AT&T 363-205-402
Issue 4
May 1992

SLC® Series 5 Carrier System Channel Units Installation and Testing

Task Oriented Practice (TOP)

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Document No.: AT&T 363-205-402 Issue 4 Date: May 1992

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About This Task Oriented Practice AT&T 363-205-402

Overview

The procedures presented in this document are to be used when installing and testing channel units used in the *SLC*® Series 5 Carrier System.

How to Use This Document

To find the instructions for performing channel unit installation and testing, proceed as follows:

1. Find your task in the TASK INDEX LIST (**IXL-001**).
2. Turn to the indicated director level or detailed level procedure. All procedures in each section are in numerical order, regardless of type. Procedures in this TOP are of two types:
   a. Non Trouble-Clearing Procedures (**NTP**) - A director level procedure that lists normal work items to perform other than trouble clearing.
   b. Detailed Level Procedures (**DLP**) - Detailed step-by-step instructions.
3. Perform all the items in the director level procedure in the indicated order unless it sends you to another director-level procedure. When you complete a director-level procedure, you have finished the task. Where more detailed information is required, you will be sent to a Detailed Level Procedure **DLP-( ).** You may also be sent to a Detailed Level Procedure by another Detailed Level Procedure.

4. **IMPORTANT:** When you complete a DLP, you **MUST** return to the procedure which sent you there.
5. **IMPORTANT:** In most cases, if one director-level procedure sends you to another director-level procedure, you should not return to the first director level procedure after you complete the second.
6. If you need assistance after completing all the applicable procedures in this section, call the AT&T Regional Technical Assistance Center (RTAC). The telephone number is **1-800-225-RTAC.**

Circuit packs being returned for repair should be sent, along with your company's repair and return form, to the following address:

AT&T Network Systems
Carolinas Service Center
6701-A North Park Blvd.
Charlotte, NC 28216

Documentation Plan

This document is part of a documentation set that provides turnup, end-to-end, channel unit installation, and maintenance procedures. Figure 1 provides a documentation plan summary.

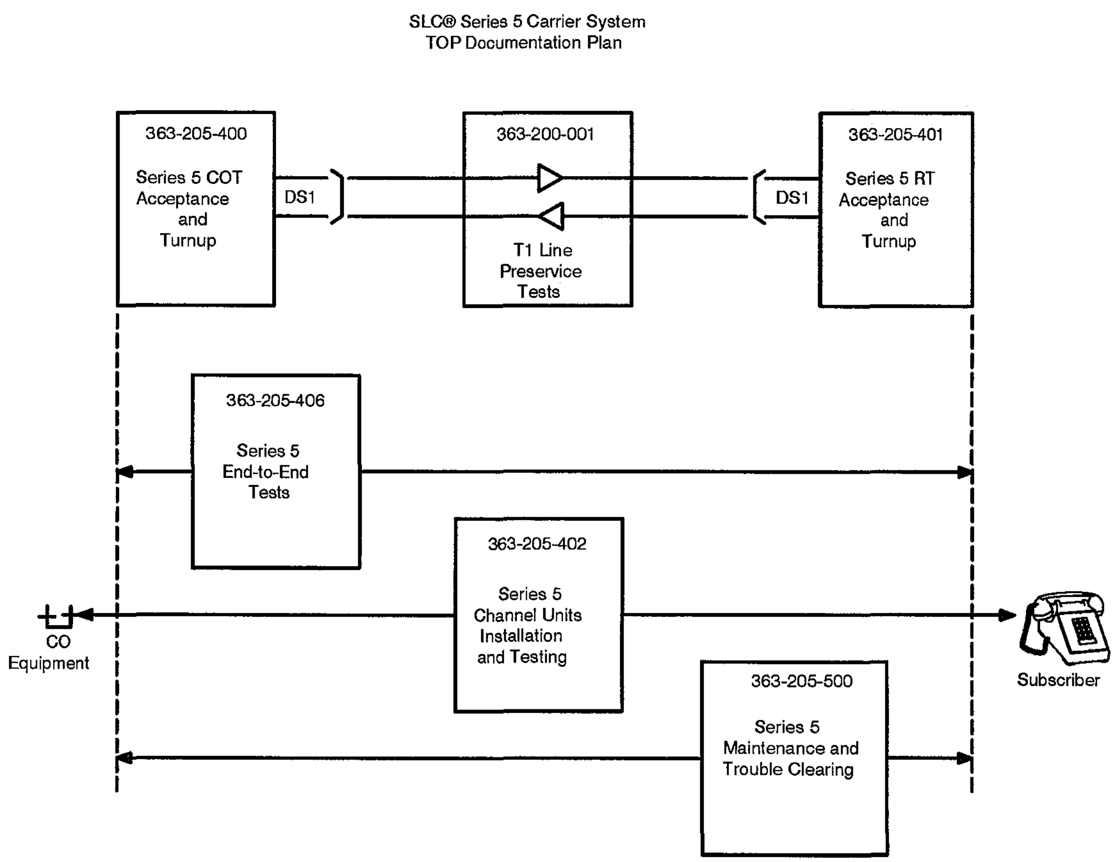

Figure 1 — Documentation Plan Summary

Feature Packages

The *SLC* Series 5 Carrier System offers several feature package configurations. The choice of feature package is determined by the bank control unit (BCU) and alarm display unit (ADU), and supporting common units. Option settings on the ADU also determine the feature package configuration. Feature packages are abbreviated when referred to in text (for example, FPC = Feature Package C).

The following is a summary of *SLC* Series 5 Carrier System feature packages.

FPA
FPA has been rated discontinued availability (DA) and provides POTS service only.

FPB
FPB provides a TR-08* interface that is available in a universal (*SLC* 96 COT) or integrated (TR-08 digital switch) configuration, Mode 1 (unconcentrated) or Mode 2 (concentrated), and allows use of special service channel units. The service capabilities of FPB are abbreviated in text as follows:

- FPB/[U or I] — U for universal, I for integrated
- FPB/[U or I]/[M1 or M2]/ — M1 for Mode 1, M2 for Mode 2
- FPB/[SS]/[U or I]/[M1 or M2]/ — SS for special services.

FPC
FPC provides POTS special service capabilities.

FPC-AutoCut
FPC-AutoCut provides the same features as FPC and can be cutover to FPB/SS/I/M1 without requiring dispatch to the remote terminal (RT) site.

FPD
FPD provides a low bit rate voice FPC capability (reduces the number of required digital facilities).

FTTH
Fiber to the Home (FTTH) is supported by FPC, FPC-AutoCut, and FPB/SS/M1 or FPB/SS/M2. FTTH has two configurations:

- Distant terminal versions provide up to four POTS lines per 900A( ) distant terminal (DT) cabinet.
- *SLC*-2000 multi-services distant terminal (MSDT) provides up to 24 POTS or special service lines per MSDT cabinet.

* Bellcore Technical Reference TR-TSY-000008 Issue 2, August 1987, *Digital Interface Between the SLC 96 Digital Loop Carrier System and a Local Digital Switch.*

FPF

FPF supports *SLC*-2000 MSDT feature and provides the same type service capabilities as FPC (using FPC-AutoCut configuration). Procedures to equip the MSDT are found in AT&T 363-205-004.

FPG

FPG provides cost effective POTS service, the full range of switched and nonswitched special services, Mode 1 or Mode 2 (concentrated) capability, and enhanced operations, administration, maintenance, and provisioning (OAM&P) capabilities.

Admonishments

Admonishments in this document have the following definitions:

DANGER:
This indicates the presence of a hazard that *will* cause death or severe personal injury if the hazard is not avoided.

Warning:
This indicates the presence of a hazard that *can* cause death or severe personal injury if the hazard is not avoided.

Caution:
This indicates the presence of a hazard that *will* or can cause minor personal injury or property if the hazard is not avoided. This includes equipment damage, loss of software, or service interruption.

Equipment and Craft Personnel Considerations

⚠ CAUTION:
*An electrostatic discharge wrist strap, with a minimum resistance of 250K ohms, should be worn when handling Series 5 circuit packs to prevent possible damage to the circuit packs. Before using the wrist strap, check it for opens, shorts, and minimum resistance value. If the strap does not pass these checks, it should not be used. To avoid possible personal injury while using the wrist strap at the COT, connect the wrist strap to the **ESD WRIST STRAP GROUNDING POINT** on the right-hand side of the COT frame. If no grounding point is present, connect the wrist strap to a bare-metal section of the COT frame. At the RT, to avoid possible personal injury while using the wrist strap, do not connect it to the power shelf or adjacent portions of the RT frame. Connect the wrist strap to the **ESD GRD** jack on the fan unit, if present. If the grounding jack is not present, connect the wrist strap to the bare-metal section of the frame well away from the power shelf.*

The Series 5 channel bank assembly and associated equipment provide high voltage ringing current and high amperage power distribution. You should remove any metal jewelry before working on this equipment, particularly around the backplane. *Follow local personal safety procedures when working on any AT&T product.*

Checklist

The following table provides a means to verify that all elements are present. This information should not be used for direct access to a particular element because *most elements are not stand-alone procedures.*

Table A. Element Summary

Element	Title
IXL-001	Task Index List
NTP-002	Acceptance
NTP-003	Add Channel Service to Universal or Integrated Feature Package B System Without Special Services Option
NTP-004	Add Channel Service to System with Series 5 Feature Package A, C, D, or G
NTP-005	Add Digital Connectivity Unit (DCU) Channels
NTP-006	Add Channel Service to Integrated FPB System with Special Services Option
NTP-007	Add Channel Service to Universal FPB System with Special Services Option
DLP-500	Review Channel Test Equipment
DLP-501	Test Single-Party Loop-Start Channel (POTS or *SPOTS*® Channel Unit) End-To-End on Integrated System
DLP-502	Test Single-Party Ground-Start Channel (*SPOTS*® Channel Unit) End-To-End on Integrated System
DLP-503	Test Single-Party Channel End-To-End on Universal *SLC*® Carrier System
DLP-504	Test *SPOTS*® Channel Unit (Loop-Start) End-To-End on Universal *SLC*® Carrier System
DLP-505	Test *SPOTS*® Channel Unit (Ground-Start) End-To-End on Universal *SLC*® Carrier System

Continued on next page

Table A.—Continued

Element	Title
DLP-506	Test Coin Channel End-To-End on Universal *SLC*® Carrier System
DLP-507	Test Coin Channel End-To-End On Integrated System
DLP-508	Verify COT Channel Unit Settings — 2-Wire Interface to Carrier Terminal, Metallic Repeater, or Central Office Switch
DLP-509	Verify COT Channel Unit Settings and Loop Integrity — 2-Wire COT Interface to Loop to PBX, Telephone Set, or Data Modem
DLP-510	Verify COT Channel Unit Settings 4-Wire Interface to Carrier Terminal
DLP-511	Verify COT Channel Unit Settings and Metallic Extension Integrity — 4-Wire Metallic Extension to Customer Location or Foreign Central Office
DLP-512	Verify RT Channel Unit Settings and Loop Integrity — 2-Wire Loop to NCTE
DLP-513	Verify RT Channel Unit Settings and Loop Integrity 2-Wire Loop to PBX, Telephone Set, or Data Modem
DLP-514	Verify RT Channel Unit Settings and Loop Integrity — 4-Wire Loop to NCTE
DLP-515	Verify RT Channel Unit Settings and Loop Integrity 4-Wire Loop Without NCTE (to PBX or Data Terminal)
DLP-516	Prepare for Recent Change Activities
DLP-517	Assign Service to Channel
DLP-518	Assign Telephone Number to Channel
DLP-519	Provision 2-Wire Special Services Channel (AUA42, AUA43, and AUA142 Channel Units)
DLP-520	Provision 4W-0 (AUA54) or 4W-2 (AUA44) Channel Unit

Continued on next page

Table A.—Continued

Element	Title
DLP-521	Provision 4W-1 (AUA41 and AUA141) Channel Unit
DLP-522	Provision Dataport Channels (AUA34, AUA34B, AUA52, and AUA52B)
DLP-523	Perform OCU and Channel Loopback Test (Test Conducted at COT, Through DS0 Dataport)
DLP-525	Adjust Gain of 2-Wire Special Services (AUA42, AUA43, or AUA142 Channel Unit)
DLP-526	Adjust Attenuation of 4W-0 (AUA54), 4W-1 (AUA41/AUA141), or 4W-2 (AUA44) Channel Unit
DLP-527	Provision DCU Channels (AUA16 and AUA17)
DLP-528	Test DCU at Both Ends from DACS to Network Interface with Loopback at NIF
DLP-529	Test RT DCU with Loopback at Network Interface
DLP-530	Test COT DCU from DACS Test Port
DLP-531	Test COT DCU with Loopback at DSX
DLP-532	Test RT and COT DCU at COT Through CIU (DACS Not Available)
DLP-533	Perform OCU and Channel Loopback Test from COT Equipped with DCU
DLP-534	Clear Test Bus Access
DLP-535	Make Connections at RT for DS1 Cabling to DCU
DLP-536	Test Multiparty (2-Party ANI) Channel on Integrated System (DCLU to Series 5 Mode 96 RT)
DLP-537	Test Multiparty (2-Party ANI) Channel COT-to-RT on Universal *SLC*® Carrier System
DLP-538	Test FSR Channel COT-to-RT on Universal *SLC*® Carrier System
DLP-539	Test FSR Channel on Integrated System (DCLU to Series 5 Mode 96 RT)
DLP-540	Set Option Switches on RT Frequency Selective Ringing (FSR) Channel Unit

Continued on next page

Table A.—Continued

Element	Title
DLP-541	Set Option Switches on Dual Ringing Repeater Channel Unit
DLP-542	Set Option Switches on DCU (Digital Connectivity Unit)
DLP-543	Test Using 52A Channel Unit Test Extender
DLP-544	Test DID Channel on Universal System
DLP-545	Test AUA45(B) Manual Ringdown Channel on Universal System or Integrated System with Nail-Up
DLP-546	Verify RT Channel Unit Settings and Loop Integrity — 2-Wire Loop to NCTE (FPB/SS System)
DLP-547	Verify RT Channel Unit Settings and Loop Integrity — 2-Wire Loop to PBX, Telephone Set, or Data Modem (FPB/SS System)
DLP-548	Verify RT Channel Unit Settings and Loop Integrity — 4-Wire Loop to NCTE (FPB/SS System)
DLP-549	Verify RT Channel Unit Settings and Loop Integrity — 4-Wire Loop Without NCTE (to PBX or Data Terminal) (FPB/SS System)
DLP-551	Perform OCU and Channel Loopback Test at RT (FPB/SS System)
DLP-554	Verify COT Channel Unit Settings — 2-Wire Interface to Carrier Terminal, Metallic Repeater, or Central Office Switch (FPB/SS System)
DLP-555	Verify COT Channel Unit Settings — 2-Wire COT Interface to Loop to PBX, Telephone Set, or Data Modem (FPB/SS System)
DLP-556	Verify COT Channel Unit Settings — 4-Wire Interface to Carrier Terminal (FPB/SS System)
DLP-557	Verify COT Channel Unit Settings and Metallic Extension Integrity — 4-Wire Metallic Extension to Customer Location or Foreign CO (FPB/SS System)

Continued on next page

Table A.—Continued

Element	Title
DLP-558	Perform Trunk Line Work Station Tests Integrated FPB/SS System
DLP-559	Measure Signal Level End-To-End on Single-Party Channel (ALC Channel Unit Inserting Maximum Loss)
DLP-560	Measure Signal Level from Central Office to Network Interface (NIF) on Single-Party Channel (ALC Channel Unit Inserting Expected Loss)
DLP-561	Set Option Switches on AUA34B DS0 Dataport Channel Unit
DLP-562	Set Option Switches AUA52B Office Channel Unit (OCU) Dataport
DLP-563	Set Option Switches on Dual Private Line Auto Ring (PLAR) Channel Unit
DLP-564	Test AUA75 Private Line Auto Ring (PLAR) Channel on Universal System or Integrated System with Nail-Up

Task Index List

FIND YOUR JOB IN THE LIST BELOW	THEN GO TO
Acceptance	NTP-002
Dataport Channels (Channel/DSU and OCU Loopback) — Test	DLP-551
AUA90 T-BRITE Channel Unit — Install and Test	AT&T 363-205-106
AUA93 BRITE II Channel Unit — Install and Test	AT&T 363-205-107
AUA94 U-DSL Channel Unit — Install and Test	AT&T 363-205-113
DCU (Digital Connectivity Unit) Channels — Add	NTP-005
Coin Channel on Integrated System — End-To-End Test	DLP-507
Coin Channel on Universal System — End-To-End Test	DLP-506
Ground-Start Channel on Universal System — End-To-End Test	DLP-505
Loop-Start Channel on Universal System — End-To-End Test	DLP-504
Single-Party Channel on Universal System — End-To-End Test	DLP-503
Single-Party Ground-Start Channel on Integrated System — End-To-End Test	DLP-502
Single-Party Loop-Start Channel on Integrated System — End-To-End Test	DLP-501
Integrated FPB System with Special Services Option — Add Channel Service	NTP-006
Universal FPB System with Special Services Option — Add Channel Service	NTP-007
Universal or Integrated FPB System Without Special Services Option — Add Channel Service	NTP-003
Universal System with Feature Package A, C, D, or G — Add Channel Service	NTP-004
52A Channel Unit Test Extender — Test Channel Units	DLP-543

FIND YOUR JOB IN THE LIST BELOW **THEN GO TO**

NOTE:
Table A provides direct access to the procedures used to option, provision, and test *SLC*® Series 5 Carrier System channel units. This method of accessing these procedures is an alternative to using the NTPs and does not include any of the preliminary information or instructions presented in the NTPs. Since the omission of any of the information or instructions found in the NTPs could affect channel unit test results, it is suggested that only telco personnel familiar with these installation and test procedures use Table A; all others should use the task index list on Page 1 and the appropriate NTP.

Table A. Channel Unit DLP References

Channel Unit	Function	Location	Option	Provision	Installation Test Configuration	Installation Test Universal	Installation Test Integrated
AUA16/17	DCU	RT/COT	**DLP-542**	**DLP-527**	Test at least two channels from the DACS with a loopback at the network interface (NIF)	**DLP-528**	
		RT/COT			Test at least two channels from the COT with a CIU	**DLP-532**	
		RT			Test at least two channels from the CIU through the bit stream to the customer location with a loopback at the NIF	**DLP-529**	
		COT			Test at least two channels with a loopback at the DSX	**DLP-531**	
		COT			Test at least two channels from the DACS to the COT	**DLP-530**	

Continued on next page

FIND YOUR JOB IN THE LIST BELOW — THEN GO TO

Table A—*Continued*

Channel Unit	Function	Location	Option	Provision	Installation Test Configuration	Universal	Integrated
AUA25B	M *SPOTS*®	RT			POTS	**DLP-503**	**DLP-501**
					Loop start	**DLP-504**	**DLP-501**
					Ground start	**DLP-505**	**DLP-502**
AUA31	POTS	COT				**DLP-503**	
AUA32	*SPOTS*	COT			Loop start	**DLP-504**	
					Ground start	**DLP-505**	
AUA33	Coin	COT				**DLP-506**	
AUA34	DS0-DP	COT		**DLP-522**		**DLP-523**	
AUA34B	DS0-DP	COT	**DLP-561**	**DLP-522**		**DLP-523**	
AUA35	Multiparty	COT				**DLP-537**	
AUA36	DID	COT				**DLP-544**	
AUA37	FSR	COT				**DLP-538**	
AUA38	POTS	COT				**DLP-503**	
AUA39	*SPOTS*	COT			Loop start	**DLP-504**	
					Ground start	**DLP-505**	
AUA41	4W-CF	COT		**DLP-521**	Interface to CO carrier terminal	**DLP-510**	
		RT			At COT — 4-wire interface to CO carrier terminal (FPB/SS system only)	**DLP-556**	

Continued on next page

FIND YOUR JOB IN THE LIST BELOW — THEN GO TO

Table A—*Continued*

Channel Unit	Function	Location	Option	Provision	Installation Test Configuration	Universal	Integrated
AUA41 (Contd)	4W-CF	COT		**DLP-521**	4-wire metallic extension to foreign CO or customer location	**DLP-511**	
		RT			At COT — 4-wire metallic extension to foreign CO or customer location (FPB/SS system only)	**DLP-557**	
		RT			4-wire loop with network channel terminating equipment (NCTE (to PBX or data modem)	**DLP-514**	
		RT			4-wire loop without NCTE (to PBX or data terminal)	**DLP-515**	
		RT			FPB/SS system — 4-wire loop with NCTE (to PBX or data terminal)	**DLP-548**	**DLP-548**
		RT			FPB/SS system — 4-wire loop without NCTE (to PBX or data terminal)	**DLP-549**	**DLP-549**
AUA42	E *SPOTS*	COT		**DLP-519**	Interface to carrier terminal, metallic repeater, or CO switch	**DLP-508**	
		RT			At COT — 2-wire interface to carrier terminal, metallic repeater, or CO switch (FPB/SS system only)	**DLP-554**	

Continued on next page

FIND YOUR JOB IN THE LIST BELOW — THEN GO TO

Table A—*Continued*

Channel Unit	Function	Location	Option	Provision	Installation Test: Configuration	Installation Test: Universal	Installation Test: Integrated
AUA42 (Contd)	E *SPOTS*	COT		**DLP-519**	COT interface to loop to PBX, telset, or data modem	**DLP-509**	
		RT			COT interface to loop to PBX, telset, or data modem (FPB/SS system only)	**DLP-555**	
		RT			At RT — 2-wire loop to NCTE (to PBX or data terminal)	**DLP-512**	
		RT			2-wire loop to PBX, telset, or data modem (no NCTE)	**DLP-513**	
		RT			FPB/SS system — 2-wire loop to NCTE (to PBX or data modem)	**DLP-546**	**DLP-546**
		RT			FPB/SS system — 2-wire loop to PBX, telset, or data modem (no NCTE)	**DLP-547**	**DLP-547**
AUA43	E *SPOTS*	COT		**DLP-519**	2-wire interface to carrier terminal, metallic repeater, or CO switch	**DLP-508**	
		COT			COT interface to loop to PBX, telset, or data set	**DLP-509**	
		RT			2-wire loop to NCTE (to PBX or data terminal)	**DLP-512**	
		RT			2-wire loop to PBX, telset, or data modem (no NCTE)	**DLP-513**	

Continued on next page

FIND YOUR JOB IN THE LIST BELOW — THEN GO TO

Table A—*Continued*

Channel Unit	Function	Location	Option	Provision	Installation Test Configuration	Universal	Integrated
AUA43 (Contd)	E *SPOTS*	RT		**DLP-519**	FPB/SS system — 2-wire loop to NCTE (to PBX or data modem)	**DLP-546**	**DLP-546**
		RT			FPB/SS system — 2-wire loop to PBX, telset, or data modem (no NCTE)	**DLP-547**	**DLP-547**
AUA44	4W-CS	COT		**DLP-520**	Interface to carrier terminal	**DLP-510**	
		RT			At COT — 4-wire interface to carrier terminal (FPB/SS system only)	**DLP-556**	
		COT			4-wire metallic extension to foreign CO or customer location	**DLP-511**	
		RT			At COT — 4-wire metallic extension to foreign CO or customer location (FPB/SS system only)	**DLP-557**	
		RT			4-wire loop with NCTE (to PBX or data modem)	**DLP-514**	
		RT			4-wire loop without NCTE (to PBX or data terminal)	**DLP-515**	
		RT			FPB/SS system — 4-wire loop with NCTE (to PBX or data modem)	**DLP-548**	**DLP-548**

Continued on next page

FIND YOUR JOB IN THE LIST BELOW — THEN GO TO

Table A—*Continued*

Channel Unit	Function	Location	Option	Provision	Installation Test: Configuration	Universal	Integrated
AUA44 (Contd)	4W-CS	RT		**DLP-520**	FPB/SS system — 4-wire loop without NCTE (to PBX or data terminal)	**DLP-549**	**DLP-549**
AUA45(B)	Dual ringing repeater	RT/COT	**DLP-541**			**DLP-545**	**DLP-545**
AUA51	POTS/ *SPOTS*	RT			POTS	**DLP-503**	**DLP-501**
					Loop start	**DLP-504**	**DLP-501**
					Ground start	**DLP-505**	**DLP-502**
AUA52	OCU-DP	RT		**DLP-522**	Without DCU	**DLP-523**	
		RT			From COT equipped with DCU	**DLP-533**	
		RT			FPB/SS system	**DLP-551**	
AUA52B	OCU-DP	RT	**DLP-562**	**DLP-522**	Without DCU	**DLP-523**	
		RT			From COT equipped with DCU	**DLP-533**	
		RT			FPB/SS system	**DLP-551**	
AUA53	Coin	RT				**DLP-506**	**DLP-507**
AUA54	4W-EM	RT		**DLP-520**	At COT — 4-wire metallic extension to foreign CO or customer location (FPB/SS system only)	**DLP-557**	

Continued on next page

FIND YOUR JOB IN THE LIST BELOW — THEN GO TO

Table A—*Continued*

Channel Unit	Function	Location	Option	Provision	Installation Test: Configuration	Universal	Integrated
AUA54 (Contd)	4W-EM	RT		**DLP-520**	At RT — 4-wire loop without NCTE (to PBX)	**DLP-515**	
		RT			FPB/SS system — 4-wire loop without NCTE (to PBX)	**DLP-549**	**DLP-549**
AUA55	Multiparty	RT				**DLP-537**	**DLP-536**
AUA56	DID	RT				**DLP-544**	
AUA57	FSR	RT	**DLP-540**			**DLP-538**	**DLP-539**
AUA58(B)	POTS	RT				**DLP-503**	**DLP-501**
AUA59	POTS/ *SPOTS*	RT			POTS Loop start Ground start	**DLP-503** **DLP-504** **DLP-505**	**DLP-501** **DLP-501** **DLP-502**
AUA75	PLAR	RT/COT	**DLP-563**			**DLP-564**	**DLP-564**
AUA141	4W-CF	COT		**DLP-521**	Interface to CO carrier terminal	**DLP-510**	
		RT			At COT — 4-wire interface to CO carrier terminal (FPB/SS system only)	**DLP-556**	
		COT			4-wire metallic extension to foreign CO or customer location	**DLP-511**	

Continued on next page

FIND YOUR JOB IN THE LIST BELOW — THEN GO TO

Table A—*Continued*

Channel Unit	Function	Location	Option	Provision	Configuration	Installation Test Universal	Installation Test Integrated
AUA141 (Contd)	4W-CF	RT		**DLP-521**	At COT — 4-wire metallic extension to foreign CO or customer location (FPB/SS system only)	**DLP-557**	
		RT			4-wire loop with NCTE (to PBX to data modem)	**DLP-514**	
		RT			4-wire loop without NCTE (to PBX or data terminal)	**DLP-515**	
		RT			FPB/SS system — 4-wire loop with NCTE (to PBX or data modem)	**DLP-548**	**DLP-548**
		RT			FPB/SS system — 4-wire loop without NCTE (to PBX or data terminal)	**DLP-549**	**DLP-549**
AUA142	E *SPOTS*	COT		**DLP-519**	Interface to carrier terminal, metallic repeater, or CO switch	**DLP-508**	
		RT			At COT — 2-wire interface to carrier terminal, metallic repeater, or CO switch (FPB/SS system only)	**DLP-554**	
		RT			COT interface to loop to PBX, telset, or data modem (FPB/SS system only)	**DLP-555**	
		COT			COT interface to loop to PBX, telset, or data modem	**DLP-509**	

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FIND YOUR JOB IN THE LIST BELOW — THEN GO TO

Table A—*Continued*

Channel Unit	Function	Location	Option	Provision	Installation Test: Configuration	Universal	Integrated
AUA142 (Contd)	E *SPOTS*	RT		**DLP-519**	2-wire loop to NCTE (to PBX or data terminal)	**DLP-512**	
		RT			2-wire loop to PBX, telset, or data modem (no NCTE)	**DLP-513**	
		RT			FPB/SS system — 2-wire loop to NCTE (to PBX or data modem)	**DLP-546**	**DLP-546**
		RT			FPB/SS system — 2-wire loop to PBX, telset, or data modem (no NCTE)	**DLP-547**	**DLP-547**
AUA150	POTS/ *SPOTS*	RT			POTS	**DLP-503**	**DLP-503**
					Loop start	**DLP-504**	**DLP-501**
					Ground start	**DLP-505**	**DLP-502**
AUA151	POTS/ *SPOTS*	RT			POTS	**DLP-503**	
					Loop start	**DLP-504**	**DLP-501**
					Ground start	**DLP-505**	**DLP-502**
AUA152	OCU-DP	RT			Without DCU	**DLP-523**	
					From COT equipped with DCU	**DLP-533**	
		RT			FPB/SS system	**DLP-551**	
AUA158	POTS	RT			POTS	**DLP-503**	**DLP-501**
					Loss measured at RT	**DLP-559**	**DLP-559**
					Loss measured at NIF	**DLP-560**	**DLP-560**

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FIND YOUR JOB IN THE LIST BELOW — THEN GO TO

Table A—*Continued*

Channel Unit	Function	Location	Option	Provision	Configuration	Installation Test Universal	Installation Test Integrated
AUA159	POTS/ *SPOTS*	RT			POTS	**DLP-503**	**DLP-503**
					Loop start	**DLP-504**	**DLP-501**
					Ground start	**DLP-505**	**DLP-502**
					Loss measured at RT	**DLP-559**	**DLP-559**
					Loss measured at NIF	**DLP-560**	**DLP-560**

Acceptance

General

Acceptance tasks for the Series 5 universal system central office terminal (COT) and remote terminal (RT) are provided in AT&T 363-205-400 (TOP) and AT&T 363-205-401 (TOP), respectively. For the Series 5 Mode 96 RT (universal or integrated systems), acceptance tasks are provided in AT&T 363-205-401. Also, acceptance tasks for the T1 digital facility and support pairs are provided in AT&T 363-200-001 (TOP).

Add Channel Service to Universal or Integrated Feature Package B System Without Special Services Option

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

1. Overview: To add or establish channel service, channel units must be installed and tested. Channel service may be added without interrupting service to other channels in the system. The Series 5 Mode 96 remote terminal (RT) channel units — POTS, *SPOTS*® and M *SPOTS* channel units, coin, multiparty, and direct inward dial (DID) channel units do *not* have options. (DID channel units may be used only in the universal systems.)

   The RT frequency selective ringing (FSR) channel unit has an option switch that must be set before the channel is put in service.

   NOTE:
   If the central office uses nonphased ringing generators, there should be no more than 10 FSR lines per shelf assigned to emergency customers that could be rung simultaneously.

   In a Series 5 Mode 96 RT, the FSR channel units do not provide automatic number identification (ANI).

   In integrated systems, this procedure assumes a working knowledge of the *5ESS*® switch master control center (MCC) or recent change and verify (RC/V) terminal used to add or establish service. In universal systems, refer to AT&T 363-202-402 for options and installation of channel units in the *SLC*® 96 central office terminal (COT).

2. Testing Notes: The channel units in a universal Mode 96 system may be tested using the pair gain test controller

DO ITEMS BELOW IN ORDER LISTED	**FOR DETAILS, GO TO**

(PGTC), extended test controller (XTC), or by personnel at the COT and RT. In an integrated system, channels may be tested using a local test desk or the mechanized loop testing (MLT) system to initiate tests with the *5ESS* switch software. The *5ESS* switch software emulates the PGTC test sequence and is connected to the test pair by means of the test bus control unit (TBCU).

Multiparty — If the XTC is optioned to test 4-party lines, then 2-party lines in RTs without an **AUG1** positive ringing unit (PRU) will test "bad". In order for 2-party lines to test "good", an **AUG1** PRU must be installed in those RTs.

DID — Channels in a universal system can be tested by means of the XTC if it is equipped with an MC97761A1 control unit (XCU). The DID channel cannot be accessed like other locally switched lines; it must be tested by MLT through the XTC channel unit emulator (CUE) like a special service channel. DID channels in an integrated system cannot be tested with the PGTC or XTC.

Tip/Ring Access — Some channel units have a faceplate jack for tip and ring test access (requires a test cord, comcode 405755208). The 52A channel unit test extender provides test access and other features and may be used with any Series 5 channel unit (AT&T 363-005-235 data sheet).

3. Obtain test equipment as required for channel service to be tested.

   A. POTS, *SPOTS*, and M *SPOTS* channel units: KS-14510 volt-ohm-milliammeter (VOM) and 500-type telephone set at the RT.

   B. Multiparty channels: KS-14510 VOM and two or more 500-type telephone sets at the RT.

   C. FSR channels: 500-type telephone sets and ringer box (optional) at the RT.

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	D. Coin channels: Coin telephone set and coins (nickel, dime, and quarter) at the RT.	
	E. DID channels:	DLP-500
4.	**CAUTION:** *An electrostatic discharge wrist strap, with a minimum resistance of 250K ohms, should be worn when handling Series 5 circuit packs to prevent possible damage to the circuit packs. Before using the wrist strap, check it for opens, shorts, and minimum resistance value. If the strap does not pass these checks, it should not be used. To avoid possible personal injury while using the wrist strap, connect only to* **ESD GRD** *jack on the fan unit.* Set options on the **AUA57** RT FSR channel unit as required.	DLP-540
5.	**CAUTION:** *Multiparty service for four or more parties requires a positive ringing supply (the equivalent of an AUG1 PRU installed in the power shelf at the RT).* Install the Series 5 channel units as required for channels to be added or established.	
6.	At the central office, prepare the system for end-to-end channel tests.	
	A. Universal system: At *SLC* 96 Carrier System COT, install channel units as required for channels to be added or established. Refer to AT&T 363-202-402, *Channel Unit Installation* for option settings for COT channel units.	
	B. Integrated system:	
	1. Select and prepare the *5ESS* switch terminal for recent change activities.	DLP-516

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	2. Assign the service to a channel.	DLP-517
	3. Assign the telephone number to a channel.	DLP-518
7.	Test single-party POTS service as required.	
	A. Universal system:	DLP-503
	B. Integrated system:	DLP-501
8.	**NOTE:** It is recommended that *SPOTS* and M *SPOTS* channel units be tested with a ground start test line. However, if a ground start test line is not available and the application is loop start, a loop start test line may be used. Test 2-wire locally switched special services (*SPOTS* and M *SPOTS* channel units) - loop start application - as required.	
	A. Universal system:	DLP-504
	B. Integrated system:	DLP-501
9.	Test 2-wire locally switched special services (*SPOTS* and M *SPOTS* channel units) - ground start application - as required.	
	A. Universal system:	DLP-505
	B. Integrated system:	DLP-502
10.	Test coin service as required.	
	A. Universal system:	DLP-506
	B. Integrated system:	DLP-507
11.	**NOTE:** For testing party line service (four or more parties) operator number identification (ONI), refer to AT&T 363-202-402, *Channel Unit Installation* (DLP-549 for universal system or DLP-581 for integrated system).	

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	Multiparty service for four or more parties requires a positive ringing supply (the equivalent of an AUG1 PRU installed in the power shelf at the RT).	
	Test multiparty 2-party automatic number identification (ANI) service - as required.	
	A. Universal system:	DLP-537
	B. Integrated system:	DLP-536
12.	Test FSR service - as required.	
	A. Universal system:	DLP-538
	B. Integrated system:	DLP-539
13.	Test DID service - as required (universal system only).	DLP-544
14.	Update office records per local practice [work order record detail (WORD), system, facility, and/or channel records].	

Add Channel Service to System with Series 5 Feature Package A, C, D, or G

DO ITEMS BELOW IN ORDER LISTED **FOR DETAILS, GO TO**

1. Overview: To add or establish channel service, channel units must be installed, provisioned (as necessary), and tested. Channel service may be added without interrupting service to other channels in the system.

   Channel Unit Options: The POTS, *SPOTS*® and M *SPOTS* channel units, automatic loss compensation (ALC) units, coin, multiparty, central office terminal (COT) frequency selective ringing (FSR) channel unit, and direct inward dial (DID) channel units do not have options. The remote terminal (RT) FSR, **AUA34B** (COT) and **AUA52B** (RT) dataports, dual ringing repeater (**AUA45B**), and dual private line auto ring (**AUA75**) channel units have option switches that must be set before the channels are put in service. For FSR units, if the central office uses nonphased ringing generators, there should be no more than 10 FSR lines per shelf assigned to the emergency customers that could be rung simultaneously.

   Provisioning: The 2-wire special service (**AUA42**, **AUA43**, and **AUA142**), 4-wire voice-frequency (VF) special service, and dataport channels must be provisioned before being put into service. These channels require the **J99404TA** craft interface unit (CIU) at the COT or RT for provisioning and channel testing. In addition to CIU provisioning, **AUA34B** (COT) and **AUA52B** (RT) dataport channel units have option switches that must be set before the channels are put in service.

2. Testing Notes: The POTS, *SPOTS* and M *SPOTS* channel units, coin, multiparty, and FSR channel units may be tested with the pair gain test controller (PGTC), extended test

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	controller (XTC), or by personnel at the COT and RT. Neither the dual ringing repeater (**AUA45B**) nor the private line auto ring [PLAR (**AUA75**)] channel unit may be tested by means of the PGTC or XTC. Private line circuits containing either of these channel units can be accessed by the Switched Access Remote Testing System (SARTS) in the bit stream between the COT and the RT; PLAR circuits can be accessed by SARTS at the RT looking toward the customer. The 2-wire special service (**AUA42**, **AUA43**, and **AUA142**), 4-wire VF special service, and dataport channel units can be tested with the CIU from the COT with a tester at the customer location. Personnel are not required at the RT except to install the channel units. *Multiparty* — If the XTC is optioned to test 4-party lines, then 2-party lines in RTs without an **AUG1** positive ringing unit (PRU) will test "bad". In order for 2-party lines to test "good", an **AUG1** PRU must be installed in those RTs. *DID* — Channel units can be tested with the PGTC or XTC except in systems with Feature Package A. To test DID channel units, the XTC must be equipped with an MC97761A1 control unit (XCU). The DID channel cannot be accessed like other locally switched lines; it must be tested by MLT through the XTC channel unit emulator (CUE) like a special service channel. *Tip/Ring Access* — Some channel units have a faceplate jack for tip and ring test access (requires a test cord, comcode 405755208). The 52A channel unit test extender provides test access and other features and may be used with any Series 5 channel unit (AT&T 363-005-235 data sheet).	
3.	Obtain the test equipment for the channel service to be tested.	DLP-500
4.	⚠ CAUTION: *An electrostatic discharge wrist strap, with a minimum resistance of 250K ohms, should be worn when handling Series 5 circuit packs to prevent possible damage to the circuit packs. Before using the wrist strap, check it for opens, shorts, and minimum resistance value. If the strap does not pass these checks, it should not be used. To avoid possible*	

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

*personal injury while using the wrist strap at the COT, connect the wrist strap to the **ESD WRIST STRAP GROUNDING POINT** on the right-hand side of the COT frame. If no grounding point is present, connect the wrist strap to a bare-metal section of the COT frame. At the RT, to avoid possible personal injury while using the wrist strap, do not connect it to the power shelf or adjacent portions of the RT frame. Connect the wrist strap to the **ESD GRD** jack on the fan unit, if present. If the grounding jack is not present, connect the wrist strap to the bare-metal section of the frame well away from the power shelf.*

At the COT and RT for channel units listed below, set options and install channel units as required.

A. **AUA57** RT FSR channel unit:	DLP-540
B. **AUA45B** dual ringing repeater channel unit:	DLP-541
C. **AUA75** private line auto ring channel unit:	DLP-563
D. **AUA34B** DS0 dataport channel unit:	DLP-561
E. **AUA52B** OCU dataport channel unit:	DLP-562

5.

CAUTION:
Multiparty service for four or more parties requires a positive ringing supply (the equivalent of an AUG1 PRU installed in the power shelf at the RT).

NOTE:
The 2- and 4-wire special service channel units may be installed before or after provisioning. In systems with low bit-rate voice (LBRV), dataport channel units with second channel error correction must *not* be installed in the last slot of a digroup (23/24, 47/48, 71/72, and 95/96)

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	Install any other channel units at the COT and RT as required for channels to be added or established.	
6.	Test single-party POTS service as required.	
	A. Fixed loss channel units [**AUA31** or **AUA38** with **AUA51**, **AUA58**(**B**), **AUA59**, **AUA150**, or **AUA25**(**B**)]; ALC channel units (**AUA158** or **AUA159**):	DLP-503
	B. ALC channel unit loss measurements (**AUA158** or **AUA159**):	DLP-560
	C. ALC channel units operating with maximum loss (**AUA158** or **AUA159**):	DLP-559
7.	NOTE: It is recommended that *SPOTS* and M *SPOTS* channel units be tested with a ground start test line. However, if a ground start test line is not available and the application is loop start, a loop start test line may be used. Test 2-wire locally switched special services (*SPOTS* and M *SPOTS* channel units) [**AUA32** or **AUA39** with **AUA51**, **AUA59**, **AUA25**(**B**), or **AUA159** channel units] (COT to RT) as required.	
	A. Loop start application:	DLP-504
	B. Ground start application:	DLP-505
8.	Test coin service (**AUA33**, **AUA53** channel units) (COT to RT) as required.	DLP-506
9.	NOTE: For testing party-line service (four or more parties) operator number identification (ONI), refer to AT&T 363-202-402, *Channel Unit Installation* (DLP-549 for universal system or DLP-581 for integrated system). **Multiparty service for four or more parties requires a positive ringing supply (the equivalent of an AUG1 PRU installed in the power shelf at the RT).**	

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	Test multiparty automatic number identification (ANI) service (**AUA35**, **AUA55**) (COT to RT) as required.	DLP-537
10.	Test FSR service (**AUA37**, **AUA57** channel units) (COT to RT) as required.	DLP-538
11.	Test DID service (**AUA36**, **AUA56** channel units) (COT to RT) as required.	DLP-544
12.	Test dual ringing repeater [**AUA45**(**B**) channel units] (COT to RT) as required.	DLP-545
13.	Test dual private line auto ring (PLAR) (**AUA75** channel units) (COT to RT) as required.	DLP-564
14.	If the CIU is required for provisioning and/or testing, connect the CIU test cord to the COT channel test unit (CTU) (**AUB5**) in the dual channel bank for the system being tested.	
15.	Provision 2- and 4-wire special services and dataports as required.	
	A. **AUA42**, **AUA43**, and **AUA142** channel units:	DLP-519
	B. **AUA44** and **AUA54** channel units:	DLP-520
	C. **AUA41** and **AUA141** channel units:	DLP-521
	D. **AUA34**, **AUA34B**, **AUA52**, and **AUA52B** channel units:	DLP-522
16.	Test the COT circuit-end of 2-wire special service circuits as required.	
	A. 2-wire interface to carrier terminal, metallic repeater, or central office (CO) switch:	DLP-508
	B. 2-wire COT interface to loop to PBX, telephone set (Telset), or data set:	DLP-509

17.

NOTE:
References to the **AUA41** channel unit also apply to the **AUA141** channel unit.

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	Test the COT circuit-end of 4-wire special service circuits as required.	
	A. 4-wire interface to carrier terminal:	DLP-510
	B. 4-wire metallic extension to foreign CO or customer location:	DLP-511
18.	Test the RT circuit-end of 2-wire special service circuits as required.	
	A. 2-wire loop to network channel terminating equipment (to PBX or data modem):	DLP-512
	B. 2-wire loop to PBX, telset or data modem (no network channel terminating equipment):	DLP-513
19.	NOTE: References to the **AUA41** channel unit also apply to the **AUA141** channel unit. Test the RT circuit-end of 4-wire special service circuits as required.	
	A. 4-wire loop with network channel terminating equipment (to PBX or data modem):	DLP-514
	B. 4-wire loop without network channel terminating equipment (to PBX or data terminal):	DLP-515
20.	NOTE: If the RT terminates in a Digital Access Cross-Connect System (DACS II) at the CO, refer to AT&T 365-301-617 for DACS procedures for testing the Series 5 channel. The dataport may be tested from the RT with DLP-551. Test dataport channels as required.	DLP-523
21.	Update office records per local practice [work order record detail (WORD), system, facility, and/or channel records].	

Add Digital Connectivity Unit (DCU) Channels

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO
1. Overview: The digital connectivity unit (DCU) may be added to a system with Feature Package C or D without interrupting service to other digroups. If the system is equipped for low bit rate voice (LBRV) (Feature Package D), the DCU will operate only at one end; special service channel units must be installed at the other end. The direct inward dial (DID) special service channel unit does not have options. The dual ringing repeater channel unit has manual switch options that must be set. The other special service channels must be provisioned before being put into service. This requires the **J99404TA** craft interface unit (CIU) at the central office terminal (COT) or remote terminal (RT) for provisioning and channel testing.	
2. Testing Notes: DID channels can be tested with the extended test controller (XTC) equipped with an MC97761A1 control unit (XCU). The DID channel cannot be accessed like other locally switched lines; it must be tested by a Mechanized Loop Testing (MLT) system through the XTC channel unit emulator (CUE) like a special service channel. The dual ringing repeater channel unit [**AUA45**(**B**)] cannot be tested by means of the pair gain test controller (PGTC) or XTC. The other special service channel units can be tested with the CIU from the COT with a tester at the customer location. Personnel are not required at the RT except to install the DCU or channel units.	
3. Obtain test equipment for channel service to be tested.	DLP-500

DO ITEMS BELOW IN ORDER LISTED		**FOR DETAILS, GO TO**
4.	Verify that the office timing unit [OTU (**AUA3**)] is installed in the COT in the system for the DCU. (The OTU is required for DCU operation at either end.)	
5.	If the DCU is to be installed at the COT, verify that the required DS1 connector assembly is installed in each digroup per COT application SD-7C116-01.	
6.	If the DCU is to be installed at the RT, install the DS1 connector assembly as required in each digroup per RT application SD-7C118-01.	DLP-535
7.	**CAUTION:** *An electrostatic discharge wrist strap, with a minimum resistance of 250K ohms, should be worn when handling Series 5 circuit packs to prevent possible damage to the circuit packs. Before using the wrist strap, check it for opens, shorts, and minimum resistance value. If the strap does not pass these checks, it should not be used. To avoid possible personal injury while using the wrist strap at the COT, connect the wrist strap to the* **ESD WRIST STRAP GROUNDING POINT** *on the right-hand side of the COT frame. If no grounding point is present, connect the wrist strap to a bare-metal section of the COT frame. At the RT, to avoid possible personal injury while using the wrist strap, do not connect it to the power shelf or adjacent portions of the RT frame. Connect the wrist strap to the* **ESD GRD** *jack on the fan unit, if present. If the grounding jack is not present, connect the wrist strap to the bare-metal section of the frame well away from the power shelf.* Set the switches on the **AUA16** [DCU-left (DCU-L)] according to the work order record detail (WORD) document or AT&T 363-005-142 (DCU-L data sheet).	DLP-542

	DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO
8.	NOTE: The DCU must *not* be installed with channel units in the same digroup; the digroup must be empty except for the DCU. If channel units are to be installed in a DCU digroup, they must be installed at the other end of the system from the DCU. If a DCU is to be installed at both ends, continue with Step **9**, otherwise proceed to Step **13.**	
9.	Install the **AUA16** (DCU-L) in the sixth channel unit position and the **AUA17** [DCU-right (DCU-R)] in the twelfth channel unit position of each digroup at the COT and RT as required.	
10.	NOTE: With the DCU at the COT and RT, only digital data system (DDS) channels must be provisioned; the other channels are automatically provisioned for voice-frequency (VF) service. Also, channels that are redlined must be provisioned to assign redline status. Provision the DCU.	DLP-527
11.	If possible, test at least two DCU channels (randomly selected). If a Digital Access Cross-Connect System (DACS) is connected in the circuit, test the COT and RT DCU from the DACS with a loopback at the network interface (NIF). Otherwise, test from the COT with the DCU looped back at the DSX-1, then with the RT DCU looped back at the NIF.	
	A. From the DACS with a loopback at the NIF:	DLP-528
	B. From the COT with a CIU:	DLP-532
12.	Proceed to Step **29.**	
13.	Set options and install the **AUA45(B)** dual ringing repeater as required.	DLP-541

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
14.	NOTE: The 2- and 4-wire special service channel units and DCU may be installed before or after provisioning. In systems with LBRV, dataport channel units with second channel error correction must *not* be installed in the last slot of a digroup (23/24, 47/48, 71/72, and 95/96). Install channel units in each digroup as required at the COT or RT for channels to be added or established.	
15.	NOTE: Testing DID channels requires an **AUA36** channel unit at the COT and an **AUA56** channel unit at the RT. When testing is completed, remove the DID channel unit from the digroup that the DCU will be installed in. Test the DID channel as required.	DLP-544
16.	NOTE: Testing dual ringing repeater channel units requires an **AUA45**(**B**) channel unit at the COT and RT. When testing is completed, remove the dual ringing repeater channel unit from the digroup that the DCU will be installed in. Test the dual ringing repeater [**AUA45**(**B**) channel units] (COT to RT) as required.	DLP-545
17.	Install an **AUA16** (DCU-L) in the sixth channel unit position and an **AUA17** (DCU-R) in the twelfth channel unit position of each digroup as required at the COT or RT.	
18.	Connect a CIU test cord to the COT channel test unit [CTU (**AUB5**)] in the dual channel bank for the system being tested.	

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
19.	NOTE: If channel units are not installed before provisioning, the system stores the provisioning information and provisions the channel units when they are installed. With channel units at one end, the DCU does not require provisioning; provisioning a channel unit in the far end overrides any provisioning of the DCU for VF or DDS channels. Provision 2- and 4-wire special services as required. (The **AUA36** and **AUA56** DID channel units do not require provisioning.)	
	A. **AUA42**, **AUA43**, and **AUA142** channel units:	DLP-519
	B. **AUA44** and **AUA54** channel units:	DLP-520
	C. **AUA41** and **AUA141** channel units:	DLP-521
	D. **AUA34**, **AUA34B**, and **AUA52**(**B**) channel units:	DLP-522 (provision only)
20.	If any special service channels are redlined, provision the DCU channel for redline status.	DLP-527
21.	If channel units are installed in the COT (DCU in the RT), continue with Step **22**. If the DCU is installed in the COT (channel units in the RT), proceed to Step **26**.	
22.	Test the COT circuit-end of the 2-wire special service circuits as required.	
	A. 2-wire interface to a carrier terminal, metallic repeater, or central office (CO) switch:	DLP-508
	B. 2-wire COT interface to loop to private branch exchange (PBX), telset, or data set:	DLP-509
23.	Test the COT circuit-end of the 4-wire special service circuits as required.	
	A. 4-wire interface to a carrier terminal:	DLP-510

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	B. 4-wire metallic extension to a foreign CO or customer location:	DLP-511
	C. Digital signal zero (DS0) dataport channel unit:	DLP-523
24.	If possible, test at least two DCU channels (randomly selected). The channels are tested from the CIU through the bit stream to the customer location with a loopback at the NIF.	DLP-529
25.	Proceed to Step **29**.	
26.	Test the RT circuit-end of the 2-wire special service circuits as required.	
	A. 2-wire loop to a network channel terminating equipment (to PBX or data modem):	DLP-512
	B. 2-wire loop to a PBX, telset or data modem (no network channel terminating equipment):	DLP-513
27.	Test the RT circuit-end of the 4-wire special service circuits as required.	
	A. 4-wire loop with a network channel terminating equipment (to PBX or data modem):	DLP-514
	B. 4-wire loop without a network channel terminating equipment (to PBX or data terminal):	DLP-515
	C. Office channel unit (OCU) dataport channel unit:	DLP-533
28.	If possible, test at least two DCU channels (randomly selected). If the DACS is not connected in the circuit, the DCU channels may be tested with a loopback at the DSX.	
	A. From the DACS to the COT:	DLP-530
	B. With a loopback at the DSX:	DLP-531
29.	Update office records per local practice (WORD, system, facility, and/or channel records).	

Add Channel Service to Integrated FPB System with Special Services Option

DO ITEMS BELOW IN ORDER LISTED | **FOR DETAILS, GO TO**

1. Overview: To add or establish channel service, channel units must be installed in the Series 5 remote terminal (RT), provisioned (as necessary), and tested. Channel service may be added without interrupting service to other channels in the system.

   Provisioning: The 2-wire special service (**AUA42**, **AUA43**, and **AUA142**) and 4-wire voice-frequency (VF) special service (**AUA41**, **AUA44**, **AUA54**, and **AUA141**) channels must be provisioned before being put into service. These channels require the **J99404TA** craft interface unit (CIU) at the RT for provisioning and channel testing. A working knowledge of the *5ESS*® switch master control center (MCC) or recent change and verify (RC/V) terminal is required to add or establish service.

   RT Channel Unit Options: The Series 5 RT POTS, *SPOTS*® and M *SPOTS* channel units, coin, and multiparty and direct inward dial (DID) channel units do *not* have options. The RT frequency selective ringing (FSR), dual ringing repeater, and private line auto ring (PLAR) channel units have option switches that must be set before the channels are put in service.

   Considerations (integrated Mode 1 and Mode 2 systems)

   - If the central office uses nonphased ringing generators, there should be no more than ten FSR lines per shelf assigned to emergency customers that could be rung simultaneously.

DO ITEMS BELOW IN ORDER LISTED **FOR DETAILS, GO TO**

- Only the odd channel is available on some of the channel units (corresponding to the equivalent *SLC*® 96 Carrier System RT channel unit that the Series 5 RT emulates).
- The Series 5 RT FSR channel units provide 2-party automatic number identification (ANI) in an integrated system.
- DID channel units may be used in an integrated system (Mode 1 only) with the 5E6 or later generic.
- Dataport channel units will be supported in future integrated applications with the integrated digital carrier unit (IDCU).
- The POTS with derived channel alarm (**AUA27**) is not compatible with an integrated system (except when used for POTS-only service).
- For integrated Mode 1 private line voice (PLV) circuits that are nailed up through the switch, the procedures used for universal FPB PLV circuits are specified with the understanding that the procedures used at the COT can also be performed at the distant terminating D-bank.

