. Alarm Indication Signal (AIS) activation

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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.

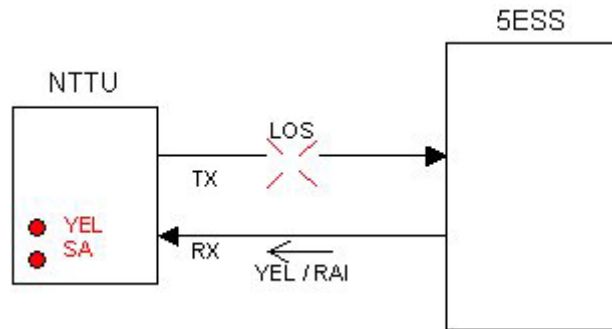


Figure 3. Remote Alarm Indication (RAI, also know as Yellow Alarm) condition

([Return](#))

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.

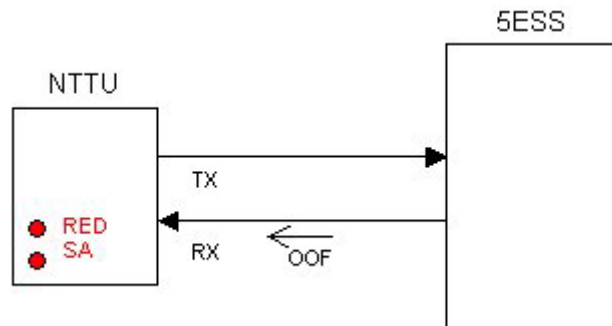


Figure 4. Red alarm condition

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Continued on next page

Addendums (cont.)

DS1 Alarm Conditions (cont.)

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.

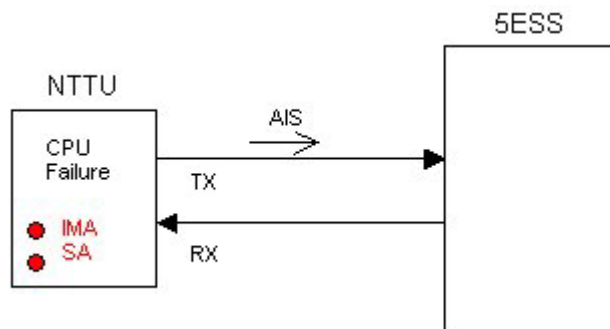


Figure 5. Controlled CPU alarm condition

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 $\pm 5\%$ 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.

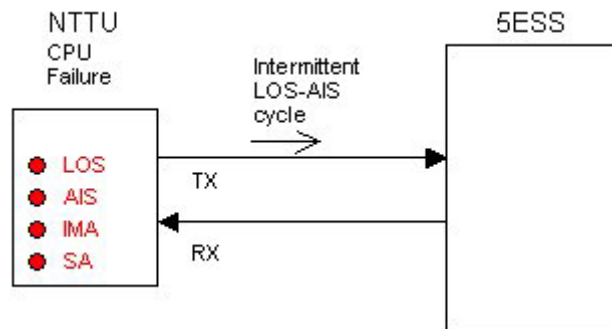


Figure 6. Uncontrolled CPU failure condition

([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

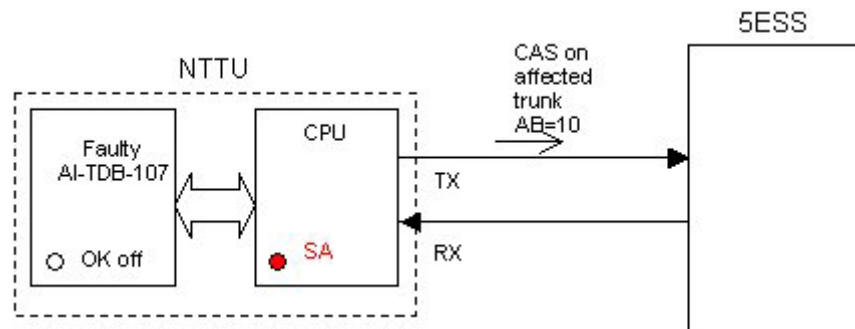


Figure 7. Trunk pack failure indication

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.

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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.