<u>Considerations (integrated Mode 2 systems)</u>

- The coin, and 2- and 4-wire special service channel units may be installed *only* in one of the four right-hand slots in each digroup (17/18, 19/20, 21/22, 23/24; 41/42, 43/44, 45/46, 47/48; 65/66, 67/68, 69/70, 71/72; and 89/90, 91/92, 93/94, 95/96).
- The *SPOTS* channel units will be supported in future integrated Mode 2 applications. Currently, the **AUA51** and **AUA59** channel units can be used only for POTS applications. Verify *5ESS*® switch software upgrade status for *SPOTS* channel units prior to channel unit application.
- The DID channel unit may be supported in future integrated Mode 2 applications; currently, it cannot be assigned in the data base.

2. <u>Testing Notes:</u> In an integrated system, locally switched channels may be tested using a local test desk or the Mechanized Loop Testing (MLT) System to initiate tests with

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	the *5ESS* switch software. The *5ESS* switch software emulates the pair gain test controller (PGTC) test sequence and is connected to the test pair by means of the test bus control unit (TBCU). Transmission on special service channels can be checked using the MCC or trunk line work station (TLWS) to send and receive a tone to/from the RT. The TLWS tests must be done **before the circuit is nailed** up at the *5ESS* switch. Special service channels are tested from the RT to the customer location using a transmission measuring set (TMS) at each end. ***Testing from TLWS: Tests should not be initiated by the TLWS while a CIU session is in progress at the RT.*** Doing so may result in very misleading failure messages (incorrectly indicating a *5ESS* switch problem). ***Tip/Ring Access:*** Some channel units have a faceplate jack for tip and ring test access (requires a test cord, comcode 405755208). The 52A channel unit test extender provides test access and other features and may be used with any Series 5 channel unit (AT&T 363-005-235 data sheet).	
3.	Obtain test equipment as required for channel service to be tested.	DLP-500
4.	⚠ CAUTION: *An electrostatic discharge wrist strap, with a minimum resistance of 250K ohms, should be worn when handling Series 5 circuit packs to prevent possible damage to the circuit packs. Before using the wrist strap, check it for opens, shorts, and minimum resistance value. If the strap does not pass these checks, it should not be used. To avoid possible personal injury while using the wrist strap at the COT, connect the wrist strap to the* **ESD WRIST STRAP GROUNDING POINT** *on the right-hand side of the COT frame. If no grounding point is present, connect the wrist strap to a bare-metal section of the COT frame. At the RT, to avoid possible personal injury while using the wrist strap, do not connect it to the power shelf or adjacent portions of the RT frame. Connect the wrist*	

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	strap to the **ESD GRD** *jack on the fan unit, if present. If the grounding jack is not present, connect the wrist strap to the bare-metal section of the frame well away from the power shelf.* On the channel units listed below, set the options and install the channel units as required.	
	A. **AUA57** RT FSR channel unit options:	DLP-540
	B. **AUA45**(**B**) dual ringing repeater channel unit options:	DLP-541
	C. **AUA75** dual private line auto ring channel unit options:	DLP-563
5.	**CAUTION:** *Multiparty service for four or more parties requires a positive ringing supply (the equivalent of an AUG1 PRU installed in the power shelf at the RT).* **NOTE:** The 2- and 4-wire provisionable special service channel units may be installed before or after provisioning. In Mode 2 systems, special service channel units may be installed *only* in one of the four right-hand slots of each digroup (17/18, 19/20, 21/22, 23/24; 41/42, 43/44, 45/46, 47/48; 65/66, 67/68, 69/70, 71/72; and 89/90, 91/92, 93/94, 95/96). With the exception of the **AUA45**(**B**) and **AUA75** channel units, the **SPL** (special) indicator on the TRU will light whenever a channel unit is installed incorrectly. Install any other channel units at the RT as required for channels to be added or established.	
6.	At the central office, prepare the *5ESS* switch terminal for recent change activities.	DLP-516
7.	Assign service to the channel.	DLP-517
8.	Assign a telephone number to the channel.	DLP-518

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
9.	Test the single-party POTS service as required.	
	A. Fixed loss channel units [**AUA51**, **AUA58**(**B**), **AUA59**, **AUA150**, or **AUA25**(**B**)]; automatic loss compensation (ALC) channel units (**AUA158** or **AUA159**):	DLP-501
	B. ALC channel unit loss measurements (**AUA158** or **AUA159**):	DLP-560
10.	NOTE: It is recommended that *SPOTS* and M *SPOTS* channel units be tested with a ground start test line. However, if a ground start test line is not available and the application is loop start, a loop start test line may be used. Test 2-wire locally switched special services (*SPOTS* and M *SPOTS* channel units) - as required. (Not applicable in integrated Mode 2 systems.)	
	A. Loop start application:	DLP-501
	B. Ground start application:	DLP-502
11.	Test coin service as required.	DLP-507
12.	NOTE: For testing party-line service (four or more parties) operator number identification (ONI), refer to AT&T 363-202-402, *Channel Unit Installation* (DLP-581 for integrated system). **Multiparty service for four or more parties requires a positive ringing supply (the equivalent of an AUG1 PRU installed in the power shelf at the RT).** Test multiparty 2-party automatic number identification (ANI) service - as required.	DLP-536

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
13.	Test FSR service - as required.	DLP-539
14.	Test dual ringing repeater channel units [**AUA45**(**B**)] (distant D-bank to RT).	DLP-545
15.	Test PLAR channel units (**AUA75**) (distant D-bank to RT).	DLP-564
16.	If the CIU is required for provisioning and/or testing, connect a CIU test cord to the RT channel test unit (CTU) in the dual channel bank for the system being tested.	
17.	Provision 2- and 4-wire special services as required.	
	A. **AUA42**, **AUA43**, and **AUA142** channel units:	DLP-519
	B. **AUA44** and **AUA54** channel units:	DLP-520
	C. **AUA41** and **AUA141** channel units:	DLP-521
18.	Test the RT end of 2-wire special service circuits as required.	
	A. 2-wire loop to network channel terminating equipment [to a private branch exchange (PBX) or data modem]:	DLP-546
	B. 2-wire loop to a PBX, telset or data modem (no network channel terminating equipment):	DLP-547
19.	Test the RT end of 4-wire special service circuits as required.	
	A. 4-wire loop with network channel terminating equipment (to a PBX or data modem):	DLP-548
	B. 4-wire loop without network channel terminating equipment (to PBX or data terminal):	DLP-549
20.	At the MCC or TLWS, check the channel unit transmission and signaling as required.	DLP-558
21.	Update office records per local practice [work order record detail (WORD), system, facility, and/or channel records].	

Add Channel Service to Universal FPB System with Special Services Option

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

1. Overview: To add or establish channel service, channel units must be installed, provisioned (as necessary), and tested. Channel service may be added without interrupting service to other channels in the system. Refer to AT&T 363-202-402 for options and installation of channel units in the *SLC*® 96 central office terminal (COT).

   Provisioning: The 2-wire special service (**AUA42**, **AUA43**, and **AUA142**), 4-wire voice-frequency (VF) special service (**AUA41**, **AUA44**, **AUA54**, and **AUA141**), and dataport (**AUA52** and **AUA52B**) channels must be provisioned before being put into service. These channels require the **J99404TA** craft interface unit (CIU) at the remote terminal (RT) for provisioning and channel testing.

   RT Channel Unit Options: The Series 5 RT POTS, *SPOTS*® and M *SPOTS* channel units, coin, multiparty, and direct inward dial (DID) channel units do not have options. The RT frequency selective ringing (FSR), dataport (**AUA52B**), dual ringing repeater [**AUA45**(**B**)], and private line auto ring [PLAR (**AUA75**)] channel units have option switches that must be set before the channels are put in service.

   Considerations (Mode 1 and Mode 2):

   - If the central office uses nonphased ringing generators, there should be no more than ten FSR lines per shelf assigned to emergency customers that could be rung simultaneously. The Series 5 RT FSR channel unit does not provide automatic number identification (ANI)

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

and provides the same four frequency bands used by the *SLC* 96 FSR channel unit.

- Only the odd channel is available on some of the Series 5 dual channel units. (If the COT channel unit is a dual channel unit, both channels are available at the RT. If the COT channel unit is single-channel, only the odd channel can be used at the RT.)
- Dataport channel units can be used if provisioned for majority vote error correction (MVEC) at the subrates; second channel error correction (SCEC) is allowed only at the 56 kb/s rate in Mode 1.
- The POTS with derived channel alarm channel unit (**AUA27**) may be used only in a Mode 1 system.

Considerations (universal Mode 2 system): The coin, and 2- and 4-wire special service channel units may be installed *only* in one of the four right-hand slots in each digroup (17/18, 19/20, 21/22, 23/24; 41/42, 43/44, 45/46, 47/48; 65/66, 67/68, 69/70, 71/72; and 89/90, 91/92, 93/94, 95/96). Also, if *SPOTS* channel units are used in a Mode 2 system, it is recommended that they be installed only in the four right-hand slots of the digroup.

2. Testing Notes: The POTS, *SPOTS* and M *SPOTS* channel units, coin, multiparty, FSR, and DID channel units may be tested with the pair gain test controller (PGTC), extended test controller (XTC), or by personnel at the COT and RT. To test DID channel units, the XTC must be equipped with an MC97761A1 control unit (XCU). The DID channel cannot be accessed like other locally switched lines; it must be tested by the Mechanized Loop Testing (MLT) System through the XTC channel unit emulator (CUE) like a special service channel. The dual ringing repeater channel unit [**AUA45(B)**] cannot be tested by means of the PGTC or XTC. The 2-wire special service (**AUA42**, **AUA43**, and **AUA142**), PLAR (**AUA75**), and 4-wire VF special service channel units are tested COT to RT with a transmission

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	measuring set (TMS) at both ends. The dataport channel units are tested COT to RT using the Digital Data System (DDS) test sets either at the COT or by means of the CIU test access at the RT. ***Multiparty:*** If the XTC is optioned to test 4-party lines, then 2-party lines in RTs without an **AUG1** positive ringing unit (PRU) will test "bad". In order for 2-party lines to test "good", an **AUG1** PRU must be installed in those RTs. ***Tip/Ring Access:*** Some channel units have a faceplate jack for tip and ring test access (requires a test cord, comcode 405755208). The 52A channel unit test extender provides test access and other features and may be used with any Series 5 channel unit (AT&T 363-005-235 data sheet).	
3.	Obtain test equipment for channel service to be tested.	DLP-500
4.	At the *SLC* 96 Carrier System COT, install channel units as required for channels to be added or established. Refer to AT&T 363-202-402, *Channel Unit Installation* for option settings for COT channel units.	
5.	⚠ CAUTION: *An electrostatic discharge wrist strap, with a minimum resistance of 250K ohms, should be worn when handling Series 5 circuit packs to prevent possible damage to the circuit packs. Before using the wrist strap, check it for opens, shorts, and minimum resistance value. If the strap does not pass these checks, it should not be used. To avoid possible personal injury while using the wrist strap at the COT, connect the wrist strap to the* **ESD WRIST STRAP GROUNDING POINT** *on the right-hand side of the COT frame. If no grounding point is present, connect the wrist strap to a bare-metal section of the COT frame. At the RT, to avoid possible personal injury while using the wrist strap, do not connect it to the power shelf or adjacent portions of the RT frame. Connect the wrist strap to the* **ESD GRD** *jack on the fan unit, if present. If*	

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	the grounding jack is not present, connect the wrist strap to the bare-metal section of the frame well away from the power shelf. At the Series 5 RT for the channel units listed below, set options and install channel units as required.	
	A. **AUA57** RT FSR channel unit:	DLP-540
	B. **AUA45(B)** dual ringing repeater channel unit:	DLP-541
	C. **AUA75** dual private line auto ring channel unit:	DLP-563
	D. **AUA52B** OCU dataport channel unit:	DLP-562
6.	⚠ CAUTION: *Multiparty service for four or more parties requires a positive ringing supply (the equivalent of an* ***AUG1*** *PRU installed in the power shelf at the RT).* NOTE: The 2- and 4-wire provisionable special service channel units may be installed before or after provisioning. In Mode 2 systems, special service channel units may be installed *only* in one of the four right-hand slots of each digroup (17/18, 19/20, 21/22, 23/24; 41/42, 43/44, 45/46, 47/48; 65/66, 67/68, 69/70, 71/72; and 89/90, 91/92, 93/94, 95/96). With the exception of the **AUA45(B)** and **AUA75** channel units, the **SPL** (special) indicator on the TRU will light whenever a channel unit is installed incorrectly. Install any other channel units at the RT as required for the channels to be added or established.	
7.	Install and test the AUA90 T-basic rate interface transmission extension (T-BRITE) channel unit as required.	AT&T 363-205-106
8.	Option, install, and test the AUA93 BRITE II channel unit as required.	AT&T 363-205-107

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
9.	Test single-party POTS service as required.	
	A. Fixed loss channel units [**AUA51**, **AUA58**(**B**), **AUA59**, **AUA150**, or **AUA25**(**B**)]; automatic loss compensation (ALC) channel units (**AUA158** or **AUA159**):	DLP-503
	B. ALC channel unit loss measurements (**AUA158** or **AUA159**):	DLP-560
10.	NOTE: It is recommended that *SPOTS* and M *SPOTS* channel units be tested with a ground start test line. However, if a ground start test line is not available and the application is loop start, a loop start test line may be used. Test 2-wire locally switched special services (*SPOTS* and M *SPOTS* channel units) (COT to RT) as required.	
	A. Loop start application:	DLP-504
	B. Ground start application:	DLP-505
11.	Test coin service (COT to RT) as required.	DLP-506
12.	NOTE: For testing party line service (four or more parties) operator number identification (ONI), refer to AT&T 363-202-402, *Channel Unit Installation* (DLP-549 for universal system). **Multiparty service for four or more parties requires a positive ringing supply (the equivalent of an AUG1 PRU installed in the power shelf at the RT).** Test multiparty ANI service (COT to RT) as required.	DLP-537
13.	Test FSR service (COT to RT) as required.	DLP-538
14.	Test DID service (COT to RT) as required.	DLP-544

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
15.	Test dual ringing repeater (COT to RT) as required.	DLP-545
16.	Test dual PLAR (COT to RT) as required.	DLP-564
17.	If the CIU is required for provisioning and/or testing, connect the CIU test cord to the RT channel test unit (CTU) in the dual channel bank for system being tested.	
18.	Provision 2- and 4-wire special services and dataports as required.	
	A. **AUA42**, **AUA43**, and **AUA142** channel units:	DLP-519
	B. **AUA44** and **AUA54** channel units:	DLP-520
	C. **AUA41** and **AUA141** channel units:	DLP-521
	D. **AUA52** and **AUA52B** channel units:	DLP-522
19.	Test 2-wire special service circuits from the COT to the RT as required.	
	A. 2-wire interface to a carrier terminal, metallic repeater, or central office (CO) switch:	DLP-554
	B. 2-wire COT interface to loop to a private branch exchange (PBX), telephone set (telset), or data set:	DLP-555
20.	Test 4-wire special service circuits from the COT to the RT as required.	
	A. 4-wire interface to a carrier terminal:	DLP-556
	B. 4-wire metallic extension to a foreign CO or customer location:	DLP-557
21.	Test the RT end of 2-wire special service circuits as required.	
	A. 2-wire loop to network channel terminating equipment (to a PBX or data modem):	DLP-546
	B. 2-wire loop to a PBX, telset or data modem (no network channel terminating equipment):	DLP-547

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
22.	Test the RT end of 4-wire special service circuits as required.	
	A. 4-wire loop with network channel terminating equipment (to a PBX or data modem):	DLP-548
	B. 4-wire loop without network channel terminating equipment (to a PBX or data terminal):	DLP-549
23.	Test dataport channels as required.	DLP-523
24.	Update office records per local practice [work order record detail (WORD), system, facility, and/or channel records].	

Add Channel Service to Feature Package 303 System

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

1. Overview: To add or establish channel service, channel units must be installed and tested. Channel service may be added without interrupting service to other channels in the system. The Series 5 feature package 303 remote terminal (RT) support the following channel units:

   - AUA25B M SPOTS
   - AUA27 POTS
   - AUA51 SPOTS
   - AUA53 COIN
   - AUA55 Multiparty
   - AUA56 DID
   - AUA57 FSR
   - AUA58(_) POTS
   - AUA59 SPOTS
   - AUA150 SPOTS
   - AUA151 SPOTS
   - AUA158(_) ALC POTS
   - AUA159(_) ALC SPOTS
   - AUA94 UDSL ISDN refer craft to 363-205-113 document for installation.

   The RT frequency selective ringing (FSR) channel unit has

DO ITEMS BELOW IN ORDER LISTED	FOR DETAILS, GO TO

an option switch that must be set before the channel is put in service. This procedure assumes a working knowledge of the *5ESS*® switch master control center (MCC) or recent change and verify (RC/V) terminal used to add or establish service.

2. Testing Notes: The channels may be tested using a local test desk or the mechanized loop testing (MLT) system to initiate tests with the *5ESS* switch software. The *5ESS* switch software emulates the PGTC test sequence and is connected to the test pair by means of the test bus control unit (TBCU).

   Tip/Ring Access — Some channel units have a faceplate jack for tip and ring test access (requires a test cord, comcode 405755208). The 52A channel unit test extender provides test access and other features and may be used with any Series 5 channel unit (AT&T 363-005-235 data sheet).

3. Obtain test equipment as required for channel service to be tested.

   A. POTS, *SPOTS*, and M *SPOTS* channel units: KS-14510 volt-ohm-milliammeter (VOM) and 500-type telephone set at the RT.

   B. Multiparty channels: KS-14510 VOM and two or more 500-type telephone sets at the RT.

   C. FSR channels: 500-type telephone sets and ringer box (optional) at the RT.

   D. Coin channels: Coin telephone set and coins (nickel, dime, and quarter) at the RT.

4. CAUTION:
   An electrostatic discharge wrist strap, with a minimum resistance of 250K ohms, should be worn when handling Series 5 circuit packs to prevent possible damage to the circuit packs. Before using the wrist

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
	strap, check it for opens, shorts, and minimum resistance value. If the strap does not pass these checks, it should not be used. To avoid possible personal injury while using the wrist strap, connect only to **ESD GRD** *jack on the fan unit.* Set options on the **AUA57** RT FSR channel unit as required.	DLP-540
5.	CAUTION: *Multiparty service for four or more parties requires a positive ringing supply (the equivalent of an AUG1 PRU installed in the power shelf at the RT).* Install the Series 5 channel units as required for channels to be added or established.	
6.	At the central office, prepare the system for end-to-end channel tests. Use *5ESS* Switch Recent Change Procedures to assign the service to a channel, and assign the telephone number to a channel IDCU 303 system.	
7.	Test single-party POTS service as required.	DLP-501
8.	NOTE: It is recommended that *SPOTS* and M *SPOTS* channel units be tested with a ground start test line. However, if a ground start test line is not available and the application is loop start, a loop start test line may be used. Test 2-wire locally switched special services (*SPOTS* and M *SPOTS* channel units) - loop start application - as required.	DLP-501
9.	Test 2-wire locally switched special services (*SPOTS* and M *SPOTS* channel units) - ground start application - as required.	DLP-502
10.	Test coin service as required.	DLP-507

DO ITEMS BELOW IN ORDER LISTED		FOR DETAILS, GO TO
11.	⇛ NOTE: For testing party line service (four or more parties) operator number identification (ONI), refer to AT&T 363-202-402, *Channel Unit Installation* (DLP-581). **Multiparty service for four or more parties requires a positive ringing supply (the equivalent of an AUG1 PRU installed in the power shelf at the RT).** Test multiparty 2-party automatic number identification (ANI) service - as required.	DLP-536
12.	Test FSR service - as required.	DLP-539
13.	Update office records per local practice [work order record detail (WORD), system, facility, and/or channel records].	

Review Channel Test Equipment

1.

NOTE:
If listed test equipment is not available, refer to manufacturer's operating manual of available test set for testing method.

Is a digital connectivity unit (DCU) installed at one or both ends of the system?

If **YES,** then proceed to Step **4.**
If **NO,** then continue with Step **2.**

2.

NOTE:
Tip and ring access for installation testing is normally at the protector block. Some channel units have a faceplate jack for tip and ring test access (requires a test cord, comcode 405755208). The 52A channel unit test extender provides test access and other features and may be used with any Series 5 channel unit. *Test connections to the 52A test extender must be made with 310-type plugs.*

Refer to Table A for test equipment used at the central office terminal (COT). For channels to be tested at a remote terminal (RT) [POTS, *SPOTS*® and M *SPOTS* channel units, coin, multiparty, frequency selective ringing (FSR), and direct inward dialing (DID)], verify that the tester at the RT has test equipment (Table A).

3.

NOTE:
If the 2-wire channel unit function is FXS or DPO or if the channel unit is a single-party unit with automatic loss compensation (AUA158 or AUA159), the channel unit must be conditioned on the metallic side for AC measurement. This requires the equivalent of a test set with a HOLD feature in the TRANSMIT and RECEIVE modes.

For 2- and 4-wire special service channels, verify that the tester at the customer location has a suitable transmission measuring set and noise measuring set. For dataport tests, the loop must be terminated at the customer location with the customer's data service unit (DSU) or with a test set equivalent to a channel service unit (CSU) or DSU.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

4. Refer to Table B for the test equipment used at the COT for testing channels with the DCU in one end and channel units in the other end or with the DCU installed at both ends. For DCU testing at a Digital Access Cross-Connect System (DACS) location, if the J1C140A digital access time slot selector (DATS) is available, it may be used instead of the transmission measuring set.

5. NOTE:
   If the 2-wire channel unit function is FXS or DPO, the channel unit must be conditioned on the metallic side for AC measurement. This requires the equivalent of a test set with a HOLD feature in the TRANSMIT and RECEIVE modes.

For 2- and 4-wire special service channels, verify that the tester at the customer location has a suitable transmission measuring set and noise measuring set. For dataport tests, the loop must be terminated at the customer location with the customer's DSU or with a test set equivalent to a CSU or DSU.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Table A. Equipment for Channel Tests

Channel Units	Channel Service	Equipment Required (Note)
AUA31/38 AUA32/39 AUA58(B) AUA51/59/25 AUA150 AUA158 AUA159	Single party service and 2-wire locally switched special services	KS-14510 volt-ohm-milliammeter (VOM) or equivalent at RT 500-type telephone set at RT Halcyon 704A transmission measuring set (TMS) with 705B signaling unit, or equivalent, at the RT or at the customer location *
AUA33 AUA53	Coin service	Coin telephone set at RT Coins — nickel, dime, and quarter
AUA35 AUA55	Multiparty service	KS-14510 VOM or equivalent (optional) Two 500-type telephone sets wired for automatic number identification (ANI) at RT
AUA36 AUA56	Direct inward dial service	52A channel unit test extender *at COT and RT* 500-type telephone set *at COT and RT* KS-14510 VOM or equivalent at COT Patch cord with 310-type plug on one end and clip leads on the other end (or equivalent) *at COT and RT*
AUA37 AUA57	Frequency-selective ringing service	KS-14510 VOM or equivalent (optional) Two 500-type telephone sets at RT ANI marker at RT Ringer box at RT (optional)
AUA45(B)	Dual ringing repeater	Halcyon 704A set (TMS) or equivalent *at COT and RT* 500-type telephone set at RT

Continued on next page

Table A.—*Continued*

Channel Units	Channel Service	Equipment Required (Note)
AUA42 AUA43	2-Wire special service	J99404TA craft interface unit (CIU) Halcyon 704A TMS or equivalent KS-20501 return loss measuring set (RLMS) or equivalent 600-ohm (262B), 900-ohm (262C), and 1,200-ohm terminating plugs
AUA41 AUA44 AUA54	4-Wire voice-frequency (VF) special service	J99404TA CIU Halcyon 704A TMS or equivalent 600-ohm (262B), 900-ohm (262C), and 1,200-ohm terminating plugs
AUA34 AUA52(B)	Dataport service	J99404TA CIU KS-20908 data test set (DTS) receiver/KS-20909 DTS transmitter, TPI 108/109 RT II data test unit, or equivalent ED-3C792 D3/D4 dataport test interface unit and cable assembly (comcode 842725111), TPI 108-51 clock interface unit, or equivalent ED-3C793 loopback connector, TPI 108-50A dataport interface unit, or equivalent

Note: At the COT unless specified otherwise.

* The procedures using a TMS apply only to the AUA158/AUA159 ALC channel units.

Table B. Equipment for Channel Tests with DCU at One End

Channel Units	Channel Service	Equipment Required (Note)
AUA36 AUA56	Direct inward dial service	52A channel unit test extender *at COT and RT* 500-type telephone set *at COT and RT* KS-14510 VOM or equivalent at COT Patch cord with 310-type plug on one end and clip leads on the other end (or equivalent) *at COT and RT*
AUA45(B)	Dual ringing repeater	Halcyon 704A TMS or equivalent *at COT and RT* 500-type telephone set at RT
AUA42 AUA43	2-Wire special service	J99404TA CIU Halcyon 704A TMS or equivalent KS-20501 RLMS or equivalent 600-ohm (262B) and 900-ohm (262C) terminating plugs
AUA41 AUA44 AUA54	4-Wire VF special service	J99404TA CIU Halcyon 704A TMS or equivalent 600-ohm (262B), 900-ohm (262C), and 1,200-ohm terminating plugs

Continued on next page

Table B.—*Continued*

Channel Units	Channel Service	Equipment Required (Note)
AUA34 AUA52(B)	Dataport service	J99404TA CIU KS-20908 data test set (DTS) receiver/KS-20909 DTS transmitter, TPI 108/109 RT II data test unit, or equivalent ED-3C792 D3/D4 dataport test interface unit and cable assembly (comcode 842725111), TPI 108-51 clock interface unit, or equivalent ED-3C793 loopback connector, TPI 108-50A dataport interface unit, or equivalent
AUA16/AUA17	DCU	J99404TA CIU Halcyon 704A TMS or equivalent Patch cords (for loopback at DSX)

Note: At the COT unless specified otherwise.

Test Single-Party Loop-Start Channel (POTS or *SPOTS*® Channel Unit) End-To-End on Integrated System

Summary: This procedure tests single-party POTS channel units or the loop-start function of *SPOTS* channel units. At the central office, verify channel service and telephone number assignment. Channels may be tested using a local test desk or the mechanized loop testing (MLT) system. Otherwise, at the remote terminal (RT) determine the corresponding channel. Connect a test telephone set with ringer connected for bridged ringing, to the channel being tested. Make talking, dialing, ringing, and ring-trip tests on each channel.

1. Establish communication between the central office and the RT.

2. ⚠ CAUTION:
   Channel must be out of service before testing; otherwise, service will be interrupted.

   At the central office, select the channel for testing and inform the RT of the channel selected.

3. Verify channel service and telephone number assignments for the channel being tested.

4. ⇒ NOTE:
   In an integrated system, channels may be tested using a local test desk or the MLT system to initiate tests with the *5ESS*® switch software. The *5ESS* switch software emulates the pair gain test controller (PGTC) test sequence and is connected to the test pair by means of the test bus control unit (TBCU).

Is the TBCU available to test channels?

If **YES,** then continue with Step **5.**
If **NO,** then proceed to Step **10.**

5.

NOTE:
AT&T 662-505-507 provides procedures for using the TBCU to test channels. The TBCU can only verify operation to the RT channel unit. To verify operation to the cross-connect field, a test telephone must be used at each channel location on the cross-connect field.

Request the repair service bureau or local test desk to test the channel. Did the tests pass?

If **YES,** then proceed to Step **9.**
If **NO,** then continue with Step **6.**

6. Check the test connections and correct if needed. Replace the RT channel unit and repeat the channel tests. Did the tests pass?

If **YES,** then proceed to Step **9.**
If **NO,** then continue with Step **7.**

7.

NOTE:
AT&T 662-505-507 provides procedures for using the TBCU to test channels. The TBCU can only verify operation to the RT channel unit. To verify operation to the cross-connect field, a test telephone must be used at each channel location on the cross-connect field.

Make sure that the TBCU is working properly and that you are using the proper procedures. Repeat the channel tests. Did the tests pass?

If **YES,** then proceed to Step **9.**
If **NO,** then continue with Step **8.**

8. Use office drawings to check wiring. Look for tip and ring reversal between the RT and cross-connect terminal. Verify the central office channel and number assignments. Correct the problem until the channel tests pass.

9. Repeat the channel tests with the TBCU as required on the remaining POTS channels or *SPOTS* loop-start channels.

10. NOTE:
A test telephone set should be connected for bridged ringing. To verify correct wiring from the RT, connect the test telephone at the cross-connect field. The 52A channel unit test extender may be used [DLP-543].

At the RT, temporarily connect a test telephone set to the channel selected for test.

11. At the RT, lift the handset and check for dial tone. Is dial tone present?

If **YES,** then proceed to Step **14.**
If **NO,** then continue with Step **12.**

12. Check the test connections and correct if needed. If no dial tone, replace the RT channel unit. Is dial tone present at the RT now?

If **YES,** then proceed to Step **14.**
If **NO,** then continue with Step **13.**

13. Use office drawings to check wiring. Look for tip and ring reversal between the RT and cross-connect terminal. Verify the central office channel and number assignments. Correct the problem until dial tone is present at the RT.

14. At the RT, dial the local main distributing frame (MDF) or central office number and make normal talk tests.

15. Was the call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **18.**
    If **NO,** then continue with Step **16.**

16. Replace the RT channel unit and repeat from Step **11.** Is the talk quality normal now?

    If **YES,** then proceed to Step **18.**
    If **NO,** then continue with Step **17.**

17. Use the RT schematic drawings to check wiring. Look for tip and ring reversal between the RT and cross-connect terminal. Correct the wiring until talk quality is good in both directions.

18. At the RT, put the handset on hook.

19. At the central office, dial the telephone number to ring the telephone at the RT.

20. At the RT does the test telephone ring normally?

    If **YES,** then proceed to Step **22.**
    If **NO,** then continue with Step **21.**

21. Look for a tip and ring reversal between the RT and cross-connect terminal. If the telephone does not ring, replace the RT channel unit and repeat from Step **11.**

22. At the RT, lift the telephone handset during ringing. Does the ringing trip normally?

    If **YES,** then proceed to Step **24.**
    If **NO,** then continue with Step **23.**

23. Replace the RT channel unit and repeat from Step **11.**

24. Is this the last channel to be tested on this system?

    If **YES,** then proceed to Step **27.**
    If **NO,** then continue with Step **25.**

25. At the central office, select the next channel to be tested and inform the RT of the channel selected.

26. Verify the channel unit and telephone number assignments for the channel being tested and repeat from Step **10.**

27. At the RT, disconnect the test telephone.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Test Single-Party Ground-Start Channel (*SPOTS*® Channel Unit) End-To-End on Integrated System

Summary: This procedure tests the ground-start function of *SPOTS* channel units. At the central office, verify the channel service and telephone number assignments for the channel being tested. At the remote terminal (RT), determine the corresponding channel. Connect a test telephone set with the ringer connected for bridged ringing to the channel being tested. Make talking, dialing, ringing, and ring-trip tests on each channel. On-hook T/R = 0 V DC. Off-hook T/R (ground start) = 4 to 15 V DC.

1. Establish communication between the central office and the RT.

2. **CAUTION:**
   The channel must be out of service before testing; otherwise, service will be interrupted.

   At the central office, select the channel for testing and inform the RT of the channel selected.

3. Verify the channel service and telephone number assignments for the channel being tested.

4. **NOTE:**
   In an integrated system, channels may be tested using a local test desk or the mechanized loop testing (MLT) system to initiate tests with the *5ESS*® switch software. The *5ESS* switch software emulates the pair gain test controller (PGTC) test sequence and is connected to the DC test pair by means of the test bus control unit (TBCU).

NOTE:
The TBCU cannot be used to verify ground-start operation of *SPOTS* channel units.

Is the TBCU available to test channels?

If **NO,** then proceed to Step **10.**
If **YES,** then continue with Step **5.**

5.

NOTE:
AT&T 662-505-507 provides procedures for using the TBCU to test channels. The TBCU can only verify operation to the RT channel unit. To verify operation to the cross-connect field, a test telephone must be used at each channel location on the cross-connect field.

Request the repair service bureau or local test desk to test the channel. Did tests pass?

If **YES,** then proceed to Step **9.**
If **NO,** then continue with Step **6.**

6. Check the test connections and correct if needed. Replace the RT channel unit and repeat the channel tests. Did the tests pass?

If **YES,** then proceed to Step **9.**
If **NO,** then continue with Step **7.**

7.

NOTE:
AT&T 662-505-507 provides procedures for using the TBCU to test channels. The TBCU can only verify operation to the RT channel unit. To verify operation to the cross-connect field, a test telephone must be used at each channel location on the cross-connect field.

Make sure that the TBCU is working properly and that you are using the proper procedures. Repeat the channel tests. Did the tests pass?

If **YES,** then proceed to Step **9.**
If **NO,** then continue with Step **8.**

8. Use office drawings to check wiring. Look for a tip and ring reversal between the RT and cross-connect terminal. Verify the central office channel and number assignments. Correct the problem until the channel tests pass.

9. Repeat the channel tests with the TBCU as required on the remaining *SPOTS* channel units (ground-start channels).

10. NOTE:
The test telephone set should be connected for bridged ringing. To verify correct wiring from the RT, connect the test telephone at the cross-connect field. The 52A channel unit test extender may be used [DLP-543].

At the RT, temporarily connect a test telephone set to the channel selected for test.

11. At the RT, get a volt-ohm-milliammeter (VOM) and condition to measure DC volts.

12. Connect the (+) red lead of the VOM to the tip conductor and the (–) black lead to the ring conductor of the test telephone. Does the meter indicate 0 V DC?

If **YES,** then proceed to Step **15.**
If **NO,** then continue with Step **13.**

13. Check the test connections; verify that the test line is ground start. Correct if necessary. If the indication is not 0 V DC, replace the RT channel unit. Does the meter indicate 0 V DC now?

    If **YES,** then proceed to Step **15.**
    If **NO,** then continue with Step **14.**

14. Use office drawings to check wiring. Look for a tip and ring reversal between the RT and cross-connect terminal. Verify the central office channel and number assignments. Correct the problem until the meter indicates 0 V DC.

15. At the RT, lift the handset off hook. Connect ring lead to frame ground for approximately 3 to 5 seconds. Does the meter indicate between 4 and 15 V DC?

    If **YES,** then proceed to Step **18.**
    If **NO,** then continue with Step **16.**

16. Check the test connections and correct if needed. If the indication is not 4 to 15 V DC, replace the RT channel unit and repeat from Step **12.** Does the meter indicate between 4 and 15 V DC now?

    If **YES,** then proceed to Step **18.**
    If **NO,** then continue with Step **17.**

17. Use office drawings to check wiring. Look for a tip and ring reversal between the RT and cross-connect terminal. Verify the central office channel and number assignments. Correct the problem until the meter indicates between 4 and 15 V DC.

18. At the RT, check for dial tone. Is dial tone present?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **19.**

19. Check test connections and correct if needed. If no dial tone, replace the RT channel unit and repeat from Step **12.** Is dial tone present at the RT now?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **20.**

20. Use office drawings to check wiring. Look for a tip and ring reversal between the RT and cross-connect terminal. Verify the central office channel and number assignments. Correct the problem until dial tone is present at the RT.

21. At the RT, dial the local main distributing frame (MDF) or central office number and make normal talk tests.

22. Was the call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **25.**
    If **NO,** then continue with Step **23.**

23. Replace the RT channel unit and repeat from Step **12.** Is the talk quality normal now?

    If **YES,** then proceed to Step **25.**
    If **NO,** then continue with Step **24.**

24. Use the RT schematic drawings to check wiring. Look for a tip and ring reversal between the RT and cross-connect terminal. Correct the wiring until the talk quality is good in both directions.

25. At the RT, put the handset on hook. Does the meter indicate 0 volts after 3 seconds?

    If **YES,** then proceed to Step **28.**
    If **NO,** then continue with Step **26.**

26. Replace the RT channel unit and repeat from Step **12.** Does the meter indicate 0 V DC now?

    If **YES,** then proceed to Step **28.**
    If **NO,** then continue with Step **27.**

27. Look for a tip and ring reversal between the RT and cross-connect terminal. Correct the wiring until the meter indicates 0 V DC.

28. At the central office, dial the telephone number to ring the telephone at the RT.

29. At the RT does the test telephone ring normally?

    If **YES,** then proceed to Step **31.**
    If **NO,** then continue with Step **30.**

30. Look for a tip and ring reversal between the RT and cross-connect terminal. If the telephone does not ring, replace the RT channel unit and repeat from Step **12.**

31. At the RT, lift the telephone handset during ringing. Does the ringing trip normally?

    If **YES,** then proceed to Step **33.**
    If **NO,** then continue with Step **32.**

32. Replace the RT channel unit and repeat from Step **12.**

33. Is this the last channel to be tested on this system?

    If **YES,** then proceed to Step **36.**
    If **NO,** then continue with Step **34.**

34. At the central office, select the next channel to be tested and inform the RT of channel selected.

35. Verify the channel service and telephone number assignments for the channel being tested and repeat from Step **10.**

36. At the RT, disconnect the test telephone.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Test Single-Party Channel End-To-End on Universal *SLC*® Carrier System

Summary: This procedure tests single-party POTS channels and key telephone service compatibility (fast forward disconnect). At the central office terminal (COT), use the test line to connect the unassigned subscriber line and call number to the channel being tested. At the remote terminal (RT), determine the corresponding channel. Connect a test telephone set with ringer connected for bridged ringing to the channel being tested. Make talking, dialing, ringing, and ring-trip tests on each channel. Off-hook T/R = 4 to 15 V DC. Key set feature = 0 V DC, then 4 to 15 V DC.

1. Establish communication between the central office and the RT.

2. CAUTION:
   The channel must be out of service before testing; otherwise, service will be interrupted.

   At the COT, select the channel for testing and inform the RT of the channel selected.

3. At the selected channel appearance on the main distributing frame (MDF), connect a temporary call number and subscriber line circuit test line.

4. Is a pair gain test controller (PGTC) or extended test controller (XTC) available to test the channels?

   If **NO,** then proceed to Step **11.**
   If **YES,** then continue with Step **5.**

5. NOTE:
   AT&T 662-505-507 provides procedures for using the PGTC to test the channels. The XTC procedures are given in AT&T 363-205-300.

The PGTC or XTC can only verify operation to the RT channel unit. To verify operation to the cross-connect field, a test telephone must be used at each channel location on the cross-connect field.

Request the repair service bureau or local test desk to perform PGTC or XTC channel tests. Did the tests pass?

If **YES,** then proceed to Step **10.**
If **NO,** then continue with Step **6.**

6. Check the test connections and correct if needed. Replace the RT channel unit and repeat channel tests. If the tests do not pass, replace the COT channel unit and repeat the channel tests.

7. Did the tests pass?

   If **YES,** then proceed to Step **10.**
   If **NO,** then continue with Step **8.**

8. NOTE:
   AT&T 662-505-507 provides procedures for using the PGTC to test the channels. The XTC procedures are given in AT&T 363-205-300. The PGTC or XTC can only verify operation to the RT channel unit. To verify operation to the cross-connect field, a test telephone must be used at each channel location on the cross-connect field.

   Make sure the PGTC or XTC is working properly and that you are using the proper procedures. Repeat the channel tests. Did the tests pass?

   If **YES,** then proceed to Step **10.**
   If **NO,** then continue with Step **9.**

9. Use office drawings and schematic drawings for the Series 5 COT or *SLC* 96 Carrier System COT to check the wiring. Look for a tip and ring

reversal between the COT channel appearance and office equipment; also between the RT and cross-connect terminal. Correct the wiring problem until the channel tests pass.

10. Repeat the channel tests with the PGTC or XTC as required on the remaining POTS channels.

11. ⇛ NOTE:
The test telephone set should be connected for bridged ringing. To verify correct wiring from the RT, connect the test telephone at the cross-connect field. The 52A channel unit test extender may be used [DLP-543].

At the RT, temporarily connect a test telephone set to the channel selected for test.

12. At the RT, lift the handset and check for dial tone. Is dial tone present?

    If **YES,** then proceed to Step **15.**
    If **NO,** then continue with Step **13.**

13. Check the test connections and correct if needed. If no dial tone, replace the RT channel unit. If still no dial tone, replace the COT channel unit. Is dial tone present at the RT now?

    If **YES,** then proceed to Step **15.**
    If **NO,** then continue with Step **14.**

14. Use office drawings and schematic drawings for the Series 5 COT or *SLC* 96 Carrier System COT to check wiring. Look for a tip and ring reversal between the COT channel appearance and office equipment, also between the RT and cross-connect terminal. Correct the wiring until dial tone is present at the RT.

15. At the RT, dial the local MDF or central office number and make normal talk tests.

16. Was the call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **19.**
    If **NO,** then continue with Step **17.**

17. Replace the RT channel unit and repeat from Step **12.** If poor talk quality, replace the COT channel unit and repeat from Step **12.** Is talk quality normal now?

    If **YES,** then proceed to Step **19.**
    If **NO,** then continue with Step **18.**

18. Use the COT and RT schematic drawings to check channel bank wiring. Look for a tip and ring reversal between the COT channel appearance and office equipment, also between the RT and cross-connect terminal. Correct wiring until talk quality is good in both directions.

19. At the RT, put the handset on hook.

20. At the COT, dial the test line number to ring the telephone at the RT.

21. At the RT does the test telephone ring normally?

    If **YES,** then proceed to Step **23.**
    If **NO,** then continue with Step **22.**

22. Look for a tip and ring reversal at the COT and RT; correct if needed. If no ringing, replace the RT channel unit and repeat from Step **12.** If still no ringing, replace the COT channel unit and repeat from Step **12.**

23. At the RT, lift the telephone handset during ringing. Does ringing trip normally?

    If **YES,** then proceed to Step **25.**
    If **NO,** then continue with Step **24.**

24. Replace the RT channel unit and repeat from Step **12.** If still no ring trip, replace the COT channel unit and repeat from Step **12.**

25. NOTE:
    Key telephone service compatibility cannot be tested with the PGTC or XTC. A test telephone must be connected at the RT and a test call established between the COT and RT.

    At the RT, get a volt-ohm-milliammeter (VOM) and condition to measure DC volts.

26. Make sure the test call is established and held between the COT and RT.

27. Connect the (+) red lead of the VOM to the tip conductor and the (–) black lead to the ring conductor of the test telephone.

28. Does the meter indicate between 4 and 15 V DC?

    If **YES,** then proceed to Step **31.**
    If **NO,** then continue with Step **29.**

29. Check the RT test connections and correct if needed. If indication is not between 4 and 15 V DC, replace the RT channel unit. If indication still is not between 4 and 15 V DC, replace the COT channel unit. Does the meter indicate between 4 and 15 V DC now?

    If **YES,** then proceed to Step **31.**
    If **NO,** then continue with Step **30.**

30. Use the COT and RT schematic drawings to check wiring. Use office drawings to check central office wiring.

31. At the RT, observe the VOM meter.

    Comment: A VOM should be used to observe results at the RT because results may be difficult to see with a digital voltmeter.

32. At the COT, momentarily (1-2 seconds) break tip or ring connection for the channel being tested.

33. At the RT, does the meter indicate 0 volts for approximately 1 second, then return to the previous level (4 to 15 volts)?

    If **YES,** then proceed to Step **35.**
    If **NO,** then continue with Step **34.**

34. Replace the RT channel unit and repeat from Step **15.** If the meter does not indicate the correct levels, replace the COT channel unit and repeat from Step **15.** If the meter still does not indicate the correct levels, use the COT and RT schematic drawings to check the wiring. Use office drawings to check the central office wiring. Correct the wiring until the meter indicates the correct levels.

35. Is this the last channel to be tested on this system?

    If **YES,** then proceed to Step **38.**
    If **NO,** then continue with Step **36.**

36. At the COT, select the next channel to be tested and inform the RT of the channel selected.

37. At the selected channel appearance on the MDF, connect a temporary call number and subscriber line circuit test line and repeat from Step **11.**

38. At the RT, remove the test telephone. At the COT, remove the test line connection.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Test *SPOTS*® Channel Unit (Loop-Start) End-To-End on Universal *SLC*® Carrier System

Summary: This procedure tests the loop-start function of *SPOTS* channel units. At the central office terminal (COT), use a test line to connect an unassigned loop-start test line and call number to the channel being tested. At the remote terminal (RT), determine the corresponding channel. Connect a test telephone set with ringer connected for bridged ringing, to the channel being tested. Make talking, dialing, ringing, and ring-trip tests on each channel, or use the pair gain test controller (PGTC) or extended test controller (XTC) to test.

1. Establish communication between the central office and the RT.

2. ⚠ CAUTION:
   The channel must be out of service before testing; otherwise, service will be interrupted.

   At the COT, select the channel for testing and inform the RT of the channel selected.

3. At the selected channel appearance on the main distributing frame (MDF), connect a temporary call number and loop-start test line.

4. Is a PGTC or XTC available to test the channels?

   If **NO,** then proceed to Step **10.**
   If **YES,** then continue with Step **5.**

5. ⇒ NOTE:
   AT&T 662-505-507 provides procedures for using the PGTC to test the channels. The XTC procedures are given in AT&T 363-205-300. The PGTC or XTC can only verify operation to the RT channel unit. To verify operation to the cross-connect field, a test telephone must be used at each channel location on the cross-connect field.

Request the repair service bureau or local test desk to perform PGTC or XTC channel tests. Did the tests pass?

If **YES,** then proceed to Step **9.**
If **NO,** then continue with Step **6.**

6. Check the test connections and correct if needed. Replace the RT channel unit and repeat channel tests. If the tests do not pass, replace the COT channel unit and repeat the channel tests. Did the tests pass?

If **YES,** then proceed to Step **9.**
If **NO,** then continue with Step **7.**

7. NOTE:
AT&T 662-505-507 provides procedures for using the PGTC to test channels. The XTC procedures are given in AT&T 363-205-300. The PGTC or XTC can only verify operation to the RT channel unit. To verify operation to the cross-connect field, a test telephone must be used at each channel location on the cross-connect field.

Make sure the PGTC or XTC is working properly and that you are using the proper procedures. Repeat the channel tests. Did the tests pass?

If **YES,** then proceed to Step **9.**
If **NO,** then continue with Step **8.**

8. Use office drawings and schematic drawings for the Series 5 COT or *SLC* 96 Carrier System COT to check wiring. Look for a tip and ring reversal between the COT channel appearance and office equipment; also between the RT and cross-connect terminal. Correct the wiring problem until the channel tests pass.

9. Repeat the channel tests with the PGTC or XTC as required on the remaining *SPOTS* channel units (loop-start channels).

10. **NOTE:**
    The test telephone set should be connected for bridged ringing. To verify correct wiring from the RT, connect the test telephone at the cross-connect field. The 52A channel unit test extender may be used [DLP-543].

    At the RT, temporarily connect a test telephone set to the channel selected for test.

11. At the RT, lift the handset and check for dial tone. Is dial tone present?

    If **YES,** then proceed to Step **14.**
    If **NO,** then continue with Step **12.**

12. Check the test connections and correct if needed. If no dial tone, replace the RT channel unit. If still no dial tone, replace the COT channel unit. Is dial tone present at the RT now?

    If **YES,** then proceed to Step **14.**
    If **NO,** then continue with Step **13.**

13. Use office drawings and schematic drawings for the Series 5 COT or *SLC* 96 Carrier System COT to check wiring. Look for a tip and ring reversal between the COT channel appearance and office equipment, also between the RT and cross-connect terminal. Correct the wiring until dial tone is present at the RT.

14. At the RT, dial the local MDF or central office number and make normal talk tests.

15. Was the call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **18.**
    If **NO,** then continue with Step **16.**

16. Replace the RT channel unit and repeat from Step **11.** If poor talk quality, replace the COT channel unit and repeat from Step **11.** Is talk quality normal now?

    If **YES,** then proceed to Step **18.**
    If **NO,** then continue with Step **17.**

17. Use the COT and RT schematic drawings to check the channel bank wiring. Look for a tip and ring reversal between the COT channel appearance and office equipment, also between the RT and cross-connect terminal. Correct the wiring until talk quality is good in both directions.

18. At the RT, put the handset on hook.

19. At the COT, dial the test line number to ring the telephone at the RT.

20. At the RT does the test telephone ring normally?

    If **YES,** then proceed to Step **22.**
    If **NO,** then continue with Step **21.**

21. Look for a tip and ring reversal at the COT and RT; correct if needed. If no ringing, replace the RT channel unit and repeat from Step **11.** If still no ringing, replace the COT channel unit and repeat from Step **11.**

22. At the RT, lift the telephone handset during ringing. Does ringing trip normally?

    If **YES,** then proceed to Step **24.**
    If **NO,** then continue with Step **23.**

23. Replace the RT channel unit and repeat from Step **11.** If still no ring trip, replace the COT channel unit and repeat from Step **11.**

24. Is this the last channel to be tested on this system?

    If **YES,** then proceed to Step **27.**
    If **NO,** then continue with Step **25.**

25. At the COT, select the next channel to be tested and inform the RT of the channel selected.

26. At the selected channel appearance on the MDF, connect a temporary call number and loop-start test line and repeat from Step **10.**

27. At the RT, disconnect the test telephone. At the COT, remove the test line connection.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Test *SPOTS*® Channel Unit (Ground-Start) End-To-End on Universal *SLC*® Carrier System

Summary: This procedure tests the ground-start function of *SPOTS* channel units. At central office terminal (COT), use test line to connect unassigned ground-start test line and call number to channel being tested. At remote terminal (RT), determine corresponding channel. At RT, connect a test telephone set with ringer connected for bridged ringing, to channel being tested. Make talking, dialing, ringing, and ring-trip tests on each channel. On-hook T/R = 0 V DC. Off-hook T/R (ground start) = 4 to 15 V DC.

1. Establish communication between central office and RT.

2. CAUTION:
   Channel must be out of service before testing; otherwise, service will be interrupted.

   At COT, select channel for testing and inform RT of channel selected.

3. At selected channel appearance on main distributing frame (MDF), connect a temporary call number and ground-start test line.

4. NOTE:
   The pair gain test controller (PGTC) or extended test controller (XTC) cannot be used to verify ground start operation of *SPOTS* channel units.

Is PGTC or XTC available to test channels?

If **NO,** then proceed to Step **10.**
If **YES,** then continue with Step **5.**

5. NOTE:
AT&T 662-505-507 provides procedures for using the PGTC to test channels. The XTC procedures are given in AT&T 363-205-300. The PGTC or XTC can only verify operation to the RT channel unit. To verify operation to cross-connect field, a test telephone must be used at each channel location on the cross-connect field.

Request repair service bureau or local test desk to perform PGTC or XTC channel tests. Did tests pass?

If **YES,** then proceed to Step **9.**
If **NO,** then continue with Step **6.**

6. Check test connections and correct if needed. Replace RT channel unit and repeat channel tests. If tests still do not pass, replace COT channel unit and repeat channel tests. Did tests pass?

If **YES,** then proceed to Step **9.**
If **NO,** then continue with Step **7.**

7. NOTE:
AT&T 662-505-507 provides procedures for using the PGTC to test channels. The XTC procedures are given in AT&T 363-205-300. The PGTC or XTC can only verify operation to the RT channel unit. To verify operation to cross-connect field, a test telephone must be used at each channel location on the cross-connect field.

Make sure PGTC or XTC is working properly and that you are using proper procedures. Repeat channel tests. Did tests pass?

If **YES,** then proceed to Step **9.**
If **NO,** then continue with Step **8.**

8. Use office drawings and schematic drawings for Series 5 COT or *SLC* 96 Carrier System COT to check wiring. Look for tip and ring reversal between COT channel appearance and office equipment; also between RT and cross-connect terminal. Correct wiring problem until channel tests pass.

9. Repeat channel tests with PGTC or XTC as required on remaining *SPOTS* channel units (ground-start channels).

10. NOTE:
Test telephone set should be connected for bridged ringing. To verify correct wiring from RT, connect test telephone at cross-connect field. The 52A channel unit test extender may be used [DLP-543].

At RT, temporarily connect a test telephone set to channel selected for test.

11. Get volt-ohm-milliammeter (VOM) and condition to measure DC volts.

12. Connect (+) red lead of VOM to tip conductor and (–) black lead to ring conductor of test telephone. Does meter indicate 0 V DC?

If **YES,** then proceed to Step **15.**
If **NO,** then continue with Step **13.**

13. Check test connections; verify test line is ground start. Correct if necessary. If indication is not 0 V DC, replace RT channel unit. If indication still is not 0 V DC, replace COT channel unit. Does meter indicate 0 V DC now?

    If **YES,** then proceed to Step **15.**
    If **NO,** then continue with Step **14.**

14. Use office drawings and schematic drawings for Series 5 COT or *SLC* 96 Carrier System COT to check wiring. Look for tip and ring reversal between COT channel appearance and office equipment, also between RT and cross-connect terminal. Correct wiring until meter indicates 0 V DC.

15. At RT, lift handset off hook. Connect ring lead to frame ground for approximately 3 to 5 seconds. Does meter indicate between 4 and 15 V DC?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **16.**

16. Check test connections and correct if needed. If indication is not 4 to 15 V DC, replace RT channel unit. If indication still is not 4 to 15 V DC, replace COT channel unit. Does meter indicate between 4 and 15 V DC now?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **17.**

17. Use office drawings and schematic drawings for Series 5 COT or *SLC* 96 Carrier System COT to check wiring. Look for tip and ring reversal between COT channel appearance and office equipment, also between RT and cross-connect terminal. Correct wiring until meter indicates between 4 and 15 V DC.

18. At RT, check for dial tone. Is dial tone present?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **19.**

19. Check test connections and correct if needed. If no dial tone, replace RT channel unit and repeat from Step **12.** If still no dial tone, replace COT channel unit and repeat from Step **12.** Is dial tone present at RT now?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **20.**

20. Use office drawings and schematic drawings for Series 5 COT or *SLC* 96 Carrier System COT to check wiring. Look for tip and ring reversal between COT channel appearance and office equipment, also between RT and cross-connect terminal. Correct wiring until dial tone is present at RT.

21. At RT, dial local MDF or central office number and make normal talk tests.

22. Was call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **25.**
    If **NO,** then continue with Step **23.**

23. Replace RT channel unit and repeat from Step **12.** If poor talk quality, replace COT channel unit and repeat from Step **12.** Is talk quality normal now?

    If **YES,** then proceed to Step **25.**
    If **NO,** then continue with Step **24.**

24. Use COT and RT schematic drawings to check channel bank wiring. Look for tip and ring reversal between COT channel appearance and office equipment, also between RT and cross-connect terminal. Correct wiring until talk quality is good in both directions.

25. At RT, put handset on hook. Does meter indicate 0 volts after 3 seconds?

    If **YES,** then proceed to Step **28.**
    If **NO,** then continue with Step **26.**

26. Replace RT channel unit and repeat from Step **12.** If indication still is not 0 V DC, replace COT channel unit and repeat from Step **12.** Does meter indicate 0 V DC now?

    If **YES,** then proceed to Step **28.**
    If **NO,** then continue with Step **27.**

27. Use COT and RT schematic drawings to check channel bank wiring. Look for tip and ring reversal between COT channel appearance and office equipment, also between RT and cross-connect terminal. Correct wiring until meter indicates 0 V DC.

28. At COT, dial test line number to ring telephone at RT.

29. At RT does test telephone ring normally?

    If **YES,** then proceed to Step **31.**
    If **NO,** then continue with Step **30.**

30. Look for tip and ring reversal at COT and RT; correct if needed. If no ringing, replace RT channel unit and repeat from Step **12.** If still no ringing, replace COT channel unit and repeat from Step **12.**

31. At RT, lift telephone handset during ringing. Does ringing trip normally?

    If **YES,** then proceed to Step **33.**
    If **NO,** then continue with Step **32.**

32. Replace RT channel unit and repeat from Step **12.** If still no ring trip, replace COT channel unit and repeat from Step **12.**

33. Is this the last channel to be tested on this system?

    If **YES,** then proceed to Step **36.**
    If **NO,** then continue with Step **34.**

34. At COT, select next channel to be tested and inform RT of channel selected.

35. At selected channel appearance on MDF, connect a temporary call number and ground start test line and repeat from Step **10.**

36. At RT, disconnect test telephone. At COT, remove test line connection.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Test Coin Channel End-To-End on Universal *SLC*® Carrier System

Summary: Before performing this procedure, coin phone set must be correctly wired for service desired: coin first (CF) or dial tone first (DTF), and must be operating correctly. This procedure does not verify correct operation of coin phone set, only channel unit functions. AT&T 506-900-503 describes coin maintenance procedures. In Step-by-Step (SXS) central offices, Coin Trunk Circuit SD-31592-02 must be modified per Option YK. Coin Trunk Circuit SD-31592-01 must be modified per Option YK and Option ZZ, or BT relay function inhibited as indicated in note 112 on the SD.

1. Establish communication between central office and remote terminal (RT).

2. At central office terminal (COT), select channel for testing and inform RT of channel selected. Verify channel units are installed.

   Comment: These channel units provide one line of coin service.

3. At selected channel appearance on main distributing frame (MDF), connect a temporary call number and coin line circuit test line.

4. NOTE:
   The 52A channel unit test extender may be used [DLP-543].

   At RT, temporarily connect jumpers from cross-connect terminals associated with selected channel to coin phone set.

5. Is channel service CF or DTF?

   If **CF,** then continue with Step **6.**
   If **DTF,** then proceed to Step **21.**

6. At RT, lift coin phone handset off-hook, deposit nickel, and check for dial tone. Is dial tone present?

   If **YES,** then continue with Step **7.**
   If **NO,** then proceed to Step **8.**

7. Replace RT channel unit and repeat from Step **6.**

8. Deposit additional coins to initial rate and check for dial tone. Is dial tone present?

   If **YES,** then proceed to Step **11.**
   If **NO,** then continue with Step **9.**

9. Replace COT channel unit and repeat from Step **6.** If no dial tone, replace RT channel unit and repeat from Step **6.** Is dial tone present now?

   If **YES,** then proceed to Step **11.**
   If **NO,** then continue with Step **10.**

10. Use COT and RT schematic drawings to check wiring. Check for tip and ring reversal at COT and RT. Correct wiring until dial tone is present at RT.

11. At RT, dial any digit except "0" or "1". Does dial tone break?

    If **YES,** then proceed to Step **13.**
    If **NO,** then continue with Step **12.**

12. Replace COT channel unit and repeat from Step **6.** If no dial tone break, replace RT channel unit and repeat from Step **6.**

13. Do coins return?

    If **YES,** then continue with Step **14.**
    If **NO,** then proceed to Step **15.**

14. If system being tested has *SLC* 96 Carrier System COT, replace COT special service unit (**SSU**) and repeat from Step **6.**

15. At RT, put handset on hook. Do coins return?

    If **YES,** then proceed to Step **17.**
    If **NO,** then continue with Step **16.**

16. If system being tested has *SLC* 96 Carrier System COT, replace COT **SSU** and repeat from Step **6.** If coins not returned, replace COT channel unit and repeat from Step **6.** If coins still not returned, replace RT channel unit and repeat from Step **6.**

17. NOTE:
    If deposit is not automatically refunded when operator answers, request operator to return coins.

    Lift handset, deposit initial rate, call operator, and make normal talk tests.

18. Was call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **20.**
    If **NO,** then continue with Step **19.**

19. Replace COT channel unit and repeat from Step **6.** If talk quality not normal, replace RT channel unit and repeat from Step **6.**

20. Deposit nickel, dime, and quarter in sequence and request operator to identify coins, and proceed to Step **36.**

21. At RT, lift coin handset and check for dial tone. Is dial tone present?

    If **YES,** then proceed to Step **24.**
    If **NO,** then continue with Step **22.**

22. Replace COT channel unit. If no dial tone, replace RT channel unit. Is dial tone present?

    If **YES,** then proceed to Step **24.**
    If **NO,** then continue with Step **23.**

23. Use COT and RT schematic drawings to check wiring. Check for tip and ring reversal at COT and RT. Correct wiring until dial tone is present at RT.

24. At RT, deposit nickel and dial number that requires initial deposit.

25. Does dial tone break and is "insufficient deposit" recorded message played?

    If **YES,** then proceed to Step **27.**
    If **NO,** then continue with Step **26.**

26. Replace COT channel unit and repeat from Step **21.** If no dial tone break, replace RT channel unit and repeat from Step **21.**

27. At RT, put handset on hook. Does nickel return?

    If **YES,** then continue with Step **28.**
    If **NO,** then proceed to Step **21.** If system being tested has *SLC* 96 Carrier System COT, replace **SSU** and proceed to Step **21.**

28. NOTE:
Make sure that called number will not be answered.

Lift handset, deposit initial rate, and dial a number that requires initial deposit.

29. Is ringing tone present in coin phone handset?

If **YES,** then proceed to Step **31.**
If **NO,** then continue with Step **30.**

30. Replace COT channel unit and repeat from Step **21.** If no ringing in handset, replace RT channel unit and repeat from Step **21.**

31. At RT, put handset on hook. Do coins return?

If **YES,** then continue with Step **32.**
If **NO,** then proceed to Step **21.** If system being tested has *SLC* 96 Carrier System COT, replace **SSU** and proceed to Step **21.**

32. At RT, lift handset, call operator, and make normal talk tests.

33. Was call completed with normal transmission quality in both directions?

If **YES,** then proceed to Step **35.**
If **NO,** then continue with Step **34.**

34. Replace COT channel unit and repeat from Step **21.** If poor talk quality, replace RT channel unit and repeat from Step **21.**

35. At RT, deposit nickel, dime, and quarter in sequence and request operator to identify coins.

36. Did operator identify coins?

    If **YES,** then proceed to Step **38.**
    If **NO,** then continue with Step **37.**

37. Replace COT channel unit and repeat from Step **5.** If identification is not correct, replace RT channel unit and repeat from Step **5.**

38. Ask operator to return coins. Do coins return?

    If **YES,** then continue with Step **39.**
    If **NO,** then proceed to Step **5.** If system being tested has *SLC* 96 Carrier System COT, replace **SSU** and proceed to Step **5.**

39. Ask operator to call back, then put handset on hook. Does coin phone ring normally?

    If **YES,** then proceed to Step **41.**
    If **NO,** then continue with Step **40.**

40. Replace COT channel unit and repeat from Step **5.** If no ringing, replace RT channel unit and repeat from Step **5.**

41. At RT, lift handset and make normal talk tests.

42. Was call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **44.**
    If **NO,** then continue with Step **43.**

43. Replace COT channel unit and repeat from Step **5.** If talk quality is not normal, replace RT channel unit and repeat from Step **5.**

44. At RT, put handset on hook.

45. Is this the last coin channel to be tested in this system?

    If **YES,** then continue with Step **46.**
    If **NO,** then proceed to Step **2.**

46. At RT, disconnect coin phone; at COT, remove test line from channel.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Test Coin Channel End-To-End On Integrated System

Summary: Before performing this procedure, coin phone set must be correctly wired for service desired: coin first (CF) or dial tone first (DTF), and must be operating correctly. This procedure does not verify correct operation of coin phone set, only channel unit functions. AT&T 506-900-503 describes coin maintenance procedures.

1. Establish communication between central office and remote terminal (RT).

2. At central office, select channel for testing and inform RT of channel selected. Verify channel units are installed.

   Comment: These channel units provide one line of coin service.

3. Verify channel service assignment and telephone number assignment for channel being tested.

4. NOTE:
   The 52A channel unit test extender may be used [DLP-543].

   At RT, temporarily connect jumpers from cross-connect terminals for selected channel to coin phone set.

5. Is channel service CF or DTF?

   If **CF,** then continue with Step **6.**
   If **DTF,** then proceed to Step **19.**

6. At RT, lift coin phone handset off hook, deposit nickel, and check for dial tone. Is dial tone present?

   If **YES,** then continue with Step **7.**
   If **NO,** then proceed to Step **8.**

7. Verify central office channel service assignment. Replace RT channel unit and repeat from Step **6.**

8. Deposit additional coins to initial rate and check for dial tone. Is dial tone present?

   If **YES,** then proceed to Step **11.**
   If **NO,** then continue with Step **9.**

9. Verify central office channel service assignment. Replace RT channel unit and repeat from Step **6.** Is dial tone present?

   If **YES,** then proceed to Step **11.**
   If **NO,** then continue with Step **10.**

10. Use office drawings and RT schematic drawings to check wiring. Check for tip and ring reversal at RT. Correct wiring until dial tone is present at RT.

11. At RT, dial any digit except "0" or "1". Does dial tone break?

    If **YES,** then proceed to Step **13.**
    If **NO,** then continue with Step **12.**

12. Verify central office channel service assignment. Replace RT channel unit and repeat from Step **6.**

13. At RT, put handset on hook. Do coins return?

    If **YES,** then proceed to Step **15.**
    If **NO,** then continue with Step **14.**

14. Replace RT channel unit and repeat from Step **6.**

15. NOTE:
    If deposit is not automatically refunded when operator answers, request operator to return coins.

    At RT, lift handset, deposit initial rate, call operator, and make normal talk tests.

16. Was call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **18.**
    If **NO,** then continue with Step **17.**

17. Replace RT channel unit and repeat from Step **6.**

18. At RT, deposit nickel, dime, and quarter in sequence and request operator to identify coins, and proceed to Step **34.**

19. Lift coin handset and check for dial tone. Is dial tone present?

    If **YES,** then proceed to Step **22.**
    If **NO,** then continue with Step **20.**

20. Verify central office channel service assignment. Replace RT channel unit. Is dial tone present?

    If **YES,** then proceed to Step **22.**
    If **NO,** then continue with Step **21.**

21. Use COT and RT schematic drawings to check wiring. Check for tip and ring reversal at COT and RT. Correct wiring until dial tone is present at RT.

22. At RT, deposit nickel and dial number that requires initial deposit.

23. Does dial tone break and is "insufficient deposit" recorded message played?

    If **YES,** then proceed to Step **25.**
    If **NO,** then continue with Step **24.**

24. Replace RT channel unit and repeat from Step **19.**

25. At RT, hang up, then lift handset and deposit initial rate.

26. NOTE:
    Make sure that called number will not be answered.

    Dial a number that requires initial deposit.

27. Is ringing tone present in coin phone handset?

    If **YES,** then proceed to Step **29.**
    If **NO,** then continue with Step **28.**

28. Verify central office channel service assignment. Replace RT channel unit and repeat from Step **19.**

29. At RT, hang up, then lift handset and call operator.

30. Make normal talk tests.

31. Was call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **33.**
    If **NO,** then continue with Step **32.**

32. Replace RT channel unit and repeat from Step **19.**

33. At RT, deposit nickel, dime, and quarter in sequence and request operator to identify coins.

34. Did operator identify coins?

    If **YES,** then request operator to return coins, and proceed to Step **36.**
    If **NO,** then continue with Step **35.**

35. Verify central office channel service assignment. If identification is not correct, replace RT channel unit and repeat from Step **5.**

36. Ask operator to call back, then put handset on hook. Does coin phone ring normally?

    If **YES,** then proceed to Step **38.**
    If **NO,** then continue with Step **37.**

37. Verify central office channel service assignment. Replace RT channel unit and repeat from Step **5.**

38. At RT, lift handset and make normal talk tests.

39. Was call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **41.**
    If **NO,** then continue with Step **40.**

40. Replace RT channel unit and repeat from Step **5.**

41. Put handset on hook.

42. Is this the last coin channel to be tested in this system?

    If **YES,** then continue with Step **43.**
    If **NO,** then proceed to Step **2.**

43. Disconnect coin phone and test line from channel.

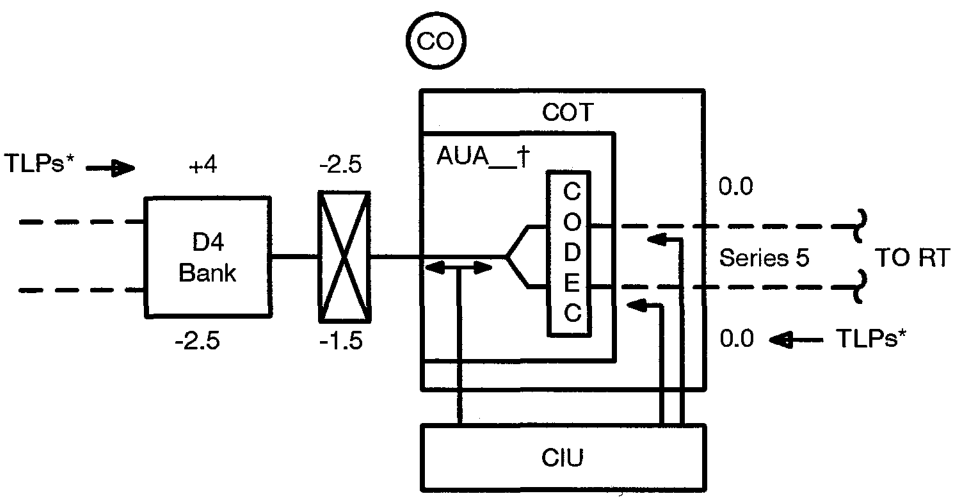
STOP. YOU HAVE COMPLETED THIS PROCEDURE

Verify COT Channel Unit Settings — 2-Wire Interface to Carrier Terminal, Metallic Repeater, or Central Office Switch

Summary: Send −TRMT(GN) level at 1 kHz; transmit gain of central office terminal (COT) channel (line level) should range from −0.6 to +0.2 dBm. Receive gain (T/R level) should range from [RCV(GN) −0.6] to [RCV(GN) +0.2] dBm. Verify connection between COT and back-to-back terminal. Trans-hybrid loss should be: THL>21 dB. Noise at channel unit should be less than 22 dBrnc.

1. Figure 1 shows the channel layout for the tests that follow. Refer to circuit layout information or work order record detail (WORD) for circuit details.

2. Connect craft interface unit (CIU) to channel test unit (CTU) and address COT channel unit.



* Actual TLP may vary with circuit design.
† AUA42 or AUA43 channel unit.

Figure 1—2-Wire Circuit, COT End with Carrier Interface

3. If necessary, provision COT channel unit.

   Reference: **DLP-519**

4. From CONNECT-TA menu, select BOTH DIG AND MET (item 3).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL AND METALLIC TEST ACCESS WAS
   ACCOMPLISHED /*

5. NOTE:
   If channel unit function code = FXS or DPO, select transmission measuring set (TMS) HOLD feature or use holding coil between TMS jack and CIU **CHANNEL UNIT ACCESS - LINE - T/R** jack. **BUSY** indicator will light on channel unit (indicating loop closure) and remain lighted as long as HOLD feature is present.

   Connect test equipment (Figure 2) as follows:

   - TMS **TRANSMIT** jack to **CHANNEL UNIT ACCESS - LINE - T/R** on CIU
   - TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on CIU.

6. Set switches on CIU as follows:

   - **BIT STREAM ACCESS - NE** depressed
   - **CHANNEL TYPE** to **VF**
   - If function code = FXS, set **SIGNALING CONTROL - TRANSMIT A** and **C** to **0**, **B** and **D** to **1**
   - If function code = FXO, DPO, or TO, set **SIGNALING CONTROL - TRANSMIT A**, **B**, **C**, and **D** to **1**

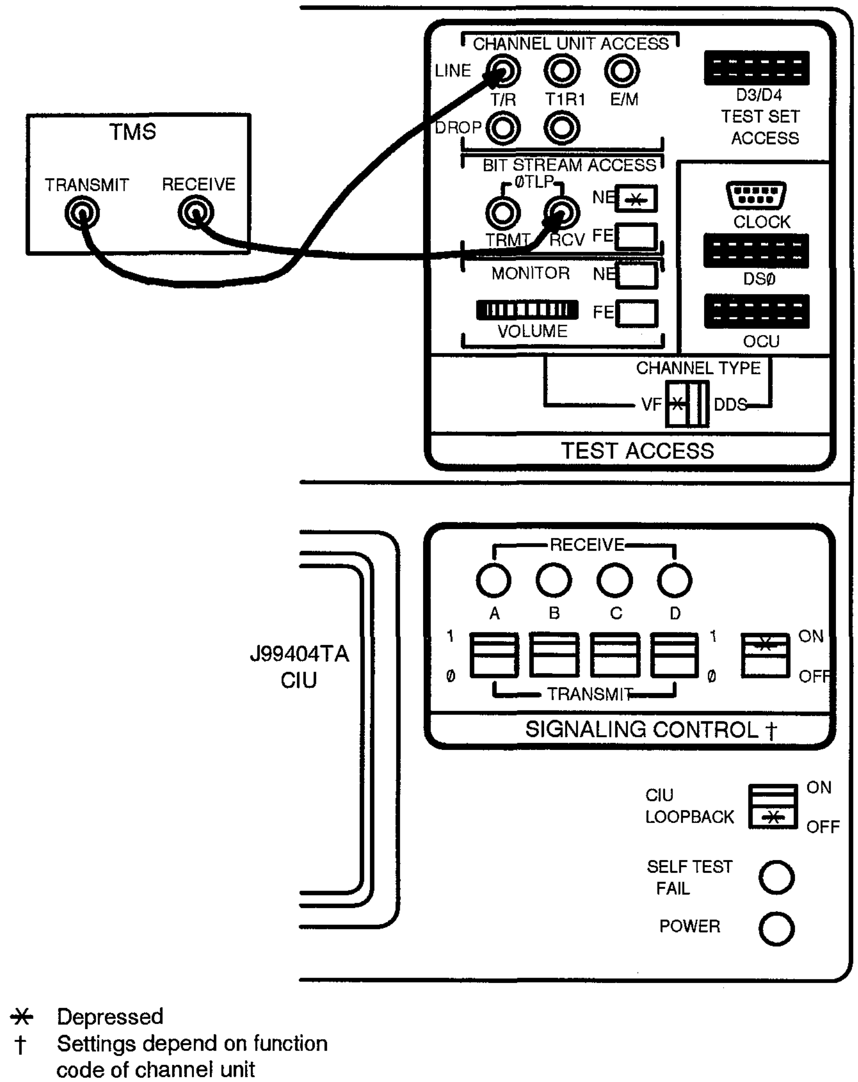


Figure 2—Test Connections for Testing COT Channel Unit

- **SIGNALING CONTROL** to **ON**
- **CIU LOOPBACK** to **OFF**.

7. This procedure is based on A-Z direction being from COT toward remote terminal (RT). If WORD defines this direction as Z-A, read A-Z as Z-A in steps that follow.

8. NOTE:
The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

Condition TMS to send −TRMT(GN) dBm level (at 1 kHz) as follows:

- Set impedance to **600** ohms
- Set **TRMT LEVEL** to −TRMT(GN) value from WORD.

9. NOTE:
If TMS switch sets same impedance for transmit and receive directions, 1-kHz level measurements will be 0.2 dB less than actual level; given levels include this offset. If test set has separate impedance controls for transmit and receive, set both controls to 600 ohms (to get same results).

Send tone through COT channel unit and measure transmit gain. Does TMS indicate between −0.6 and +0.2 dBm?

If **YES,** then proceed to Step **16.**

If **NO,** then continue with Step **10.**

10. Verify COT channel unit provisioning: select ADJUST from test adjust menu on CIU and verify default values in square brackets match WORD entries for each channel unit setting. If TRANSMIT GAIN setting is revised, repeat from Step **9**; otherwise, continue with Step **11.**

11. Replace COT channel unit. Does TMS indicate between −0.6 and +0.2 dBm?

    If **YES,** then proceed to Step **16.**

    If **NO,** then continue with Step **12.**

12. Disconnect CIU, replace COT **CTU** (**AUB5**), and reconnect CIU. Repeat channel unit dialog and request for test access. If TMS still does not indicate within limits, replace COT digital test unit - left [**DTU-L** (**AUA18**)] and digital test unit - right [**DTU-R** (**AUA19**)].

13. Does TMS indicate between −0.6 and +0.2 dBm?

    If **YES,** then proceed to Step **16.**

    If **NO,** then continue with Step **14.**

14. Clear test bus to CTU and channel unit.

    Reference: **DLP-534**

15. Does TMS indicate between −0.6 and +0.2 dBm?

    If **YES,** then continue with Step **16.**

    If **NO,** then **refer trouble to appropriate repair forces.**

16. Remove connection at **CHANNEL UNIT ACCESS - LINE - T/R** jack on CIU. Replace by 600- or 900-ohm terminating plug.

17. Measure noise on TMS. Is noise less than 22 dBrnc?

    If **YES,** then proceed to Step **20.**

    If **NO,** then continue with Step **18.**

18. Replace COT channel unit. Is noise less than 22 dBrnc?

    If **YES,** then proceed to Step **20.**

    If **NO,** then reinstall original channel unit and continue with Step **19.**

19. Replace CIU. If spare CIU is not available, is noise less than 24 dBrnc (or 22 dBrnc with spare CIU)?

    If **YES,** then note result and continue with Step **20.**

    If **NO,** then **refer trouble to appropriate repair forces.**

20. NOTE:
    If channel unit function code = FXS or DPO, select TMS HOLD feature or use holding coil between TMS jack and CIU **CHANNEL UNIT ACCESS - LINE - T/R** jack.

    Change test connections:

    - TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on CIU
    - TMS **RECEIVE** jack to **CHANNEL UNIT ACCESS - LINE - T/R** on CIU.

21. On TMS, reset **TRMT LEVEL** to 0.

22. Measure COT channel unit receive gain. Does TMS indicate between [RCV(GN) −0.6] and [RCV(GN) +0.2] dBm?

    If **YES,** then proceed to Step **29.**

    If **NO,** then continue with Step **23.**

23. Verify COT channel unit provisioning: select ADJUST from test adjust menu on CIU and verify default values in square brackets match WORD entries for each channel unit setting. If RECEIVE GAIN setting is revised, repeat from Step **22**; otherwise continue with Step **24.**

24. Replace COT channel unit. Does TMS indicate between [RCV(GN) −0.6] and [RCV(GN) +0.2] dBm?

    If **YES,** then proceed to Step **29.**

    If **NO,** then continue with Step **25.**

25. Disconnect CIU from **CTU**, replace COT **CTU** (**AUB5**), and reconnect CIU. Repeat channel unit dialog and request for test access. If TMS still does not indicate within limits, replace COT **DTU-L** and **DTU-R** (**AUA18** and **AUA19**).

26. Does TMS indicate between [RCV(GN) −0.6] and [RCV(GN) +0.2] dBm?

    If **YES,** then proceed to Step **31.**

    If **NO,** then continue with Step **27.**

27. Clear test bus to CTU and channel unit.

    Reference: **DLP-534**

28. Does TMS indicate between [RCV(GN) −0.6] and [RCV(GN) +0.2] dBm?

    If **YES,** then continue with Step **29.**

    If **NO,** then **refer trouble to appropriate repair forces.**

29. Remove connection at **BIT STREAM ACCESS - 0TLP - TRMT** jack on CIU. Replace by 600- or 900-ohm terminating plug.

30. Measure noise on TMS. Is noise less than [20 + RCV(GN)] dBrnc?

    If **YES,** then proceed to Step **32.**

    If **NO,** then continue with Step **31.**

31. Replace channel unit. Is noise less than [20 + RCV(GN)] dBrnc?

    If **YES,** then continue with Step **32.**

    If **NO,** then **refer trouble to appropriate repair forces.**

32. Verify connection between COT and back-to-back terminal (Figure 1). Consult office records or circuit records, if necessary. Are terminals connected?

    If **YES,** then continue with Step **33.**

    If **NO,** then proceed to Step **37.**

33. To measure return loss (balance), change test connections as follows:
    - TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on CIU
    - TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on CIU

- Set TMS **TRMT LEVEL** to 0 dBm
- Verify TMS impedance is **600.**

34. Note TMS indication. (Ignore + or –.) Add RCV(GN) and TRMT(GN) (from WORD) to noted value. (Negative values from WORD should be subtracted.) The result is trans-hybrid loss (THL).

    Response: THL = TMS(meas) + RCV(GN) + TRMT(GN)

35. Is THL greater than 21 dB?

    If **YES,** then proceed to Step **37.**

    If **NO,** then continue with Step **36.**

36. Revise balance setting of COT channel unit (must be 0, 1, or 2). If THL is still less than 21 dB, check CO wiring, look for noisy termination of channel, or refer trouble to appropriate repair forces.

37. Are any more 2-wire channels of this type to be tested in this system?

    If **YES,** then disconnect TMS, address next channel unit, and proceed to Step **3.**

    If **NO,** then continue with Step **38.**

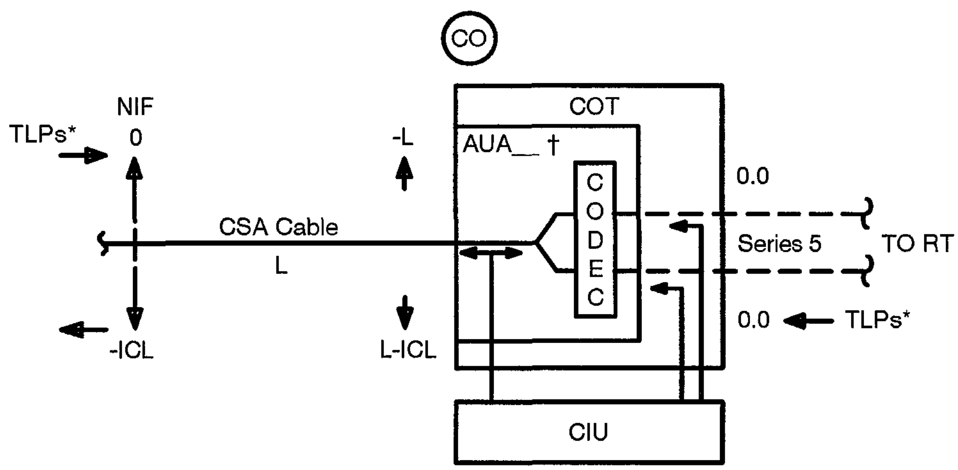
38. On CIU, select DISCONNECT TA from menu ***before*** unplugging CIU from CTU.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Verify COT Channel Unit Settings and Loop Integrity — 2-Wire COT Interface to Loop to PBX, Telephone Set, or Data Modem

Summary: Send −TRMT(GN) level at 1 kHz; transmit gain of central office terminal (COT) channel unit (line level) should range from −0.4 to +0.4 dBm. Receive gain (T/R level) should range from [RCV(GN) −0.4] to [RCV(GN) +0.4] dBm. Send 0 dBm level at 1 kHz toward network interface (NIF); customer receive level should range from [(TLP Z-A) −0.6] to [(TLP Z-A) +0.6] dBm. At NIF, send 0 dBm level; transmit line level should range from −0.6 to +0.6 dBm. At COT, then at NIF, send 0 dBm tones at 0.4 kHz and 2.8 kHz. At NIF and at COT, low-end slope should range from −0.5 to +2.5, and high-end slope should range from −0.5 to +3.74. Noise at customer location should be less than 20 dBrnc. Noise at COT should be less than 23 dBrnc.

1. Arrange for channel alignment tests to NIF at customer location. Figure 1 shows the channel layout for the tests that follow. Refer to circuit layout information or work order record detail (WORD) for circuit details.



* Actual TLP may vary with circuit design.
† AUA42 or AUA43 channel unit.

Figure 1—2-Wire Circuit with Loop at COT End

2. Connect craft interface unit (CIU) to channel test unit [**CTU** (**AUB5**)] and address COT channel unit.

3. If necessary, provision COT channel unit. From CONNECT-TA menu, select BOTH DIG AND MET (item 3).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL AND METALLIC TEST ACCESS WAS
   ACCOMPLISHED /*

   Reference: **DLP-519**

4. ⇒ NOTE:
   If channel unit function code = FXS or DPO, insert transmission measuring set (TMS) HOLD unit between TMS jack and CIU **CHANNEL UNIT ACCESS - LINE - T/R** jack. **BUSY** indicator will light on channel unit (indicating loop closure) and remain lighted as long as HOLD feature is present.

   Connect test equipment (Figure 2) as follows:

   - TMS **TRANSMIT** jack to **CHANNEL UNIT ACCESS** - **LINE** - **T/R** on CIU
   - TMS **RECEIVE** jack to **BIT STREAM ACCESS** - **0TLP** - **RCV** on CIU.

5. Set switches on CIU as follows:

   - **BIT STREAM ACCESS** - **NE** depressed
   - **CHANNEL TYPE** to **VF**
   - If function code = FXS, set **SIGNALING CONTROL** - **TRANSMIT A** and **C** to **0**, **B** and **D** to **1**
   - If function code = FXO or TO, set **SIGNALING CONTROL** - **TRANSMIT A**, **B**, **C**, and **D** to **1**

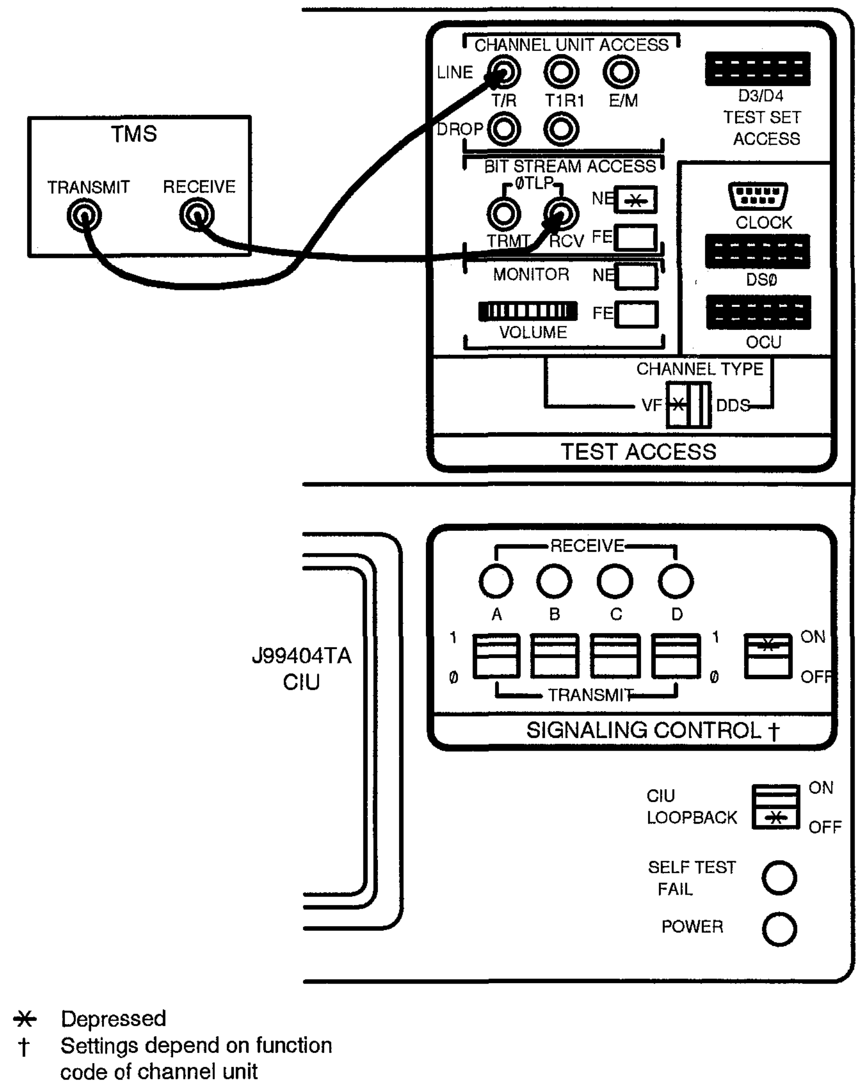


Figure 2—Test Connections for Testing COT Channel Unit

- **SIGNALING CONTROL** to **ON**
- **CIU LOOPBACK** to **OFF**.

6. This procedure is based on A-Z direction being from COT toward RT. If WORD defines this direction as Z-A, read A-Z as Z-A (and the reverse) in steps that follow.

7. NOTE:
The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

Condition TMS to send −TRMT(GN) dBm level (at 1 kHz) as follows:

- Set impedance to **600** ohms
- Set **TRMT LEVEL** to −TRMT(GN) value from WORD.

8. Send tone through COT channel unit and measure transmit gain. Does TMS indicate between −0.4 and +0.4 dBm?

   If **YES,** then proceed to Step **15.**

   If **NO,** then continue with Step **9.**

9. Verify COT channel unit provisioning: select ADJUST from test adjust menu on CIU and verify default values in square brackets match WORD entries for each channel unit setting. If TRANSMIT GAIN setting is revised, repeat from Step **8**; otherwise continue with Step **10.**

10. Replace COT channel unit. Does TMS indicate between −0.4 and +0.4 dBm?

    If **YES,** then proceed to Step **15.**

    If **NO,** then continue with Step **11.**

11. Disconnect CIU, replace COT **CTU** (**AUB5**) and reconnect CIU. Repeat channel unit dialog and request for test access. If TMS still does not indicate within limits, replace COT digital test unit - left [**DTU-L** (**AUA18**)] and digital test unit - right [**DTU-R** (**AUA19**)].

12. Does TMS indicate between −0.4 and +0.4 dBm?

    If **YES,** then proceed to Step **15.**

    If **NO,** then continue with Step **13.**

13. Clear test bus to CTU and channel unit.

    Reference: **DLP-534**

14. Does TMS indicate between −0.4 and +0.4 dBm?

    If **YES,** then continue with Step **15.**

    If **NO,** then **refer trouble to appropriate repair forces.**

15. NOTE:
    If channel unit function code = FXS or DPO, insert TMS HOLD unit between TMS jack and CIU **CHANNEL UNIT ACCESS - LINE - T/R** jack.

    Change test connections:

    - TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on CIU
    - TMS **RECEIVE** jack to **CHANNEL UNIT ACCESS - LINE - T/R** on CIU.

16. On TMS, reset **TRMT LEVEL** to 0 dBm and verify impedance is set to 600 ohms.

17. Measure COT channel unit receive gain. Does TMS indicate between [RCV(GN) −0.4] and [RCV(GN) +0.4] dBm?

    If **YES,** then proceed to Step **24.**

    If **NO,** then continue with Step **18.**

18. Verify COT channel unit provisioning: select ADJUST from test adjust menu on CIU and verify that default values in square brackets match WORD entries for each channel unit setting. If RECEIVE GAIN setting is revised, repeat from Step **17**; otherwise, continue with Step **19.**

19. Replace COT channel unit. Does TMS indicate between [RCV(GN) −0.4] and [RCV(GN) +0.4] dBm?

    If **YES,** then proceed to Step **24.**

    If **NO,** then continue with Step **20.**

20. Disconnect CIU from **CTU**, replace COT **CTU** (**AUB5**), and reconnect CIU. Repeat channel unit dialog and request for test access. If TMS still does not indicate within limits, replace COT **DTU-L** and **DTU-R** (**AUA18** and **AUA19**).

21. Does TMS indicate between [RCV(GN) −0.4] and [RCV(GN) +0.4] dBm?

    If **YES,** then proceed to Step **24.**

    If **NO,** then continue with Step **22.**

22. Clear test bus to CTU and channel unit.

    Reference: **DLP-534**

23. Does TMS indicate between [RCV(GN) −0.4] and [RCV(GN) +0.4] dBm?

    If **YES,** then continue with Step **24.**

    If **NO,** then **refer trouble to appropriate repair forces.**

24. ⇛ NOTE:
    Unless channel unit function code = TO, bit stream TLP is assumed to be 0.0 dB TLP. For circuits with a bit stream TLP other than zero, test levels

given must be modified. These levels are shown in parentheses after the normal test levels.

Change test setup to send tone toward customer location as follows:

- TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on CIU
- Set TMS **TRMT LEVEL** to 0.0 (or TLP Z-A) dBm.

25. **NOTE:**
If function code of COT channel unit is FXS or DPO, condition COT channel unit from customer location for AC measurement. This requires the equivalent of a test set with HOLD feature in TRANSMIT and RECEIVE modes. At COT, **BUSY** indicator should light on channel unit (indicating loop closure) and remain lighted as long as HOLD feature is present.

At customer location, is receive level between [(TLP Z-A) −0.6] and [(TLP Z-A) +0.6] dBm?

If **YES,** then proceed to Step **29.**

If **NO,** then note receive level at customer location and continue with Step **26.**

26. At COT, verify that COT channel unit RECEIVE GAIN is set to WORD value. Adjust COT channel unit RECEIVE GAIN no more than 1 dB. At customer location, is receive level between [(TLP Z-A) −0.6] and [(TLP Z-A) +0.6] dBm?

Reference: **DLP-525**

If **YES,** then proceed to Step **29.**

If **NO,** then reset RECEIVE GAIN to WORD value and continue with Step **27.**

27. Disconnect TMS from CIU and connect TMS **RECEIVE** jack to **BIT STREAM ACCESS** - **0TLP** - **RCV** on CIU. On TMS, set **RCV LEVEL** to 0 dBm. At customer location, send 0 dBm level (600 ohms impedance) toward COT.

28. At COT, measure gain of loop and COT channel unit in transmit direction. Note TMS indication and refer trouble to circuit provisioning center for analysis.

29. Write down receive level at customer location for later use.

30. At COT, disconnect TMS from CIU. Connect TMS **RECEIVE** jack to **BIT STREAM ACCESS** - **0TLP** - **RCV** on CIU.

31. At customer location, send 0 dBm level (600 ohms impedance) toward COT.

32. At COT, measure gain of loop and COT channel unit in transmit direction. Does TMS indicate between −0.6 and +0.6 dBm (or within 0.6 dB of bit stream TLP A-Z)?

    If **YES,** then proceed to Step **34.**

    If **NO,** then note transmit level in bit stream and continue with Step **33.**

33. Verify that COT channel unit TRANSMIT GAIN is set to WORD value. Adjust COT channel unit TRANSMIT GAIN no more than 1 dB. Does TMS indicate between +0.6 and −0.6 dBm (or within 0.6 dB of bit stream TLP A-Z)?

    Reference: **DLP-525**

    If **YES,** then continue with Step **34.**

    If **NO,** then **refer trouble to circuit provisioning center for analysis.**

34. Write down transmit level (1-kHz gain from NIF to bit stream) for later use.

35. At customer location, send 0.4 kHz tone at 0 dBm toward COT.

36. ⇛ **NOTE:**
Slope limits depend on whether customer equipment is a private branch exchange (PBX) or other customer premises switching equipment, or a telset or other nonswitched termination.

At COT, note TMS indication. Calculate low-end slope using this measurement (at 0.4 kHz) and measurement from transmit direction noted in Step **34**. Result must fall between −0.5 and +1.5 (PBX) or +2.5 (telset):

Response: Slope = Meas(Step 34) − Meas(0.4 kHz)

37. Is low-end slope between −0.5 and +1.5 (PBX) or +2.5 (telset); in other words, is 404 Hz measured level between 0.5 dB hot and 1.5 dB or 2.5 dB long relative to the level at 1 kHz?

If **YES,** then continue with Step **38.**

If **NO,** then **note result for later referral to circuit provisioning center.**

38. At customer location, send 2.8-kHz tone toward COT.

39. At COT, note TMS indication and calculate high-end slope as done in Step **36**. Result must fall between −0.5 and +2.2 (PBX) or +3.7 (telset):

Response: Slope = Meas(Step 34) − Meas(2.8 kHz)

40. Is high-end slope between −0.5 and +2.2 (PBX) or +3.7 (telset)?

If **YES,** then continue with Step **41.**

If **NO,** then **note result for later referral to circuit provisioning center.**

41. Change test setup to send tone toward customer location as follows:

    - Set TMS **TRMT** frequency to **404** and level to 0.0 (TLP A-Z) dBm. Connect TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on CIU.

42. Note measurement at customer location. Calculate low-end slope using this measurement (at 404 Hz) and measurement from receive direction noted in Step **29**:

    Response: Slope = Meas(Step 29) – Meas(404 Hz)

43. Is low-end slope between −0.5 and +1.5 (PBX) or +2.5 (telset)?

    If **YES,** then continue with Step **44.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

44. On TMS, set **TRMT** frequency to **2804.**

45. Note measurement at customer location. Calculate high-end slope as done in Step **42**:

    Response: Slope = Meas(Step 29) – Meas(2,804 Hz)

46. Is high-end slope between −0.5 and +2.2 (PBX) or +3.7 (telset)?

    If **YES,** then continue with Step **47.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

47. NOTE:
    If channel unit function code = FXS or DPO, termination must include HOLD feature.

At customer location, terminate loop with 600 ohms.

48. At COT, connect return loss measuring set to **BIT STREAM ACCESS - 0TLP - RCV** and **TRMT** on CIU. Measure return loss. Is SRL-HI>13, SRL>14, ERL>15?

    If **YES,** then proceed to Step **50.**

    If **NO,** then continue with Step **49.**

49. At COT is SRL-HI>9, SRL>11, ERL>11?

    If **YES,** then note result for later referral to circuit provisioning center and continue with Step **50.**

    If **NO,** then **refer trouble to circuit provisioning center and wait for new WORD.**

50. At customer location, remove termination. At COT insert 600- or 900-ohm terminating plug in CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack.

51. NOTE:
    If function code of COT channel unit is FXS or DPO, condition COT channel unit from customer location for AC measurement. This requires the equivalent of a test set with HOLD feature in TRANSMIT and RECEIVE modes.

    At customer location, measure noise. Is noise less than 20 dBrnc?

    If **YES,** then proceed to Step **54.**

    If **NO,** then continue with Step **52.**

52. At COT, move terminating plug to CIU **CHANNEL UNIT ACCESS - DROP - T/R** jack.

53. At customer location, measure noise. Is noise less than 20 dBrnc?

    If **YES,** then replace noisy COT channel unit and proceed to Step **51.**

    If **NO,** then **refer noisy loop trouble to appropriate repair forces.**

54. NOTE:
    If channel unit function code = FXS or DPO, termination must include HOLD feature.

    At customer location, terminate loop with either 600 or 900 ohms.

55. At COT, measure noise: connect TMS to CIU **BIT STREAM ACCESS - 0TLP - RCV** jack. Is noise less than 23 dBrnc?

    If **YES,** then proceed to Step **59.**

    If **NO,** then continue with Step **56.**

56. Change TMS connection to CIU **CHANNEL UNIT ACCESS - DROP - T/R** jack. Is noise less than (21 −TLP) dBrnc?

    If **YES,** then continue with Step **57.**

    If **NO,** then **refer noisy loop trouble to appropriate repair forces.**

57. At COT, insert 600- or 900-ohm terminating plug in CIU **CHANNEL UNIT ACCESS - LINE - T/R** jack. Connect TMS to **BIT STREAM ACCESS - 0TLP - RCV** jack. Is noise less than 22 dBrnc?

    If **YES,** then proceed to Step **55.**

    If **NO,** then continue with Step **58.**

58. Replace noisy COT channel unit. Remove terminating plug, disconnect TMS from CIU, and repeat from Step **50.**

59. Was COT channel unit replaced in noise test (Step 53 or Step 58)?

    If **YES,** then proceed to Step **4.**

    If **NO,** then continue with Step **60.**

60. Are any more 2-wire channels of this type to be tested in this system?

    If **YES,** then disconnect test sets at both ends, address next channel unit to be tested and proceed to Step **3.**

    If **NO,** then continue with Step **61.**

61. At COT and customer location, disconnect test equipment.

62. On CIU, select DISCONNECT TA from menu ***before*** unplugging CIU from CTU.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Verify COT Channel Unit Settings 4-Wire Interface to Carrier Terminal

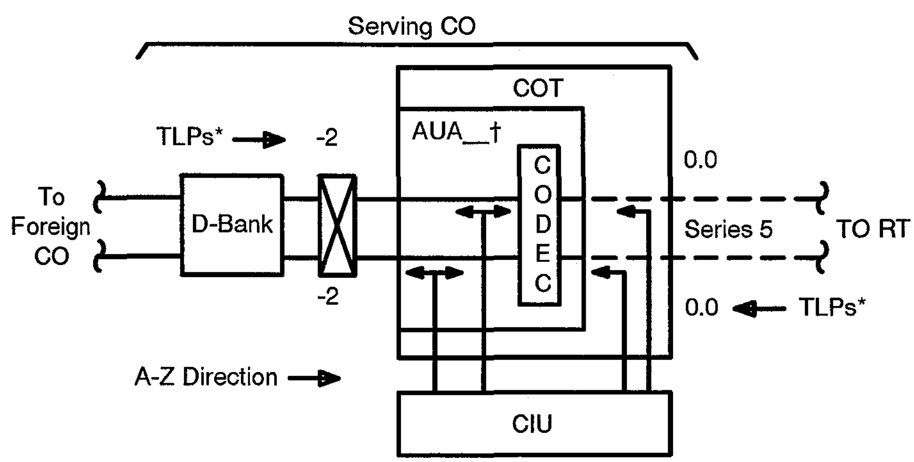
Summary: At central office terminal (COT), send TLP A-Z level at 1 kHz; transmit gain of COT channel (line level) should range from −0.4 to +0.4 dBm. Send 0 dBm level at 1 kHz. Channel unit receive gain (T/R level) should range from [(TLP Z-A) −0.4] to [(TLP Z-A) +0.4] dBm. Noise at COT should be less than [(TLP Z-A) +20] dBrnc.

1. Figure 1 shows the channel layout for the tests that follow. Refer to circuit layout information or work order record detail (WORD) for circuit details.

2. Connect craft interface unit (CIU) test cable to channel test unit [**CTU** (**AUB5**)] in dual bank of system to be tested.

3. If necessary, provision **AUA41** COT channel unit.

   Reference: **DLP-521**



* Standard TLPs shown. Actual TLP may vary with circuit design.
† AUA41 or AUA44 channel unit

Figure 1 — 4-Wire Circuit, COT End with Carrier Interface

4. If necessary, provision **AUA44** COT channel unit.

   Reference: **DLP-520**

5. From CONNECT-TA menu, select BOTH DIG AND MET (item 3).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL AND METALLIC TEST ACCESS WAS
   ACCOMPLISHED /*

6. Connect test equipment (Figure 2) as follows:

   - Transmission measuring set (TMS) **TRANSMIT** jack to **CHANNEL UNIT ACCESS** - **LINE** - **T/R** on CIU
   - TMS **RECEIVE** jack to **BIT STREAM ACCESS** - **0TLP** - **RCV** on CIU.

7. Set switches on CIU as follows:

   - **BIT STREAM ACCESS** - **NE** depressed
   - **CHANNEL TYPE** to **VF**
   - If function code = FXO(_), FXP(_), DX4(_), TO4, or ETO4, set **SIGNALING CONTROL** - **TRANSMIT A**, **B**, **C**, and **D** to **1**
   - If function code = FXS(_) or FXT(_), set **SIGNALING CONTROL** - **TRANSMIT A** and **C** to 0, **B** and **D** to 1
   - **SIGNALING CONTROL** to **ON**
   - **CIU LOOPBACK** to **OFF**.

8. NOTE:
   This procedure is based on A-Z direction being from COT toward RT. If WORD defines this direction as Z-A, read A-Z as Z-A (and the reverse) in steps that follow.

   On WORD, find TLP A-Z for COT channel unit.

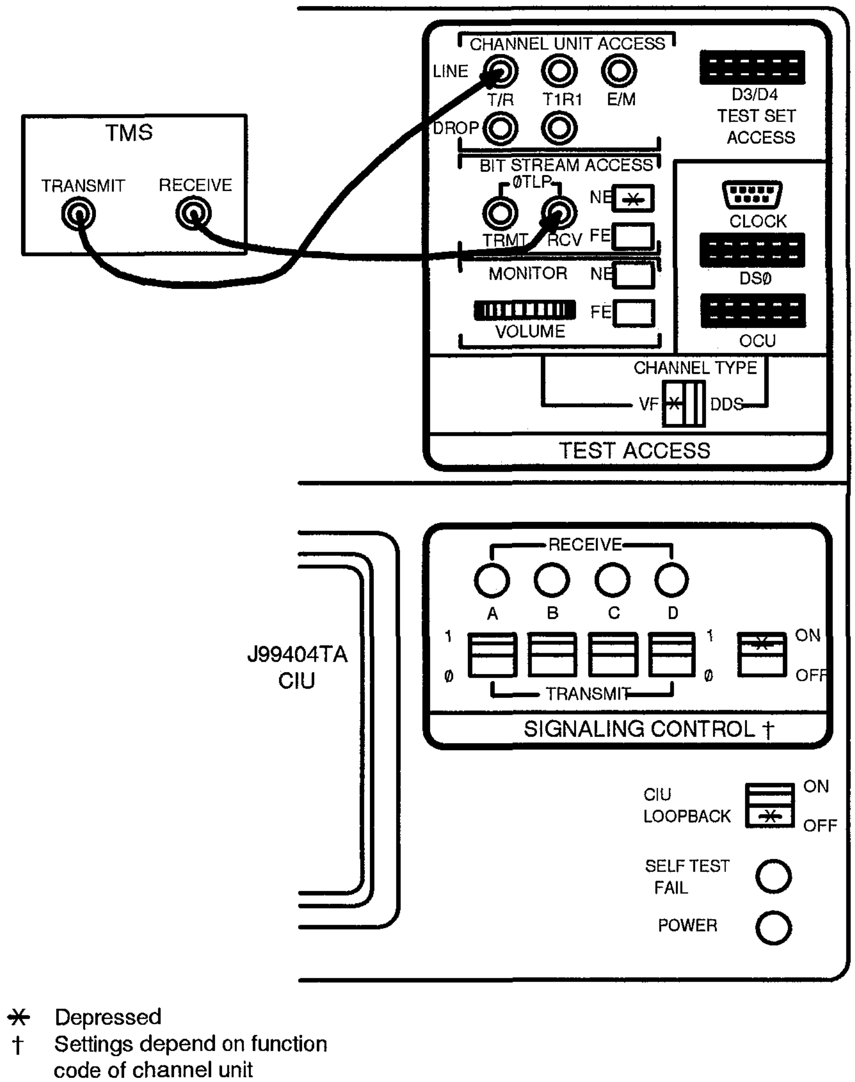


Figure 2— Test Connections for Testing COT Channel Unit

9. **NOTE:**
The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

Condition TMS to send TLP A-Z dBm level at 1 kHz (to T/R input to channel unit) as follows:

- Set impedance to **600** ohms
- Set **TRMT** frequency to **1004**
- Set **TRMT LEVEL** to TLP A-Z dBm level.

10. NOTE:
The bit stream TLP is assumed to be 0.0 dB TLP. (The WORD may list bit stream TLPs as +4 and −8.5 dB, which is equivalent to 0.0 dB.) For circuits with a bit stream TLP other than zero, test levels given must be modified. These levels are shown in parentheses after the normal test levels.

Measure COT channel unit transmit gain (**RCV LEVEL** on TMS). Does TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of bit stream TLP A-Z)?

If **YES,** then proceed to Step **17.**

If **NO,** then continue with Step **11.**

11. Verify COT channel unit provisioning: select ADJUST from test adjust menu on CIU and verify default values in square brackets match WORD entries for each channel unit setting. If TRMT ATTENUATOR setting is revised, repeat from Step **10**; otherwise continue with Step **12.**

12. Replace COT channel unit. Does TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of bit stream TLP A-Z)?

If **YES,** then proceed to Step **17.**

If **NO,** then continue with Step **13.**

13. Disconnect CIU from **CTU**, replace COT **CTU** (**AUB5**), and reconnect CIU. Repeat channel unit dialog and request for test access. If TMS still does not indicate within limits, replace COT digital test unit - left [**DTU-L** (**AUA18**)] and digital test unit - right [**DTU-R** (**AUA19**)].