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

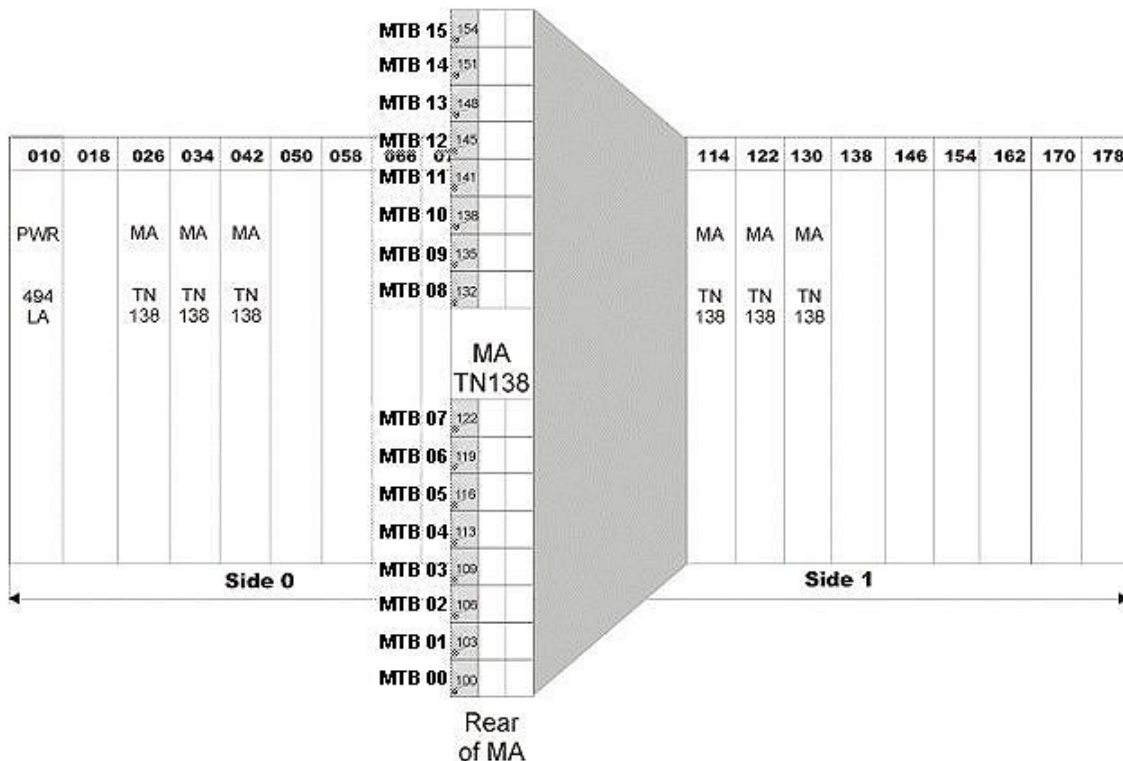
Table 1. Quick troubleshooting guide using visual indicators on the NTTU

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Addendums (cont.)

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.



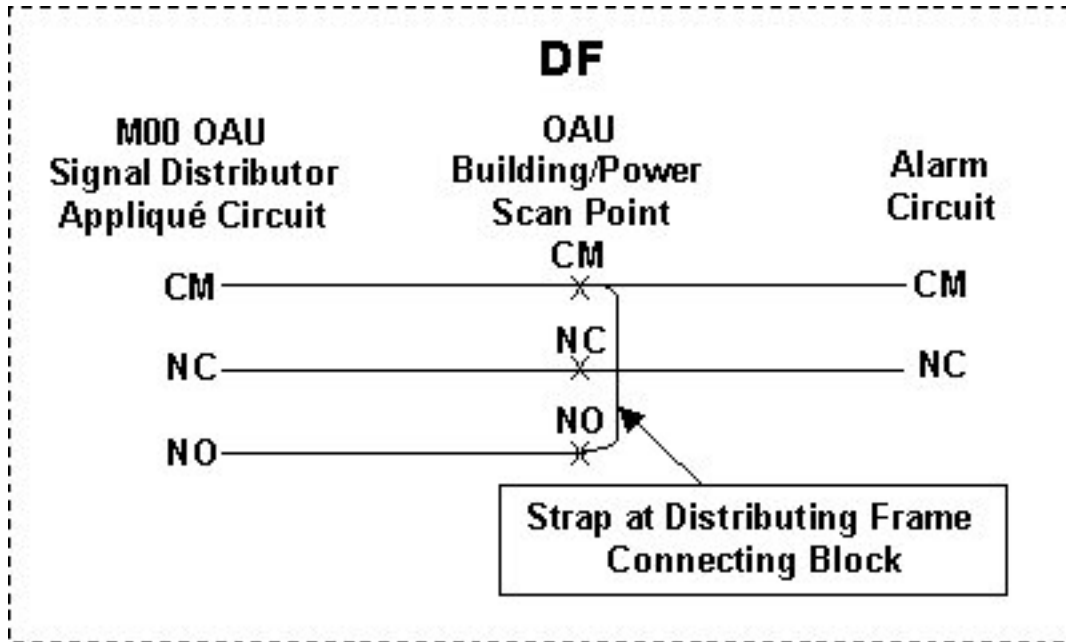
- Each MTB is a 2-wire T and R connection. The pin numbers shown are lower left pin (stenciled on connector) the MTB connector plugs onto.
- MTB 15 on all MA Packs is not assignable. It is equipped with a Diode Termination Resistor (DTR) connector, which is used for MTB testing.

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Addendums (cont.)

Alarm Strapping (OAU)

The graphic below shows the strapping on the on OAU Connecting Block (Distributing Frame) for a 'Normally Closed' alarm.



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