14. Does TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of bit stream TLP A-Z)?

    If **YES,** then proceed to Step **17.**

    If **NO,** then continue with Step **15.**

15. Clear test bus to CTU and channel unit.

    Reference: **DLP-534**

16. Does TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of bit stream TLP A-Z)?

    If **YES,** then continue with Step **17.**

    If **NO,** then **refer trouble to appropriate repair forces.**

17. Change test connections:
    - TMS **TRANSMIT** jack to **BIT STREAM ACCESS** - **0TLP** - **TRMT** on CIU
    - TMS **RECEIVE** jack to **CHANNEL UNIT ACCESS** - **LINE** - **T1/R1** on CIU.

18. Reset TMS **TRMT LEVEL** to 0.0 (or bit stream TLP Z-A) dBm.

19. On WORD, find TLP Z-A for COT channel unit.

20. Measure COT channel unit receive gain. Does TMS indicate between [(TLP Z-A) −0.4] and [(TLP Z-A) +0.4] dBm?

    If **YES,** then proceed to Step **27.**

    If **NO,** then continue with Step **21.**

21. Verify COT channel unit provisioning: select ADJUST from test adjust menu on CIU and verify default values in square brackets match WORD entries for each channel unit setting. If RCV ATTENUATOR setting is revised, repeat from Step **20**; otherwise continue with Step **22**.

22. Replace COT channel unit. Does TMS indicate between [(TLP Z-A) −0.4] and [(TLP Z-A) +0.4] dBm?

    If **YES,** then proceed to Step **27.**

    If **NO,** then continue with Step **23.**

23. Disconnect CIU from **CTU**, replace COT **CTU** (**AUB5**), and reconnect CIU. Repeat channel unit dialog and request for test access. If TMS still does not indicate within limits, replace COT **DTU-L** and **DTU-R** (**AUA18** and **AUA19**).

24. Does TMS indicate between [(TLP Z-A) −0.4] and [(TLP Z-A) +0.4] dBm?

    If **YES,** then proceed to Step **27.**

    If **NO,** then continue with Step **25.**

25. Clear test bus to CTU and channel unit.

    Reference: **DLP-534**

26. Does TMS indicate between [(TLP Z-A) −0.4] and [(TLP Z-A) +0.4] dBm?

    If **YES,** then continue with Step **27.**

    If **NO,** then **refer trouble to appropriate repair forces.**

27. Disconnect TMS **TRANSMIT** jack from CIU. Insert 600 or 900 ohm terminating plug into CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack.

28. Measure noise on TMS. Is noise less than [(TLP Z-A) +20] dBrnc?

    If **YES,** then proceed to Step **30.**

    If **NO,** then continue with Step **29.**

29. Replace channel unit. Is noise less than [(TLP Z-A) +20] dBrnc?

    If **YES,** then continue with Step **30.**

    If **NO,** then **consult appropriate repair forces.**

30. Are any more 4-wire channels of this type to be tested in this system?

    If **YES,** then disconnect TMS, address next channel unit, and proceed to Step **3.**

    If **NO,** then continue with Step **31.**

31. On CIU, select DISCONNECT TA from menu ***before*** unplugging CIU from CTU.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Verify COT Channel Unit Settings and Metallic Extension Integrity — 4-Wire Metallic Extension to Customer Location or Foreign Central Office

Summary: At central office terminal (COT), send TLP A-Z level at 1 kHz; transmit gain of COT channel (line level) should range from −0.4 to +0.4 dBm. Send 0 dBm level at 1 kHz. Channel unit receive gain (T/R level) should range from [(TLP Z-A) −0.4] to [(TLP Z-A) +0.4] dBm. At network interface (NIF), customer receive level should range from [(TLP Z-A) −0.7] to [(TLP Z-A) +0.7]. At NIF, send (TLP A-Z) dBm level; transmit level at COT should range from −0.7 to +0.7 dBm. At COT, then at NIF, send 0 dBm tones at 0.4 kHz and 2.8 kHz. At NIF and at COT, low-end slope should range from −0.3 to +1.5, and high-end slope should range from −0.3 to +2.26. Noise at NIF should be less than 21 dBrnc. Noise at COT should be less than 24 dBrnc.

1. Arrange for channel alignment tests to customer location.

2. Figure 1 shows the channel layout for the tests that follow. Refer to circuit layout information or work order record detail (WORD) for circuit details.

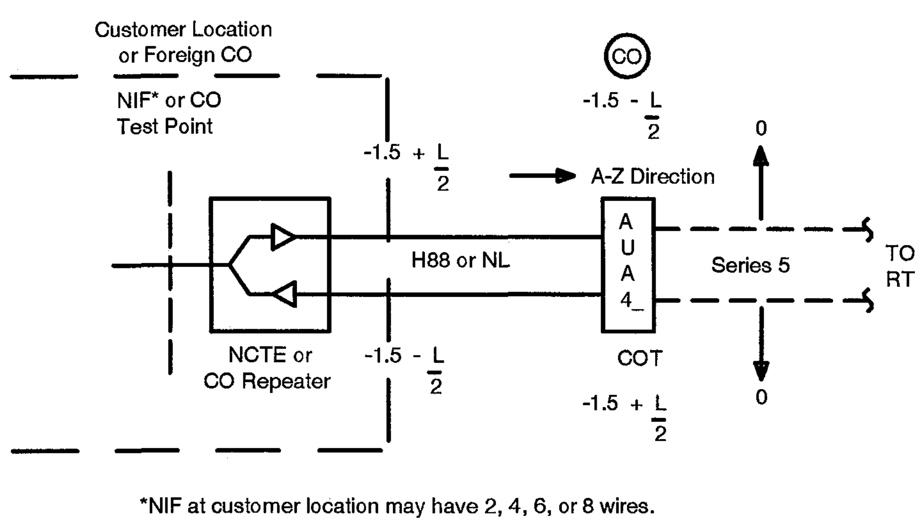


Figure 1—4-Wire Circuit, COT End with Metallic Extension

3. Connect craft interface unit (CIU) test cable to channel test unit [**CTU** (**AUB5**)] in dual bank of system to be tested.

4. If necessary, provision COT channel unit.

   Reference: **DLP-521**

5. From CONNECT-TA menu, select BOTH DIG AND MET (item 3).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL AND METALLIC TEST ACCESS WAS
   ACCOMPLISHED /*

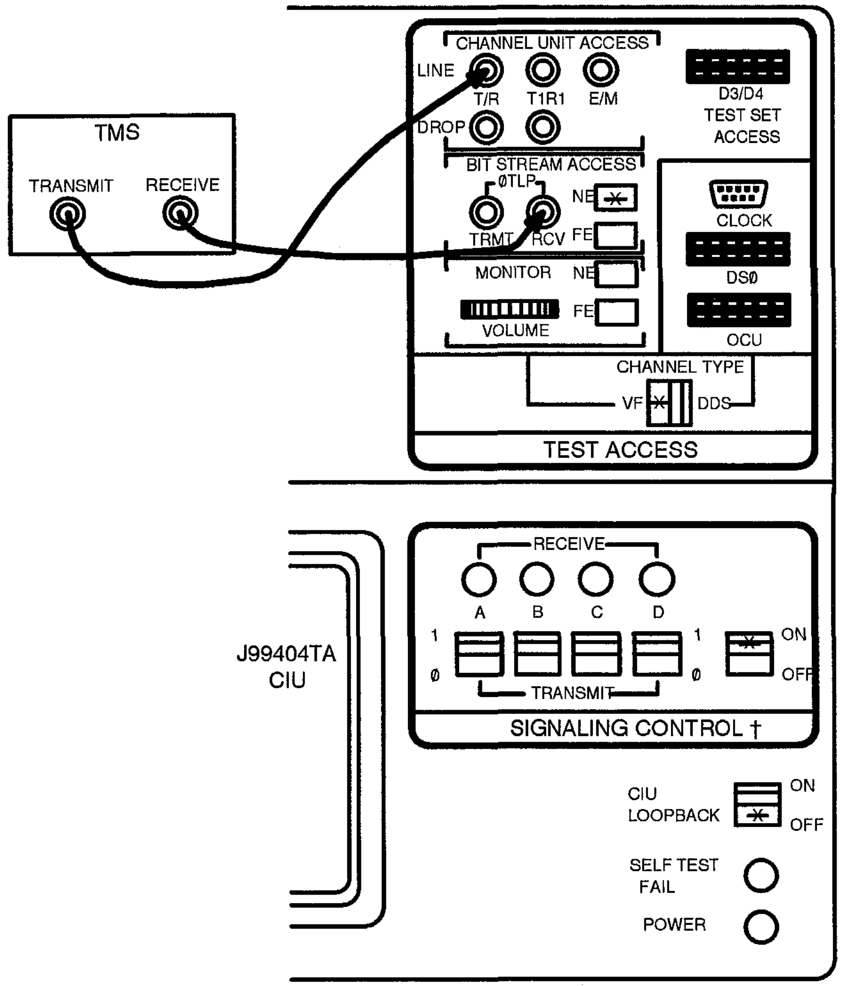
6. Connect test equipment (Figure 2) as follows:

   - Transmission measuring set (TMS) **TRANSMIT** jack to **CHANNEL UNIT ACCESS** - **LINE** - **T/R** on CIU
   - TMS **RECEIVE** jack to **BIT STREAM ACCESS** - **0TLP** - **RCV** on CIU.

7. Set switches on CIU as follows:

   - **BIT STREAM ACCESS** - **NE** depressed
   - **CHANNEL TYPE** to **VF**
   - If function code = FXO(_), FXP(_), DX4(_), TO4, or ETO4, set **SIGNALING CONTROL** - **TRANSMIT A**, **B**, **C**, and **D** to **1**
   - If function code = FXS(_) or FXT(_), set **SIGNALING CONTROL** - **TRANSMIT A** and **C** to **0**, **B** and **D** to **1**
   - **SIGNALING CONTROL** to **ON**
   - **CIU LOOPBACK** to **OFF**.

8. NOTE:
   This procedure is based on A-Z direction being from COT toward RT. If WORD defines this direction as Z-A, read A-Z as Z-A (and the reverse) in steps that follow.



* Depressed
† Settings depend on function code of channel unit

Figure 2—Test Connections for Testing COT Channel Unit

On WORD, find TLP A-Z for COT channel unit. If channel unit has been provisioned for 1,200 ohms impedance, add +0.5 to TLP listed and label new value (TLP A-Z)1200. If channel unit has been provisioned for 150 ohms impedance (mismatch equalization), add +2.8 to TLP listed and label new value (TLP A-Z)150.

9. NOTE:
The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

Condition TMS to send TLP A-Z dBm level at 1 kHz (to T/R input to channel unit) as follows:

- Set impedance to 600 ohms
- Set **TRMT** frequency to **1004**
- If channel unit impedance is 600 ohms, set **TRMT LEVEL** to TLP A-Z dBm level
- If channel unit impedance is 1,200 ohms, set **TRMT LEVEL** to (TLP A-Z)1200 dBm level
- If channel unit impedance is 150 ohms, set **TRMT LEVEL** to (TLP A-Z)150 dBm level.

10. NOTE:
The bit stream TLP is assumed to be 0.0 dB TLP. (The WORD may list bit stream TLPs as +4 and −8.5 dB, which is equivalent to 0.0 dB.) For circuits with a bit stream TLP other than zero, test levels given must be modified. These levels are shown in parentheses after the normal test levels.

Measure COT channel unit transmit gain (**RCV LEVEL**). Does TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of bit stream TLP A-Z)?

If **YES,** then proceed to Step **17.**

If **NO,** then continue with Step **11.**

11. Verify COT channel unit provisioning: select ADJUST from test adjust menu on CIU and verify default values in square brackets match WORD entries for each channel unit setting. If TRMT ATTENUATOR setting is revised, repeat from Step **10**; otherwise continue with Step **12**.

12. Replace COT channel unit. Does TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of bit stream TLP A-Z)?

    If **YES,** then proceed to Step **17.**

    If **NO,** then continue with Step **13.**

13. Disconnect CIU from **CTU**, replace COT **CTU** (**AUB5**), and reconnect CIU. Repeat channel unit dialog and request for test access. If TMS still does not indicate within limits, replace COT digital test unit - left [**DTU-L** (**AUA18**)] and digital test unit - right [**DTU-R** (**AUA19**)].

14. Does TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of bit stream TLP A-Z)?

    If **YES,** then proceed to Step **17.**

    If **NO,** then continue with Step **15.**

15. Clear test bus to CTU and channel unit.

    Reference: **DLP-534**

16. Does TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of bit stream TLP A-Z)?

    If **YES,** then continue with Step **17.**

    If **NO,** then **refer trouble to appropriate repair forces.**

17. Change test connections:

    - TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on CIU
    - TMS **RECEIVE** jack to **CHANNEL UNIT ACCESS - LINE - T1/R1** on CIU.

18. On TMS, reset **TRMT LEVEL** to 0.0 (or bit stream TLP Z-A) dB and verify impedance is 600 ohms.

19. On WORD, find TLP Z-A for COT channel unit.

20. NOTE:
    If channel unit impedance is not 600 ohms, level must be corrected: if impedance=1,200 ohms, add +0.5 to TMS indication; if impedance=150 ohms, add +2.8 to TMS indication.

    Measure COT channel unit receive gain. Does TMS indicate between [(TLP Z-A) −0.4] and [(TLP Z-A) +0.4] dBm?

    If **YES,** then proceed to Step **27.**

    If **NO,** then continue with Step **21.**

21. Verify COT channel unit provisioning: select ADJUST from test adjust menu on CIU and verify default values in square brackets match WORD entries for each channel unit setting. If RCV ATTENUATOR setting is revised, repeat from Step **20**; otherwise continue with Step **22.**

22. Replace COT channel unit. Does TMS indicate between [(TLP Z-A) −0.4] and [(TLP Z-A) +0.4] dBm?

    If **YES,** then proceed to Step **27.**

    If **NO,** then continue with Step **23.**

23. Disconnect CIU from **CTU**, replace COT **CTU** (**AUB5**), and reconnect CIU. Repeat channel unit dialog and request for test access. If TMS still does not indicate within limits, replace COT **DTU-L** and **DTU-R** (**AUA18** and **AUA19**).

24. Does TMS indicate between [(TLP Z-A) −0.4] and [(TLP Z-A) +0.4] dBm?

    If **YES,** then proceed to Step **27.**

    If **NO,** then continue with Step **25.**

25. Clear test bus to CTU and channel unit.

    Reference: **DLP-534**

26. Does TMS indicate between [(TLP Z-A) −0.4] and [(TLP Z-A) +0.4] dBm?

    If **YES,** then continue with Step **27.**

    If **NO,** then **refer trouble to appropriate repair forces.**

27. Change test setup to send tone toward customer location or foreign (distant) CO:

    - Disconnect TMS **RECEIVE** jack from CIU
    - Connect TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on CIU
    - Verify TMS **TRMT LEVEL** is 0.0 (or bit stream TLP Z-A) dBm.

28. At NIF (customer location) or foreign (distant) central office (CO) test point, measure receive level. Is receive level between [(TLP Z-A) −0.7] and [(TLP Z-A) +0.7] dBm?

    If **YES,** then proceed to Step **38.**

    If **NO,** then continue with Step **29.**

29. If network channel terminating equipment (NCTE) or CO impedance is 150 ohms, proceed to Step **38**; otherwise continue with Step **30.**

30. NOTE:
    If cable is loaded and customer location test set impedance is 600 ohms, level must be corrected; add +0.7 to test indication.

    (Check circuit without NCTE or CO repeater to see if it is causing trouble.) At loop interface of NCTE or metallic extension interface of CO repeater, measure receive level. On WORD, find TLP Z-A for NCTE or CO repeater (COT side). Is receive level between [(TLP Z-A) −0.6] and [(TLP Z-A) +0.6] dBm?

    If **YES,** then NCTE or CO repeater is causing trouble; adjust or replace it and proceed to Step **28.**

    If **NO,** then COT channel unit may be causing trouble; note result and continue with Step **31.**

31. Verify COT channel unit RCV ATTENUATOR is set to WORD value. Adjust RCV ATTENUATOR no more than 1 dB.

    Reference: **DLP-526**

32. At loop or metallic interface, is receive level now between [(TLP Z-A) −0.6] and [(TLP Z-A) +0.6] dBm?

    If **YES,** then proceed to Step **36.**

    If **NO,** then reset RCV ATTENUATOR to WORD value and continue with Step **33.**

33. Change test setup:

    - Disconnect TMS from CIU
    - Connect TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on CIU
    - Set TMS impedance to **600** ohms.

34. At loop interface of NCTE or metallic extension interface of CO repeater, send TLP A-Z dBm tone toward COT.

35. ⇛ NOTE:
    If cable is loaded and customer location test set impedance is 600 ohms, level must be corrected; add +0.7 to test indication.

    At COT, measure gain in transmit direction of COT channel unit. Is bit stream level between −0.6 and +0.6 dBm (or within 0.6 dB of bit stream TLP A-Z)?

    If **YES,** then **note TMS reading. Ask circuit provisioning to validate WORD: if WORD is valid, refer trouble in cable pair loss to appropriate repair forces.**

    If **NO,** then **there may be error in cable loss record; refer trouble to circuit provisioning center.**

36. Remeasure receive level at NIF or CO test point. (Send tone from COT toward customer location or foreign CO.) Is receive level between [(TLP Z-A) −0.7] and [(TLP Z-A) +0.7] dBm?

    If **YES,** then proceed to Step **38.**

    If **NO,** then continue with Step **37.**

37. Replace or adjust NCTE or CO repeater until receive level is within limits.

38. Write down receive level (bit stream-to-NIF gain) for later use.

39. At COT, disconnect TMS from CIU. Connect TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on CIU. Verify TMS impedance is 600 ohms.

40. At NIF or CO test point, send 1-kHz tone at TLP A-Z dBm toward COT.

41. NOTE:
    If cable is loaded and customer location test set impedance is 600 ohms, level must be corrected; add +0.7 to test indication.

    At COT, measure transmit level. Does TMS indicate between −0.7 and +0.7 dBm (or within 0.6 dB of bit stream TLP A-Z)?

    If **YES,** then proceed to Step **48.**

    If **NO,** then continue with Step **42.**

42. At loop interface of NCTE or metallic extension interface of CO repeater, send tone at TLP A-Z dBm toward COT.

43. NOTE:
If cable is loaded and customer location test set impedance is 600 ohms, level must be corrected; add +0.7 to test indication.

At COT, measure transmit level without NCTE or CO repeater in circuit. Does TMS indicate between −0.6 and +0.6 dBm (or within 0.6 dB of bit stream TLP A-Z)?

If **YES,** then NCTE or CO repeater is causing trouble; send tone from NIF again and proceed to Step **47.**

If **NO,** then continue with Step **44.**

44. Verify COT channel unit TRMT ATTENUATOR is set to WORD value. Adjust TRMT ATTENUATOR no more than 1 dB.

Reference: **DLP-526**

45. Does TMS indicate between −0.6 and +0.6 dBm (or within 0.6 dB of bit stream TLP A-Z)?

If **YES,** then note TMS indication and continue with Step **46.**

If **NO,** then **ask circuit provisioning to validate WORD. If WORD is valid, reset TRMT ATTENUATOR to WORD value and refer trouble in cable pair loss to appropriate repair forces.**

46. Remeasure overall transmit gain by sending tone from NIF or CO test point. At COT, does TMS indicate between −0.7 and +0.7 dBm (or within 0.6 dB of bit stream TLP A-Z)?

If **YES,** then proceed to Step **48.**

If **NO,** then continue with Step **47.**

47. Replace or adjust NCTE or CO repeater until TMS indicates between −0.7 and +0.7 (or within 0.7 dB of bit stream TLP A-Z) at COT.

48. Write down transmit level (1-kHz gain from NIF to bit stream) for later use.

49. At NIF or CO test point, send 0.4-kHz tone at TLP A-Z dBm toward COT.

50. At COT, note TMS indication. Calculate low-end slope using this measurement (0.4 kHz) and transmit level measurement noted in Step **48.** Result must fall between −0.3 and +1.0 or between −0.5 and +1.5.

    Response: Slope = Meas(Step 48) − Meas(0.4 kHz)

51. Is low-end slope between −0.3 and +1.0 (for circuit that extends beyond foreign CO) or −0.5 and +1.5 (for other circuits) (in other words, is 404-Hz measured level between 0.3 dB hot and 1.0 dB long or between 0.5 dB hot and 1.5 dB long relative to 1-kHz level)?

    If **YES,** then continue with Step **52.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

52. At NIF or CO test point, send 2.8-kHz tone toward COT.

53. At COT, note TMS indication and calculate result as done in Step **50.** Result must fall between −0.3 and +1.5 or between −0.5 and +2.2.

    Response: Slope = Meas(Step 48) − Meas(2.8 kHz)

54. Is high-end slope between −0.3 and +1.5 (for circuit that extends beyond foreign CO) or −0.5 and +2.2 (for other circuits)?

    If **YES,** then continue with Step **55.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

55. On TMS, set **TRMT** frequency to **404** and **LEVEL** to 0.0 (or TLP A-Z) dBm. Connect TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on CIU.

56. Note measurement at NIF or CO test point. Calculate low-end slope using this measurement (at 404 Hz) and receive level measurement noted in Step **38**.

    Response: Slope = Meas(Step 38) − Meas(404 Hz)

57. Is low-end slope between −0.3 and +1.0 (for circuit that extends beyond foreign CO) or −0.5 and +1.5 (for other circuits)?

    If **YES,** then continue with Step **58.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

58. On TMS, set **TRMT** frequency to **2804.**

59. Note measurement at NIF or CO test point. Calculate high-end slope as done in Step **56.**

    Response: Slope = Meas(Step 38) − Meas(2804 Hz)

60. Is high-end slope between −0.3 and +1.5 (for circuit that extends beyond foreign CO) or −0.5 and +2.2 (for other circuits)?

    If **YES,** then continue with Step **61.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

61. Disconnect test set from CIU. Insert 600-ohm terminating plug into CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack.

62. At NIF or CO test point, measure noise. Is noise less than 21 dBrnc?

    If **YES,** then proceed to Step **66.**

    If **NO,** then continue with Step **63.**

63. At loop interface of NCTE or metallic extension interface of CO repeater, measure noise. Is noise less than [(TLP Z-A) +20] dBrnc?

    If **YES,** then replace or adjust noisy NCTE or CO repeater and proceed to Step **66.**

    If **NO,** then continue with Step **64.**

64. At COT, insert 600-ohm terminating plug into CIU **CHANNEL UNIT ACCESS** - **DROP** - **T1/R1** jack.

65. At loop interface of NCTE or metallic extension interface of CO repeater, is noise less than [(TLP Z-A) +20] dBrnc?

    If **YES,** then replace COT channel unit and proceed to Step **62.**

    If **NO,** then note result and proceed to Step **68.**

66. At NIF or CO test point, terminate circuit with either 600 or 900 ohms.

67. At COT, connect TMS **RECEIVE** jack to CIU **BIT STREAM ACCESS 0TLP** - **RCV** jack. Is noise less than 24 (or 24 + TLP A-Z) dBrnc?

    If **YES,** then proceed to Step **73.**

    If **NO,** then proceed to Step **70.**

68. At NIF or CO test point, terminate circuit with either 600 or 900 ohms.

69. At COT, connect TMS **RECEIVE** jack to CIU **BIT STREAM ACCESS 0TLP - RCV** jack. Is noise less than 24 (or 24 + TLP A-Z) dBrnc?

    If **YES,** then report noisy Z-A loop or metallic extension in Z-A direction to appropriate repair forces and proceed to Step **73.**

    If **NO,** then proceed to Step **66.**

70. At loop interface of NCTE or metallic extension interface of CO repeater, terminate transmit pair with 600 ohms (nonloaded cable) or 1,200 ohms (loaded cable).

71. At COT, is noise level less than 21 (or 21 + TLP A-Z) dBrnc?

    If **YES,** then replace or adjust noisy NCTE or CO repeater and proceed to Step **73.**

    If **NO,** then continue with Step **72.**

72. At COT, connect TMS to CIU **CHANNEL UNIT ACCESS - DROP - T/R** jack and set impedance to **600** (nonloaded cable) or **900** (loaded cable). Is noise less than 21 dBrnc?

    If **YES,** then replace noisy COT channel unit and continue with Step **73.**

    If **NO,** then **report noisy Z-A (or Z-A and A-Z) loop or metallic extension to appropriate repair forces.**

73. Was any apparatus replaced in noise test (from Step 61)?

    If **YES,** then proceed to Step **7.**

    If **NO,** then continue with Step **74.**

74. Are any more 4-wire channels of this type to be tested in this system?

    If **YES,** then disconnect test set, address next channel unit to be tested, and proceed to Step **3.**

    If **NO,** then continue with Step **75.**

75. On CIU, select DISCONNECT TA from menu ***before*** unplugging CIU from CTU.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Verify RT Channel Unit Settings and Loop Integrity — 2-Wire Loop to NCTE

Summary: At central office terminal (COT), all test access for remote terminal (RT) is through the digital bit stream. At COT, send 0 dBm level at 1 kHz (to RT); customer receive level from RT should range from [(TLP A-Z) −0.5] to [(TLP A-Z) +0.5] dBm. At network interface (NIF), send 0 dBm level; transmit level at RT should range from −0.5 to +0.5 dBm at COT. At COT, then at NIF, send 0 dBm tones at 0.4 kHz and 2.8 kHz. At NIF and at COT, low-end slope should range from −0.5 to +2.5, and high-end slope should range from −0.5 to +3.8. Balance of RT channel unit, measured in the bit stream, should be: RL>14 dB. Noise at NIF should be less than [TLP (A-Z) + 23] dBrnc. Noise from the NIF should be less than 23 dBrnc at the COT.

1. NOTE:
   If function code = FXS or DPO, channel unit at RT must be conditioned for AC measurement; customer location must have the equivalent of a test set with HOLD feature in send and receive modes.

   Arrange for channel alignment tests to customer location.

2. Figure 1 shows the channel layout for the tests that follow. Refer to circuit layout information or work order record detail (WORD) for circuit details.

3. If necessary, connect craft interface unit (CIU) to channel test unit [CTU **AUB5**] in dual bank of system being tested.

4. If necessary, provision RT channel unit.

   Reference: **DLP-519**

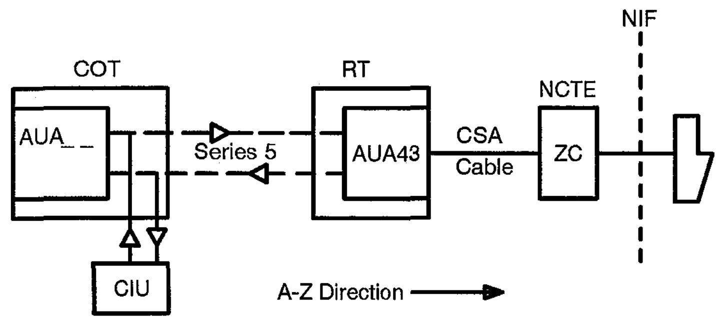


Figure 1—2-Wire Loop (RT End) with NCTE (Network Channel Terminating Equipment)

5. From CONNECT-TA menu, select DIGITAL ONLY (item 1).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

6. Set switches on CIU as follows:

   - **BIT STREAM ACCESS** - **0TLP** - **FE** depressed
   - **CHANNEL TYPE** to **VF**
   - If function code = FXO, set **SIGNALING CONTROL** - **TRANSMIT A** and **C** to **1**, **B** and **D** to **0**
   - If function code = FXS, set **SIGNALING CONTROL** - **TRANSMIT A** and **C** to **0**, **B** and **D** to **1**
   - If function code = DPO or TO, set **SIGNALING CONTROL** - **TRANSMIT A**, **B**, **C**, and **D** to **1**
   - **SIGNALING CONTROL** to **ON**
   - **CIU LOOPBACK** to **OFF**.

7. This procedure is based on A-Z direction being from COT toward RT. If WORD defines this direction as Z-A, read A-Z as Z-A (and the reverse) in the following steps.

8. **NOTE 1:**
   Unless channel unit function code = TO, bit stream transmission level point (TLP) is assumed to be 0.0 dB TLP. For circuits with a bit stream TLP other than zero, test levels given must be modified. These levels are shown in parentheses after the normal test levels.

   NOTE 2:
   The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

   At COT, connect test equipment to send 1-kHz tone at 0.0 (or TLP A-Z) dBm toward NIF (Figure 2):

   - Connect transmission measuring set (TMS) **TRANSMIT** jack to CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack
   - Set TMS **TRMT** frequency to **1004**, **LEVEL** to 0.0 (or TLP A-Z) dBm, and impedance to **600.**

9. At NIF at customer location, measure gain in receive (RT channel unit) direction. Is receive level between [(TLP A-Z) −0.7] and [(TLP A-Z) +0.7]?

   If **YES,** then proceed to Step **19.**

   If **NO,** then note receive level at NIF and continue with Step **10.**

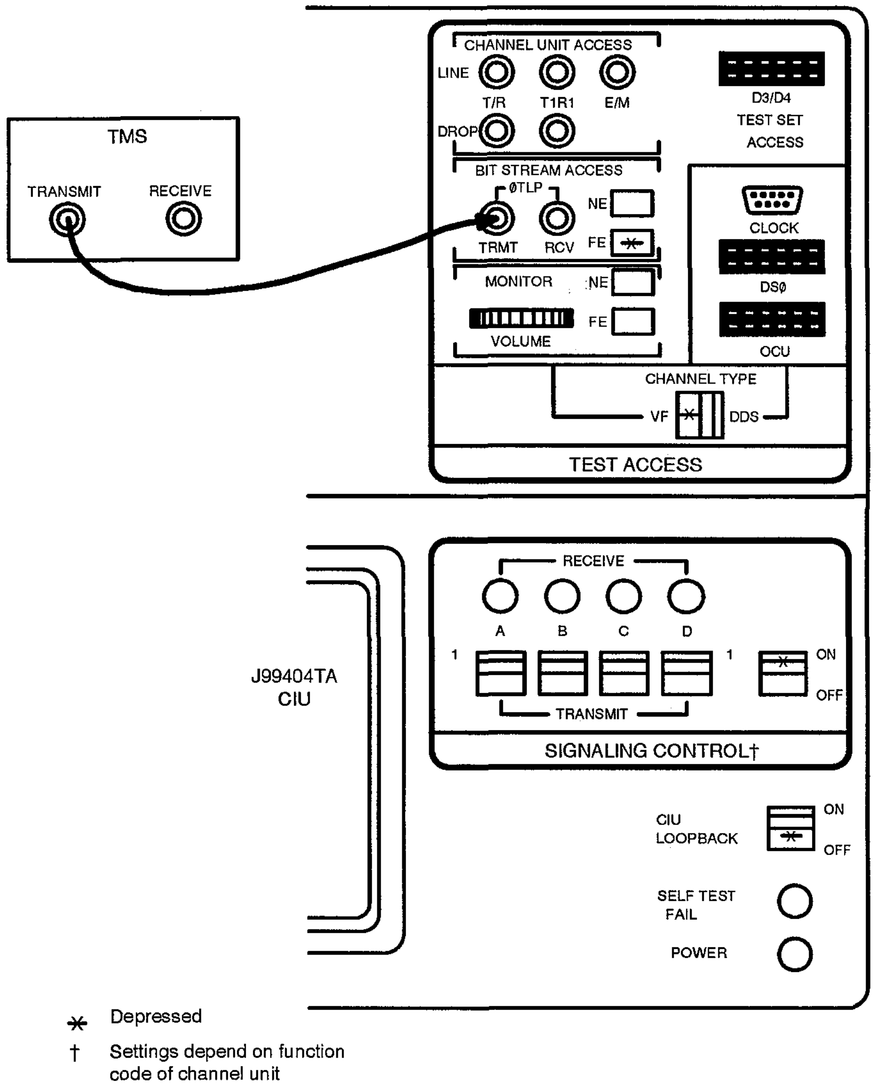


Figure 2—Test Connections for Testing RT Channel Unit

10. Measure receive level at loop interface of network channel terminating equipment (NCTE). On WORD, find value of TLP A-Z listed for NCTE, loop side. At loop interface of NCTE, is receive level between [(TLP A-Z) −0.6] and [(TLP A-Z) +0.6] dBm?

    If **YES,** then NCTE is causing trouble; adjust or replace it and proceed to Step **19.**

    If **NO,** then note result and continue with Step **11.**

11. Verify that RT channel unit RECEIVE GAIN is set to WORD value. Adjust RT channel unit RECEIVE GAIN no more than 1 dB. At loop interface of NCTE, is receive level between [(TLP A-Z) −0.6] and [(TLP A-Z) +0.6] dBm?

    Reference: **DLP-525**

    If **YES,** then proceed to Step **17.**

    If **NO,** then reset RECEIVE GAIN to WORD value and continue with Step **12.**

12. Change test connections: disconnect TMS from CIU and connect TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on CIU. Verify TMS impedance is 600 ohms.

13. At loop interface of NCTE, send TLP Z-A dBm tone toward RT.

14. At COT, measure gain in transmit direction of RT channel unit. Is receive level between −0.6 and +0.6 dBm (or within 0.6 dB of TLP Z-A)?

    If **YES,** then continue with Step **15.**

    If **NO,** then **refer trouble, possibly loop loss, to circuit provisioning center for analysis.**

15. Ask circuit provisioning center to validate WORD. If WORD is valid, continue; otherwise, wait for new WORD.

16. Replace RT channel unit and repeat from Step **8.**

17. Remeasure receive level at NIF (send tone from COT towards NIF). Is receive level between [(TLP A-Z) −0.7] and [(TLP A-Z) +0.7] dBm?

    If **YES,** then proceed to Step **19.**

    If **NO,** then continue with Step **18.**

18. Replace or adjust NCTE until receive level is within limits.

19. Write down receive level (bit stream-to-NIF gain) for later use.

20. At COT, disconnect TMS from CIU. Connect TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on CIU.

21. At NIF, send 1-kHz tone at TLP Z-A dBm toward RT.

22. At COT, measure transmit level (gain in transmit direction of RT channel unit). Does TMS indicate between −0.7 and +0.7 dBm (or within 0.7 dB of TLP Z-A)?

    If **YES,** then proceed to Step **30.**

    If **NO,** then continue with Step **23.**

23. At loop interface of NCTE, send tone at TLP Z-A dBm toward RT.

24. At COT, measure transmit level without NCTE in circuit. Does TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of TLP Z-A)?

    If **YES,** then NCTE is causing trouble; adjust or replace NCTE and proceed to Step **30.**

    If **NO,** then continue with Step **25.**

25. Verify RT channel unit TRANSMIT GAIN is set to WORD value. Adjust TRANSMIT GAIN no more than 1 dB. Does TMS indicate between −0.6 and +0.6 dBm (or within 0.6 dB of TLP Z-A)?

    Reference: **DLP-525**

    If **YES,** then proceed to Step **28.**

    If **NO,** then continue with Step **26.**

26. Reset TRANSMIT GAIN to WORD value. Ask circuit provisioning center to validate WORD. If WORD is valid, continue; otherwise, wait for new WORD.

27. Replace RT channel unit and repeat from Step **21.**

28. Remeasure transmit level from NIF. At NIF, send 1-kHz tone at 0 dBm toward COT. At COT, does TMS indicate between −0.7 and +0.7 dBm (or within 0.7 dB of TLP Z-A)?

    If **YES,** then proceed to Step **30.**

    If **NO,** then continue with Step **29.**

29. Replace or adjust NCTE or central office (CO) repeater until TMS indicates between −0.7 and +0.7 (or within 0.7 dB of TLP Z-A) at COT.

30. Write down transmit level (1-kHz gain from NIF to bit stream) for later use.

31. On TMS, set **TRANSMIT** frequency to **404** and **LEVEL** to 0.0 (or TLP A-Z) dBm. Connect TMS **TRANSMIT** jack to **BIT STREAM ACCESS** - **0TLP - TRMT** on CIU. Verify **BIT STREAM ACCESS** - **FE** is depressed.

32. ⇛ NOTE:
    Slope limits depend on whether customer equipment is a private branch exchange (PBX) or other customer premises switching equipment, or a modem or other nonswitched termination.

    Note measurement at NIF. Calculate low-end slope using this measurement (at 404 Hz) and measurement from receive direction noted in Step **19**:

    Response: Slope = Meas(Step 19) – Meas(404 Hz)

33. Is low-end slope between −0.5 and +1.5 (PBX) or +2.5 (modem); in other words, is 404-Hz measured level between 0.5 dB hot and 1.5 dB or 2.5 dB long relative to 1-kHz level?

    If **YES,** then continue with Step **34.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

34. On TMS, set **TRMT** frequency to **2804**.

35. Note measurement at NIF. Calculate high-end slope as done in Step **32.**

    Response: Slope = Meas(Step 19) – Meas(2,804 Hz)

36. Is high-end slope between −0.5 and +2.2 (PBX) or +3.7 (modem)?

    If **YES,** then continue with Step **37.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

37. Disconnect TMS **TRANSMIT** jack from CIU. Verify TMS **RECEIVE** jack is connected to **RCV** jack on CIU.

38. At NIF, send 0.4-kHz tone at 0 dBm toward RT.

39. At COT, note TMS indication. Calculate low-end slope using this measurement (at 0.4 kHz) and measurement from transmit direction noted in Step **30**.

    Response: Slope = Meas(Step 30) − Meas(0.4 kHz)

40. Is low-end slope between −0.5 and +1.5 (PBX) or +2.5 (modem)?

    If **YES,** then continue with Step **41.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

41. At customer location, send 2.8-kHz tone toward RT.

42. At COT, note TMS indication and calculate high-end slope as done in Step **39**.

    Response: Slope = Meas(Step 30) − Meas(2.8 kHz)

43. Is high-end slope between −0.5 and +2.2 (PBX) or +3.7 (modem)?

    If **YES,** then continue with Step **44.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

44. NOTE:
If function code = FXS or DPO, termination must include HOLD feature.

At NIF, terminate loop with 600 ohms.

45. At COT, connect return loss measuring set to **BIT STREAM ACCESS - 0TLP - RCV** and **TRMT** on CIU. Measure return loss. Is SRL-HI>13, SRL>14, and ERL>15?

    If **YES,** then proceed to Step **47.**

    If **NO,** then continue with Step **46.**

46. At COT, is SRL-HI>9, SRL>10, and ERL>11?

    If **YES,** then note result for later referral to circuit provisioning center and continue with Step **47.**

    If **NO,** then **refer trouble to circuit provisioning center and wait for new WORD.**

47. Disconnect TMS from CIU. Insert 600-ohm terminating plug into CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack.

48. NOTE:
If function code = FXS or DPO, noise measuring set must have HOLD feature.

At NIF, measure noise. Is noise less than [(TLP A-Z) + 23] dBrnc?

If **YES,** then proceed to Step **52.**

If **NO,** then continue with Step **49.**

49. At loop interface of NCTE, measure noise. Is noise less than [(TLP A-Z) + 20] dBrnc?

    If **YES,** then proceed to Step **52.**

    If **NO,** then continue with Step **50.**

50. At loop interface of NCTE, terminate the loop with 600 ohms.

51. At COT, connect TMS **RECEIVE** jack to CIU **BIT STREAM ACCESS - 0TLP - RCV** jack. Is noise less than 23 (or 23 + TLP Z-A) dBrnc?

    If **YES,** then replace noisy RT channel unit and proceed to Step **47.**

    If **NO,** then **refer trouble (possible noisy cable) to appropriate repair forces.**

52. At NIF, terminate loop with either 600 or 900 ohms.

53. At COT, connect TMS **RECEIVE** jack to CIU **BIT STREAM ACCESS - 0TLP - RCV** jack. Is noise less than 25 (or 25 + TLP Z-A) dBrnc?

    If **YES,** then proceed to Step **56.**

    If **NO,** then continue with Step **54.**

54. At loop interface of NCTE, terminate loop with 600 ohms.

55. At COT, is noise less than 23 (or 23 + TLP Z-A) dBrnc?

    If **YES,** then **replace NCTE and repeat from Step 47.**

    If **NO,** then replace noisy RT channel unit and proceed to Step **47.**

56. Was RT channel unit replaced in noise test?

    If **YES,** then **repeat RT channel alignment tests except for noise (Step 4 - Step 46).**

    If **NO,** then continue with Step **57.**

57. Are any more 2-wire channels of this type to be tested in this system?

    If **YES,** then disconnect TMS, address next channel unit to be tested, and proceed to Step **4.**

    If **NO,** then continue with Step **58.**

58. On CIU, select DISCONNECT TA from menu ***before*** unplugging CIU from CTU.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Verify RT Channel Unit Settings and Loop Integrity 2-Wire Loop to PBX, Telephone Set, or Data Modem

Summary: At central office terminal (COT), all test access for remote terminal (RT) is through the digital bit stream. At COT, send 0 dBm level at 1 kHz (to RT); customer receive level from RT should range from [(TLP A-Z) −0.6] to [(TLP A-Z) +0.6] dBm. At network interface (NIF), send 0 dBm level; transmit level at RT should range from −0.6 to +0.6 dBm at COT. At COT, then at NIF, send 0 dBm tones at 0.4 kHz and 2.8 kHz. At NIF and at COT, low-end slope should range from −0.5 to +2.5, and high-end slope should range from −0.5 to +3.8. Balance of RT channel unit measured in the bit stream should be ERL>15 dB. Noise at NIF should be less than 20 dBrnc. RT noise should be less than 23 dBrnc at COT.

1. Arrange for channel alignment tests to customer location.

2. Figure 1 shows the channel layout for the tests that follow. Refer to circuit layout information or work order record detail (WORD) for circuit details.

3. Connect craft interface unit (CIU) to channel test unit (CTU) and address RT channel unit.

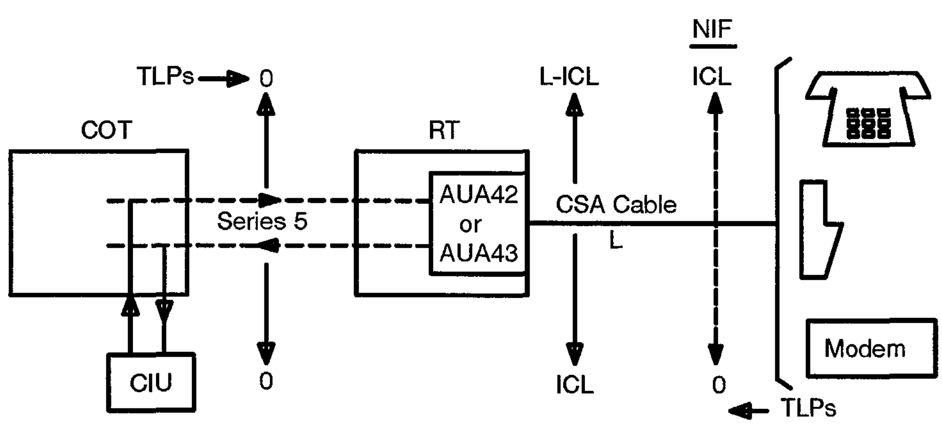


Figure 1—2-Wire Loop (RT End), No Network Channel Terminating Equipment (NCTE)

4. If necessary, provision RT channel unit. From CONNECT-TA menu, select DIGITAL ONLY (item 1).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

   Reference: **DLP-519**

5. Set switches on CIU as follows:

   - **BIT STREAM ACCESS** - **0TLP** - **FE** depressed
   - **CHANNEL TYPE** to **VF**
   - If function code = FXS, set **SIGNALING CONTROL** - **TRANSMIT A** and **C** to **0**, **B** and **D** to **1**
   - If function code = FXO, DPT, or TO, or if channel unit is **AUA56**, set **SIGNALING CONTROL** - **TRANSMIT A**, **B**, **C**, and **D** to **1**
   - **SIGNALING CONTROL** to **ON**
   - **CIU LOOPBACK** to **OFF**.

6. This procedure is based on A-Z direction being from COT toward RT. If WORD defines this direction as Z-A, read A-Z as Z-A in steps that follow.

7. **NOTE 1:**
   Unless channel unit function code = TO, bit stream transmission level point (TLP) is assumed to be 0.0 dB TLP. For circuits with a bit stream TLP other than zero, test levels given must be modified. These levels are shown in parentheses after the normal test levels.

   NOTE 2:
   The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

At COT, send 1-kHz tone at 0 dBm toward customer location. See Figure 2:

- Connect transmission measuring set (TMS) **TRANSMIT** jack to CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack
- Set **TRMT** frequency to **1004**, **LEVEL** to 0.0 (or TLP A-Z) dBm, and impedance to **600**.

8.

NOTE:
If function code of RT channel unit is FXS or DPO, condition RT channel unit from customer location for AC measurement. This requires the equivalent of a test set with HOLD feature in SEND and RECEIVE modes.

At customer location, measure gain in receive (RT channel unit) direction. Is receive level between [(TLP A-Z) −0.6] and [(TLP A-Z) +0.6]?

If **YES,** then proceed to Step **14.**

If **NO,** then note receive level at customer location and continue with Step **9.**

9. At COT, verify RT channel unit RECEIVE GAIN is set to WORD value. Adjust RT channel unit RECEIVE GAIN no more than 1 dB. At customer location, is receive level between [(TLP A-Z) −0.6] and [(TLP A-Z) +0.6]?

Reference: **DLP-525**

If **YES,** then proceed to Step **14.**

If **NO,** then reset RECEIVE GAIN to WORD value and continue with Step **10.**

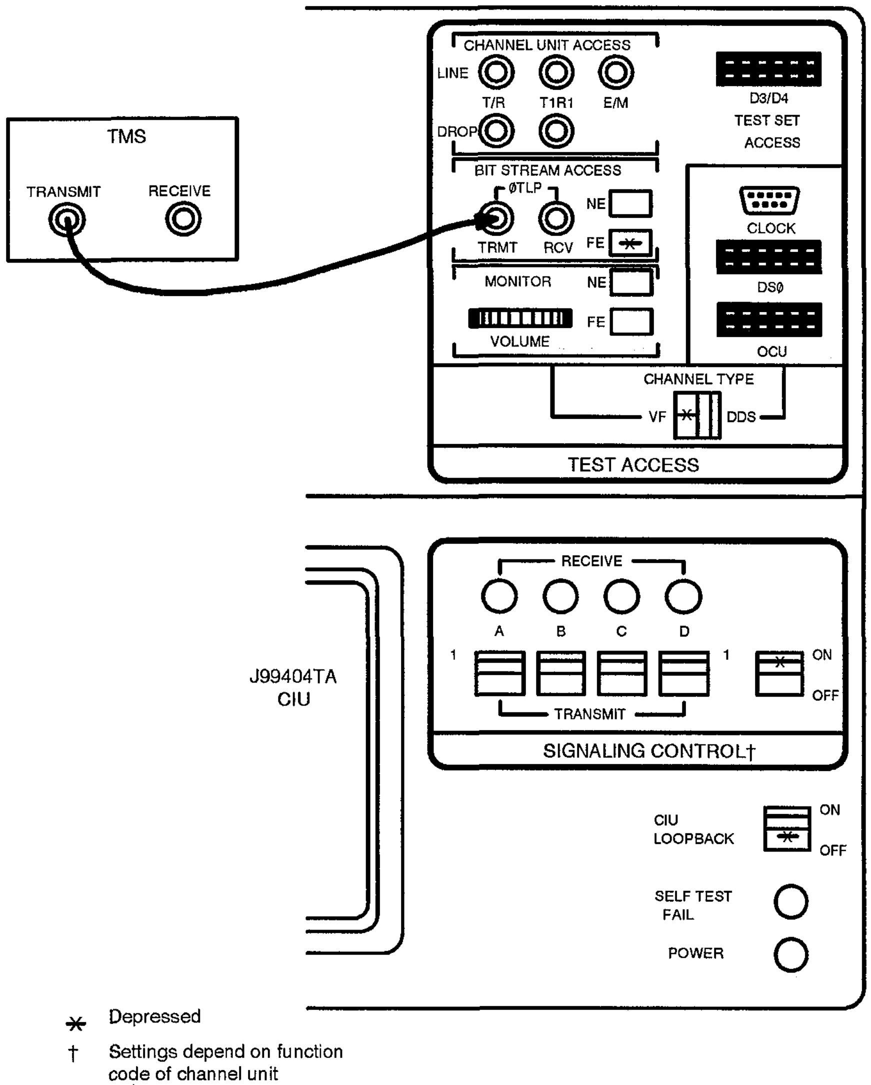


Figure 2—Test Connections for Testing RT Channel Unit

10. Disconnect TMS from CIU and connect TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on CIU. On TMS, set **RCV LEVEL** to 0 dBm. At customer location, send 0 dBm level (600-ohm impedance) toward RT.

11. At COT, measure gain in transmit (RT channel unit) direction. Does TMS indicate between −0.6 and +0.6 dBm (or within 0.6 dB of TLP Z-A)?

    If **YES,** then continue with Step **12.**

    If **NO,** then **note TMS indication and refer loop loss trouble to circuit provisioning center for analysis.**

12. Ask circuit provisioning center to validate WORD. If WORD is valid, continue; otherwise, wait for new WORD.

13. Replace RT channel unit and repeat from Step **7.**

14. Write down measurement in receive direction (bit stream-to-NIF gain) for later use.

15. At COT, disconnect TMS from CIU. Connect TMS **RECEIVE** jack to **BIT STREAM ACCESS** - **0TLP** - **RCV** on CIU.

16. At customer location, send 0 dBm tone toward RT.

17. At COT, measure gain in transmit (RT channel unit) direction. Does TMS indicate between −0.6 and +0.6 dBm (or within 0.6 dB of TLP Z-A)?

    If **YES,** then proceed to Step **21.**

    If **NO,** then continue with Step **18.**

18. Verify RT channel unit TRANSMIT GAIN is set to WORD value. Adjust RT channel unit TRANSMIT GAIN no more than 1 dB. Does TMS indicate between +0.6 and −0.6 dBm (or within 0.6 dB of bit stream TLP Z-A)?

    Reference: **DLP-525**

    If **YES,** then proceed to Step **21.**

    If **NO,** then continue with Step **19.**

19. Ask circuit provisioning center to validate WORD. If WORD is valid, continue; otherwise wait for new WORD.

20. Replace RT channel unit and repeat from Step **16.**

21. Write down measurement in transmit direction (1-kHz gain from NIF to bit stream) for later use.

22. At COT on TMS, set **TRMT** frequency to **404** and **LEVEL** to 0.0 (or TLP A-Z) dBm. Connect TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on CIU. Verify **BIT STREAM ACCESS - FE** is depressed.

23. ⇛ **NOTE:**
    Slope limits depend on whether customer equipment is a private branch exchange (PBX) or other customer premises switching equipment, or a telset or other nonswitched termination.

    Note measurement at customer location. Calculate low-end slope using this measurement (at 404 Hz) and measurement from receive direction noted in Step **14.**

    Response: Slope = Meas(Step 14) − Meas(404 Hz)

24. Is low-end slope between −0.5 and +1.5 (PBX) or +2.5 (telset); in other words, is 404 Hz measured level between 0.5 dB hot and 1.5 dB or 2.5 dB long relative to 1 kHz level?

    If **YES,** then continue with Step **25.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

25. On TMS, set TRMT frequency to **2804.**

26. Note measurement at customer location. Calculate high-end slope as done in Step **23.**

    Response: Slope = Meas(Step 14) − Meas(2804 Hz)

27. Is high-end slope between −0.5 and +2.2 (PBX) or +3.7 (telset)?

    If **YES,** then continue with Step **28.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

28. Disconnect TMS **TRANSMIT** jack from CIU. Verify TMS **RECEIVE** jack is connected to **RCV** on CIU.

29. At customer location, send 0.4-kHz tone at 0 dBm toward RT.

30. At COT, note TMS indication. Calculate low-end slope using this measurement (at 0.4 kHz) and measurement from transmit direction noted in Step **21.**

    Response: Slope = Meas(Step 21) − Meas(0.4 kHz)

31. Is low-end slope between −0.5 and +1.5 (PBX) or +2.5 (telset)?

    If **YES,** then continue with Step **32.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

32. At customer location, send 2.8-kHz tone toward RT.

33. At COT, note TMS indication and calculate result as done in Step **30.**

    Response: Slope = Meas(Step 21) − Meas(2.8 kHz)

34. Is high-end slope between −0.5 and +2.2 (PBX) or +3.7 (telset)?

    If **YES,** then continue with Step **35.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

35. At customer location, terminate loop with 600-ohm terminating plug or 600-ohm test set with HOLD feature activated in RECEIVE mode.

36. At COT, connect return loss measuring set to **BIT STREAM ACCESS - 0TLP - RCV** and **TRMT** on CIU. Measure return loss. Is SRL-HI>13, SRL>14, ERL>15?

    If **YES,** then proceed to Step **38.**

    If **NO,** then continue with Step **37.**

37. At COT, is SRL-HI>9, SRL>10, and ERL>11?

    If **YES,** then note result for later referral to circuit provisioning center and continue with Step **38.**

    If **NO,** then **refer trouble to circuit provisioning center and wait for new WORD.**

38. At COT, insert 600- or 900-ohm terminating plug in CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack. Depress **BIT STREAM ACCESS - 0TLP - FE** switch.

39. NOTE:
If function code of RT channel unit is FXS or DPO, condition RT channel unit from customer location for AC measurement. This requires the equivalent of a test set with HOLD feature in SEND and RECEIVE modes.

At customer location, measure noise. Is noise less than 20 dBrnc?

If **YES,** then continue with Step **40.**

If **NO,** then proceed to Step **41.**

40. At COT, connect TMS to **BIT STREAM ACCESS - 0TLP - RCV** jack. Measure C-message noise. Is noise less than 23 (or 23 + TLP Z-A) dBrnc?

If **YES,** then proceed to Step **43.**

If **NO,** then replace noisy RT channel unit and proceed to Step **38.**

41. At customer location, terminate loop with handset or 600-ohm test set with HOLD feature activated in RECEIVE mode.

42. At COT, connect TMS to **BIT STREAM ACCESS - 0TLP - RCV** jack. Measure C-message noise. Is noise less than 23 (or 23 + TLP Z-A) dBrnc?

If **YES,** then replace noisy RT channel unit and proceed to Step **38.**

If **NO,** then **report noisy loop to appropriate repair forces.**

43. Was RT channel unit replaced in noise test?

    If **YES,** then **repeat RT channel unit tests except noise (Step 4 - Step 37).**

    If **NO,** then continue with Step **44.**

44. Are any more 2-wire channels of this type to be tested in this system?

    If **YES,** then disconnect test set, address next channel unit to be tested and proceed to Step **4.**

    If **NO,** then continue with Step **45.**

45. On CIU, select DISCONNECT TA from menu ***before*** unplugging CIU from CTU.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

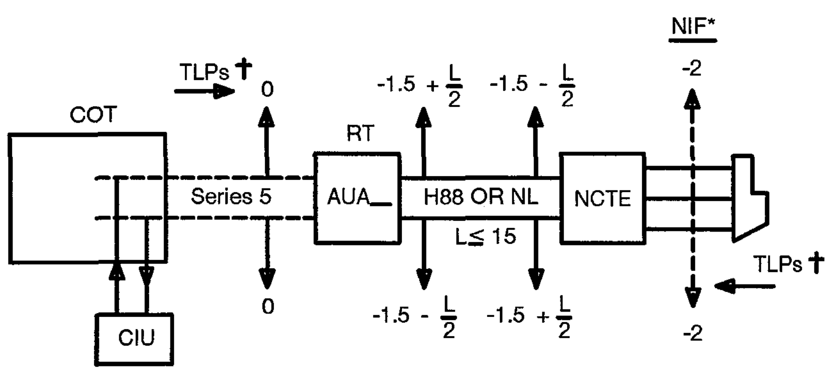
Verify RT Channel Unit Settings and Loop Integrity — 4-Wire Loop to NCTE

Summary: At central office terminal (COT), all test access for remote terminal (RT) is through the digital bit stream. At COT, send 0 dBm level at 1 kHz (to RT); customer receive level from RT should range from [(TLP A-Z) −0.7] to [(TLP A-Z) +0.7] dBm. At network interface (NIF), send 0 dBm level; transmit level at RT should range from −0.7 to +0.7 dBm at COT. At COT, then at NIF, send 0 dBm tones at 0.4 kHz and 2.8 kHz. At NIF and at COT, low-end slope should range from −0.5 to +2.5, and high-end slope should range from −0.5 to +3.9. Noise at NIF should be less than (TLP A-Z) + 23 dBrnc. RT noise (at COT) should be less than 23 dBrnc at COT.

1. Arrange for channel alignment tests to customer location.

2. Figure 1 shows the channel layout for the tests that follow. Refer to circuit layout information or work order record detail (WORD) for circuit details.

3. If necessary, connect craft interface unit (CIU) to channel test unit (CTU) and address RT channel unit.



* Network interface may have 2, 4, 6, or 8 wires.

† Standard TLPs shown. Actual TLP may vary with circuit design.

Figure 1—4-Wire Loop (RT End) with Network Channel Terminating Equipment (NCTE)

4. If necessary, provision **AUA41/AUA141** RT channel unit.

   Reference: **DLP-521**

5. If necessary, provision **AUA44** RT channel unit.

   Reference: **DLP-520**

6. From CONNECT-TA menu, select DIGITAL ONLY (item 1).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

7. Set switches on CIU as follows:

   - **BIT STREAM ACCESS - 0TLP - FE** depressed
   - **CHANNEL TYPE** to **VF**
   - If function code = FXS(_) or FXT(_), set **SIGNALING CONTROL - TRANSMIT A** and **C** to **0**, **B** and **D** to **1**
   - If function code = FXO(_), FXP(_), EM4(_), PLR(_), DX4(_), TO4, ETO4, TDO(_), or TDS(_), set **SIGNALING CONTROL - TRANSMIT A**, **B**, **C**, and **D** to **1**
   - All function codes except TO4 and ETO4, set **SIGNALING CONTROL** to **ON**
   - **CIU LOOPBACK** to **OFF**.

8. NOTE 1:

   The bit stream transmission level point (TLP) is assumed to be 0.0 dB TLP. (The WORD may list bit stream TLPs as +4 and -8.5 dB, which is equivalent to 0.0 dB.) For circuits with a bit stream TLP other than zero, test levels given must be modified. These levels are shown in parentheses after the normal test levels.

NOTE 2:
The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

Connect test equipment to send 1-kHz tone at 0 dBm toward NIF (Figure 2):

- Connect transmission measuring set (TMS) TRANSMIT jack to CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack
- Set TRMT frequency to **1004**
- Set TRMT LEVEL to 0.0 (or TLP A-Z) dBm
- Set TMS impedance to **600**.

9.

NOTE:
Test values at NIF at customer location depend on type of circuit. Refer to WORD for actual value.

At NIF, measure gain in receive (RT channel unit) direction. Is receive level between [(TLP A-Z) −0.7] and [(TLP A-Z) +0.7]?

If **YES,** then proceed to Step **20.**

If **NO,** then note receive level at NIF and continue with Step **10.**

10.

NOTE:
If cable is loaded and customer location test set impedance is 600 ohms, level must be corrected — add 0.7 dB to test indication.

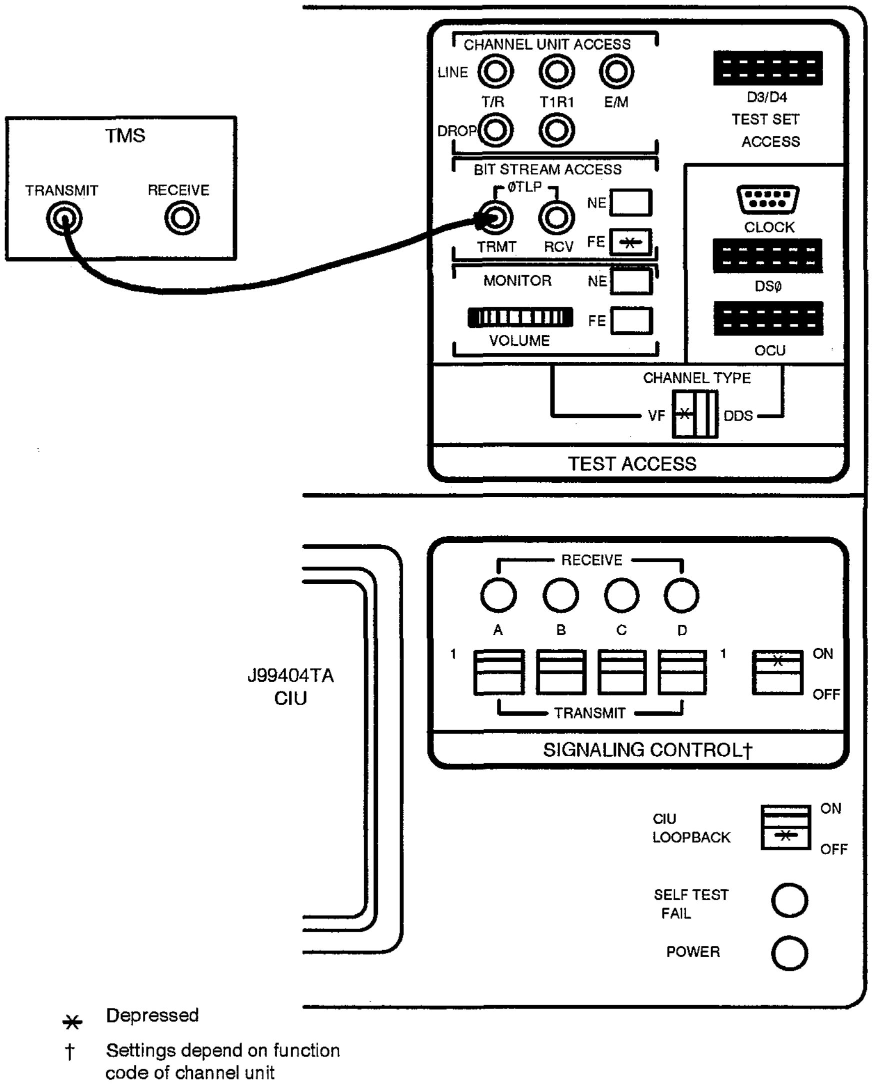


Figure 2—Test Connections for Testing RT Channel Unit

Check circuit without network channel terminating equipment (NCTE) (to find trouble) as follows: On WORD, find TLP A-Z for NCTE (COT side). At loop interface of NCTE, measure receive level. Is receive level between [(TLP A-Z) −0.6] and [(TLP A-Z) +0.6] dBm?

If **YES,** then NCTE is causing trouble; adjust or replace it and proceed to Step **20.**

If **NO,** then RT channel unit may be causing trouble; note result and continue with Step **11.**

11. At COT, verify RT channel unit RCV ATTENUATOR is set to WORD value. Adjust RCV ATTENUATOR no more than 1 dB.

    Reference: **DLP-526**

12. At loop interface of NCTE, is receive level now between [(TLP A-Z) −0.6] and [(TLP A-Z) +0.6] dBm?

    If **YES,** then proceed to Step **18.**

    If **NO,** then reset RCV ATTENUATOR to WORD value and continue with Step **13.**

13. Change test connections: disconnect TMS from CIU and connect TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on CIU. Verify TMS impedance is 600 ohms.

14. At loop interface of NCTE, send TLP Z-A dBm tone toward RT.

15. NOTE:
    If cable is loaded and customer location test set impedance is 600 ohms, level must be corrected — add 0.7 dB to test indication.

At COT, measure gain in transmit direction of RT channel unit. Is receive level between −0.6 and +0.6 dBm (or within 0.6 dB of TLP Z-A)?

If **YES,** then continue with Step **16.**

If **NO,** then **refer trouble, possibly loop loss, to circuit provisioning center for analysis.**

16. Ask circuit provisioning center to validate WORD. If WORD is valid, continue; otherwise, wait for new WORD.

17. Replace RT channel unit and repeat from Step **9.**

18. Remeasure receive level at NIF (send tone from COT toward NIF). Is receive level between [(TLP A-Z) −0.7] and [(TLP A-Z) +0.7] dBm?

    If **YES,** then proceed to Step **20.**

    If **NO,** then continue with Step **19.**

19. Replace or adjust NCTE until receive level is within limits.

20. Write down receive level (bit stream-to-NIF gain) for later use.

21. At COT, disconnect TMS from CIU. Connect TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on CIU. Verify TMS impedance is 600 ohms.

22. At NIF, send 1-kHz tone at TLP Z-A dBm toward RT.

23. At COT, measure transmit level (gain in transmit direction of RT channel unit). Does TMS indicate between −0.7 and +0.7 dBm (or within 0.7 dB of TLP Z-A)?

    If **YES,** then proceed to Step **31.**

    If **NO,** then continue with Step **24.**

24. At loop interface of NCTE, send tone at TLP Z-A dBm toward RT.

25. **NOTE:**
    If cable is loaded and customer location test set impedance is 600 ohms, level must be corrected — add 0.7 dB to test indication.

    At COT, measure transmit level without NCTE in circuit. Does TMS indicate between −0.6 and +0.6 dBm (or within 0.6 dB of bit stream TLP Z-A)?

    If **YES,** then NCTE is causing trouble; adjust or replace NCTE and proceed to Step **31.**

    If **NO,** then continue with Step **26.**

26. Verify RT channel unit TRMT ATTENUATOR is set to WORD value. Adjust TRMT ATTENUATOR no more than 1 dB. Does TMS indicate between −0.6 and +0.6 dBm (or within 0.6 dB of bit stream TLP Z-A)?

    Reference: **DLP-526**

    If **YES,** then proceed to Step **29.**

    If **NO,** then continue with Step **27.**

27. Reset TRMT ATTENUATOR to WORD value. Ask circuit provisioning center (CPC) to validate WORD. If WORD is valid, continue; otherwise, wait for new WORD.

28. Replace RT channel unit and repeat from Step **22.**

29. Remeasure transmit level from NIF. At NIF, send 1-kHz tone at (TLP A-Z) dBm toward COT. At COT, does TMS indicate between −0.7 and +0.7 dBm (or within 0.7 dB of bit stream TLP Z-A)?

    If **YES,** then proceed to Step **31.**

    If **NO,** then continue with Step **30.**

30. Replace or adjust NCTE or CO repeater until TMS indicates between −0.7 and +0.7 dBm (or within 0.7 dB of bit stream TLP Z-A) at COT.

31. Write down transmit level (1-kHz gain from NIF to bit stream) for later use.

32. Verify that TMS **RECEIVE** jack is connected to CIU **BIT STREAM ACCESS - 0TLP - RCV** jack.

33. At NIF, send 0.4-kHz tone at 0 dBm toward COT.

34. ⇛ NOTE:
    Slope limits depend on whether customer equipment is a private branch exchange (PBX) or other customer premises switching equipment, or a telset or other nonswitched termination.

    At COT, note TMS indication. Calculate low-end slope using this measurement (at 0.4 kHz) and measurement from transmit direction noted in Step **31**. Result must fall between −0.5 and +1.5 (PBX) or +2.5 (telset).

    Response: Slope = Meas(Step 31) − Meas(0.4 kHz)

35. Is low-end slope between −0.5 and +1.5 (PBX) or +2.5 (telset); in other words, is measured 0.4 kHz level between 0.5 dB hot and 1.5 dB or 2.5 dB long relative to 1 kHz level?

    If **YES,** then proceed to Step **41.**

    If **NO,** then continue with Step **36.**

36. Does WORD list an NCTE equalization setting (other than zero) in the Z-A direction?

    If **YES,** then note low-end slope for later referral to CPC and proceed to Step **40.**

    If **NO,** then continue with Step **37.**

37. ⇛ NOTE:
    If cable is loaded and customer location test set impedance is 600 ohms, level must be corrected — add 0.7 dB to test indication.

    Measure transmit gain at 1 kHz from loop interface of NCTE to COT bit stream.

38. Measure transmit gain at 0.4 kHz from loop interface of NCTE to COT bit stream. Calculate low-end slope using this measurement (0.4 kHz) and transmit gain measurement at 1 kHz. Is calculated low-end slope between −0.5 and +1.5 (PBX) or +2.5 (telset)?

    If **YES,** then replace or adjust NCTE and proceed to Step **33.**

    If **NO,** then note result for later referral to circuit provisioning center and continue with Step **39.**

39. At loop interface of NCTE, send 2.8 kHz and measure at COT bit stream. Calculate high-end slope and note result for later referral to circuit provisioning center and proceed to Step **46.**

40. At NIF, send 2.8-kHz tone toward COT.

41. At COT, note TMS indication and calculate high-end slope as done in Step **34**. Result must fall between −0.5 and +2.2 (PBX) or +3.7 (telset).

    Response: Slope = Meas(Step 31) − Meas(2.8 kHz)

42. Is high-end slope between −0.5 and +2.2 (PBX) or +3.7 (telset)?

    If **YES,** then proceed to Step **46.**

    If **NO,** then continue with Step **43.**

43. Does WORD list an NCTE equalization setting (other than zero) in the Z-A direction?

    If **YES,** then note high-end slope for later referral to CPC and proceed to Step **46.**

    If **NO,** then continue with Step **44.**

44. Measure transmit gain at 1 kHz (if not previously measured and noted) from loop interface of NCTE to COT bit stream.

45. Measure transmit gain at 2.8 kHz from loop interface of NCTE to COT bit stream. Calculate high-end slope using this measurement (at 2.8 kHz) and measurement from transmit direction noted in Step **44.** Is calculated high-end slope between −0.5 and +2.2 (PBX) or +3.7 (telset)?

    If **YES,** then replace or adjust NCTE and proceed to Step **41.**

    If **NO,** then note result for later referral to circuit provisioning center and continue with Step **46.**

46. On TMS, set **TRMT** frequency to **404** Hz and **LEVEL** to 0.0 (or TLP A-Z) dBm. Connect TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on CIU.

47. Note measurement at NIF. Calculate low-end slope using this measurement (at 404 Hz) and measurement from receive direction noted in Step **20**.

    Response: Slope = Meas(Step 20) – Meas(404 Hz)

48. Is low-end slope between −0.5 and +1.5 (PBX) or +2.5 (telset)?

    If **YES,** then continue with Step **49.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

49. On TMS, set **TRMT** frequency to **2804.**

50. Note measurement at NIF. Calculate high-end slope as done in Step **47.**

    Response: Slope = Meas(Step 20) – Meas(2804 Hz)

51. Is high-end slope between −0.5 and +2.2 (PBX) or +3.7 (telset)?

    If **YES,** then continue with Step **52.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

52. Disconnect TMS from CIU. Insert 600-ohm terminating plug into CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack.

53. At NIF, measure noise on receive pair. Is noise less than [(TLP A-Z) + 23] dBrnc?

    If **YES,** then proceed to Step **57.**

    If **NO,** then continue with Step **54.**

54. ⇛ NOTE:
If cable is loaded, impedance of noise measuring set should be 900 or 1,200 ohms.

At loop interface of NCTE, is noise less than [(TLP A-Z) + 20] dBrnc?

If **YES,** then replace NCTE and proceed to Step **57.**

If **NO,** then continue with Step **55.**

55. At loop interface of NCTE, terminate transmit pair with 600 ohms (nonloaded cable) or 1,200 ohms (loaded cable).

56. At COT, connect TMS **RECEIVE** jack to CIU **BIT STREAM ACCESS - 0TLP - RCV** jack. Is noise less than 23 (or 23 + TLP Z-A) dBrnc?

If **YES,** then replace noisy RT channel unit and proceed to Step **52.**

If **NO,** then **refer trouble (possible noisy cable) to appropriate repair forces.**

57. At NIF, terminate the transmit pair with either 600 or 900 ohms.

58. AT COT, connect TMS **RECEIVE** jack to CIU **BIT STREAM ACCESS - 0TLP - RCV** jack. Is noise less than 25 (or 25 + TLP Z-A) dBrnc?

If **YES,** then proceed to Step **61.**

If **NO,** then continue with Step **59.**

59. At loop interface of NCTE, terminate the transmit pair with 600 ohms (nonloaded cable) or 1,200 ohms (loaded cable).

60. At COT, measure noise. If noise is less than 23 (or 23 + TLP Z-A) dBrnc, replace NCTE and proceed to Step **61.** If noise is more than 23 (or 23 + TLP Z-A) dBrnc, replace noisy RT channel unit and repeat from Step **52.**

61. Was RT channel unit or NCTE replaced in noise test?

    If **YES,** then **repeat RT channel unit and NCTE tests except noise (Step 4 - Step 51).**

    If **NO,** then continue with Step **62.**

62. Are any more 4-wire channels of this type to be tested, in this system?

    If **YES,** then disconnect test set, address next channel unit to be tested and proceed to Step **4.**

    If **NO,** then continue with Step **63.**

63. On CIU, select DISCONNECT TA from menu ***before*** unplugging CIU from CTU.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Verify RT Channel Unit Settings and Loop Integrity 4-Wire Loop Without NCTE (to PBX or Data Terminal)

Summary: At central office terminal (COT), all test access for remote terminal (RT) is through the digital bit stream. At COT, send 0 dBm level at 1 kHz (to RT); customer receive level from RT should range from [(TLP A-Z) −0.6] to [(TLP A-Z) +0.6] dBm. At network interface (NIF), send (TLP Z-A) dBm level; transmit level at RT should range from −0.6 to +0.6 dBm at COT. At COT, then at NIF, send 0 dBm tones at 0.4 kHz and 2.8 kHz. At NIF and at COT, low-end slope should range from −0.3 to +1.5, and high-end slope should range from −0.3 to +2.2. Noise at NIF should be less than 19 dBrnc. RT noise should be less than 23 dBrnc at COT.

1. Arrange for channel alignment tests to customer location.

2. NOTE:
   This procedure applies when the RT is located close enough to the NIF that the RT channel unit does not have to be equalized. For longer loops requiring equalization, the RT channel unit is equalized in the Z-A direction, and network channel terminating equipment (NCTE) must be added to equalize the A-Z direction; that is covered in another procedure.

   Figure 1 shows a typical channel layout for the tests that follow. Refer to circuit layout information or work order record detail (WORD) for circuit details.

3. If necessary, connect craft interface unit (CIU) to channel test unit (CTU) and address RT channel unit.

4. If necessary, provision **AUA41/AUA141** RT channel unit.

   Reference: **DLP-521**

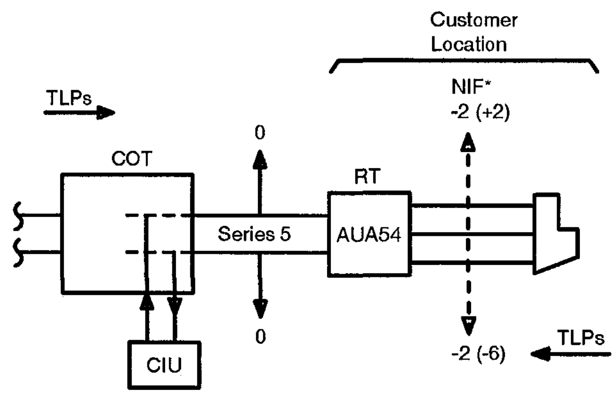


Figure 1—4-Wire Loop (RT End), No Network Channel Terminating Equipment (NCTE)

5. If necessary, provision **AUA44** or **AUA54** RT channel unit.

   Reference: **DLP-520**

6. From CONNECT-TA menu, select DIGITAL ONLY (item 1).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

7. Set switches on CIU as follows:

   - **BIT STREAM ACCESS** - **0TLP** - **FE** depressed
   - **CHANNEL TYPE** to **VF**
   - If function code = FXS_ or FXT_, set **SIGNALING CONTROL - TRANSMIT A** and **C** to **0**, **B** and **D** to **1**
   - If function code = FXO_, FXP_, EM4_, PLR_, TD__, TO4, or ETO4, set **SIGNALING CONTROL - TRANSMIT A**, **B**, **C**, and **D** to **1**
   - **SIGNALING CONTROL** to **ON**
   - **CIU LOOPBACK** to **OFF**.

8\.

⇒ NOTE 1:

The bit stream TLP is assumed to be 0.0 dB TLP. (The WORD may list bit stream TLPs as +4 and −8.5 dB, which is equivalent to 0.0 dB.) For circuits with a bit stream TLP other than zero, test levels given must be modified. These levels are shown in parentheses after the normal test levels.

⇒ NOTE 2:

The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

Connect test equipment to send tone toward customer location (Figure 2):

- Transmission measuring set (TMS) **TRANSMIT** jack to CIU **BIT STREAM ACCESS** - **0TLP** - **TRMT** on CIU
- Set TMS **TRMT LEVEL** to 0.0 (or TLP A-Z) dBm.

9\.

⇒ NOTE:

Test values at NIF at customer location depend on type of circuit; refer to WORD for value.

At NIF, measure receive level. On WORD, find TLP A-Z for NIF. Is receive level between [(TLP A-Z) −0.6] and [(TLP A-Z) +0.6] dBm?

If **YES,** then proceed to Step **14.**

If **NO,** then continue with Step **10.**

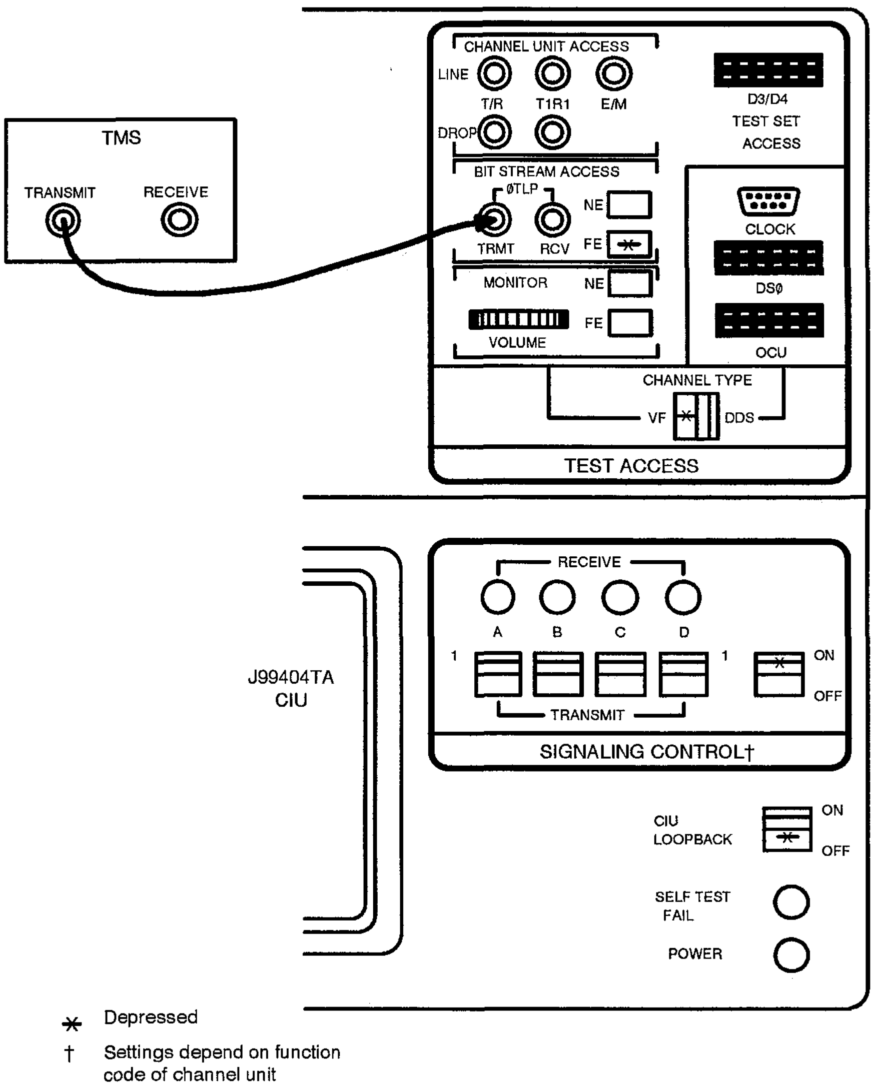


Figure 2 — Test Connections for Testing RT Channel Unit

10. Verify that RT channel unit RCV ATTENUATOR is set to WORD value. Adjust RT channel unit RCV ATTENUATOR no more than 1 dB. At NIF, is receive level between [(TLP A-Z) −0.6] and [(TLP A-Z) +0.6] dBm?

    Reference: **DLP-526**

    If **YES,** then proceed to Step **14.**

    If **NO,** then reset RCV ATTENUATOR to WORD value and continue with Step **11.**

11. Change test setup to measure gain in transmit direction (of RT channel unit):
    - Disconnect TMS from CIU
    - Connect TMS **RECEIVE** jack to **BIT STREAM ACCESS** - **0TLP** - **RCV** on CIU.

12. At NIF, send 1-kHz tone at (TLP Z-A) dBm toward RT.

13. At COT, does TMS indicate between +0.6 and −0.6 dBm (or within 0.6 dB of TLP Z-A)?

    If **YES,** then **note TMS reading. Ask circuit provisioning center (CPC) to validate WORD; if WORD is valid, refer cable pair loss trouble to appropriate repair forces.**

    If **NO,** then **there may be error in cable loss record; refer trouble to circuit provisioning center for analysis.**

14. Write down receive level (bit stream-to-NIF gain) for later use.

15. Change test setup to measure gain in transmit direction (of RT channel unit):

    - Disconnect TMS from CIU
    - Connect TMS **RECEIVE** jack to **BIT STREAM ACCESS** - **0TLP** - **RCV** on CIU.

16. At NIF, send 1-kHz tone at (TLP Z-A) dBm toward RT.

17. At COT, does TMS indicate between +0.6 and −0.6 dBm (or within 0.6 dB of TLP Z-A)?

    If **YES,** then proceed to Step **19.**

    If **NO,** then continue with Step **18.**

18. Verify that RT channel unit TRMT ATTENUATOR is set to WORD value. Adjust RT channel unit TRMT ATTENUATOR no more than 1 dB. Does TMS indicate between +0.6 and −0.6 dBm (or within 0.6 dB of bit stream TLP Z-A)?

    Reference: **DLP-526**

    If **YES,** then continue with Step **19.**

    If **NO,** then **ask CPC to validate WORD; if WORD is valid, reset TRMT ATTENUATOR to WORD value and refer cable pair loss trouble to appropriate repair forces.**

19. Write down transmit level (1-kHz gain from NIF to bit stream) for later use.

20. At NIF, send 0.4-kHz tone at 0 dBm toward COT.

21. At COT, note TMS indication. Calculate low-end slope using this measurement (0.4 kHz) and transmit level measurement noted in Step **19.** Result must fall between −0.3 and +1.0 or between −0.5 and +1.5.

    Response: Slope = Meas(Step 19) − Meas(0.4 kHz)

22. Is low-end slope between −0.3 and +1.0 (for circuit that extends beyond foreign central office) or −0.5 and +1.5 (for other circuits) (in other words, is 404 Hz measured level between 0.3 dB hot and 1.0 dB long or between 0.5 dB hot and 1.5 dB long relative to 1-kHz level)?

    If **YES,** then continue with Step **23.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

23. At NIF, send 2.8-kHz tone toward COT.

24. At COT, note TMS indication and calculate slope as done in Step **21**. Result must fall between −0.3 and +1.5 or between −0.5 and 2.2.

    Response: Slope = Meas(Step 19) − Meas(2.8 kHz)

25. Is high-end slope between −0.3 and +1.5 (for circuit that extends beyond foreign central office) or −0.5 and +2.2 (for other circuits)?

    If **YES,** then continue with Step **26.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

26. On TMS, set **TRMT** frequency to **404** and **LEVEL** to 0.0 (or TLP A-Z) dBm. Connect TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on CIU.

27. Note measurement at NIF. Calculate low-end slope using this measurement (404 Hz) and receive level measurement noted in Step **14.**

    Response: Slope = Meas(Step 14) – Meas(404 Hz)

28. Is low-end slope between –0.3 and +1.0 (for circuit that extends beyond foreign central office) or –0.5 and +1.5 (for other circuits)?

    If **YES,** then continue with Step **29.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

29. On TMS, set **TRMT** frequency to **2804.**

30. Note measurement at NIF. Calculate high-end slope as done in Step **24.**

    Response: Slope = Meas(Step 24) – Meas(2804 Hz)

31. Is high-end slope between –0.3 and +1.5 (for circuit that extends beyond foreign central office) or –0.5 and +2.2 (for other circuits)?

    If **YES,** then continue with Step **32.**

    If **NO,** then **note result for later referral to circuit provisioning center.**

32. Disconnect test set from CIU. Insert 600-ohm terminating plug into CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack.

33. At NIF, measure noise. Is noise less than 19 dBrnc?

    If **YES,** then proceed to Step **36.**

    If **NO,** then continue with Step **34.**

34. At NIF, terminate the transmit pair with either 600 or 900 ohms.

35. At COT, connect TMS **RECEIVE** jack to CIU **BIT STREAM ACCESS - 0TLP - RCV** jack. Is noise less than 23 (or 23 + TLP Z-A) dBrnc?

    If **YES,** then **report noisy cable pair or RT channel unit to appropriate repair forces.**

    If **NO,** then **report noisy cable trouble to appropriate repair forces.**

36. At NIF, terminate the transmit pair with either 600 or 900 ohms.

37. At COT, connect TMS **RECEIVE** jack to CIU **BIT STREAM ACCESS - 0TLP - RCV** jack. Is noise less than 23 (or 23 + TLP Z-A) dBrnc?

    If **YES,** then continue with Step **38.**

    If **NO,** then **report noisy cable pair or RT channel unit to appropriate repair forces.**

38. Are any more 4-wire channels of this type to be tested in this system?

    If **YES,** then disconnect test set, address next channel unit to be tested, and proceed to Step **5.**

    If **NO,** then continue with Step **39.**

39. On CIU, select DISCONNECT TA from menu ***before*** unplugging CIU from CTU.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Prepare for Recent Change Activities

1. Is master control center (MCC), supplementary trunk line work station (STLWS), or recent change/verify (RC/V) terminal to be used?

   If **MCC or STLWS,** then continue with Step **2.**
   If **RC/V,** then proceed to Step **8.**

2. Is RECENT CHANGE view or VERIFY view displayed?

   If **YES,** then proceed to Step **5.**
   If **NO,** then continue with Step **3.**

3. At MCC, do Steps 4 through 7.

4. NOTE:
   If cursor is at bottom of the screen, press **CMD MES** button on right of MCC terminal keyboard.

   With cursor beside CMD, type and enter 198 [for 5E1(2) or 5E2 generic] or 196 [for 5E2(2) or 5E4(2) generic].

   Response: MCC page 198 (196) is displayed with cursor at PRINT OPTION.

5. Type and enter N.

   Response: Cursor at DETAIL OPTION.

6. Type and enter N.

   Response: Cursor at SUMMARY OPTION.

7. Type and enter Y.

    Response: CLASS_MENU page is displayed.

    Proceed to Step **9.**

8. At RC/V terminal, type and enter appropriate message:

    If **MML**, type **RCV:MENU:DATA,APPRC**
    If **PDS**, type **RCV:MENU:APPRC**

    Response: CLASS_MENU page is displayed.

9. See list below for a summary of recent change commands.

Where **r** = Review. Use to enter growth views in the review mode. Does not alter data in RC/V.

i = Insert. Use to enter growth views in the insert mode. Also used to insert data into RC/V.

d = Delete. Use to enter growth views in the delete mode. Also used to delete data from RC/V.

u = Update. Used to enter growth views in the update mode. Also used to change data in RC/V.

c = Change command. A subcommand that can be used to change fields of a view while in insert, delete, or update modes.

< = Page backward. Go back to previous page of the view. Also brings you out of the view (from page 1) or back to main menu page (from sub-menu page).

> = Page forward. Go on to next page of view.

^ = (caret) Escape character. Gets you out of insert, delete, review, or update mode so you can use another mode.

' = (single quote) Null character. Use to blank out an RC/V field; for example, for an empty channel unit position.

x.y = Shortcut to sub-menu.

10. The following steps give an example of how recent change works.

11. First, get to a view page under a sub-menu of recent change. This can be done two ways. You can enter **12** (18) to select integrated *SLC*® carrier sub-menu, then enter the view page **1** (10), **2** (11), or **3** (12) to select the view page you want. Or, you can short-cut to the view page by entering **12.1** (18.10) for sub-menu **12** (18) view page **1** (10).

12. Next, the screen will clear. Type and enter the activity mode that you want to use. The choices are: **I** to insert a new form (a form is a file that stores information the switch uses with data about the circuit of interest), **R** to review a form, **U** to update data on the form (change data), and **D** to delete the form.

13. Next, the screen fills with the view page you selected and the cursor by field 1. *Remember that you have already selected the activity mode.* At the bottom of the view is a line with the options you can do with the form (for example, Insert, Change, Update, screen number, or Quit).

14. Next, fill in the key fields. Key fields have data with information the switch uses to find the form. The switch reads the form, and if you try to do something not allowed (for example, insert a form that already exists), you will be told. You can then enter data in the key fields, return to the sub-menu by entering **<** in field 1, or change activity mode by entering **^** (caret) in field 1. If the key field displays the correct data, hit **RETURN** and that data will be read.

15. What happens next depends on what activity mode you are in. What activity mode are you interested in?

    If **Insert,** then continue with Step **16.**

    If **Review,** then proceed to Step **19.**

    If **Update,** then proceed to Step **22.**

    If **Delete,** then proceed to Step **25.**

16. Now you can fill all fields with the required data. If a field is to be blank, enter a ' (single quote).

17. After all fields have been filled, look at the data in them. If there is a mistake, enter **C** to change field data. Then enter the field number and new data. When all fields have been corrected, hit **RETURN** (enter nothing) at the field number.

18. Now insert the form by entering **I.** (The switch will tell you if the form did not take.) Proceed to Step **26.**

19. For review, the remaining fields are filled in with data from the switch. You can return to the sub-menu by entering **<** in field 1, change activity mode by entering **^** (caret) in field 1, or copy this form to another form.

20. To copy the form, enter **C** for change-insert option at bottom of the view.

21. Now change the key fields to the required data of the new form and any other fields that may need changes. After all changes, enter **I** to insert the new form and proceed to Step **26.**

22. For update, the remaining fields are filled with data from the switch. You can return to the sub-menu by entering **<** in field 1, change the activity mode by entering **^** (caret) in field 1, or change field data by entering **C** for change option.

23. Now change the fields to the required data by entering the field number and new data. When all changes have been made, hit **RETURN** (enter nothing) for the field number.

24. Now update the form by entering **U** at the bottom of the view, and proceed to Step **26.**

25. For delete, the remaining fields are filled with data from the switch. You can quit **Q** or delete the form **D** now.

26. For any activity, you can always return to the sub-menu without doing anything to the database by entering a **<** in field 1 or at the bottom of the view (or **Q** at the bottom). The response will be an abort message.

27. If your activity took and the database was changed, you will get a response indicating so.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Assign Service to Channel

1. NOTE:
The view page numbers given are for two generics that support integrated *SLC*® carrier systems. The **bold numbers** without parentheses are for the 5E1(2) generic; numbers in parentheses ( ) are for 5E2 generic view pages. The field numbering is the same for both.

From integrated *SLC* 96 Carrier System View_Menu 12 (18), enter **2** (11) to select remote terminal equipment growth view (Figure 1).

```
                                        5ESS SWITCH
SCREEN 1 OF 2                          RECENT CHANGE
               EQUIPMENT-INTEGRATED SLC-96 CARRIER REMOTE TERMINAL  - 12.2

*1. IM         ____
*2. DCLU       _
*3. RT_EX      _

   SHELF        MODE          EQSTAT         CLI
     A        #4. ______     #5. _      #6. ________
     B         7. ______      8. _       9. ________
     C        10. ______     11. _      12. ________
     D        13. ______     14. _      15. ________
```

Figure 1—Remote Terminal Equipment Growth - View 12.2 Screen 1

2. NOTE:
If this view is displayed on the screen, you have already done this. To change the type of activity you are doing or to verify the activity mode, enter a ^ (caret) in field 1.

The data base requires that the remote terminal system configuration be installed before channel unit assignments can be made. Therefore, channel units can be added only by using the Update-Change activity mode. Enter type of activity you are doing (R, U, or D).

Where **R** = to review

U = to update or change

D = to delete or remove system.

Response: Screen 1 appears (Figure 1).

3. From work order, enter number of SM (a)

   Where a = Switch module number 001 to 048 [192 for 5E2(2)].

4. From work order, enter number of DCLU (b).

   Where b = Digital carrier line unit number 0 to 7.

5. From work order, enter number of RT_EX (c).

   Where c = Remote terminal external number 1 to 6.

   Response: The rest of the fields on the screen are filled with information from the data base.

6. Enter **2** to select screen 2 (Figure 2).

   Response: The next screen appears.

7. What type of activity is being done?

   If **CHANGE,** then continue with Step **8.**

   If **REVIEW** or **DELETE**, then proceed to Step **13.**

```
                              5ESS SWITCH
SCREEN 2 OF 2                RECENT CHANGE
            EQUIPMENT-INTEGRATED SLC-96 CARRIER REMOTE TERMINAL  - 12.2

16. POS 01/02 _____ 28. POS 25/26 _____ 40. POS 49/50 _____ 52. POS 73/74 _____
17. POS 03/04 _____ 29. POS 27/28 _____ 41. POS 51/52 _____ 53. POS 75/76 _____
18. POS 05/06 _____ 30. POS 29/30 _____ 42. POS 53/54 _____ 54. POS 77/78 _____
19. POS 07/08 _____ 31. POS 31/32 _____ 43. POS 55/56 _____ 55. POS 79/80 _____
20. POS 09/10 _____ 32. POS 33/34 _____ 44. POS 57/58 _____ 56. POS 81/82 _____
21. POS 11/12 _____ 33. POS 35/36 _____ 45. POS 59/60 _____ 57. POS 83/84 _____
22. POS 13/14 _____ 34. POS 37/38 _____ 46. POS 61/62 _____ 58. POS 85/86 _____
23. POS 15/16 _____ 35. POS 39/40 _____ 47. POS 63/64 _____ 59. POS 87/88 _____
24. POS 17/18 _____ 36. POS 41/42 _____ 48. POS 65/66 _____ 60. POS 89/90 _____
25. POS 19/20 _____ 37. POS 43/44 _____ 49. POS 67/68 _____ 61. POS 91/92 _____
26. POS 21/22 _____ 38. POS 45/46 _____ 50. POS 69/70 _____ 62. POS 93/94 _____
27. POS 23/24 _____ 39. POS 47/48 _____ 51. POS 71/72 _____ 63. POS 95/96 _____
```

Figure 2 — Remote Terminal Equipment Growth - View 12.2 Screen 2

8. Enter **C** to select the change mode.

9. Enter the field number that corresponds with the channel position at the RT.

   Comment: These field numbers range from 16 to 63.

10. Enter the type of channel unit assigned to the channel position associated with the field number.

    Where SP = Single Party (POTS)

    SPOTS = *SPOTS*® or M *SPOTS* channel unit

    COIN = Coin

    MP = Multiparty

    FSR = Frequency selective ringing

    Blank (no entry) = Unequipped or unassigned

    ’ (single quote) = erase an existing entry.

11. Repeat Steps 9 and 10 for the remaining channel positions (Fields 17-63) to be assigned channel units.

12. Hit RETURN (nothing) next to the field number when all required fields have been changed.

13. Enter **U**, **Q**, or **D** to add this information to the data base.

    Where **U** = Update (used for change)

    Q = Quit (used for review)

    D = Delete (used to remove form from data base).

14. Enter **<** twice to return to integrated *SLC* carrier system View_Menu 12.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Assign Telephone Number to Channel

1. Are you in recent change and verify menu?

   If **YES,** then proceed to Step **3.**
   If **NO,** then continue with Step **2.**

2. Select and prepare terminal for recent change verify activities and proceed to Step **4.**

   Reference: **DLP-516**

3. Enter **<** to get to the CLASS_MENU view (Figure 1). (If not already there, the **<** may have to be entered more than once.)

   Comment: If you are in the middle of a menu, enter **^** (caret) to exit menu.
   For Generic 5E2, this view is different; it has more items and different numbers.

```
                                             5ESS SWITCH
CLASS_MENU                              RECENT CHANGE AND VERIFY


 1 LINES                            11 EQUIPMENT SUBPACK
 2 LINE CUTOVER                     12 INTEGRATED SLC 96 CARRIER
 3 LINE MISC & GROUPS               13 COMMUNICATION MODULE
 4 TRUNKS & TRUNK GROUPS            14 REMOTE SWITCHING MODULE
 5 DIGIT ANALYSIS                   15 BATCH INPUT
 6 MISCELLANEOUS                    16 BRCS FEATURE DEFINITION
 7 ROUTING & CHARGING               17 TRAFFIC MEASUREMENTS
 8 EQUIPMENT MODULE
 9 EQUIPMENT UNIT
10 EQUIPMENT PACK
```

Figure 1—*5ESS*® Switch RECENT CHANGE and Verify - CLASS_MENU View

4. NOTE:
The view page numbers given are for two generics that support integrated *SLC*® Carrier Systems. The **bold numbers** without parentheses are for the 5E1(2) generic; numbers in parentheses ( ) are for 5E2 generic view pages. The field numbering is the same for both.

Enter **1** (1) to select LINES VIEW_MENU (Figure 2).

```
                                        5ESS SWITCH
VIEW_MENU 1                              LINE VIEWS

 1  COMPOSITE TN              12  TEL NO (V ONLY)        23  TOD LINE PARMS
 2  NON-MLH TN                13  LEN & PTY (V ONLY)     24  CALL PICKUP LINES
 3  NON-MLH LEN&PTY           14  MLMG & MEMB (V ONLY)   25  MW LINE PARMS
 4  MLH     TN                15  ID LINE PARAMETERS     26  CF LINE PARMS
 5  MLH     LEN&PTY           16  TGSR LINE PARAMETERS   27  ARS LINE PARMS
 6  MLH     MLMG&MEMB         17  PFA LINE PARAMETERS    28  LINE COPY EN
 7  2 4 8 5 & 10 PTY TN       18  FEAT ASGN-TN           29  LINE COPY TN
 8  2 4 8 5 & 10 PTY LEN&PTY  19  FEAT ASGN-EN & PTY     30  LINE COPY MLHG & MEMB
 9  PBX-DID TN                20  FEAR ASGN-MLHG & MEM   31  ACB LINE PARMS
10  COIN    TN                21  CALL WAITING
11  COIN    LEN&PTY           22  DISTINCTIVE RING
```

Figure 2—*5ESS*® Switch LINES VIEW_MENU 1

5. Enter **1** to select COMPOSITE TN view.

Comment: This view can be used for any type of service. The other views are condensed versions of the composite TN view. They contain fields from the composite TN view that apply to the service offered in that particular view. For example, view 11 (2.4) would be used to add a coin circuit to an integrated *SLC* carrier system; view 3 (2.1) would be used for general subscriber service. AT&T 235-118-106 defines the attributes (fields) for each of these views.

6. Enter the type of activity you are doing.

   Where **I** = to insert or add new circuit

   R = to review

   U = to update or change

   D = to delete or remove circuit.

7. **NOTE:**
   These procedures are for composite TN view 1.1 (1.6). If other views are used, fill in the key fields that have an asterisk (*) by them.

   Enter a 7-digit telephone number in the TN field.

   Response: For review, update, or delete; the remaining screen fields will be filled with information from the data base.

8. What type of activity is being done?

   If **CHANGE** or **UPDATE,** then continue with Step **9.**

   If **INSERT,** then proceed to Step **12.**

   If **REVIEW** or **DELETE,** then proceed to Step **15.**

9. Enter **C** to select the change mode.

10. At ENTYPE field, enter **SLEN.** For the remaining fields, enter the field number and new data from the work order.

11. Hit **RETURN** (enter nothing) next to the field number when all required fields have been changed and proceed to Step **15.**

12. At LEN field, enter *SLC* Carrier Line Equipment Number (LEN) =(SM)(DCLU)(RT)(LINE)

    Where Switch module (SM) = 1 to 048 [192 for 5E2(2)]

    Digital carrier line unit (DCLU) = 0 to 7

    Remote terminal number (RT) = 1 to 6

    Remote line (LINE) = 01 to 96.

13. At ENTYPE field, enter **SLEN.**

14. Fill in the remaining fields with the information supplied from the work order.

15. Enter **I**, **U**, **Q**, or **D** to add this information to the data base.

    Where **I** = Insert (used for growth or new circuits)

    U = Update (used for change)

    Q = Quit (used for review)

    D = Delete (used to remove form from data base).

16. Enter **<** to return to recent change and verify class menu.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Provision 2-Wire Special Services Channel (AUA42, AUA43, and AUA142 Channel Units)

1. Select CKT ACTIVITIES from operations menu.

2. At prompt SYSTEM ID = enter system number (0001 - 9999).

3. At prompt CHANNEL = enter channel number (1-96).

4. Enter the location of the channel unit to be provisioned; from the menu for CU LOCATION= enter either CO-END or RT-END.

5. At the prompt CU CLEI = enter the *CLEI** code [from work order record detail (WORD)] for the channel unit (5SCU690A or 5SCU6A0A).

6. From the circuit activities menu, select PROVISION.

7.

   ⚠ **CAUTION 1:**
   If the function code is FXS or FXO without toll diversion or DPO/DPT, verify correct Series 5 channel unit and provisioning at the other end before provisioning this unit. Incorrect provisioning or incorrect channel unit at the far end can cause continuous ringing on the circuit.

   ⚠ **CAUTION 2:**
   If the function code is TO, verify that the cable has been cross-connected or that the channel unit has not ***been installed before proceeding.***

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At the prompt FUNCTION CODE = enter the channel unit function code (given on WORD). The function codes are: DPT, TO, FXO, DPO, and FXS.

8. At the prompt IMPEDANCE = enter 600 or 900 from IMP= on WORD.

9. At the prompt BALANCE = enter the value from BAL= on WORD.

10. At the prompt TRANSMIT GAIN = enter the value from TRMT(GN)= on WORD.

11. At the prompt RECEIVE GAIN = enter the value from RCV(GN)= on WORD.

12. At the prompt SLOPE = enter the value from SL= on WORD.

13. Which function code are you using?

    If **DPO/DPT/TO,** then proceed to Step **17.**
    If **FXO,** then continue with Step **14.**
    If **FXS,** then proceed to Step **16.**

14. At the prompt TOLL DIVERSION? enter **YES** or **NO** from TD= on WORD.

15. At the prompt SIGNALING TYPE = enter LS or GS from LS-GS= on WORD.

16. At the prompt ON-HOOK TRANSMISSION? enter **YES** or **NO** from OHT= on WORD.

17. At the prompt REDLINE-SSP? enter:

    YES if the WORD header has **PRQ SSP**
    NO if the WORD header has **PRQ.**

18. At prompt DO YOU WANT TO MAKE CHANGES? enter YES (to review) or NO (to provision the other end).

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Provision 4W-0 (AUA54) or 4W-2 (AUA44) Channel Unit

1. Select CKT ACTIVITIES from the operations menu.

2. At the prompt SYSTEM ID = enter the system number (0001 - 9999).

3. At the prompt CHANNEL = enter the channel number (1-96).

4. Enter the location of the channel unit to be provisioned; from the menu for CU LOCATION= enter either CO-END or RT-END.

5. At the prompt CU CLEI = enter the *CLEI** code [from work order record detail (WORD)] for the channel unit (5SCU7B0A or 5SCU7C0A).

6. From the circuit activities menu, select PROVISION.

7. From the menu, select the COT channel unit function code (given on WORD). The function codes are: EM4C, EM4H, PLR1, PLR2, FXO1, FXO2, FXO3, FXO5, FXP1, FXP2, FXP3, FXP5, TDOA, TDOB, TDOC, TDOD, TDSA, TDSB, TDSC, and TDSD.

8. Which function code was selected?

    If **FXO_/FXP_,** then continue with Step **9.**
    If **EM__/PLR_,** then proceed to Step **18.**
    If **TDO_/TDS_,** then proceed to Step **21.**

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9. At the prompt TRMT ATTENUATOR = enter the value from TRMT= on WORD.

10. At the prompt RCV ATTENUATOR = enter the value from RCV= on WORD.

11. At the prompt NONLOADED/LOADED = enter L or N from L-N= on WORD.

12. At the prompt SLOPE = enter the value from SL= on WORD.

13. At the prompt BANDWIDTH = enter the value from BW= on WORD.

14. At the prompt HEIGHT = enter the value from HT= on WORD.

15. At the prompt TRMT & RCV IMPEDANCE = enter 150, 600, or 1200 from TRMT(IMP)= or RCV(IMP)= on WORD.

16. At the prompt REDLINE-SSP? enter:

    YES if WORD header has **PRQ SSP**
    NO if WORD header has **PRQ**.

17. At the prompt DO YOU WANT TO MAKE CHANGES? enter YES (to review) or NO (to provision the other end).

STOP. YOU HAVE COMPLETED THIS PROCEDURE

18. At the prompt TRMT ATTENUATOR = enter the value from TRMT= on WORD.

19. At the prompt RCV ATTENUATOR = enter the value from RCV= on WORD.

20. At the prompt DO YOU WANT TO MAKE CHANGES? enter YES (to review) or NO (to provision the other end).

STOP. YOU HAVE COMPLETED THIS PROCEDURE

21. At the prompt TRMT ATTENUATOR = enter the value from TRMT= on WORD.

22. At the prompt DO YOU WANT TO MAKE CHANGES? enter YES (to review) or NO (to provision the other end).

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Provision 4W-1 (AUA41 and AUA141) Channel Unit

1. Select CKT ACTIVITIES from the operations menu.

2. At the prompt SYSTEM ID = enter the system number (0001 - 9999).

3. At the prompt CHANNEL = enter the channel number (1-96).

4. Enter the location of the channel unit to be provisioned; from the menu for CU LOCATION= enter either CO-END or RT-END.

5. At the prompt CU CLEI = enter the *CLEI** code [from the work order record detail (WORD)] for the channel unit (5SCU7D0A).

6. From the circuit activities menu, select PROVISION.

7.

   CAUTION:
   If function code is FXS_, verify correct Series 5 channel unit and provisioning at the other end before provisioning this unit. Incorrect provisioning or incorrect channel unit can cause continuous ringing on the circuit.

   From the menu, select the COT channel unit function code (given on WORD). The function codes are: FXS1, FXS2, FXS3, FXS5, FXT1, FXT2, FXT3, FXT5, DX4N, DX4R, ETO4, and TO4.

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8. Which function code was selected?

   If **FXS_/T_** or **DX__,** then continue with Step **9.**
   If **ETO4,** then proceed to Step **18.**
   If **TO4,** then proceed to Step **27.**

9. At the prompt TRMT ATTENUATOR = enter the value from TRMT= on WORD.

10. At the prompt RCV ATTENUATOR = enter the value from RCV= on WORD.

11. At the prompt NONLOADED/LOADED = enter L or N from L-N= on WORD.

12. At the prompt SLOPE = enter the value from SL= on WORD.

13. At the prompt BANDWIDTH = enter the value from BW= on WORD.

14. At the prompt HEIGHT = enter the value from HT= on WORD.

15. At the prompt TRMT & RCV IMPEDANCE = enter the value from TRMT(IMP) or RCV(IMP) on WORD.

16. At the prompt REDLINE-SSP? enter:

    [YES] if WORD header has **PRQ SSP**
    [NO] if WORD header has **PRQ.**

17. At the prompt DO YOU WANT TO MAKE CHANGES? enter [YES] (to review) or [NO] (to provision the other end).

STOP. YOU HAVE COMPLETED THIS PROCEDURE

18. At the prompt TRMT ATTENUATOR = enter the value from TRMT= on WORD.

19. At the prompt RCV ATTENUATOR = enter the value from RCV= on WORD.

20. At the prompt −7DB(J3) = enter WHITE or BLACK from −7DB(J3)= on WORD.

21. At the prompt NONLOADED/LOADED = enter L or N from L-N= on WORD.

22. At the prompt SLOPE = enter the value from SL= on WORD.

23. At the prompt BANDWIDTH = enter the value from BW= on WORD.

24. At the prompt HEIGHT = enter the value from HT= on WORD.

25. At the prompt TRMT & RCV IMPEDANCE = enter 150, 600, or 1200 from TRMT(IMP)= or RCV(IMP)= on WORD.

26. At the prompt DO YOU WANT TO MAKE CHANGES? enter YES (to review) or NO (to provision other end).

STOP. YOU HAVE COMPLETED THIS PROCEDURE

27. At the prompt TRMT ATTENUATOR = enter the value from TRMT= on WORD.

28. At the prompt RCV ATTENUATOR = enter the value from RCV= on WORD.

29. At the prompt −7DB TRMT = enter WHITE or BLACK from −7DB TRMT= on WORD.

30. At the prompt −7DB RCV = enter WHITE or BLACK from −7DB RCV= on WORD.

31. At the prompt DO YOU WANT TO MAKE CHANGES? enter $\boxed{\text{YES}}$ (to review) or $\boxed{\text{NO}}$ (to provision the other end).

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Provision Dataport Channels (AUA34, AUA34B, AUA52, and AUA52B)

Summary: This procedure provisions the AUA34/AUA34B DS0 dataport and/or the AUA52/AUA52B office channel unit (OCU) dataport channel unit. Provision the dataport channel unit at the remote terminal (RT) and/or central office terminal (COT) for function code, subscriber data rate, error correction, all-zero-code allowed, secondary channel used, and redline-SSP as specified on the work order record detail (WORD) document.

1. NOTE:
   This procedure applies to three system configurations as follows:

   - *SLC*® Series 5 RT connecting to a *SLC* Series 5 COT or *SLC* 96 COT
   - *SLC* Series 5 RT connecting to a Digital Access Cross-connect System (DACS) II
   - *SLC*-2000 Multi-Services Distant Terminal (MSDT) connecting to a *SLC* Series 5 Feature Package F (FPF) RT connecting to a *SLC* Series 5 Feature Package C (FPC) COT.

   Verify the status of a data link for the system configuration (Table A) and determine the location of the craft interface unit (CIU) for provisioning.

2. At the selected location, connect the CIU test cord to either the channel test unit (CTU) in the Series 5 bank or the test port at the DACS II as follows:

   - For systems with a data link, connect the CIU to the RT, COT, or DACS II.
   - For systems without a data link, connect the CIU at the RT to provision the RT channel units and at the COT to provision the COT channel units.

Table A. Data Link Configurations

Central Office	Remote Terminal FPB/SS	FPC or FPC/AC	FPG	FPF/*SLC*®-2000 MSDT	INA-RT	FPD
D4 Bank					No Data Link	
SLC 96 COT	No Data Link		No Data Link			
FPC COT		Data Link		Data Link		
FPG COT			Data Link*			
FPB/SS COT	No Data Link					
DACS II					No Data Link	
DACS II Release 3.2 or later	No Data Link	Data Link	No Data Link		No Data Link	
FPD COT						Data Link

* If optioned for supplemental data link.

- For FPC RTs connecting to a DACS II (Release 3.2 or later), refer to AT&T 365-301-619, Issue 2, *DACS II Release 3 through 5 (PDS)* SLC *Carrier Features Operation and Maintenance Manual.*
- For FPF systems with *SLC*-2000 MSDTs, connect the CIU at the COT or RT to remotely provision the MSDT channel units.

3. On AUA34B dataports, verify that the option switches are set as specified on the WORD document.

   Reference: DLP-561

4. On AUA52B dataports, verify that the option switches are set as specified on the WORD document.

   Reference: DLP-562

5. From the operations menu, select CKT ACTIVITIES.

6. At the SYSTEM ID = prompt, enter system ID (0001—9999).

7. At the CHANNEL = prompt, enter channel number (1—96) to be provisioned.

8. At the CU LOCATION = prompt, enter the location of the channel unit to be provisioned: CO-END for the AUA34 and AUA34B. The AUA52 or AUA52B can be located at the COT, RT, or *SLC*-2000 MSDT. Choose CO-END or RT-END depending on the channel unit location. If the location is the MSDT, choose RT-END.

9. **NOTE:**
   The *CLEI** code entered in the CIU for the AUA34 and AUA34B is 5SCU38. The *CLEI* code entered in the CIU for the AUA52 and AUA52B is 5SCU48.

   At the CU CLEI = prompt, enter *CLEI* code either 5SCU38 or 5SCU48 for the channel unit.

   Response: Circuit activities menu is displayed

10. From the circuit activities menu, select PROVISION.

11. For the AUA34 and AUA34B, the choices are DS0A or DS0B; for the AUA52 and AUA52B, choose OCU.

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12. Which function code was entered?

    If OCU, then continue with Step 13.

    If DS0A or DS0B, then proceed to Step 14.

13. **NOTE:**
    If the dataport option switch is set for 19.2 kb/s operation (only on AUA34B or AUA52B dataports), choose any subrate (2.4, 4.8, or 9.6) to enable 19.2 kb/s operation. If the 64 kb/s clear channel option switch is set to enable, choose 56 (kb/s rate) to allow the 64 kb/s clear channel operation.

    At the SUBSCRIBER DATA RATE = prompt, enter the data rate (2.4, 4.8, 9.6, or 56) from the WORD.

14. **NOTE:**
    For 56 or 64 kb/s clear channel operation (only on AUA34B or AUA52B dataports) only second channel error correction (SCEC) and NONE may be selected for error correction. For 19.2 kb/s circuits (only on AUA34B or AUA52B dataports), the selected error correction may be 19.2 error correction, SCEC, or NONE. If the dataport option switch is set for 19.2 kb/s operation, choosing MVEC activates 19.2 error correction. For systems with Feature Package D (FPD) (low bit-rate voice - LBRV compression), if SCEC is chosen, dataport channel units must not be installed in the last slot of a digroup (23/24, 47/48, 71/72, and 95/96). For all other slots, the adjacent channel unit slot must be left empty.

    At the ERR CORR = prompt, enter the error correction given on the WORD (MVEC, SCEC, or NONE).

15. NOTE:
For 64 kb/s clear channel operation, select YES.

At the SECONDARY CHANNEL USED? prompt, enter [YES] or [NO] from the WORD. If provisioning AUA34 or AUA34B, proceed to Step 17. Otherwise, continue with Step 16.

16. NOTE:
For 64 kb/s clear channel operation, select YES.

At the SECONDARY CHANNEL USED? prompt, enter [YES] or [NO] from the WORD.

17. At the REDLINE-SSP? prompt, enter [YES] or [NO] from the WORD.

18. At the DO YOU WANT TO MAKE CHANGES? prompt, enter [YES] (to review) or [NO] (to continue).

19. Is this the last dataport channel unit to be provisioned?

If YES, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**

If NO, select BEGIN NEW CHANNEL and proceed to Step 7.

Perform OCU and Channel Loopback Test (Test Conducted at COT, Through DS0 Dataport)

Summary: This is an end-to-end test of a Digital Data System (DDS) circuit through a *SLC*® Series 5 Carrier System. With the test sets connected to the DS0 dataport channel unit at the central office, loop back the channel at the network interface at the customer location. The counter should indicate 000 (no errors). If no data service unit (DSU) is connected at the network interface, loop back the channel at the office channel unit (OCU) at the remote terminal (RT). The counter should indicate 000 (no errors). Repeat for all dataport channels to be tested in this system and verify DDS qualification tests and local loop tests as required.

NOTE:
This procedure uses the KS-20908 and KS-20909 data test sets to perform the OCU and channel loopback tests at 2.4, 4,8, 9.6, or 56 kb/s. Other test equipment, such as the Telepath Industries TPI 108/109 RT II data test unit (DTU), can also be used to perform these tests at these same rates along with the capability of testing 19.2 kb/s DDS and 64 kb/s clear channel circuits. Therefore, references to the TPI 108/109 DTU and interconnection diagrams are also included in this procedure.

1. NOTE:
   This procedure assumes an arrangement with a Series 5 RT connected to a central office terminal (COT) that may be a Series 5 COT or *SLC* 96 COT (or D4 channel bank, usually in a remote CO).

   Arrange for channel tests to the network interface at the customer location. At the network interface, terminate the loop with a channel service unit (CSU) or equivalent test set, or verify that a data service unit (DSU) is connected. Figure 1 shows the circuit layout for the tests that follow.

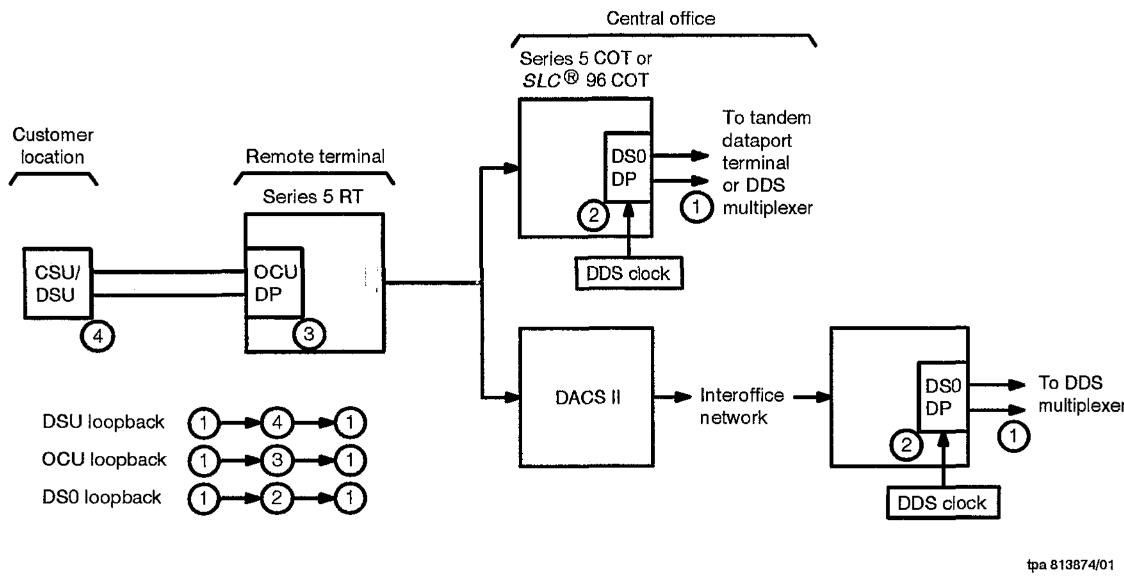

Figure 1—Typical DDS Applications

2. If necessary, provision the DS0 and OCU dataports.

   References: DLP-561, AUA34B options
   DLP-562, AUA52B options
   DLP-522, Provisioning (all dataports)

3. Make sure channel is out of service.

4. If testing from a Series 5 COT, connect the craft interface unit (CIU) to the channel test unit (CTU) and address the DS0 dataport at the COT. Select METALLIC ONLY from the CONNECT-TA menu.

   Response: /* COMPLETED,SYSTEM =_____ ...
   METALLIC TEST ACCESS WAS ACCOMPLISHED /*

5. If tests are being performed using a TPI 108/109 DTU, connect the test equipment to the dataport channel unit (Figure 2) or the CIU (Figure 3). Otherwise, proceed to Step **9.**

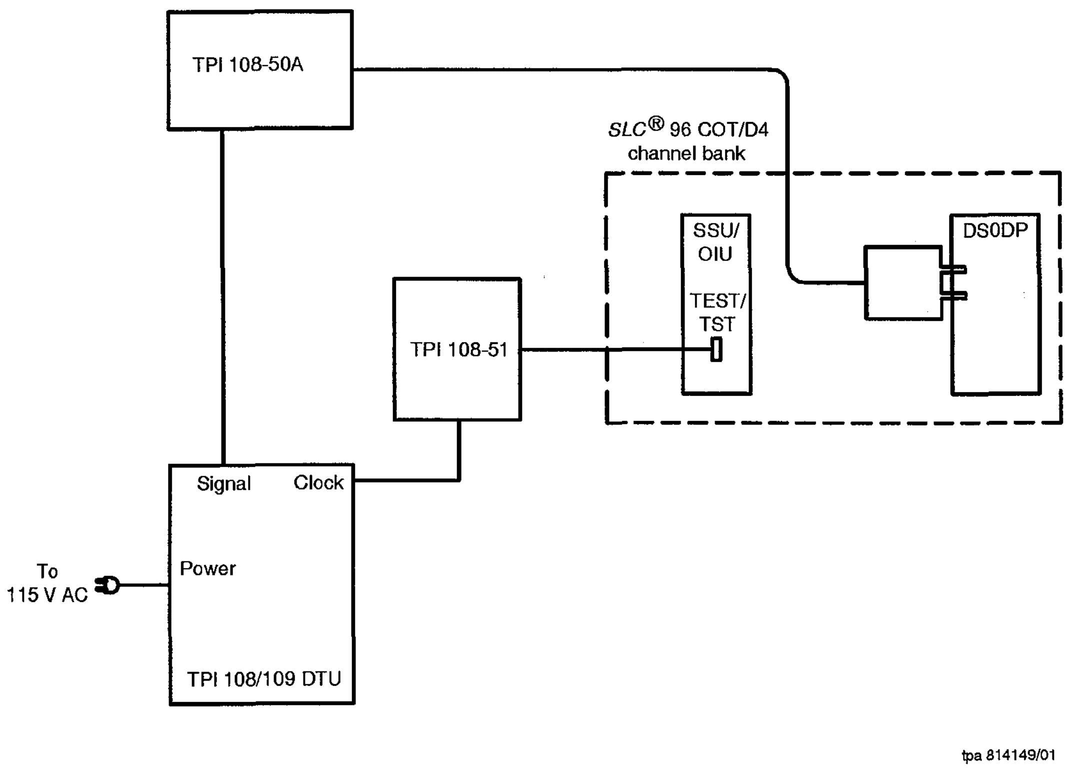

Figure 2—Test Connections for OCU/Channel Loopback Test (from *SLC* 96 COT or D4 Channel Bank Using TPI 108/109 DTU)

6\.

NOTE:
Customer location equipment must be installed for the channel or data service unit (DSU) loopback test; otherwise, the circuit is to be looped back only at the OCU dataport.

At the network interface at the customer location, is the loop terminated with a channel service unit (CSU) or an equivalent test set, or is a DSU connected?

If YES, then continue with Step **7**.
If NO, then proceed to Step **21**.

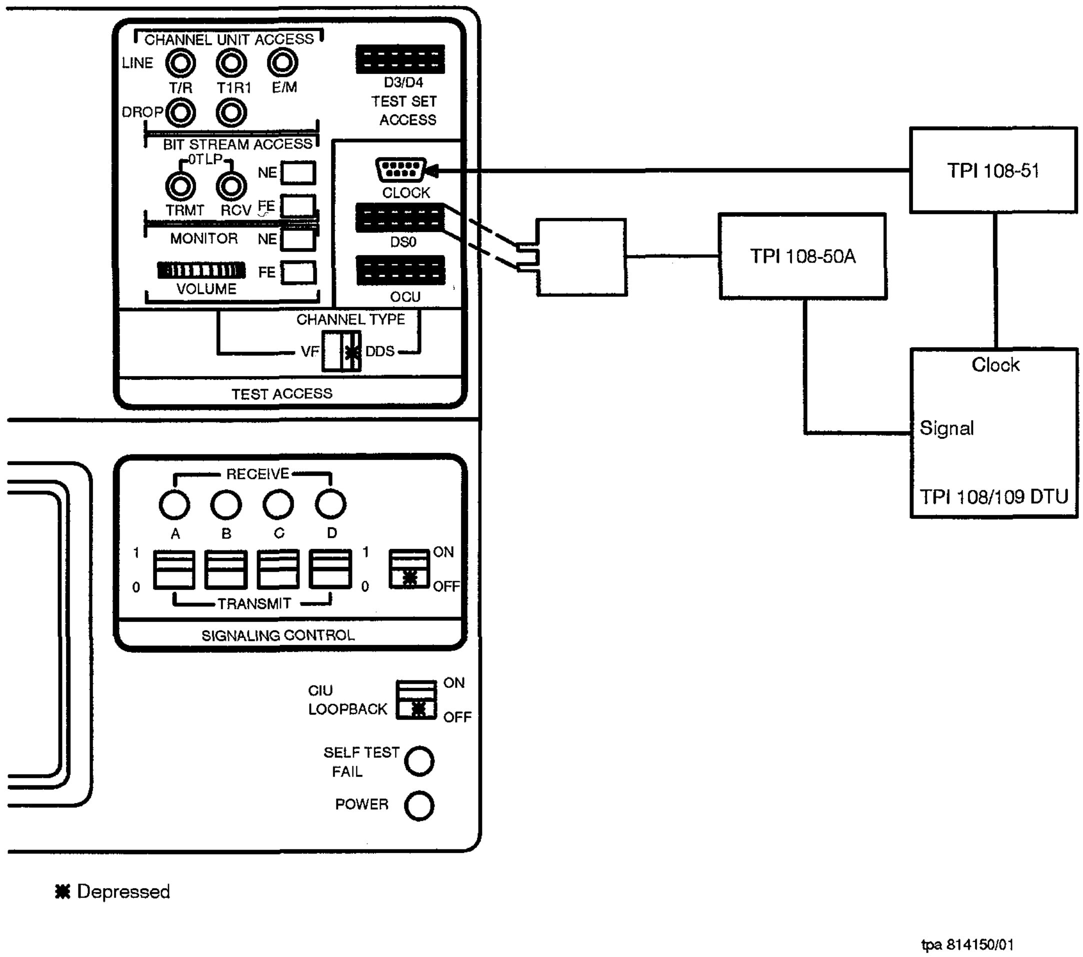

Figure 3 — Test Connections for OCU/Channel Loopback Test (from Series 5 COT Using TPI 108/109 DTU)

7. If testing from a Series 5 COT, set the switches on the CIU as follows:
   - CIU LOOPBACK to OFF
   - SIGNALING CONTROL to OFF
   - CHANNEL TYPE to DDS.

8. Refer to the TPI 108/109 DTU user's manual to set up and perform the channel loopback test and then proceed to Step **20**.

9. **NOTE:**
Refer to Figure 4 for testing from a *SLC* 96 COT or D4 channel bank. Refer to Figure 5 for testing from a Series 5 COT.

Connect the KS-20908 receiver/KS-20909 transmitter to the dataport channel unit (Figure 4) or the CIU (Figure 5) as follows:

- KS-20909 transmitter clock cord to TO TRMTR on ED-3C792 interface test set
- KS-20908 receiver clock cord to TO REC on ED-3C792 test set
- Cable assembly between TO CH BK on ED-3C792 test set and one of the following:

  For Series 5 COT: TEST ACCESS - DDS - CLOCK on CIU

  For *SLC* 96 COT: TEST on special services unit (SSU)

  For D4 channel bank: TST on office interface unit (OIU)

- KS-20909 transmitter signal cord to the white jack on the ED-3C793 loopback connector
- KS-20908 receiver signal cord to the red jack on the ED-3C793 loopback connector
- ED-3C793 loopback connector to:

  On Series 5 COT: TEST ACCESS - DDS - DS0 on the CIU (with red jack on right)

  On *SLC* 96 COT or D4 channel bank: Faceplate connector on the DS0 dataport (with red jack up).

10. Depress the POWER switches on the transmitter and receiver.

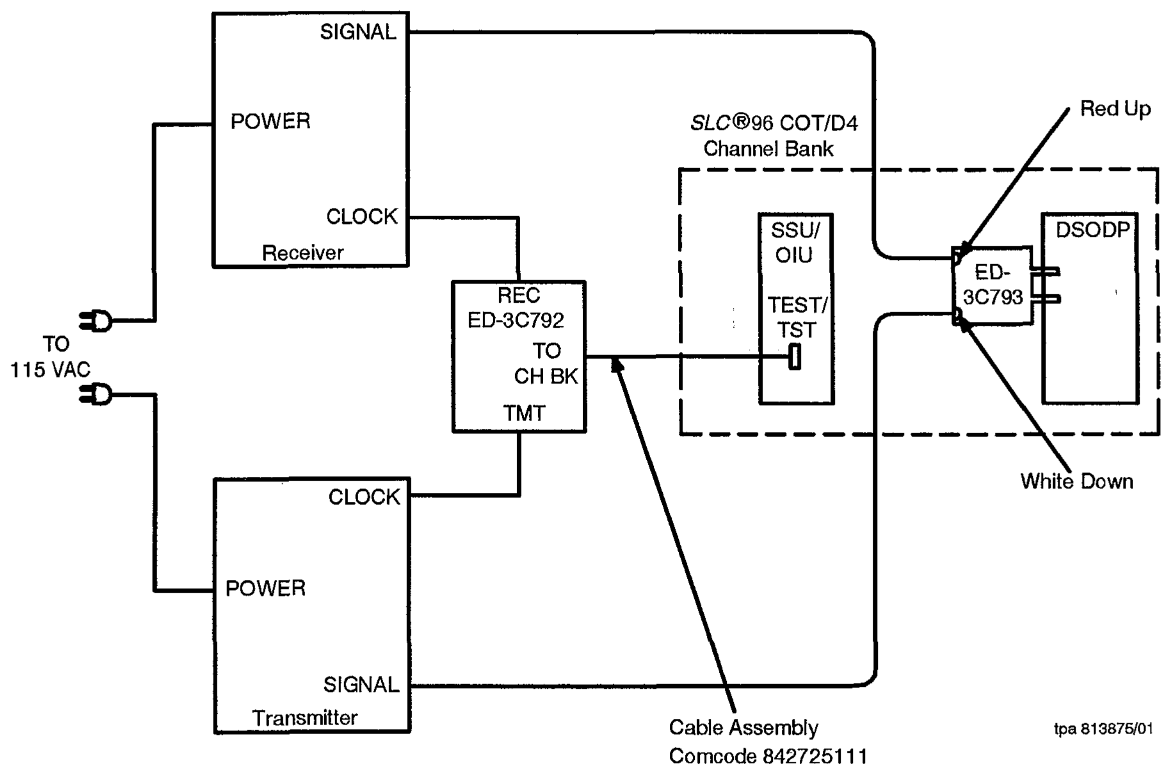

Figure 4—Test Connections for OCU/Channel Loopback Test (from *SLC* 96 COT or D4 Channel Bank Using KS-20908/KS-20909 Test Sets)

11. Are the CLOCK indicators lighted on the transmitter and receiver?

    If YES, then proceed to Step **13**.

    If NO, then continue with Step **12**.

12. **CAUTION:**
    On working circuits, service will be interrupted if you remove a common unit such as the OTU, SSU, or OIU.

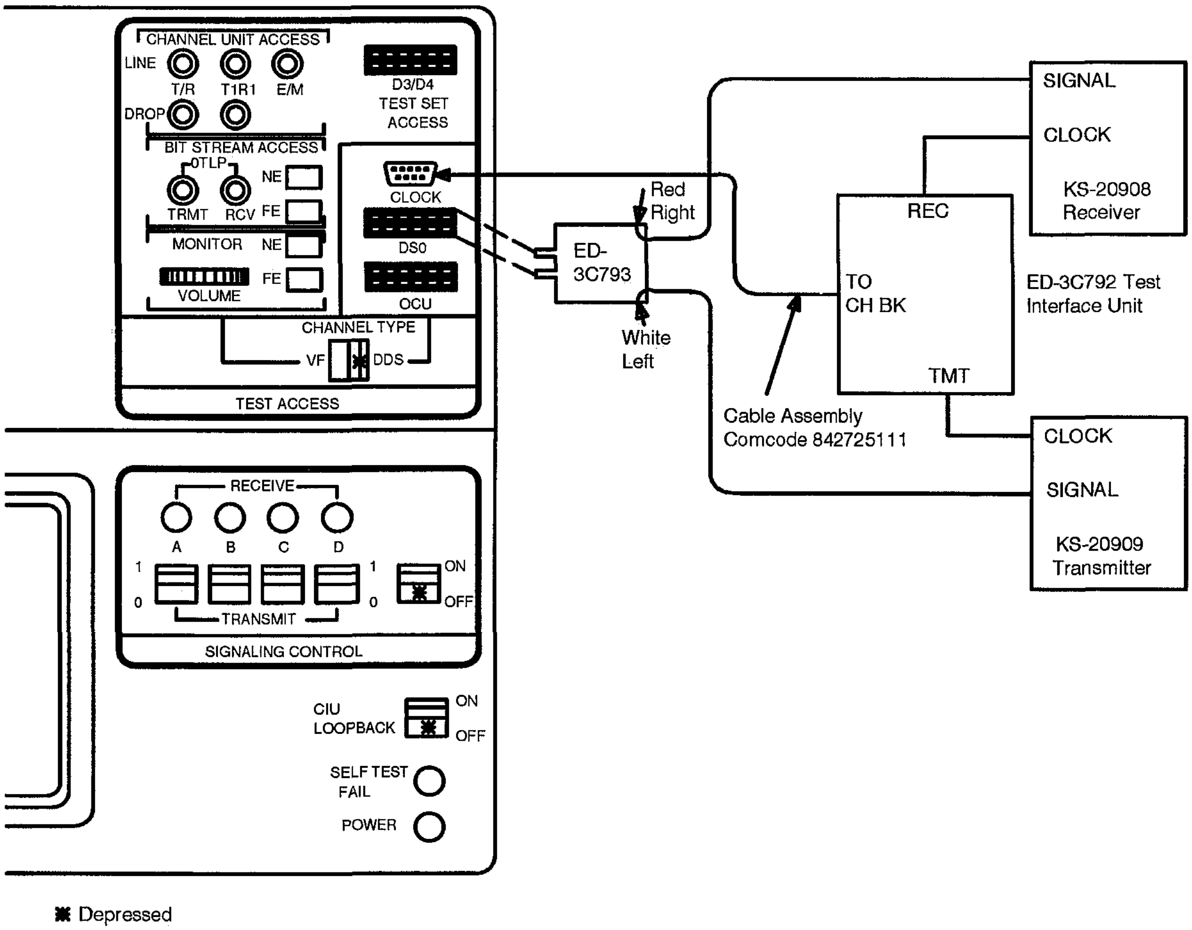

Figure 5— Test Connections for OCU/Channel Loopback Test (from Series 5 COT Using KS-20908/KS-20909 Test Sets)

Verify that the central office terminal or channel bank is wired for external clock:

For Series 5 COT:	The AUA3 office timing unit (OTU) is installed and no indicators are lighted on it
For *SLC* 96 COT:	The green EXT TIME indicator is lighted on WP2B or WP2C (*not WP2*) SSU indicating external clock is present

For D4 channel bank: The OIU card is properly set for external timing and the external clock leads are connected to terminal strip TS8 on the right-hand top-rear side of the channel bank.

13. If testing from a Series 5 COT, set the switches on the CIU as follows:
    - CIU LOOPBACK to OFF
    - SIGNALING CONTROL to OFF
    - CHANNEL TYPE to DDS.

14. Set the switches on the KS-20909 transmitter and KS-20908 receiver as follows:
    - Transmitter MODE to REPEAT
    - Transmitter FUNCTION to LOOPBACK TEST
    - DATA RATE to customer data rate on both test sets
    - Transmitter OUTPUT to BIPOLAR
    - Receiver INPUT to BIPOLAR
    - Receiver SUBRATE CHANNEL to SINGLE
    - Receiver TEST WORD to LOOPED
    - Receiver COUNTER to BIT ERRORS.

15. On the receiver, depress the terminate switch, next to POWER switch (if present).

    Response: TERMINATED indicator lights (if present)

16. ⇒ **NOTE:**
    Customer location equipment must be installed for the channel or data service unit (DSU) loopback test; otherwise, the circuit is to be looped back only at the OCU dataport.

At the network interface at the customer location, is the loop terminated with a channel service unit (CSU) or an equivalent test set, or is a DSU connected?

If YES, then continue with Step **17.**

If NO, then proceed to Step **21**.

17. Start the channel/DSU loopback test as follows: on transmitter, depress RESET button, then depress CHAN LOOPBACK or DSU LOOPBACK pushbutton for 1 second.

    Response: Transmitter CHAN LOOPBACK indicator lights; receiver BYTE PATTERN indicators 1 through 7 flicker for 56 kb/s or 2 through 7 flicker for subrates when pushbutton is released.

18. On receiver, operate COUNTER MODE to RESET.

    Response: Counter indicates 000

19. After 60 seconds, operate COUNTER MODE to HOLD.

20. Does counter indicate 000?

    If YES, then channel/DSU loopback test passed; proceed to Step **39**.

    If NO, then do OCU loopback test to isolate problem; continue with Step **21.**

21. NOTE:
This OCU loopback test is done for two conditions:

- Channel/DSU loopback test resulted in errors (trouble).
- Customer location equipment does not provide for a channel/DSU loopback.

If tests are being performed using the TPI 108/109 DTU, perform the OCU loopback test and proceed to Step **25.** Otherwise, continue with Step **22.**

22. Start OCU loopback test as follows: on transmitter, depress RESET pushbutton, then depress OCU pushbutton for 1 second.

    Response: Transmitter OCU LOOPBACK indicator lights; receiver BYTE PATTERN indicators 1 through 7 flicker for 56 kb/s or 2 through 7 flicker for subrates when pushbutton is released

23. On receiver, operate COUNTER MODE to RESET.

    Response: Counter indicates 000.

24. After 60 seconds, operate COUNTER MODE to HOLD.

25. NOTE:
If the counter indicates no errors for the OCU loopback and did show errors for the channel/DSU loopback, then a problem exists between the OCU dataport and customer equipment. Refer the trouble to appropriate repair forces. If the counter indicates no errors for the OCU loopback and no customer location equipment was available for the channel/DSU loopback, the OCU dataport test passed (the circuit between the COT and RT is good).

Does counter indicate 000?

If YES, then proceed to Step **39**.

If NO, **then use DS0 loopback test to further isolate problem; continue with Step 26**.

26. ⇒ NOTE:
The DS0 loopback test is used for trouble clearing only. It is performed using a **latching** loopback that must be removed after completing the test.

If tests are being performed using the TPI 108/109 DTU, perform the DS0 loopback test and proceed to Step **36.** Otherwise, continue with Step **27.**

27. For DS0 loopback test, set switches on transmitter and receiver as follows:
    - Transmitter FUNCTION to BYTE ENCODER
    - Receiver TEST WORD to 2047.

28. On transmitter, set BYTE ENCODER thumbwheels to 00111010. This sends the transition in progress (TIP) code that cancels any existing channel unit loopback.

29. On transmitter, depress and hold ALL 1s button and change BYTE ENCODER thumbwheels to 00000101. Release ALL 1s. This sends the DS0 dataport loopback select code (LSC).

30. On transmitter, depress and hold ALL 1s button and change BYTE ENCODER thumbwheels to 01010110. Release ALL 1s. This sends the loopback enable (LBE) code.

31. On transmitter, depress and hold ALL 1s button and change BYTE ENCODER thumbwheels to 01011010. Release ALL 1s. This sends the far-end voice (FEV) code that activates a channel unit loopback.

32. On transmitter, set FUNCTION to 2047.

33. On receiver, depress TERMINATE switch next to POWER switch (if present).

    Response: TERMINATED indicator lights (if present).

34. On receiver, operate COUNTER MODE to RESET.

    Response: Counter indicates 000.

35. After 60 seconds, operate COUNTER MODE to HOLD.

36. Does counter indicate 000?

    If YES, then DS0 dataport is good; replace OCU dataport and continue with Step **37**.

    If NO, then replace DS0 dataport and continue with Step **37**.

37. If tests are being performed using the TPI 108/109 DTU, proceed to Step **6** to retest channel and verify that trouble has been cleared after channel unit replacement. Otherwise, continue with Step **38**.

38. On transmitter, set FUNCTION to BYTE ENCODER and set BYTE ENCODER thumbwheels to 00111010 (sends TIP code to cancel the channel unit loopback). Proceed to Step **14** to retest channel and verify that trouble has been cleared after channel unit replacement.

39. Are any more dataport channels to be tested?

    If YES, then address next channel to be tested, and proceed to Step **2**.

    If NO, then continue with Step **40**.

40. Disconnect test set(s) from dataport channel unit or CIU. If CIU was used in this test, select DISCONNECT TA from menu ***before*** unplugging CIU from CTU.

41. ⇒ NOTE:
    Digital data system (DDS) qualification tests are given in AT&T 365-228-500 and in the corresponding Bellcore practices.

    If error correction on dataport channel units is not used and transmission facility is T1, verify that DDS qualification tests have been done on digital lines.

42. ⇒ NOTE:
    Local loop at remote terminal (RT) can be accessed using channel unit access jacks on craft interface unit (CIU). Local loop tests are given in AT&T 314-410-510 and in the corresponding Bellcore practices.

    According to local office procedures, verify that local loop tests have been done before putting service on dataport channels.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Adjust Gain of 2-Wire Special Services (AUA42, AUA43, or AUA142 Channel Unit)

1. If doing circuit testing, press space bar (if necessary). Then select ADJUST from menu displayed. From any other point in the craft interface unit (CIU) dialog, go to Circuit Activities Menu and select ADJUST.

   Response: CIU displays function code for channel unit being tested, as well as the first parameter to be adjusted

2. At prompts for IMPEDANCE = and BALANCE = depress **RETURN**.

3. Is TRANSMIT GAIN to be adjusted?

   If **YES,** then continue with Step **4.**
   If **NO,** then depress **RETURN** and proceed to Step **6.**

4. At prompt TRANSMIT GAIN = , enter new value (in steps of 0.25 dB).

5. Did new value give desired test results?

   If **YES,** then depress **RETURN** and continue with Step **6.**
   If **NO,** then proceed to Step **4.**

6. Is RECEIVE GAIN to be adjusted?

   If **YES,** then continue with Step **7.**
   If **NO,** then depress **RETURN** and proceed to Step **9.**

7. At prompt RECEIVE GAIN = , enter new value (in steps of 0.25 dB).

8. Did new value give desired test results?

   If **YES,** then depress RETURN and continue with Step **9.**
   If **NO,** then proceed to Step **7.**

9. At remaining prompts (SLOPE, TOLL DIVERSION, SIGNALING TYPE, and ON HOOK TRANSMISSION) depress RETURN.

   Response: After last prompt, CIU displays test adjust menu

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Adjust Attenuation of 4W-0 (AUA54), 4W-1 (AUA41/AUA141), or 4W-2 (AUA44) Channel Unit

1. If doing circuit testing, press space bar (if necessary). Then select ADJUST from menu displayed. From any other point in the craft interface unit (CIU) dialog, go to Circuit Activities Menu and select ADJUST.

   Response: CIU displays function code for channel unit being tested, as well as the first parameter to be adjusted

2. Is TRMT ATTENUATOR to be adjusted?

   If **YES,** then continue with Step **3.**
   If **NO,** then depress **RETURN** and proceed to Step **5.**

3. At prompt TRMT ATTENUATOR = , enter new value (in steps of 0.1 dB).

4. Did new value give desired test results?

   If **YES,** then depress **RETURN** and continue with Step **5.**
   If **NO,** then proceed to Step **3.**

5. Is RCV ATTENUATOR to be adjusted?

   If **YES,** then continue with Step **6.**
   If **NO,** then depress **RETURN** and proceed to Step **8.**

6. At prompt RCV ATTENUATOR = , enter new value (in steps of 0.1 dB).

7. Did new value give desired test results?

   If **YES,** then depress **RETURN** and continue with Step **8.**
   If **NO,** then proceed to Step **6.**

8. At any remaining prompts (−7DB(J3), NONLOADED/LOADED, SLOPE, BANDWIDTH, HEIGHT, TRMT & RCV IMPEDANCE, −7DB TRMT, or −7DB RCV) depress RETURN.

   Response: After last prompt, CIU displays test adjust menu

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Provision DCU Channels (AUA16 and AUA17)

1. From operations menu, select CKT ACTIVITIES.

2. At prompt SYSTEM ID = , enter system number (0001 - 9999).

3.

   ⇛ NOTE:
   With the digital connectivity unit (DCU) installed at both ends of the system, only the digital data service (DDS) channels must be provisioned. With the DCU in one end and channel units in the other end, DCU provisioning is not required except to assign redline status on DCU channels that are redlined at the other end.

   Is activity provision (DCU at both ends) or redline only (DCU at one end, channel units at the other end)?

   If **Provision**, then continue with Step **4**.

   If **Redline**, then proceed to Step **12**.

4. At prompt CHANNEL = , enter channel number (1-96) for DCU channel to be provisioned.

5. At prompt CU LOCATION = , enter location of DCU channel to be provisioned: CO-END or RT-END.

6. At prompt CU CLEI = , enter 5SCS500A (*CLEI** code for DCU).

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Response: Circuit activities menu is displayed

7. From circuit activities menu, select PROVISION-DCU.

8. At prompt OPERATION MODE?, enter DDS if the channel provides digital data service or VF if it provides voice, voiceband data, or other VF service.

9. At prompt REDLINE-SSP? enter:

   YES if WORD header has **PRQ SSP**
   NO if WORD header has **PRQ**.

10. Is this the last DCU channel to be provisioned?

    If **YES,** then continue with Step **11.**
    If **NO,** then select 3. BEGIN NEW CHANNEL from exit menu and proceed to Step **4.**

11. Has other end of channel been provisioned?

    If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
    If **NO,** then select 2. SELECT OTHER END from exit menu and proceed to Step **6.**

12. NOTE:
    With the DCU at one end, DCU channels are automatically provisioned for VF service when channels at the far end are provisioned for VF channel units. Likewise, DCU channels are automatically provisioned for DDS service when channels at the far end are provisioned for dataport channel units. However, *the CIU provisioning menu for the DCU does not reflect far-end provisioning (if any) and will accept input regardless of the channel unit provisioning at the other end*; ignore any default settings presented by the CIU.

At prompt CHANNEL = , enter channel number (1-96) for DCU channel to be redlined.

13. At prompt CU LOCATION = , enter location of DCU channel: CO-END or RT-END.

14. At prompt CU CLEI = , enter 5SCS500A (*CLEI* code for DCU).

    Response: Circuit activities menu is displayed

15. From circuit activities menu, select PROVISION-DCU.

16. At prompt OPERATION MODE?, enter DDS if far end is provisioned for dataport, otherwise enter VF.

17. At prompt REDLINE-SSP? , enter $\boxed{\text{YES}}$ (**PRQ SSP** in WORD header).

18. Repeat from Step **12** for remaining channels to be redlined.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Test DCU at Both Ends from DACS to Network Interface with Loopback at NIF

Summary: From Digital Access Cross-Connect System (DACS), test central office terminal (COT) digital connectivity unit (DCU) and remote terminal (RT) DCU through Series 5 system to customer location with loopback at network interface (NIF). With test access through DACS, connect transmission measuring set (TMS) to digital test access connector at D4 channel bank. If J1C140A digital access timeslot selector (DATS) is available, connect DATS to local test access jacks on DACS status panel. Send 0 dBm0 with TMS; receive level should be between −0.4 and +0.4 dBm.

1. At customer location, loop back RT DCU at NIF.

2. Arrange for channel tests from DACS to customer location. Figure 1 shows the channel layout for the tests that follow. Refer to circuit layout information or work order record detail (WORD) for circuit details.

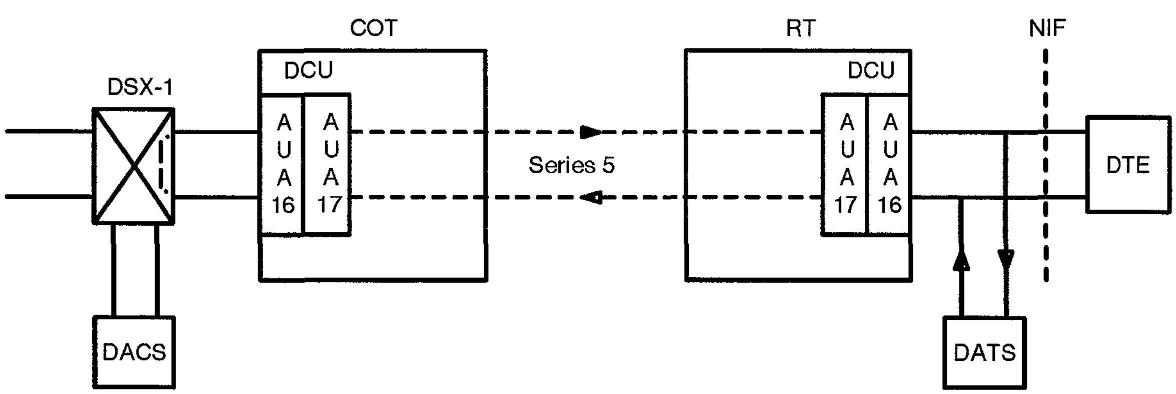

Figure 1 — VF Circuit with DCU at Both Ends

3. If necessary, at COT connect craft interface unit (CIU) to channel test unit [CTU (**AUB5**)] and provision DCU channels.

   Reference: **DLP-527**

4. Connect TMS to digital test access connector (DACS test port) at D4 channel bank. Or, if J1C140A DATS is available, connect DATS to local test access jacks on DACS status panel.

5. At D4 channel bank (or DACS), send 0 dBm0 level through DCU. Is receive level between +0.4 and −0.4 dBm?

   If **YES,** then proceed to Step **16.**
   If **NO,** then continue with Step **6.**

6. Unseat COT DCU (**AUA16** and **AUA17**).

7. Test RT DCU from bit stream to NIF.

   Reference: **DLP-529**

8. Is receive level between +0.4 and −0.4 dBm?

   If **YES,** then reinstall COT DCU and proceed to Step **11.**
   If **NO,** then replace RT DCU and continue with Step **9.**

9. Retest RT DCU.

   Reference: **DLP-529**

10. Is receive level between +0.4 and −0.4 dBm?

    If **YES,** then reinstall COT DCU and proceed to Step **5.**
    If **NO,** then refer to RT schematic drawings to fix RT wiring problem.

11. Unseat RT DCU (**AUA16** and **AUA17**).

12. Test COT DCU from DACS test port.

    Reference: **DLP-530**

13. Is receive level between +0.4 and −0.4 dBm?

    If **YES,** then reinstall RT DCU and refer trouble in connecting facility to appropriate repair forces.
    If **NO,** then replace COT DCU and continue with Step **14.**

14. Retest COT DCU.

    Reference: **DLP-530**

15. Is receive level between +0.4 and −0.4 dBm?

    If **YES,** then reinstall RT DCU proceed to Step **5.**
    If **NO,** then refer trouble to appropriate repair forces.

16. Disconnect TMS at D4 channel bank (or DATS at DACS status panel) and remove loopback at NIF.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Test RT DCU with Loopback at Network Interface

Summary: Loop back digital connectivity unit (DCU) at network interface (NIF) and test from central office terminal (COT) with transmission measuring set (TMS) and craft interface unit (CIU).

1. Arrange for DCU tests to customer location. Figure 1 shows the circuit layout for the tests that follow. Refer to circuit layout information or work order record detail (WORD) for circuit details. Verify that **no** DCU is installed at COT.

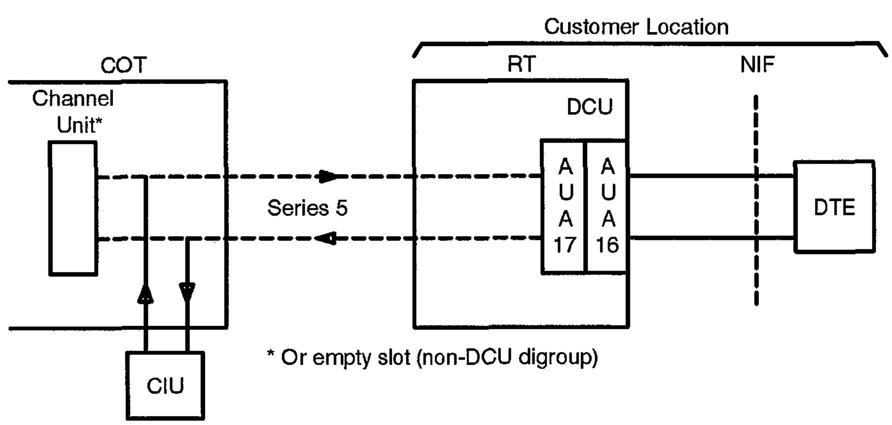

Figure 1— VF Circuit with DCU at RT

2. At customer location, loop back RT DCU at NIF.

3. If necessary, at COT connect CIU to channel test unit [CTU (**AUB5**)].

4. Select CKT ACTIVITIES from operations menu.

5. At prompt SYSTEM ID = enter system number (0001 - 9999).

6. At prompt CHANNEL = enter number of channel in DCU digroup: 1-24 in digroup A, 25-48 in digroup B, 49-72 in digroup C, or 73-96 in digroup D. Testing one channel will verify entire digroup.

7. At prompt CU LOCATION = enter RT-END.

8. At prompt CU CLEI = enter *CLEI** code for DCU (5SCS500A).

9. ⇛ NOTE:
   Even though some or all of the DCU channels may be provisioned for digital data system (DDS) service, the DCUs can be tested using these voice-frequency (VF) procedures.

   From CONNECT-TA menu, select DIGITAL ONLY (item 1).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

10. Connect test equipment (Figure 2) as follows:
    - TMS **TRANSMIT** jack to **BIT STREAM ACCESS** - **0TLP** - **TRMT** on CIU
    - TMS **RECEIVE** jack to **BIT STREAM ACCESS** - **0TLP** - **RCV** on CIU.

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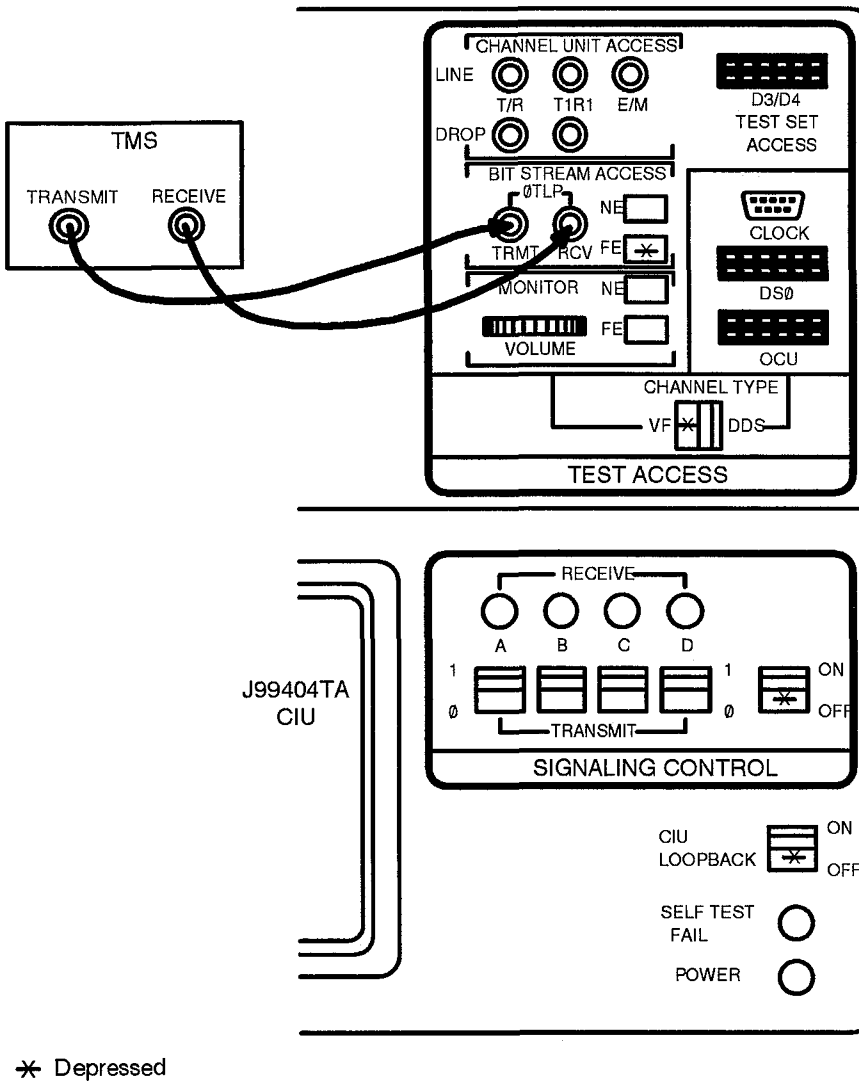

Figure 2— Test Connections for Testing RT DCU

11. Set the switches on the CIU as follows:
    - **BIT STREAM ACCESS - FE** depressed
    - **CHANNEL TYPE** to **VF**
    - **SIGNALING CONTROL** to **OFF**
    - **CIU LOOPBACK** to **OFF**.

12. NOTE:
    The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

    At the COT, send 0-dBm level through the RT DCU. On the TMS, the receive level should be between −0.4 and +0.4 dBm.

13. At the customer location, remove the loopback at the NIF.

14. On the CIU, select DISCONNECT TA from the menu ***before*** unplugging the CIU from the CTU.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Test COT DCU from DACS Test Port

Summary: Loop back central office terminal (COT) digital connectivity unit (DCU) at craft interface unit (CIU). With test access through Digital Access Cross-Connect System (DACS), connect transmission measuring set (TMS) to digital test access connector at D4 channel bank. If J1C140A digital access time slot selector (DATS) is available, connect DATS to local test access jacks on DACS status panel. Send 0 dBm0 with TMS; receive level should be 0 dBm.

1. Arrange for DACS test access on digroup connected to DCU. Figure 1 shows the channel layout for the tests that follow. Refer to circuit layout information or work order record detail (WORD) for circuit details.

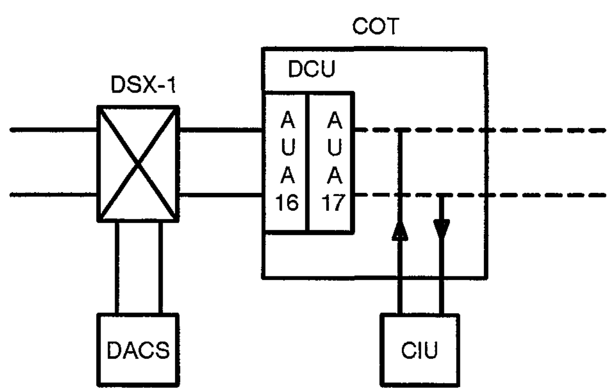

Figure 1—VF Circuit with DCU at COT

2. If necessary, at COT connect CIU to channel test unit [CTU (**AUB5**)].

3. Select CKT ACTIVITIES from operations menu.

4. At prompt SYSTEM ID = enter system number (0001 - 9999).

5. At prompt CHANNEL = enter number of channel in DCU digroup: 1-24 in digroup A, 25-48 in digroup B, 49-72 in digroup C, or 73-96 in digroup D. Testing one channel will verify entire digroup.

6. At prompt CU LOCATION = enter COT-END.

7. At prompt CU CLEI = enter *CLEI** code for DCU (5SCS500A).

8. NOTE:
   Even though some or all of the DCU channels may be provisioned for Digital Data System (DDS) service, the DCUs can be tested using these voice-frequency (VF) procedures.

   From CONNECT-TA menu, select DIGITAL ONLY (item 1).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

9. On CIU, use patch cord to connect **BIT STREAM ACCESS - 0TLP - TRMT** jack to **BIT STREAM ACCESS - 0TLP - RCV** jack (Figure 2).

10. Set the switches on the CIU as follows:
    - **BIT STREAM ACCESS - NE** depressed
    - **CHANNEL TYPE** to **VF**
    - **SIGNALING CONTROL** to **OFF**
    - **CIU LOOPBACK** to **OFF.**

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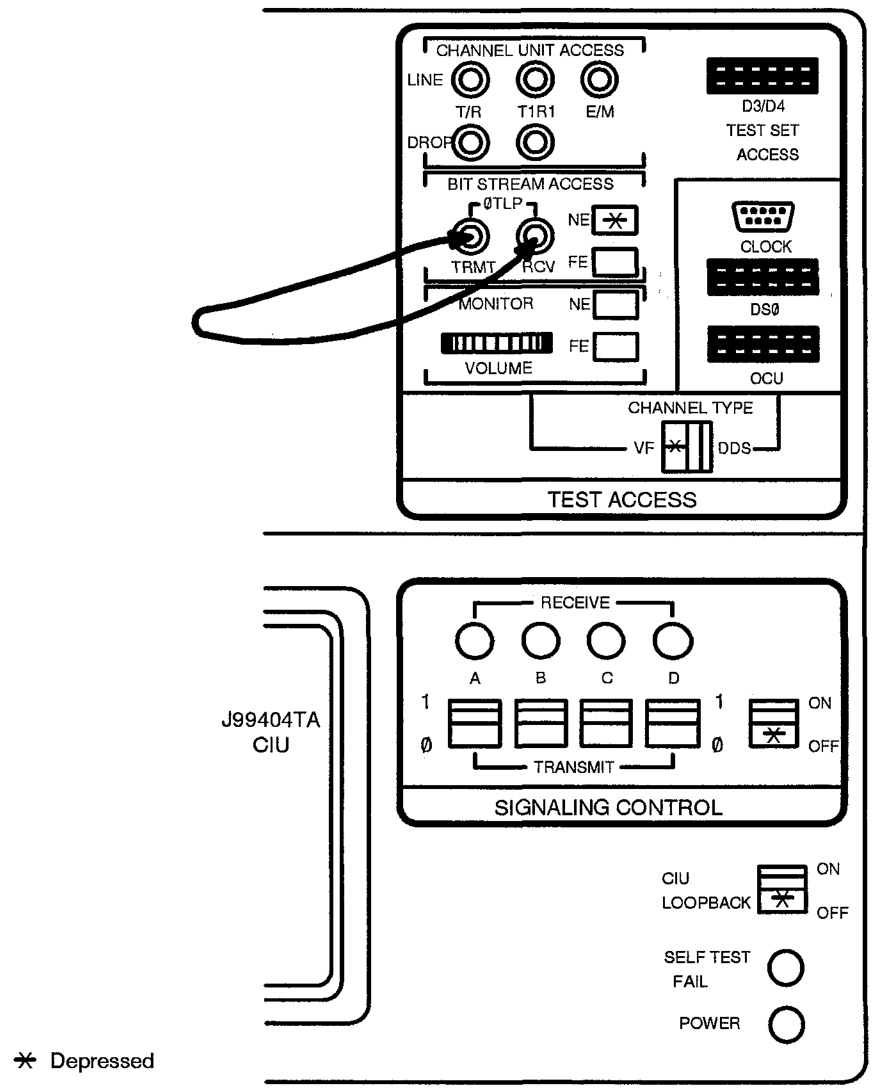

Figure 2 — Test Connections for Testing COT DCU

11. Connect the TMS to the digital test access connector (DACS test port) at the D4 channel bank. Or, if the J1C140A DATS is available, connect the DATS to the local test access jacks on the DACS status panel.

12. NOTE:
The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

At the D4 channel bank (or DACS), send 0-dBm0 level at 1 kHz. On the TMS (or DATS), is receive level between +0.4 and −0.4 dBm?

If **YES,** then proceed to Step **15.**

If **NO,** then continue with Step **13.**

13. Test the COT DCU with the loopback at the DSX-1 cross-connect.

Reference: **DLP-531**

14. On the TMS (or DATS), is the receive level between +0.4 and −0.4 dBm?

If **YES,** then refer trouble to DACS repair forces.

If **NO,** then replace the COT DCU and proceed to Step **3.**

15. Disconnect the TMS at the D4 channel bank (or DATS at DACS status panel).

16. Remove the patch cord from the CIU. Select DISCONNECT TA from the menu ***before*** unplugging the CIU from the CTU.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Test COT DCU with Loopback at DSX

Summary: Test from the craft interface unit (CIU) with the digital connectivity unit (DCU) looped back at the DSX. Send 0 dBm with the transmission measuring set (TMS); receive level should be between +0.4 and −0.4 dBm.

1. Figure 1 shows the channel layout for the tests that follow. Refer to circuit layout information or work order record detail (WORD) for circuit details. At the central office DSX cross-connect, loop back the COT DCU. Verify that **no** DCU is installed at the RT.

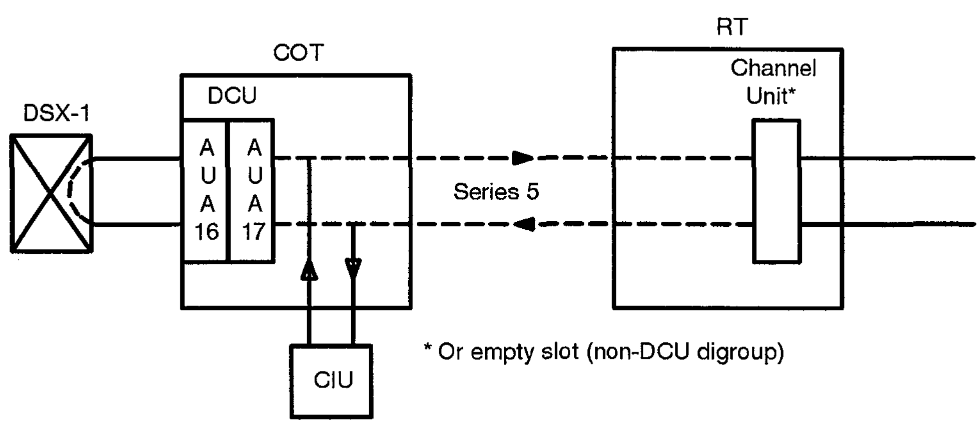

Figure 1—DCU at COT, Channel Units at RT

2. If necessary, at the COT connect the CIU to the channel test unit [CTU (**AUB5**)].

3. Select CKT ACTIVITIES from the operations menu.

4. At the prompt SYSTEM ID = enter the system number (0001 - 9999).

5. At the prompt CHANNEL = enter the number of the channel in the DCU digroup: 1-24 in digroup A, 25-48 in digroup B, 49-72 in digroup C, or 73-96 in digroup D. Testing one channel will verify the entire digroup.

6. At the prompt CU LOCATION = enter COT-END.

7. At the prompt CU CLEI = enter *CLEI** code for the DCU (5SCS500A).

8. NOTE:
Even though some or all of the DCU channels may be provisioned for Digital Data System (DDS) service, the DCUs can be tested using these voice-frequency (VF) procedures.

   From the CONNECT-TA menu, select DIGITAL ONLY (item 1).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

9. Connect the test equipment (Figure 2) as follows:
   - TMS **TRANSMIT** jack to **BIT STREAM ACCESS** - **0TLP** - **TRMT** on CIU
   - TMS **RECEIVE** jack to **BIT STREAM ACCESS** - **0TLP** - **RCV** on CIU
   - Set TMS **TRMT LEVEL** TO 0 dBm.

10. Set the switches on the CIU as follows:
   - **BIT STREAM ACCESS** - **NE** depressed
   - **CHANNEL TYPE** to **VF**
   - **SIGNALING CONTROL** to **OFF**
   - **CIU LOOPBACK** to **OFF**.

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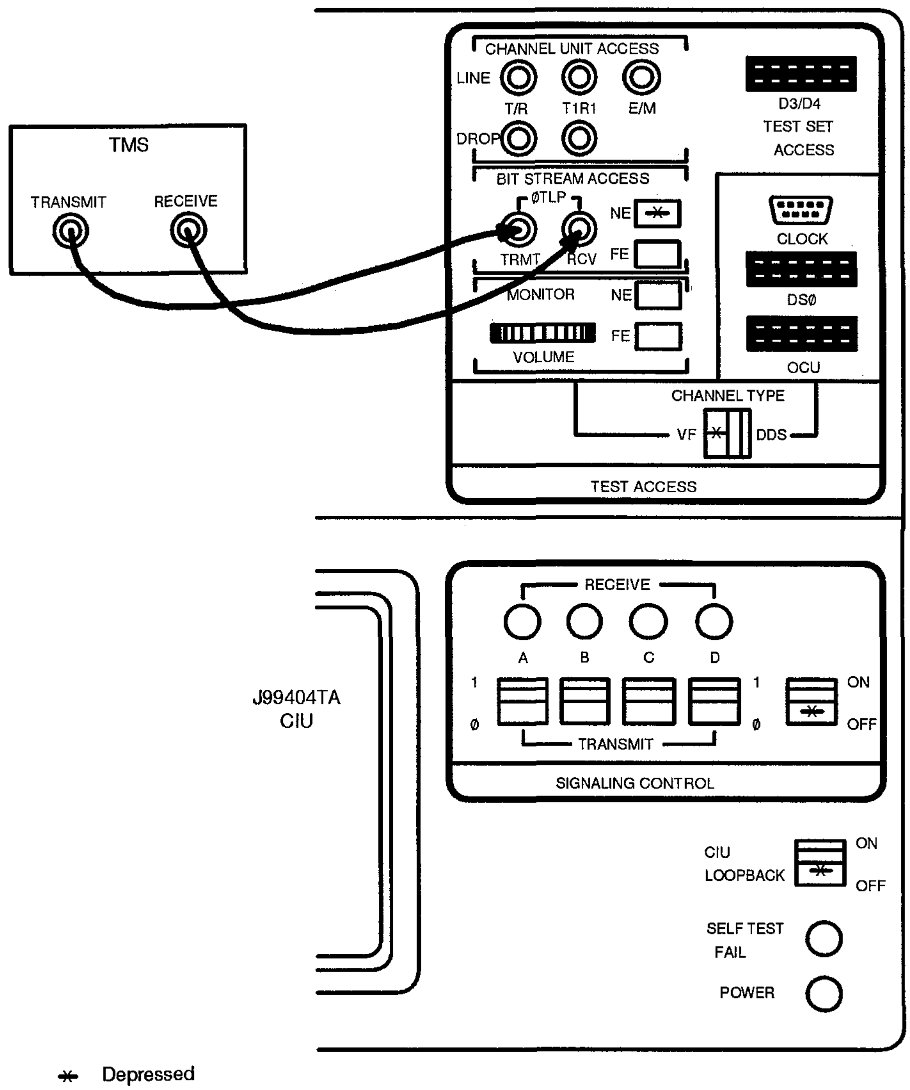

Figure 2 — Test Connections for Testing COT DCU

11. NOTE:
    The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

    At the COT, send 0 dBm level through the COT DCU. On the TMS, is the receive level between +0.4 and −0.4 dBm?

    If **YES,** then proceed to Step **13.**

    If **NO,** then continue with Step **12.**

12. Replace the COT DCU and repeat from Step **11.**

13. At the DSX-1, remove the loopback.

14. Disconnect the TMS from the CIU. On the CIU, select DISCONNECT TA from the menu ***before*** unplugging the CIU from the CTU.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Test RT and COT DCU at COT Through CIU (DACS Not Available)

Summary: Loop back the remote terminal (RT) digital connectivity unit (DCU) at the network interface (NIF) and test from the central office terminal (COT) with the transmission measuring set (TMS) and craft interface unit (CIU). Loop back the COT DCU at the DSX-1 and test.

1. Arrange for DCU tests to the customer location. Figure 1 shows the circuit layout for the tests that follow. Refer to the circuit layout information or work order record detail (WORD) for circuit details.

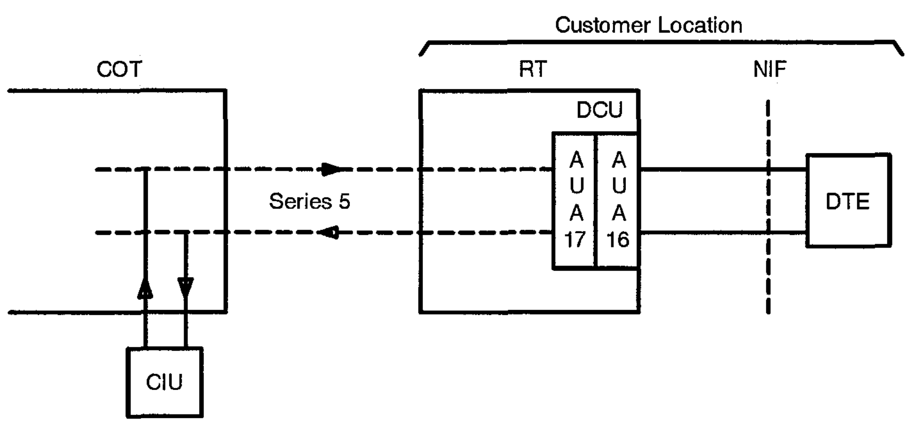

Figure 1— Test DCU at RT with Loopback at NIF

2. At the COT, unseat the DCU (**AUA16** and **AUA17**) in the digroup being tested.

3. At the customer location, loop back the RT DCU at the NIF.

4. If necessary, at the COT connect the CIU to the channel test unit [CTU (**AUB5**)].

5. Select the CKT ACTIVITIES from the operations menu.

6. At the prompt SYSTEM ID = enter the system number (0001 - 9999).

7. At the prompt CHANNEL = enter the number of channel in the DCU digroup: 1-24 in digroup A, 25-48 in digroup B, 49-72 in digroup C, or 73-96 in digroup D. Testing one channel will verify the entire digroup.

8. At the prompt CU LOCATION = enter RT-END.

9. At the prompt CU CLEI = enter the *CLEI** code for the DCU (5SCS500A).

10. From the CONNECT-TA menu, select DIGITAL ONLY (item 1).

    Response: /* COMPLETED,SYSTEM=____ ...
    DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

11. Connect the test equipment (Figure 2) as follows:
    - TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on CIU
    - TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on CIU.

12. **NOTE:**
    Even though some or all of the DCU channels may be provisioned for Digital Data System (DDS) service, the DCUs can be tested using these voice-frequency (VF) procedures.

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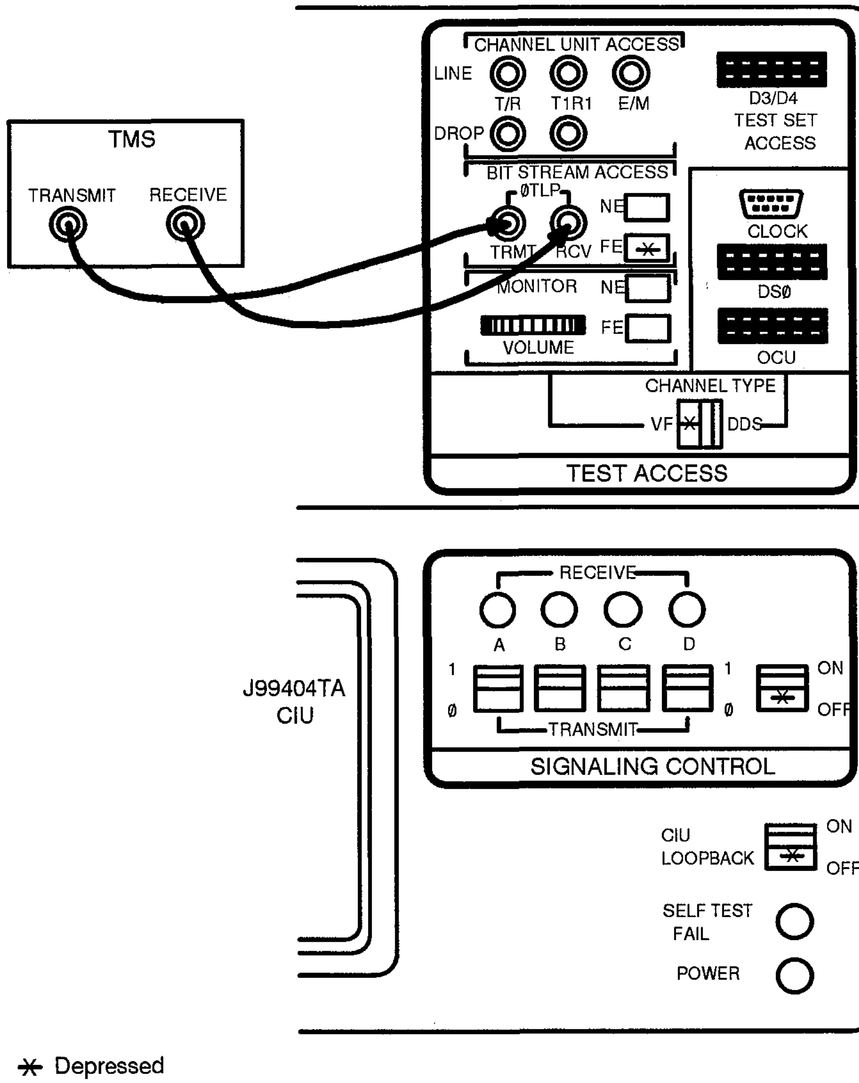


Figure 2—Test Connections for Testing RT DCU

Set switches on CIU as follows:

- **BIT STREAM ACCESS - FE** depressed
- **CHANNEL TYPE** to **VF**

- **SIGNALING CONTROL** to **OFF**
- **CIU LOOPBACK** to **OFF**.

13. NOTE:
    The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

    At COT, send 0 dBm level through RT DCU. On TMS, receive level should be between –0.4 and +0.4 dBm.

14. At customer location, remove loopback at NIF and unseat RT DCU.

15. At COT, reinstall DCU (**AUA16** and **AUA17**).

16. Figure 3 shows the channel layout for the tests that follow. At central office DSX-1 cross-connect, loop back COT DCU.

17. On the CIU, select DISCONNECT TA. From the operations menu select CKT ACTIVITIES.

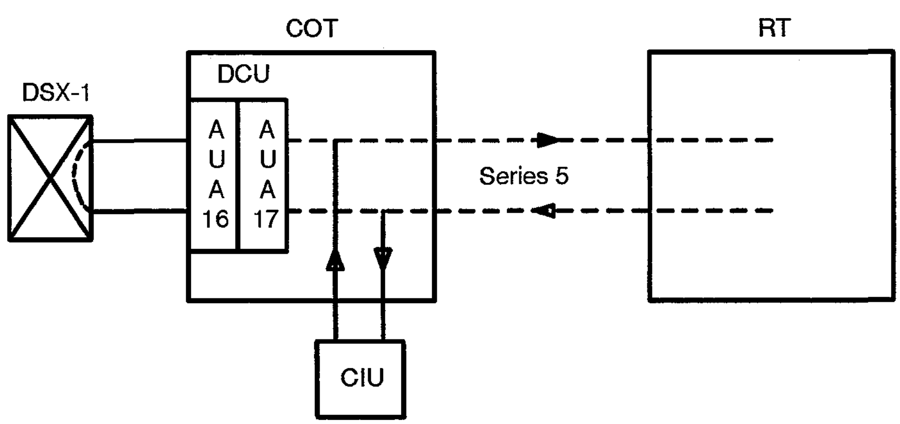


Figure 3—Test COT DCU with Loopback at DSX-1

18. At the prompt SYSTEM ID = enter the system number (0001 - 9999).

19. At the prompt CHANNEL = enter the number of channel in the DCU digroup: 1-24 in digroup A, 25-48 in digroup B, 49-72 in digroup C, or 73-96 in digroup D.

20. At the prompt CU LOCATION = enter COT-END.

21. At the prompt CU *CLEI* = enter 5SCS500A.

22. From the CONNECT-TA menu, select DIGITAL ONLY (item 1).

    Response: /* COMPLETED,SYSTEM=____ ...
    DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

23. Set the TMS **TRMT LEVEL** to 0 dBm.

24. On the CIU, change the switch setting **BIT STREAM ACCESS** - **FE** to **NE** depressed. Verify switch settings: **CHANNEL TYPE** to **VF**, **SIGNALING CONTROL** to **OFF**, and **CIU LOOPBACK** to **OFF**.

25. At the COT, send 0 dBm level through the COT DCU. On the TMS, receive level should be between −0.4 and +0.4 dBm.

26. At the DSX-1, remove the loopback.

27. At the customer location, reinstall the RT DCU (**AUA16** and **AUA17**).

28. Disconnect the TMS from the CIU. On the CIU, select DISCONNECT TA from the menu ***before*** unplugging the CIU from the CTU.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Perform OCU and Channel Loopback Test from COT Equipped with DCU

Summary: This procedure tests the Digital Data System (DDS) circuit through a *SLC*® Series 5 Carrier System that has a digital connectivity unit (DCU) installed in the COT. Because of the DCU, digital test access at the COT is used for this test. With the test sets connected to the craft interface unit (CIU) at the COT, loop back the channel at the network interface at the customer location. The counter should indicate 000 (no errors). If no data service unit (DSU) is connected at network interface, loop back the office channel unit (OCU) at RT. Repeat for all dataport channels to be tested in this system.

NOTE:
This procedure uses the KS-20908 and KS-20909 data test sets to perform the OCU and channel loopback tests at 2.4, 4,8, 9.6, or 56 kb/s. Other test equipment, such as the Telepath Industries TPI 108/109 RT II data test unit (DTU), can also be used to perform these tests at these same rates along with the capability of testing 19.2 kb/s DDS and 64 kb/s clear channel circuits. Therefore, references to the TPI 108/109 DTU and interconnection diagrams are also included in this procedure.

1. NOTE:
   This procedure assumes a circuit arrangement with a Series 5 RT dataport connected through a DCU in a Series 5 COT.

   Arrange for channel tests to network interface at customer location. Figure 1 shows the circuit layout for the tests that follow.

2. At the central office terminal (COT), connect the CIU to the channel test unit (CTU) and address the OCU dataport (at the RT).

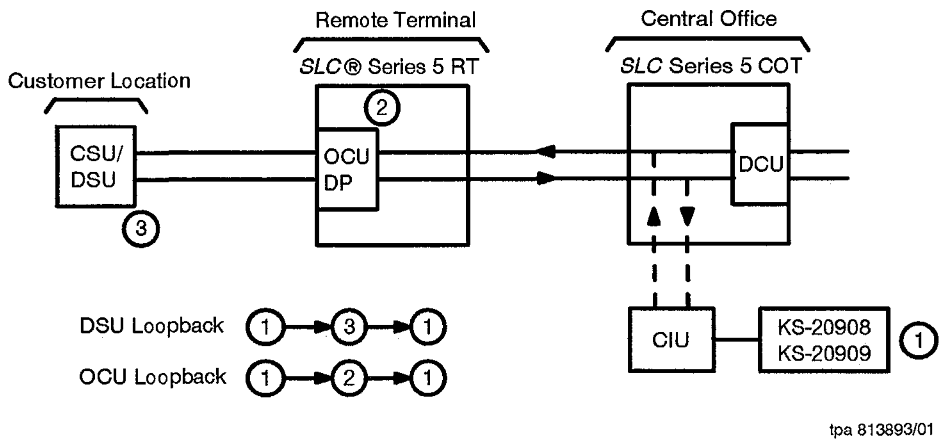


Figure 1—DSU and OCU Loopback Testing Using Digital Test Access at the COT

3. **NOTE:**
   If the OCU dataport is provisioned for error correction, reprovision it for NONE for this test.

   If necessary, provision OCU dataport.

   Reference: DLP-522

4. Make sure channel is out of service.

5. Select DIGITAL ONLY from CONNECT-TA menu.

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

6. If tests are being performed using a TPI 108/109 DTU, connect the test equipment to the CIU (Figure 2). Otherwise, continue with Step **10.**

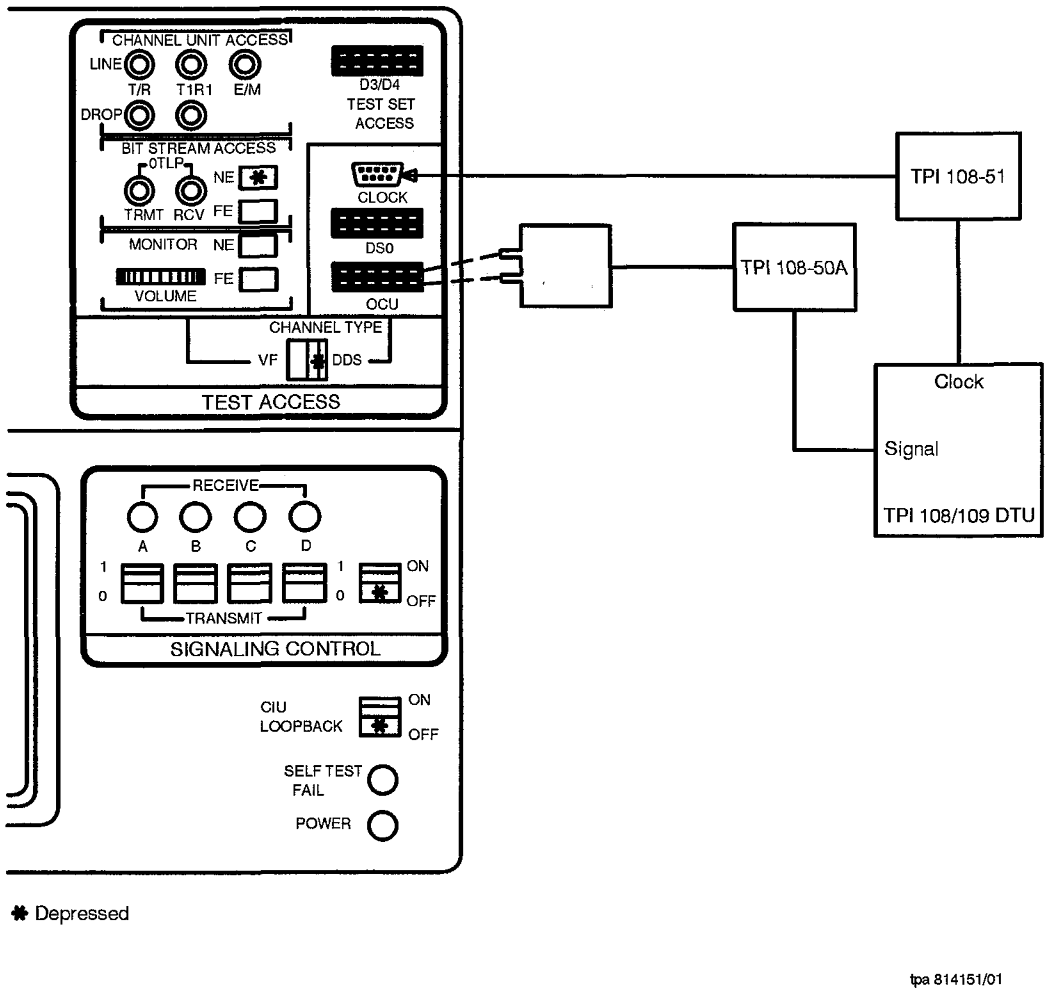


Figure 2 — Test Connections for Dataport Test Using TPI 108/109 DTU

7. Set the switches on the CIU as follows:
   - CIU LOOPBACK to OFF
   - SIGNALING CONTROL to OFF
   - CHANNEL TYPE to DDS.

8. ⇛ **NOTE:**
Customer location equipment must be installed for the channel or DSU loopback test; otherwise, the circuit is to be looped back only at the OCU dataport.

At the network interface at the customer location, is the loop terminated with a channel service unit (CSU) or equivalent test set, or is a DSU connected?

If YES, then continue with Step **9**.

If NO, then proceed to Step **23**.

9. Refer to the TPI 108/109 DTU user's manual to set up and perform the channel loopback test and then proceed to Step **22.**

10. Connect the KS-20908 receiver/KS-20909 transmitter to the CIU as follows (Figure 3):
    - KS-20909 transmitter clock cord to TO TRMTR on ED-3C792 interface test set
    - KS-20908 RECEIVER clock cord to TO REC on ED-3C792 test set
    - Cable assembly between TO CH BK on ED-3C792 test set and TEST ACCESS - DDS - CLOCK on CIU
    - KS-20909 transmitter signal cord to white jack on ED-3C793 loopback connector
    - KS-20908 receiver signal cord to red jack on ED-3C793 loopback connector.

11. Depress the POWER switches on the transmitter and receiver.

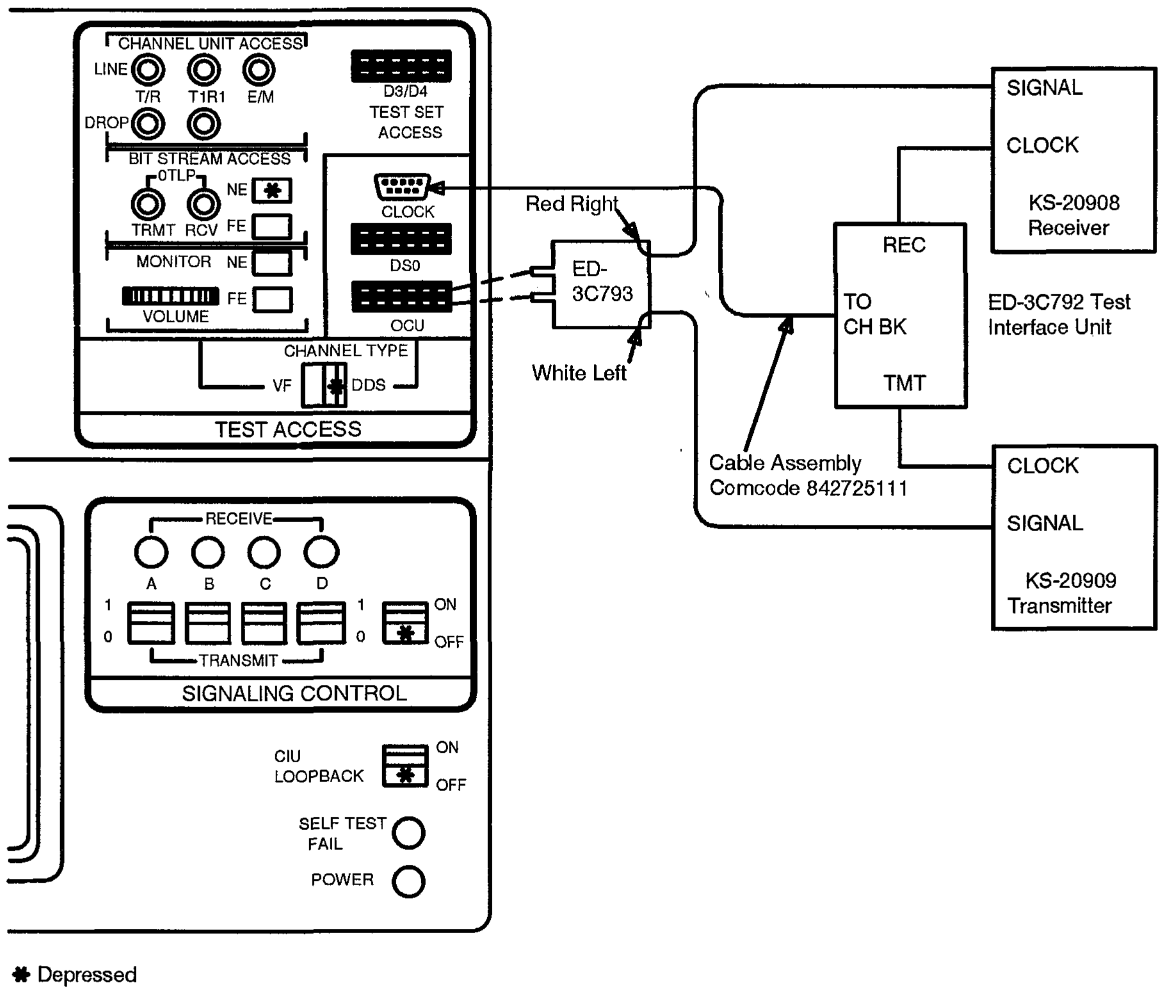


Figure 3 — Test Connections for Dataport Test Using KS-20908/KS-20909 Test Sets

12. Are the CLOCK indicators lighted on the transmitter and receiver?

    If YES, then proceed to Step **14**.

    If NO, then continue with Step **13**.

13. Verify that the COT is wired for external clock: AUA3 office timing unit (OTU) is installed and no indicators are lighted on it.

14. Set the switches on the CIU as follows:
    - CIU LOOPBACK to OFF
    - SIGNALING CONTROL to OFF
    - CHANNEL TYPE to DDS.

15. Set the switches on the KS-20909 transmitter and KS-20908 receiver as follows:
    - Transmitter MODE to REPEAT
    - Transmitter FUNCTION to LOOPBACK TEST
    - DATA RATE to customer data rate on both test sets
    - Transmitter OUTPUT to LOGIC - FAR END
    - Receiver INPUT to LOGIC - FAR END
    - Receiver SUBRATE CHANNEL to SINGLE
    - Receiver TEST WORD to LOOPED
    - Receiver COUNTER to BIT ERRORS.

16. On the receiver, depress the terminate switch, next to the POWER switch (if present).

    Response: TERMINATED indicator lights (if present).

17. With the red jack on the right, insert the ED-3C793 connector into TEST ACCESS - DDS - OCU on the CIU.

18. **NOTE:**
    Customer location equipment must be installed for the channel or DSU loopback test; otherwise, the circuit is to be looped back only at the OCU dataport.

At the network interface at the customer location, is the loop terminated with a CSU or equivalent test set, or is a DSU connected?

If YES, then continue with Step **19.**

If NO, then proceed to Step **23.**

19. Start the channel/DSU loopback test as follows: at the COT on the transmitter, depress the RESET pushbutton, then depress the CHAN LOOPBACK or DSU LOOPBACK pushbutton for 1 second.

    Response: Transmitter CHAN LOOPBACK indicator lights; receiver BYTE PATTERN indicators 1 through 7 flicker for 56 kb/s or 2 through 7 flicker for subrates when the pushbutton is released.

20. On the receiver operate the COUNTER MODE to RESET.

    Response: Counter indicates 000

21. After 60 seconds operate the COUNTER MODE to HOLD.

22. Does the counter indicate 000?

    If YES, then the channel/DSU loopback test passed; proceed to Step **28.**

    If NO, then do the OCU loopback test to isolate problem; continue with Step **23.**

23. **NOTE:**

    This OCU loopback test is done for two conditions:

    - Channel/DSU loopback test resulted in errors (trouble).
    - Customer location equipment does not provide for a channel/DSU loopback.

If tests are being performed using the TPI 108/109 DTU, perform the OCU loopback test and proceed to Step **27.** Otherwise, continue with Step **24.**

24. Start the OCU loopback test as follows: on the transmitter, depress the RESET pushbutton, then depress the OCU pushbutton for 1 second.

    Response: The transmitter OCU LOOPBACK indicator lights; receiver BYTE PATTERN indicators 1 through 7 flicker for 56 kb/s or 2 through 7 flicker for subrates when the pushbutton is released.

25. On the receiver operate the COUNTER MODE to RESET.

    Response: Counter indicates 000

26. After 60 seconds operate the COUNTER MODE to HOLD.

27. ⇒ NOTE:

    If the counter indicates no errors for the OCU loopback and the channel/DSU loopback test failed (counter showed errors), then a problem exists between the OCU dataport and customer equipment. Refer the trouble to the appropriate repair forces.

    If the OCU dataport has been replaced in this procedure and the OCU loopback test fails *again* (counter shows errors), then the replacement dataport is faulty, the wrong dataport was replaced, or the CIU setup is incorrect. Try again.

    If the counter indicates no errors for the OCU loopback and no customer location equipment was available for the channel/DSU loopback, the OCU dataport test passed.

    Does the counter indicate 000?

    If YES, then continue with Step **28.**

    If NO, then replace the OCU dataport and proceed to Step **18.**

28. If the OCU dataport was provisioned initially for error correction, reprovision it for error correction.

    Reference: DLP-522

29. Are any more dataport channels to be tested?

    If YES, then address the next channel to be tested, and proceed to Step **3.**

    If NO, then continue with Step **30.**

30. Disconnect the test set(s) from the CIU. On the CIU, select DISCONNECT TA from the menu ***before*** unplugging the CIU from the CTU.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Clear Test Bus Access

Summary: With a volt-ohm-milliammeter (VOM), check for foreign voltage or stuck channel unit relays on the test bus. Voltage should be less than 0.1 V. Resistance should be more than 500K ohms.

1. From the operations menu on the craft interface unit (CIU), select TEST BUS ACCESS (item 3).

2. At the prompt SYSTEM ID = enter the system number (0001 - 9999).

   Response: /*CLEAR TEST BUS ACCESS/*

3. Get a KS-14510 VOM or equivalent and condition to measure DC volts.

4. Connect the VOM test leads across tip and ring on the CIU at **CHANNEL UNIT ACCESS - LINE - T/R** jack and note the meter reading.

5. NOTE:
   If the CIU power cord is plugged in at the COT bay, the CIU case is connected to circuit ground. Otherwise, the CIU case should be connected to the COT bay (attach the clip lead to the test cable connector at the CIU).

   Connect the VOM test leads across tip and ground (at the test cable connector) on the CIU at **CHANNEL UNIT ACCESS - LINE - T/R** jack and note the meter reading.

6. Connect the VOM test leads across ring and ground (at the test cable connector) on the CIU at **CHANNEL UNIT ACCESS - LINE - T/R** jack and note the meter reading.

7. Switch the meter to measure AC volts. Repeat tip-ring, tip-ground, and ring-ground measurements.

8. Did the meter indicate more than 0.1 V for any measurement?

   If **YES**, then note problem with channel unit or CTU test relay and refer trouble to appropriate repair forces.

   If **NO**, then continue with Step **9**.

9. Repeat the foreign voltage test (Steps **3** through **7**) on the CIU at the remaining **CHANNEL UNIT ACCESS** jacks (**DROP - T/R**, **LINE - T1/R1**, **DROP - T1/R1**, and **E/M**).

10. Did the meter indicate more than 0.1 V for any measurement?

    If **YES**, then note problem with channel unit or CTU test relay and refer trouble to appropriate repair forces.

    If **NO**, then continue with Step **11**.

11. Condition the VOM to measure ohms.

12. Connect the VOM test leads across tip and ring at the **CHANNEL UNIT ACCESS - LINE - T/R** jack on the CIU and note the meter reading.

13. NOTE:
    If the CIU power cord is plugged in at the COT bay, the CIU case is connected to circuit ground. Otherwise, the CIU case should be connected to the COT bay (attach the clip lead to the test cable connector at the CIU).

Connect the VOM test leads across tip and ground (at the test cable connector) on the CIU at the **CHANNEL UNIT ACCESS - LINE - T/R** jack and note the meter reading.

14. Connect the VOM test leads across ring and ground (at the test cable connector) on the CIU at the **CHANNEL UNIT ACCESS - LINE - T/R** jack and note the meter reading.

15. Does the VOM indicate less than 500K ohms for any measurement?

    If **YES**, then note problem with channel unit or CTU test relay and refer the trouble to the appropriate repair forces.

    If **NO**, then continue with Step **16.**

16. Repeat the test for stuck channel unit test relays (Steps **12** through **14**) on the CIU at the remaining **CHANNEL UNIT ACCESS** jacks (**DROP - T/R**, **LINE - T1/R1**, **DROP - T1/R1**, and **E/M**).

17. Did the meter indicate less than 500K ohms for any measurement?

    If **YES**, then note the problem with the channel unit or channel test unit (CTU) test relay and refer the trouble to the appropriate repair forces.

    If **NO**, then continue with Step **18.**

18. On the CIU at the prompt CLEAR TEST BUS ACCESS enter [YES].

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Make Connections at RT for DS1 Cabling to DCU

Summary: At the remote terminal (RT), connect the special cabling kit for the digroups in which digital connectivity units (DCUs) are to be installed, or verify connections have been made.

1. Behind the RT dual bank assembly, is the special cabling kit connected (Figures 1 through 4) in each digroup in which the DCU is to be installed?

   If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**
   If **NO**, then continue with Step **2.**

2. Get the special cabling kit for each digroup in which the DCU is to be installed:

   - Digroup A - ED-7C693-30, G1
   - Digroup B - ED-7C693-30, G2
   - Digroup C - ED-7C693-30, G3
   - Digroup D - ED-7C693-30, G4.

   Connect per Figures 1 through 4. See SD-7C118-01 for RT CADs (cabling diagrams).

   STOP. YOU HAVE COMPLETED THIS PROCEDURE.

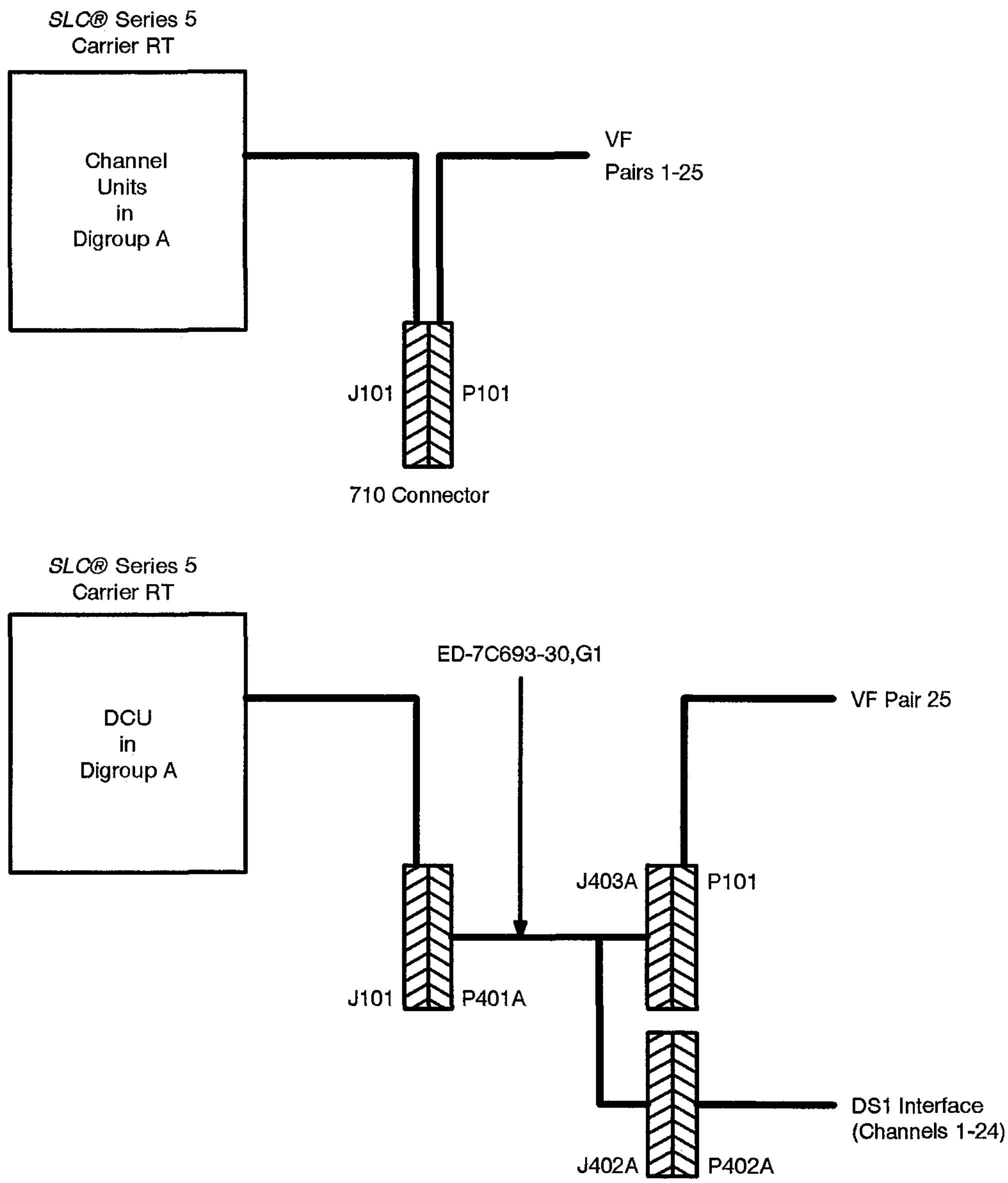


Figure 1—RT Cable Connections for Digroup A

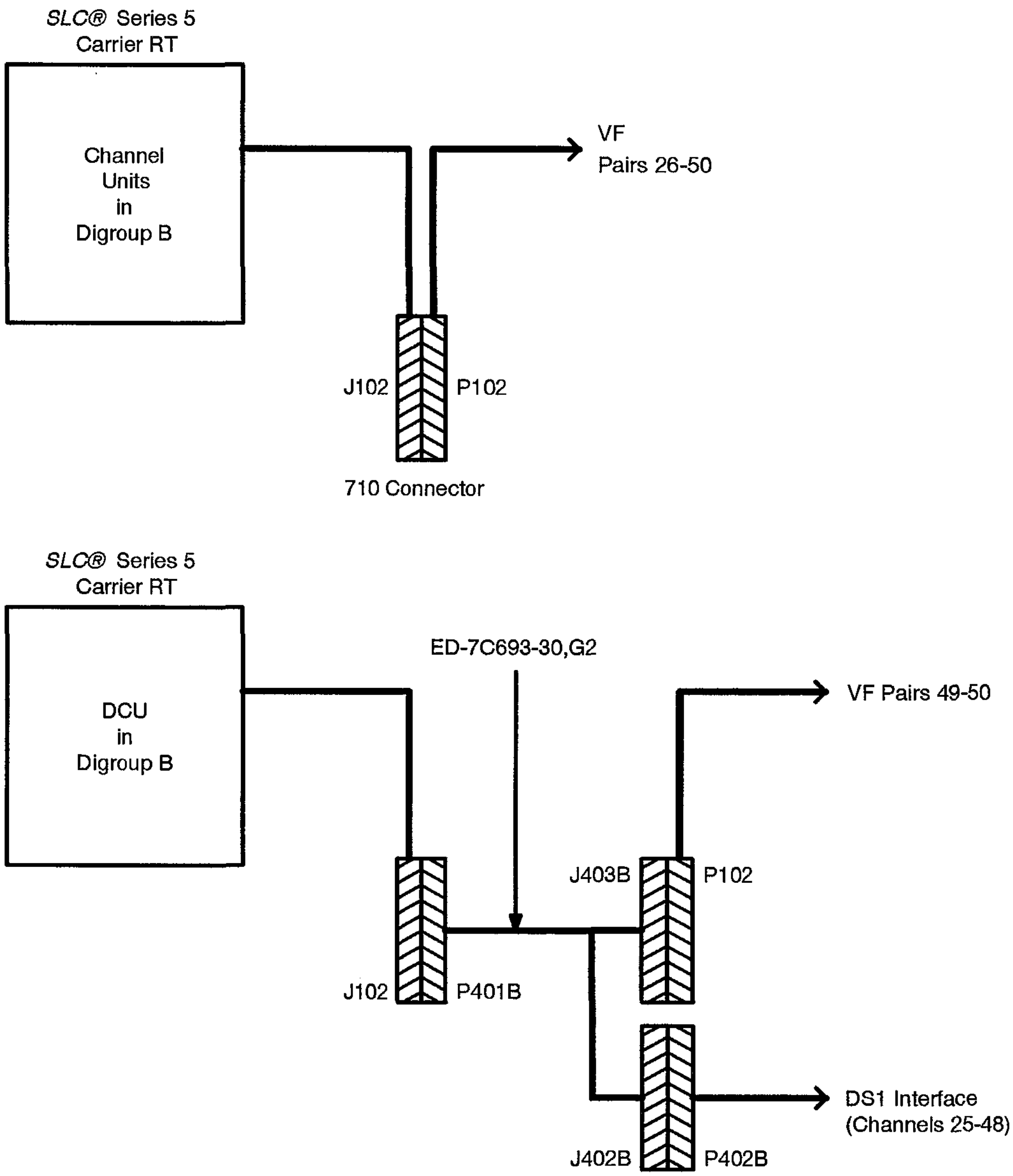


Figure 2—RT Cable Connections for Digroup B

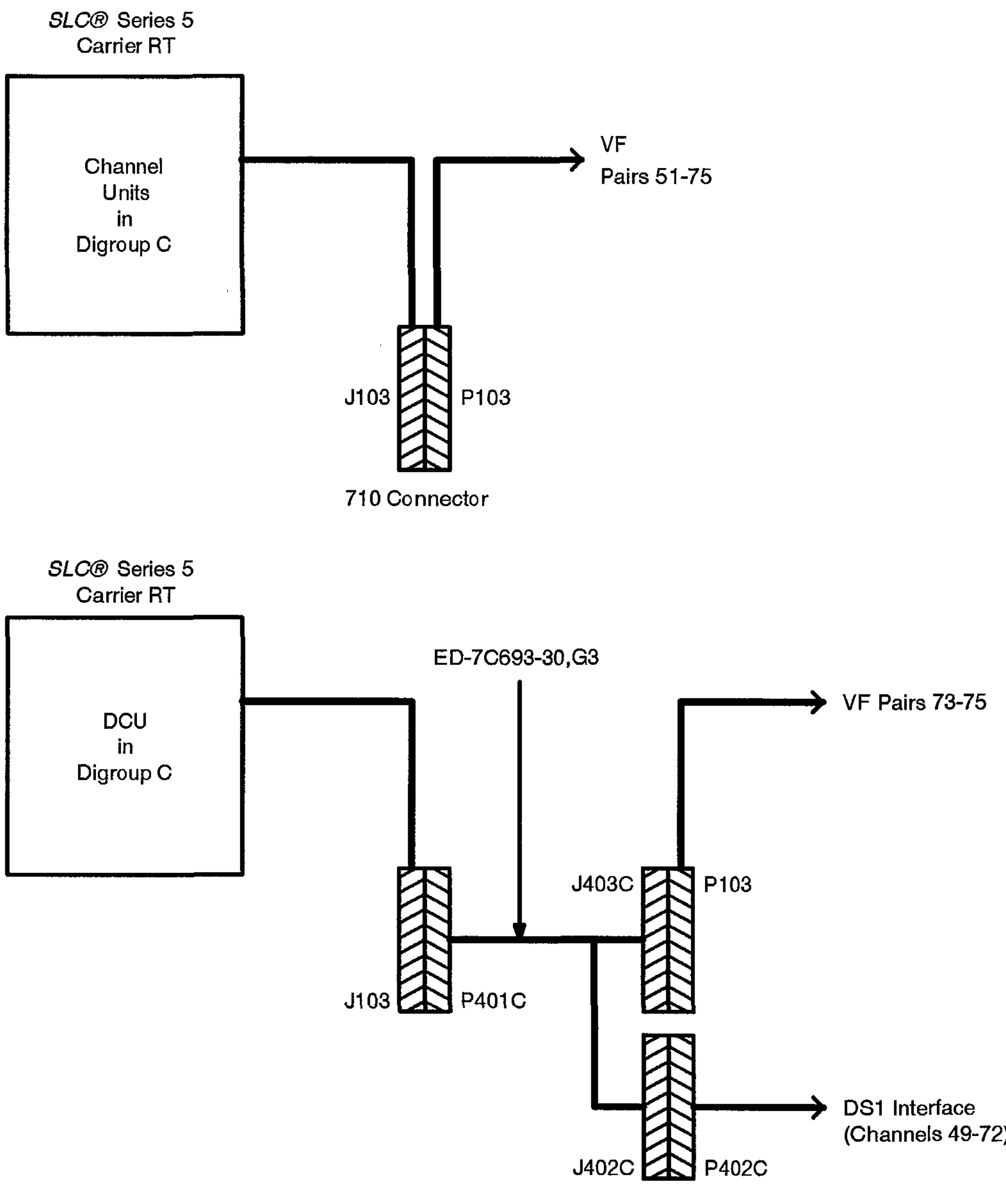


Figure 3 — RT Cable Connections for Digroup C

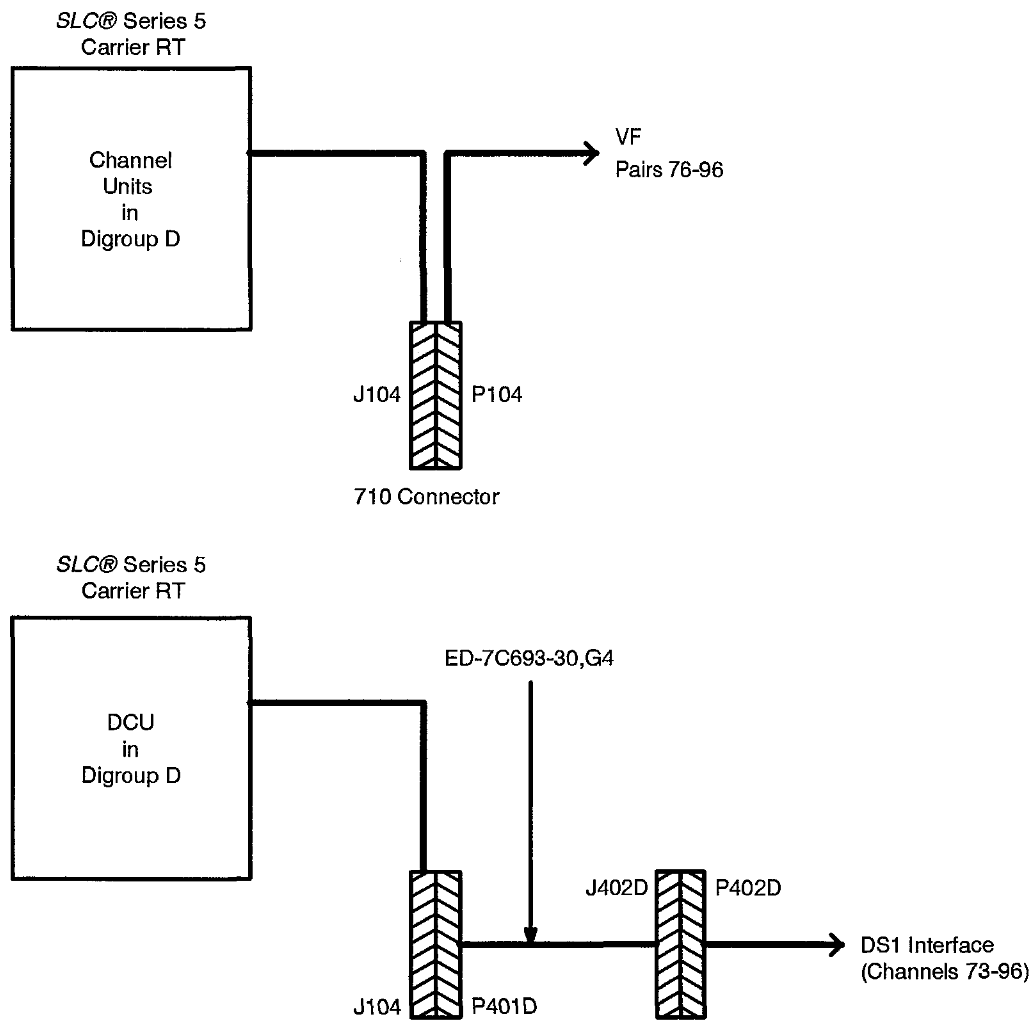


Figure 4 — RT Cable Connections for Digroup D

Test Multiparty (2-Party ANI) Channel on Integrated System (DCLU to Series 5 Mode 96 RT)

Summary: This procedure tests the multiparty automatic number identification (ANI) channels. At the central office, verify channel service and telephone number assignments for the channel being tested. Channels may be tested using a local test desk or the mechanized loop testing (MLT) system. Otherwise, at the remote terminal (RT) determine the corresponding channel. Connect the test telephone sets (tip party wired for ANI) to the channel being tested: ring party wired for negative ringing, tip party wired for negative ringing and tip party ground. Make talking, dialing, and ringing tests (tip party and ring party) on each multiparty channel. To test ANI: using recent change, set up a test line and turn on the call trace attribute (54. TRC). Call the test line from tip party and from ring party. Make sure the telephone number for each party appears in the call trace output. Select one channel and make reverting call tests.

1. ⇛ NOTE:
   In an integrated system, channels may be tested using a local test desk or the MLT system to initiate tests with *5ESS*® switch software. The *5ESS* switch software emulates the pair gain test controller (PGTC) test sequence and is connected to the DC test pair by means of the test bus control unit (TBCU).

   Is the TBCU available to use in testing channels?

   If **NO,** then proceed to Step **4.**
   If **YES,** then continue with Step **2.**

2. ⇛ NOTE:
   AT&T 662-505-507 provides procedures for using the TBCU to test channels. The TBCU can only verify operation to the RT channel unit. To verify operation to the cross-connect field, a test telephone must be used at each channel location on the cross-connect field.

Request repair service bureau or local test desk test channel. Did tests pass?

If **YES,** then proceed to Step **23.**
If **NO,** then continue with Step **3.**

3. The following items may be used to clear trouble. Repeat channel tests after each item until tests pass, then proceed to Step **23.**

   a. Check test connections and correct if needed.
   b. Replace the RT channel unit.
   c. Make sure the TBCU is working properly and that you are using the proper procedures.
   d. Use the office drawings to check wiring. Look for tip and ring reversal between the RT and cross-connect terminal. Verify central office channel and number assignments. Correct the problem until channel tests pass.

4. **CAUTION:**
   Channel must be out of service before testing; otherwise, service will be interrupted.

   At the central office, select the channel for testing and inform the RT of the channel selected.

5. **NOTE:**
   Assign the first call number for ring party ANI and the second call number for tip party ANI.

   Verify channel service and telephone number assignments for the channel being tested.

6. Establish communication between the central office and RT.

7. ⇒ NOTE 1:

One test telephone set must be wired for ring party; the other test telephone must be wired for tip party. The tip party set should be wired for ANI. Ringer connections for various types of ringers and service may be found in AT&T 500-114-100.

⇒ NOTE 2:

The 52A channel unit test extender may be used to access the channel unit tip and ring. However, to verify correct wiring from the RT to the cross-connect, the test telephone should be connected at the cross-connect field.

At the RT, temporarily connect both test telephone sets to the channel being tested.

8. At the RT, lift the handset of each test telephone (one at a time) and check for dial tone. Is dial tone present at each phone?

   If **YES,** then proceed to Step **10.**
   If **NO,** then continue with Step **9.**

9. The following items may be used to clear trouble. Check for dial tone after each item. When dial tone is present at each phone, continue with Step **10.**

   a. Check the test connections and correct if needed.
   b. Replace the RT channel unit.
   c. Use the office drawings to check wiring. Look for shorted or open pairs. Verify central office channel and number assignments.

10. At the RT, use the ring party test telephone to dial the local test desk or central office number and make normal talk tests.

11. Was the call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **13.**
    If **NO,** then continue with Step **12.**

12. The following items may be used to clear trouble. Repeat from Step **8** after each item until the call is completed normally, then continue with Step **13.**

    a. Replace the RT channel unit.
    b. Use the office drawings to check wiring. Look for shorted or open pairs. Verify central office channel and number assignments.

13. At the RT, request the test position to apply ringing to the ring party, then go on-hook.

14. Does the test telephone (ring party only) ring normally?

    If **YES,** then proceed to Step **16.**
    If **NO,** then continue with Step **15.**

15. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the test telephone (ring party only) rings normally, then continue with Step **16.**

    a. At the RT, check the test connections and ensure that the test telephones are wired correctly. One test telephone set must be wired for ring party; the other test telephone must be wired for tip party. The tip party set should be wired for ANI. Repeat from Step **13.**
    b. Replace the RT channel unit and repeat from Step **8.**
    c. Use the office drawings to check the wiring. Look for tip and ring reversal between the RT and the cross-connect terminal. Verify central office channel and number assignments.

16. Lift the handset during ringing. Does the ringing trip normally?

    If **YES,** then proceed to Step **18.**
    If **NO,** then continue with Step **17.**

17. Replace the RT channel unit and repeat from Step **8.**

18. At the RT, request the test position to apply ringing to the tip party, then go on-hook.

19. Does the test telephone (tip party only) ring normally?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **20.**

20. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the test telephone (tip party only) rings normally, then continue with Step **21.**

    a. At the RT, check the test connections and ensure that the test telephones are wired correctly. One test telephone set must be wired for ring party; the other test telephone must be wired for tip party. The tip party set should be wired for ANI. Repeat from Step **18.**
    b. Replace the RT channel unit and repeat from Step **8.**
    c. Use the office drawings to check the wiring. Look for tip and ring reversal between the RT and the cross-connect terminal. Verify central office channel and number assignments.

21. Lift the handset during ringing. Does the ringing trip normally?

    If **YES,** then proceed to Step **23.**
    If **NO,** then continue with Step **22.**

22. Replace the RT channel unit and repeat from Step **8.**

23. NOTE:
    In this procedure, a call trace on a test line is used to test the ANI function of the channel unit. If the office already has a test line assigned, use the recent change (RC) system (change mode) to turn on the call trace for the test line. If no test line is assigned, use RC (insert mode) to assign a temporary test line (with call trace turned on). A POTS (single party) line (View 1.1, Generic 5E4) may be used for the test line. The private branch exchange - direct inward dialing (PBX-DID) line (View 1.5, Generic 5E4), which has fewer attributes to assign, may also be used.

    At the central office, turn on the call trace for the test line. (Move the cursor to **54. TRC** attribute and enter "Y" for yes.) Stand by to monitor the call trace output.

24. NOTE:
    Step **7** gives the connections for the test phones at the RT for the ANI test.

    At the RT, use the tip party phone to call the test line number.

25. At the central office, does the tip party number appear in the call trace output?

    If **YES,** then proceed to Step **27.**
    If **NO,** then continue with Step **26.**

26. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the tip party number appears in the output at the central office, then continue with Step **27.**

a. At the RT, check the test connections and ensure that test telephones are wired correctly. One test telephone set must be wired for ring party; the other test telephone must be wired for tip party. The tip party set should be wired for ANI. Repeat from Step **24.**
b. Replace the RT channel unit and repeat from Step **1.**
c. Use the office drawings to check the wiring. Look for the tip and ring reversal between the RT and cross-connect terminal. Verify the central office channel and number assignments.

27. At the RT, use the ring party phone to call the test line number.

28. At the central office, does the ring party number appear in the call trace output?

    If **YES,** then proceed to Step **30.**
    If **NO,** then continue with Step **29.**

29. The following items may be used to clear the trouble. If the first item does not clear the trouble, try the remaining items in sequence until the ring party number appears in the output at the central office, then continue with Step **30.**

    a. At the RT, check the test connections and ensure that the test telephones are wired correctly. One test telephone set must be wired for ring party; the other test telephone must be wired for tip party. The tip party set should be wired for ANI. Repeat from Step **27.**
    b. Replace the RT channel unit and repeat from Step **1.**
    c. Use the office drawings to check the wiring. Look for tip and ring reversal between the RT and cross-connect terminal. Verify central office channel and number assignments.

30. Is this the last multiparty (ANI) channel to be tested on this system?

    If **YES,** then continue with Step **31.**
    If **NO,** then proceed to Step **1.**

31. At the central office, use local procedures for your type of office and make reverting call tests on any one channel to one of the test telephones at the RT.

32. At the RT, does the test telephone ring normally and ringing trip when the handset is lifted off hook?

    If **YES,** then proceed to Step **33.**
    If **NO,** then there is trouble in the central office reverting call circuits. Have the central office personnel locate and repair the trouble.

33. At the RT, remove the test telephones. At the central office, remove the call trace. If the test line assignment was temporary, delete the assignment in the RC.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Test Multiparty (2-Party ANI) Channel COT-to-RT on Universal *SLC*® Carrier System

Summary: This procedure tests the multiparty automatic number identification (ANI) channels. At the central office terminal (COT), connect the test line to the unassigned subscriber line and call numbers to the channel being tested. The pair gain test controller (PGTC) or extended test controller (XTC) may be used to test the channels. Otherwise, at the remote terminal (RT) determine the corresponding channel. Connect the test telephone sets (tip party wired for ANI) to the channel being tested: one telephone wired for ring party (negative ringing) and one telephone wired for tip party (negative ringing and tip party ground). Make talking, dialing, and ringing tests (tip party and ring party) on each multiparty channel. Ring party: off-hook resistance to ground (tip side) = less than 3 V DC (100 V or 120 V scale) at the local test desk (LTD) [or greater than 10K ohms on the volt-ohm-milliammeter (VOM)]. Tip party: off-hook resistance to ground (tip side) = at least 95 V DC at the LTD (or less than 3K ohms on the VOM). (If using a VOM to verify ANI: with both phones on-hook at the RT, tip-to-ground resistance should be greater than 10K ohms.) Select one channel and make reverting call tests.

1. Is the PGTC or XTC available to test the channels?

   If **NO,** then proceed to Step **4.**
   If **YES,** then continue with Step **2.**

2. **NOTE:**
   AT&T 662-505-507 provides procedures for using the PGTC to test the channels. The XTC procedures are given in AT&T 363-205-300. The PGTC or XTC can only verify operation to the RT channel unit. To verify operation to the cross-connect field, a test telephone must be used at each channel location on the cross-connect field.

Request the repair service bureau or local test desk personnel to perform PGTC or XTC channel tests. Did tests pass?

If **YES,** then proceed to Step **27.**
If **NO,** then continue with Step **3.**

3. The following items may be used to clear the trouble. Repeat the channel tests after each item until the tests pass, then proceed to Step **27.**

   a. Check the test connections and correct if needed.
   b. Replace the RT channel unit.
   c. Replace the COT channel unit.
   d. Make sure the PGTC or XTC is working properly and that you are using the proper procedures. If the XTC is optioned to test 4-party lines, the RTs with 2-party lines and no **AUG1** positive ringing unit (PRU) will test "bad". In order for 2-party lines to test "good", an AUG1 PRU must be installed in those RTs.
   e. Use the office drawings and schematic drawings for the Series 5 COT or *SLC* 96 Carrier System COT to check the wiring. Look for tip and ring reversal between the COT channel appearance and office equipment; also between the RT and cross-connect terminal. Correct wiring problem.

4. Establish communication between the central office and the RT.

5. **CAUTION:**
   The channel must be out of service before testing; otherwise, service will be interrupted.

   At the COT, select the channel for testing and inform the RT of the channel selected.

6. **NOTE:**
   Connect the first call number for the ring party and the second call number for the tip party.

At the selected channel appearance on the main distributing frame (MDF), connect the temporary call numbers and the subscriber line circuit test lines.

7.

NOTE 1:
One test telephone set must be wired for ring party; the other test telephone must be wired for tip party with ANI. Ringer connections for various types of ringers and service may be found in AT&T 500-114-100.

NOTE 2:
The 52A channel unit test extender may be used to access the channel unit tip and ring. However, to verify correct wiring from the RT to the cross-connect, test telephone must be connected at the cross-connect field.

NOTE 3:
If the test desk is not available, ANI can be verified with a VOM at the COT. Use the 52A test extender with the COT channel unit. Measure the resistance from the COT channel unit input — tip lead (CU I/O jack) to ground with the VOM. With both telephones on-hook, the resistance should be greater than 10K ohms.

At the RT, temporarily connect both test telephone sets to the channel being tested.

8. At the RT, lift the handset of each test telephone (one at a time) and check for dial tone. Is dial tone present at each phone?

If **YES,** then proceed to Step **10.**
If **NO,** then continue with Step **9.**

9. The following items may be used to clear trouble. Check for dial tone after each item. When dial tone is present at each phone, continue with Step **10.**

   a. Check the test connections and correct if needed.
   b. Replace the RT channel unit.
   c. Replace the COT channel unit.
   d. Use the office drawings and schematic drawings for the Series 5 COT or *SLC* 96 Carrier System COT to check wiring. Look for a short circuit between pairs or tip-ground/ring-ground. Correct wiring problem.

10. At the RT, use the ring party test telephone to dial the local test desk or the central office number and make normal talk tests.

11. Was the call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **13.**
    If **NO,** then continue with Step **12.**

12. The following items may be used to clear trouble. Repeat from Step **8** after each item until the call is completed normally, then continue with Step **13.**

    a. Replace the RT channel unit.
    b. Replace the COT channel unit.
    c. Use the COT and RT schematic drawings to check the channel bank wiring. Look for wiring trouble between the COT channel appearance and office equipment, also between the RT and cross-connect terminal. Correct wiring problem.

13. At the RT, request the test position to apply ringing to the ring party, then go on-hook.

14. Does the test telephone (ring party only) ring normally?

    If **YES,** then proceed to Step **16.**
    If **NO,** then continue with Step **15.**

15. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the test telephone (ring party only) rings normally, then continue with Step **16.**

    a. At the RT, check the test connections and ensure that the test telephones are wired correctly. One test telephone set must be wired for ring party; the other test telephone must be wired for tip party with ANI. Repeat from Step **13.**
    b. Replace the RT channel unit and repeat from Step **8.**
    c. Replace the COT channel unit and repeat from Step **8.**
    d. Use the office drawings and schematic drawings for the Series 5 COT or *SLC* 96 Carrier System COT to check wiring. Look for tip and ring reversal between the COT channel appearance and office equipment; also between the RT and cross-connect terminal. Correct wiring problem.

16. Lift the handset during ringing. Does ringing trip normally?

    If **YES,** then proceed to Step **18.**
    If **NO,** then continue with Step **17.**

17. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining item until ringing trips normally, then continue with Step **18.**

    a. Replace the RT channel unit and repeat from Step **8.**
    b. Replace the COT channel unit and repeat from Step **8.**

18. Request the test position to measure the resistance to ground on the tip side of the line (with the ring party off-hook at the RT). (Or, at the 52A CU I/O jack, measure the resistance from the COT channel unit input — tip

lead to ground with a VOM.) At the central office, does the meter indicate less than 3 V on the 100 V or 120 V scale (or resistance greater than 10K ohms on the VOM)?

If **YES,** then proceed to Step **20.**
If **NO,** then continue with Step **19.**

19. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the meter indicates less than 3 V at the central office (or greater than 10K ohms on the VOM), then continue with Step **20.**

    a. At the RT, check the test connections and ensure that test telephones are wired correctly. One test telephone set must be wired for ring party; the other test telephone must be wired for tip party with ANI. Repeat from Step **18.**
    b. Replace the RT channel unit and repeat from Step **8.**
    c. Replace the COT channel unit and repeat from Step **8.**
    d. Use the office drawings and schematic drawings for the Series 5 COT or *SLC* 96 Carrier System COT to check the wiring. Look for tip and ring reversal between the COT channel appearance and office equipment; also between the RT and cross-connect terminal. Correct wiring problem.

20. At the RT, request the test position to apply ringing to tip party, then go on-hook.

21. Does the test telephone (tip party only) ring normally?

If **YES,** then proceed to Step **23.**
If **NO,** then continue with Step **22.**

22. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the test telephone (tip party only) rings normally, then continue with Step **23.**

    a. At the RT, check the test connections and ensure that the test telephones are wired correctly. One test telephone set must be wired for ring party; the other test telephone must be wired for tip party with ANI. Repeat from Step **20.**

b. Replace the RT channel unit and repeat from Step **8.**
c. Replace the COT channel unit and repeat from Step **8.**
d. Use the office drawings and schematic drawings for the Series 5 COT or *SLC* 96 Carrier System COT to check wiring. Look for tip and ring reversal between the COT channel appearance and office equipment; also between the RT and cross-connect terminal. Correct wiring problem.

23. Lift the handset during ringing. Does ringing trip normally?

    If **YES,** then proceed to Step **25.**
    If **NO,** then continue with Step **24.**

24. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining item until ringing trips normally, then continue with Step **25.**

    a. Replace the RT channel unit and repeat from Step **8.**
    b. Replace the COT channel unit and repeat from Step **8.**

25. Request the test position to measure the resistance to ground on tip side of the line (with tip party off-hook at the RT). (Or, at the 52A CU I/O jack, measure the resistance from the COT channel unit input — tip lead to ground with the VOM.) At the central office, does the meter indicate at least 95 V (or resistance less than 3K ohms on the VOM)?

    If **YES,** then proceed to Step **27.**
    If **NO,** then continue with Step **26.**

26. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the meter indicates at least 95 V at the central office (or less than 3K ohms on the VOM), then continue with Step **27.**

    a. At the RT, check the test connections and ensure that the test telephones are wired correctly. One test telephone set must be wired for ring party; the other test telephone must be wired for tip party with ANI. Repeat from Step **25.**

b. Replace the RT channel unit and repeat from Step **8.**
c. Replace the COT channel unit and repeat from Step **8.**
d. Use the office drawings and schematic drawings for the Series 5 COT or *SLC* 96 Carrier System COT to check wiring. Look for tip and ring reversal between the COT channel appearance and office equipment; also between the RT and cross-connect terminal. Correct wiring problem.

27. Is this the last multiparty (ANI) channel to be tested on this system?

    If **YES,** then continue with Step **28.**
    If **NO,** then proceed to Step **1.**

28. NOTE:
    In step-by-step offices, the revertive call selectors (such as SD-31762-01 and SD-31831-01) may have to be modified to prevent simultaneous ringing on both tip and ring conductors. In step-by-step offices with SD-31831-01 revertive call selectors, option Q is recommended instead of option N to prevent false tripping. Reverting call trunk circuits SD-26068-01 in No. 5 crossbar offices and SD-26068-05 in No. 5A crossbar offices require option S to ground the called party side of the line while the calling party is being rung. Revertive call trunk circuit SD-25703 in No. 5 crossbar offices must be wired with both the T and S options.

    At the central office, use the local procedures for your type of office and make reverting call tests on any one channel to one of the test telephones at the RT.

29. At the RT, does the test telephone ring normally and ringing trip when the handset is lifted off hook?

    If **YES,** then proceed to Step **30.**
    If **NO,** then there is trouble in the central office reverting call circuits. Have the central office personnel locate and repair the trouble.

30. At the RT, remove the test telephones. At the COT, remove the test line connections. (If the 52A test extender was used at the COT, remove it and reinstall the channel unit.)

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Test FSR Channel COT-to-RT on Universal *SLC*® Carrier System

Summary: This procedure tests the frequency selective ringing (FSR) channels for transmission quality and proper ringing. The highest frequency of FSR ringing and the automatic number identification (ANI) function are available only with the AUA37 channel unit [Series 5 central office terminal (COT)]; they are not available with the WP11 channel unit (*SLC* 96 Carrier System COT). At the central office, connect the test line to an unassigned 5-party [4-party with Series 5 Mode 96 remote terminal (RT)] FSR subscriber line and call the numbers to the channel being tested. The pair gain test controller (PGTC) or extended test controller (XTC) may be used to test the channels. Otherwise, at the RT determine the corresponding channel. Connect the test telephone sets for bridged ringing with the ringers tuned to the proper ringing frequencies. Make talking, dialing, ringing, and ring trip tests at each central office frequency on each FSR channel. If the COT FSR channel unit is an AUA37, test 2-party ANI on each FSR channel. The XTC equipped with an MC97761A1 XTC control unit (XCU) will test the 2-party ANI function. Otherwise, use an ANI marker on one test phone at the RT. Measure the tip-to-ground resistance at the COT channel unit input: with both phones on-hook, resistance = greater than 10K ohms; with unmarked (no ANI marker) phone off-hook, resistance = greater than 10K ohms; with ANI marker phone off-hook, resistance = less than 3K ohms.

1. Verify that the RT FSR channel unit switch options are set to ringing scheme used by the serving central office (Table A).

   Reference: DLP-540

2. Is the PGTC or XTC available to test the channels?

   If **YES,** then continue with Step **3.**
   If **NO,** then proceed to Step **5.**

3. ⇒ **NOTE 1:**
   AT&T 662-505-507 provides the procedures for using the PGTC to test channels. The XTC procedures are given in AT&T 363-205-300. The PGTC or XTC can only verify operation to the RT channel unit. To verify operation to the cross-connect field, a test telephone must be used at each channel location on the cross-connect field.

Table A. Ringing Options

Decimonic Option D	Harmonic Option H	Synchromonic Option S
20 Hz	16.6 Hz	20 Hz
30 Hz	25 Hz	30 Hz
40 Hz	33.3 Hz	42 Hz
50 Hz	50 Hz	54 Hz
60 Hz*	66.6 Hz*	66 Hz*

* Only with AUA37 channel unit (in Series 5 COT).

NOTE 2:
The PGTC or XTC (with MC97734A1 XCU) tests only one ringing frequency of the FSR channel unit (the one used for single party lines). The XTC equipped with the MC97761A1 XCU will test some of the other ringing frequencies and the 2-party ANI function (Series 5 system only).

Request the repair service bureau or local test desk personnel to perform PGTC or XTC channel tests. Did tests pass?

If **YES,** then proceed to Step **21.**
If **NO,** then continue with Step **4.**

4. The following items may be used to clear trouble. Repeat the channel tests after each item until the tests pass, then proceed to Step **21.**

   a. Check the test connections and correct if needed. Verify that the RT FSR channel unit switch options are set to the ringing scheme used by the serving central office (Table A).
   b. Replace the RT channel unit and repeat from Step **1.**
   c. Replace the COT channel unit and repeat from Step **2.**
   d. Make sure the PGTC or XTC is working properly and that you are using the proper procedures.

e. Use the office drawings and schematic drawings for the Series 5 COT or *SLC* 96 Carrier System COT to check the wiring. Look for a tip and ring reversal between the COT channel appearance and office equipment; also between the RT and cross-connect terminal. Correct wiring problem.

5. Establish communication between the central office and RT.

6.

CAUTION:
The channel must be out of service before testing; otherwise, service will be interrupted.

At the COT, select the channel for testing and inform the RT of the channel selected.

7. At the selected channel appearance on the main distributing frame (MDF), connect the temporary call numbers and 5-party FSR subscriber line circuit test line (4-party line for Series 5 Mode 96 RT).

8.

NOTE 1:
Test telephone sets should be connected for bridged ringing with ringers tuned to the proper ringing frequency (Table A). If a ringer box is available with the ringers tuned to each frequency of the FSR channel unit, one telephone may be used to check supervision and transmission and the ringer box used to check each ringing frequency.

NOTE 2:
The 52A channel unit test extender may be used to access channel unit tip and ring. However, to verify correct wiring from the RT to the cross-connect, the test telephone should be connected at the cross-connect field.

At the RT, temporarily connect the test telephone sets to the channel being tested.

9. At the RT, lift the handset and check for dial tone. Is dial tone present?

   If **YES,** then proceed to Step **11.**
   If **NO,** then continue with Step **10.**

10. The following items may be used to clear trouble. Check for dial tone after each item. When dial tone is present at each phone, continue with Step **11.**

    a. Check the test connections and correct if needed.
    b. Replace the RT channel unit and repeat from Step **9.**
    c. Replace the COT channel unit and repeat from Step **9.**
    d. Use the office drawings and schematic drawings for the Series 5 COT or *SLC* 96 Carrier System COT to check the wiring. Correct wiring problem.

11. At the RT, dial the local test desk or central office number and make normal talk tests.

12. Was the call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **14.**
    If **NO,** then continue with Step **13.**

13. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the call is completed normally, then continue with Step **14.**

    a. Replace the RT channel unit.
    b. Replace the COT channel unit.
    c. Use the COT and RT schematic drawings to check the channel bank wiring. Correct wiring problem.

14. NOTE:
The central office rings only the frequencies shown in **one** of the groups (decimonic, harmonic, or synchromonic) in Table A.

At the central office, dial the test line number to ring the RT test telephone at the first frequency of group.

15. Does the test telephone ring normally?

    If **YES,** then proceed to Step **17.**
    If **NO,** then continue with Step **16.**

16. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the test telephone rings normally, then continue with Step **17.**

    a. At the RT, check the test connections and ensure that the test telephone ringers are tuned to the proper ringing frequency (Table A). Verify that the RT FSR channel unit switch options are set properly.
    b. Use the office drawings and schematic drawings for the Series 5 COT or *SLC* 96 Carrier System COT to check the wiring. Correct wiring problem and repeat from Step **14.**
    c. Replace the RT channel unit and repeat from Step **9.**
    d. Replace the COT channel unit and repeat from Step **9.**

17. Lift the handset during ringing. Does ringing trip normally?

    If **YES,** then proceed to Step **19.**
    If **NO,** then continue with Step **18.**

18. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining item until ringing trips normally, then continue with Step **19.**

a. Replace the RT channel unit and repeat from Step **9.**
b. Replace the COT channel unit and repeat from Step **9.**

19. Have all the frequencies in the group been checked?

    If **YES,** then proceed to Step **21.**
    If **NO,** then continue with Step **20.**

20. **NOTE:**
    The central office rings only the frequencies shown in **one** of the groups (decimonic, harmonic, or synchromonic) in Table A.

    At the central office, dial the test line number to ring the RT test telephone at the next frequency of group and proceed to Step **15.**

21. **NOTE:**
    If ANI has been tested automatically by means of the XTC equipped with MC97761A1 XCU, proceed to Step **34.**

    Is an AUA37 (Series 5) FSR channel unit installed in the COT?

    If **YES,** then continue with Step **22.**
    If **NO,** then proceed to Step **34.**

22. At the central office, insert the 52A test extender into the channel slot and insert the COT channel unit into the extender.

23. At the RT, connect the two test telephones to the RT channel unit: one with an ANI marker (the other without). Both phones should be on-hook.

24. At the central office, condition the volt-ohm-milliammeter (VOM) to measure resistance.

25. Measure the resistance from the tip lead at the COT channel unit input with the test line disconnected (CU I/O jack) to ground. Does the meter indicate greater than 10K ohms (no tip party ground)?

    If **YES,** then proceed to Step **27.**
    If **NO,** then continue with Step **26.**

26. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the meter indicates greater than 10K ohms, then continue with Step **27.**

    a. Check the test connections and correct if needed.
    b. Replace the RT channel unit and repeat from Step **1.**
    c. Replace the COT channel unit and repeat from Step **2.**
    d. Use the office drawings and schematic drawings for the Series 5 COT to check the wiring. Look for tip and ring reversal between the COT channel appearance and office equipment; also between the RT and cross-connect terminal. Correct wiring problem.

27. At the RT on the phone without ANI marker, lift the handset off-hook.

28. Measure the resistance from the tip lead at the COT channel unit input with the test line disconnected (CU I/O jack) to ground. Does the meter indicate greater than 10K ohms (no tip party ground)?

    If **YES,** then proceed to Step **30.**
    If **NO,** then continue with Step **29.**

29. The following items may be used to clear the trouble. If the first item does not clear the trouble, try the remaining items in sequence until the meter indicates greater than 10K ohms, then continue with Step **30.**

    a. Check the test connections and correct if needed.
    b. Replace the RT channel unit and repeat from Step **1.**
    c. Replace the COT channel unit and repeat from Step **2.**
    d. Use the office drawings and schematic drawings for the Series 5 COT to check the wiring. Look for tip and ring reversal between the COT channel appearance and office equipment; also between the RT and cross-connect terminal. Correct wiring problem.

30. At the RT, replace the handset on-hook. On the phone with ANI marker, lift the handset off-hook.

31. Measure the resistance from the tip lead at the COT channel unit input with the test line disconnected (CU I/O jack) to ground. Does the meter indicate less than 3K ohms (tip party ground)?

    If **YES,** then proceed to Step **33.**
    If **NO,** then continue with Step **32.**

32. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the meter indicates less than 3K ohms, then continue with Step **33.**

    a. Check the test connections and correct if needed.
    b. Replace the RT channel unit and repeat from Step **1.**
    c. Replace the COT channel unit and repeat from Step **2.**
    d. Use the office drawings and schematic drawings for the Series 5 COT to check the wiring. Look for tip and ring reversal between the COT channel appearance and office equipment; also between the RT and cross-connect terminal. Correct wiring problem.

33. At the COT, remove the 52A test extender and reinstall the channel unit. On the RT FSR channel unit, verify option switch settings or reset option switch to proper setting.

34. Is this the last FSR channel to be tested?

    If **YES,** then continue with Step **35.**
    If **NO,** then proceed to Step **1.**

35. At the central office, use local procedures for your type of office and make reverting call tests on any one channel between the test phones at the RT.

36. At the RT, does the test telephone ring normally and ringing trip when the handset is lifted off hook?

    If **YES,** then continue with Step **37.**
    If **NO,** then there is trouble in the central office reverting call circuits. Have the central office personnel locate and repair trouble.

37. At the RT, remove the test telephones. At the COT, remove the test line connection.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Test FSR Channel on Integrated System (DCLU to Series 5 Mode 96 RT)

Summary: This procedure tests the frequency selective ringing (FSR) channels for transmission quality and proper ringing. At the central office, verify the channel service and telephone number assignments for the channel being tested. Channels may be tested using a local test desk or the mechanized loop testing (MLT) system. Otherwise, at the remote terminal (RT) connect test telephone sets for bridged ringing with the ringers tuned to the proper ringing frequencies. Make talking, dialing, ringing, and ring trip tests at each central office frequency on each FSR channel.

1. Verify that the RT FSR channel unit switch options are set to the ringing scheme used by the serving central office (Table A).

   Reference: DLP-540

Table A. Ringing Options

Decimonic Option D	Harmonic Option H	Synchromonic Option S
20 Hz	16.6 Hz	20 Hz
30 Hz	25 Hz	30 Hz
40 Hz	33.3 Hz	42 Hz
50 Hz	50 Hz	54 Hz

2. NOTE:
   In an integrated system, channels may be tested using a local test desk or the mechanized loop testing (MLT) system to initiate tests with the *5ESS*® switch software. The *5ESS* switch software emulates the pair gain test controller (PGTC) test sequence and is connected to the DC test pair by means of the test bus control unit (TBCU).

Is the TBCU available to use in testing the channels?

If **NO,** then proceed to Step **5.**
If **YES,** then continue with Step **3.**

3.

NOTE 1:
AT&T 662-505-507 provides procedures for using the TBCU to test the channels. The TBCU can only verify operation to the RT channel unit. To verify operation to the cross-connect field, a test telephone must be used at each channel location on the cross-connect field.

NOTE 2:
The local test desk tests only one ringing frequency of the FSR channel unit (the one used for single-party lines.)

Request the repair service bureau or the local test desk to test the channel. Did the tests pass?

If **YES,** then proceed to Step **19.**
If **NO,** then continue with Step **4.**

4. The following items may be used to clear trouble. Repeat the channel tests after each item until the tests pass, then proceed to Step **19.**

   a. Check the test connections and correct if needed. Verify that the RT FSR channel unit switch options are set to the ringing scheme used by the central office (Table A).
   b. Replace the RT channel unit.
   c. Make sure the TBCU is working properly and that you are using the proper procedures.
   d. Use the office drawings to check wiring. Verify the central office channel and number assignments. Correct the problem until the channel tests pass.

5.

CAUTION:
The channel must be out of service before testing; otherwise, service will be interrupted.

At the central office, select the channel for testing and inform the RT of the channel selected.

6. Make sure the channel unit and telephone numbers have been assigned to the channel being tested.

7.

NOTE 1:
Test telephone sets should be connected for bridged ringing with the ringers tuned to the proper ringing frequency (Table A). If a ringer box is available with the ringers tuned to each frequency of the FSR channel unit, one telephone may be used to check supervision and transmission and the ringer box used to check each ringing frequency.

NOTE 2:
The 52A channel unit test extender may be used to access the channel unit tip and ring. However, to verify correct wiring from the RT to the cross-connect, the test telephone should be connected at the cross-connect field.

At the RT, temporarily connect the test telephone sets to the channel being tested.

8. At the RT, lift the handset and check for dial tone. Is dial tone present?

   If **YES,** then proceed to Step **10.**
   If **NO,** then continue with Step **9.**

9. The following items may be used to clear trouble. Check for dial tone after each item. When dial tone is present at each phone, continue with Step **10.**

   a. At RT, check test connections and correct if needed.
   b. Replace the RT channel unit.
   c. At the central office, make sure channel assignments are correct.
   d. At the central office, use the office drawings to check wiring. Correct wiring problem.

10. At the RT, dial local test desk or central office number and make normal talk tests.

11. Was call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **13.**
    If **NO,** then continue with Step **12.**

12. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining item until the call is completed normally, then continue with Step **13.**

    a. Replace the RT channel unit and repeat from Step **8.**
    b. Use the RT schematic drawings to check the channel bank wiring and wiring between the RT and the cross-connect terminal. Correct wiring problem.

13. NOTE:
    The central office rings only the frequencies shown in **one** of the groups (decimonic, harmonic, or synchromonic) in Table A.

At the central office, dial the test line number to ring the RT test telephone at the first frequency of group.

14. Does the test telephone ring normally?

    If **YES,** then proceed to Step **16.**
    If **NO,** then continue with Step **15.**

15. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the test telephone rings normally, then continue with Step **16.**

    a. At the RT, check the test connections and ensure that the test telephone ringers are tuned to the proper ringing frequency (Table A). Verify that the RT FSR channel unit switch options are set properly.
    b. Verify that the RT FSR channel unit switch options are set to the ringing scheme used by the central office.
    c. At the central office, use the office drawings to check the wiring. Use the RT schematic drawings to check the channel bank wiring and wiring between the RT and the cross-connect terminal. Correct the wiring problem and repeat from Step **13.**
    d. Replace the RT channel unit and repeat from Step **8.**

16. Lift the handset during ringing. Does ringing trip normally?

    If **YES,** then continue with Step **17.**
    If **NO,** then replace the RT channel unit and repeat from Step **8.**

17. Have all frequencies in the group been checked?

    If **YES,** then proceed to Step **19.**
    If **NO,** then continue with Step **18.**

18. ⇛ NOTE:
    The central office rings only the frequencies shown in **one** of the groups (decimonic, harmonic, or synchromonic) in Table A.

At the central office, dial the test line number to ring the RT test telephone at the next frequency of group and proceed to Step **14.**

19. Is this the last FSR channel to be tested?

    If **YES,** then continue with Step **20.**
    If **NO,** then proceed to Step **1.**

20. At the central office, use the local procedures for your type of office and make reverting call tests on any one channel between the test phones at the RT.

21. At the RT, does the test telephone ring normally and ringing trip when the handset is lifted off hook?

    If **YES,** then continue with Step **22.**
    If **NO,** then there is trouble in the central office reverting call circuits. Have the central office personnel locate and repair trouble.

22. At the RT, remove the test telephones. On the RT FSR channel unit, verify option switch settings or reset the option switch to the proper setting. At the central office, remove the test line connection.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Set Option Switches on RT Frequency Selective Ringing (FSR) Channel Unit

1. Get one FSR channel unit (**AUA57**) and inspect for possible damage.

2. ⚠ CAUTION:
   If the RT FSR options are set for an invalid selection (for example, more than one frequency group switch set to **ON**), the **BUSY** ***light on the faceplate will flash when the FSR channel unit is installed.***

   On the FSR frequency group switch (Figure 1), set *only one* option switch **D**, **H**, or **S** to the **ON** position according to the ringing scheme used at the central office. [Refer to the work order record detail (WORD) document or facility record.] The other two switches must be set to off (depressed away from **ON**).

3. Install the FSR channel unit.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

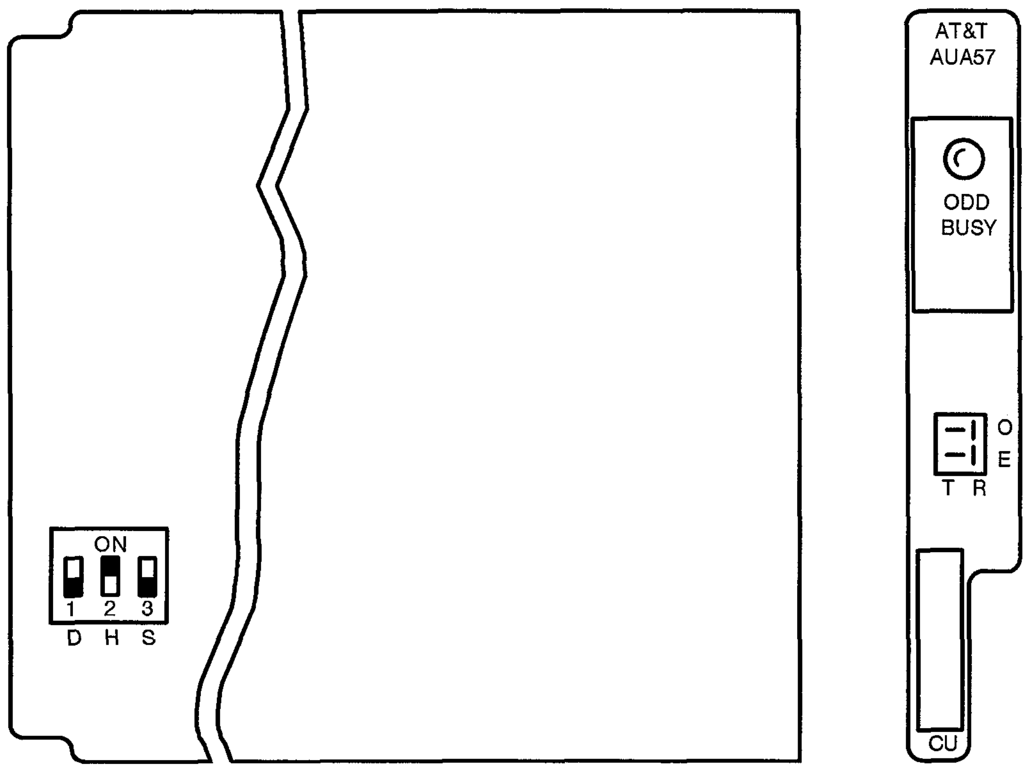


Figure 1 — AUA57 RT FSR Channel Unit Option Switches

Set Option Switches on Dual Ringing Repeater Channel Unit

1. Get one dual ringing repeater channel unit [**AUA45(B)**] and inspect for possible damage.

2. On the dual ringing repeater channel unit at the central office terminal (COT), set option switch **COT/RT** (Figure 1) to the **COT** position.

3. On the dual ringing repeater channel unit at the remote terminal (RT), set option switch **COT/RT** (Figure 1) to the **RT** position.

4. NOTE:
   If only one of the channels on the AUA45 is being placed in service, the loss switches for the unterminated channel on both the COT and RT units must be set to the −3 dB position (that is, 6 dB end-to-end loss). This will prevent the unterminated channel from singing.

   On the dual ringing repeater channel unit, set option switch **ODD** (Figure 1) to **0DB** or −**3DB** to agree with the work order record detail (WORD) document or facility record for the odd channel. Set option switch **EVEN** (Figure 1) to **0DB** or −**3DB** to agree with the WORD document or facility record for the even channel.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

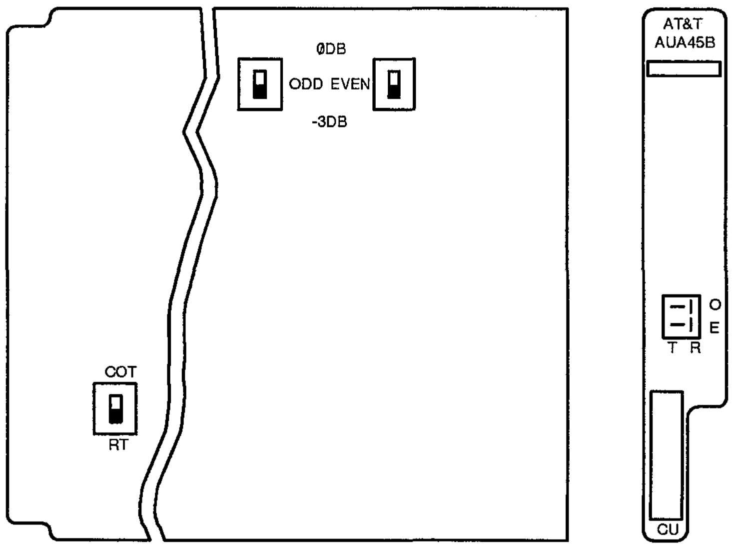


Figure 1 — AUA45 Dual Ringing Repeater Channel Unit Option Switches

Set Option Switches on DCU (Digital Connectivity Unit)

1. Get one digital connectivity unit - left [**DCU-L** (**AUA16**)] and inspect for possible damage.

2. On **DCU-L** option switch **S100** (Figure 1), set option switch **D/F** to the **D** position and option switch **B/Z** to the **Z** position.

3. On **DCU-L** option switch **S400** (Figure 1), set switches **0**, **1**, and **2** to agree with facility record or WORD (work order record detail) document.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

EQUALIZER SETTING			DISTANCE TO DSX-1
2	1	0	(FEET)
OFF	OFF	ON	0 TO 132
OFF	ON	OFF	133 TO 265
OFF	ON	ON	266 TO 398
ON	OFF	OFF	399 TO 532
ON	OFF	ON	533 TO 655

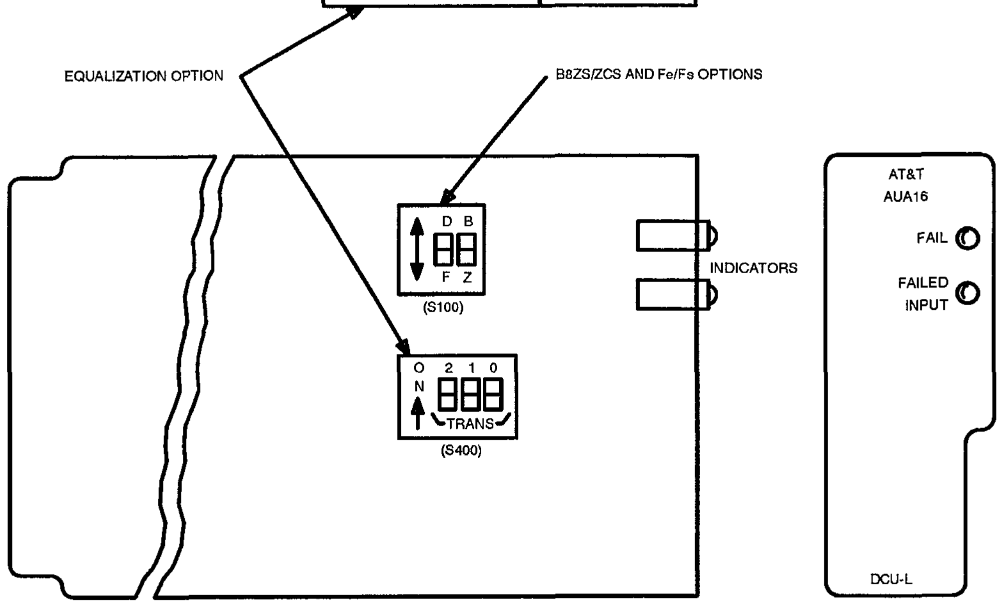


Figure 1 — AUA16 DCU-L Option Switches

Test Using 52A Channel Unit Test Extender

Summary: The 52A test extender is used in testing channel units in the *SLC*® Series 5 Carrier System. Faceplate mounted 310-compatible jacks allow monitoring access to T/R, T1/R1, E/M, and SG/SB leads on the backplane. With the channel unit removed from the extender, the monitor jacks provide access to all of the transmission and signaling leads associated with that channel slot. This allows a craftsperson to verify all of the wiring between a particular channel unit slot of the Series 5 channel bank and the main frame. Splitting access jacks (the drop is split away from the channel unit) for T/R, T1/R1, E/M, and SG/SB allow testing of a channel unit installed in the extender. Active circuitry is included to provide battery feed (normal and reverse) and a hold function to aid in testing 2-wire channel units.

The battery feed/hold function is switch selectable for bridging to either 2-wire odd (T/R), 2-wire even (T1/R1), or 4-wire simplex leads of a channel unit. When the feed/hold function is off, the 52A acts as a straight-through card extender. Likewise, when 2-wire odd is selected, 2-wire even is not affected (and vice versa).

The feed/hold functions provide a DC termination with a high AC impedance. The battery feed function applies a grounded feed, current-limited to 42 mA. The hold function applies a floating electronic hold circuit which looks like 900 ohms at 20 mA loop current, decreasing to 700 ohms at 60 mA.

1. Is the 52A test extender being used to verify channel slot cabling?

   If **YES,** then continue with Step **2.**
   If **NO,** then proceed to Step **4.**

2. Insert the extender into the channel slot in the dual bank associated with the circuit to be tested.

3. Use the monitor jacks (Figure 1) to access the transmission and signaling leads associated with the channel slot (Figure 2) to verify the wiring between the channel unit slot and the main frame or cross-connect.

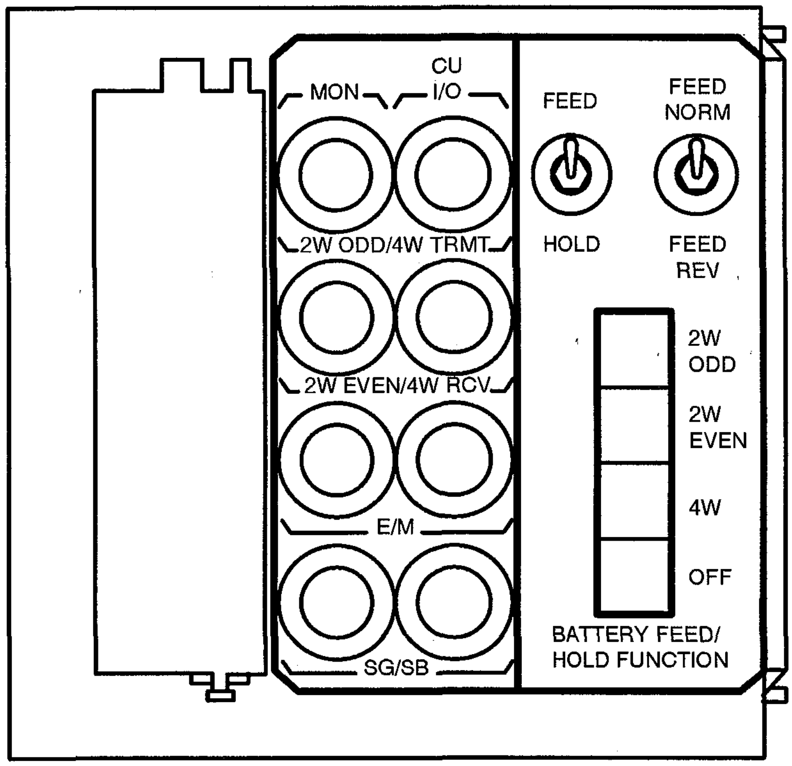


Figure 1— 52A Test Extender Faceplate

4. **NOTE:**
The purpose of this procedure is to condition the channel units for the off-hook state for transmission tests. This procedure assumes that a 52A test extender is being used at both ends [central office terminal (COT) and remote terminal (RT)].

Is the 52A test extender being used in the channel unit tests?

If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**
If **YES,** then continue with Step **5.**

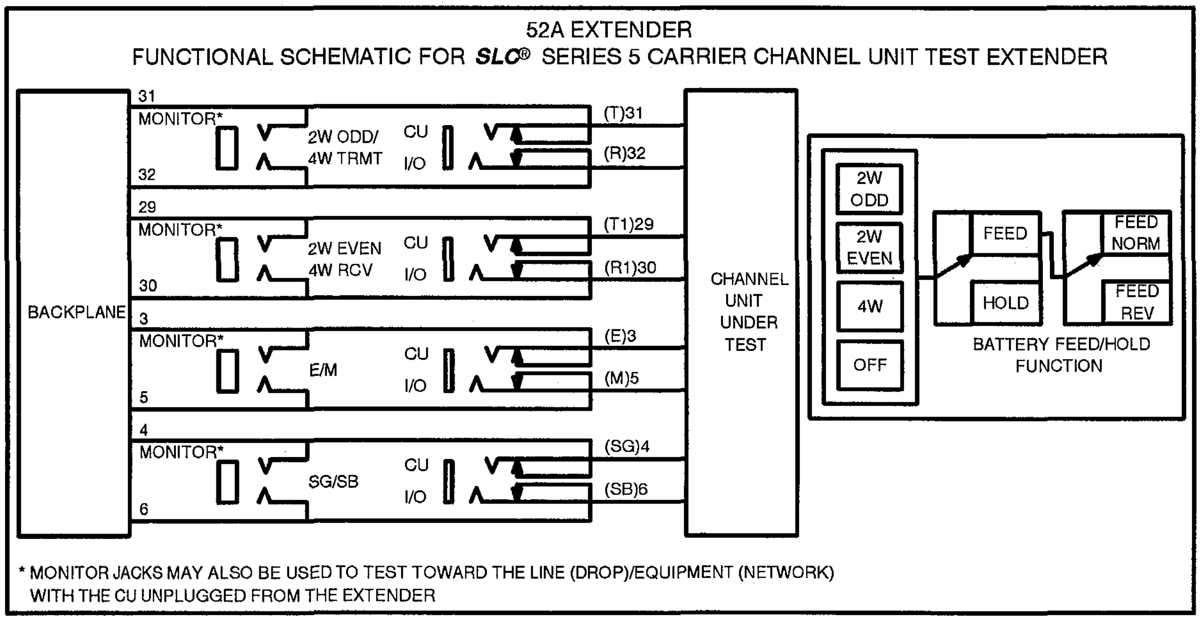


Figure 2—52A Test Extender Functional Schematic (Decal)

5. Set the **BATTERY FEED/HOLD FUNCTION** to **OFF.**

6. Insert the 52A extender into the channel bank slot associated with the circuit to be tested.

7. Insert the channel unit into the extender.

8. Use the monitor jacks to monitor the performance of the circuit being tested.

9. Is the 52A test extender being used in transmission tests?

   If **YES,** then continue with Step **10.**
   If **NO,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE**

10. Is the circuit 2-wire loop-signaling type?

    If **YES,** then continue with Step **11.**
    If **NO,** then proceed to Step **12.**

11. NOTE:
    The switch settings on the 52A test extender must be made in the order listed to prevent connecting battery feed outputs together.

    Set the switches on the 52A test extender as follows:

    - Depending on the type of channel unit being tested, set the **FEED/HOLD** as indicated in Table A.
    - If the **FEED/HOLD** switch is set to **FEED, set the FEED NORM/FEED REV** to **FEED NORM.**
    - **BATTERY FEED/HOLD FUNCTION** to **2W ODD** (for the odd channel) or **2W EVEN** (for the even channel).

Table A. Setting for Feed/Hold Switch on 52A Test Extender

Channel Unit Code	Switch Setting	Channel Unit Code	Switch Setting
AUA25	Hold	AUA43	Hold
AUA31	Feed	AUA45	Feed
AUA32	Feed	AUA51	Hold
AUA33	Feed	AUA53	Hold
AUA35	Feed	AUA55	Hold
AUA36	Hold	AUA56	Feed
AUA37	Feed	AUA57	Hold
AUA38	Feed	AUA58	Hold
AUA39	Feed	AUA59	Hold
AUA42	Feed	—	—

12. NOTE:
The **BATTERY FEED/HOLD FUNCTION** is not required for the 4-wire channel unit transmission tests (it should be set to **OFF**).

Connect the transmission measuring set (TMS) to the **CU I/O** jacks on the 52A test extender.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Test DID Channel on Universal System

Summary: This procedure tests direct inward dial (DID) channels. The extended test controller (XTC) may be used to test channels. Otherwise, at the central office terminal (COT) and remote terminal (RT), insert the 52A test extender into the channel to be tested and install the channel unit. At the RT, send normal and reverse battery; verify at the COT. At the COT and RT, connect the test telephones and verify normal voice transmission.

1.

NOTE:
The XTC must be equipped with the MC97761A1 control unit (XCU) in order to test the DID circuits. The DID channel cannot be accessed like other locally switched lines; it must be tested by the mechanized loop testing (MLT) system through the XTC channel unit emulator (CUE) like a special service channel.

Is the XTC available to test channels?

If **NO,** then proceed to Step **4.**
If **YES,** then continue with Step **2.**

2.

NOTE:
The XTC procedures are given in AT&T 363-205-300. The XTC can only verify operation to the RT channel unit. To verify operation to the cross-connect field, use a 52A test extender to verify channel slot cabling.

Request the repair service bureau or local test desk personnel to perform XTC channel tests. Did tests pass?

If **YES,** then proceed to Step **27.**
If **NO,** then continue with Step **3.**

3. The following items may be used to clear trouble. Repeat channel tests after each item until the tests pass, then proceed to Step **27.**

   a. Check the test connections and correct if needed.
   b. Replace the RT channel unit.
   c. Replace the COT channel unit.
   d. Make sure the XTC is working properly and that you are using the proper procedures.
   e. Use the office drawings and schematic drawings for the Series 5 COT or *SLC* 96 Carrier System COT to check the wiring. Look for tip and ring reversal between the COT channel appearance and office equipment; also between the RT and cross-connect terminal. Correct wiring problem.

4. Establish communication between the central office and the RT.

5. ⚠ CAUTION:
   The channel must be out of service before testing; otherwise, service will be interrupted.

   At the COT, select the channel for testing and inform the RT of the channel selected.

6. At the COT and RT on 52A test extenders, set the **BATTERY FEED/HOLD FUNCTION** switch to **OFF.**

7. Insert the 52A test extenders into the channel slots.

8. Connect the test telephones to the **CU I/O** jack on the 52A test extender for the channel under test (**2W ODD** (for the odd channel) or **2W EVEN** (for the even channel).

9. Install the AUA36 and AUA56 channel units in the test extenders.

10. At the RT, set the switches on the 52A test extender as follows:
    - **BATTERY FEED/HOLD FUNCTION** to **2W ODD** (for the odd channel) or **2W EVEN** (for the even channel)
    - **FEED/HOLD** to **FEED**
    - **FEED NORM/FEED REV** to **FEED NORM**.

11. At the COT, verify that the **BATTERY FEED/HOLD FUNCTION** switch is set to **OFF**.

12. At the COT and RT, take both phones off hook to verify loop closure being sent and detected. Is the **BUSY** indicator lighted on the AUA36 and AUA56 channel units?

    If **YES,** then proceed to Step **14.**

    If **NO,** then continue with Step **13.**

13. The following items may be used to clear trouble. Repeat from Step **12** after each item until the **BUSY** indicator lights on both channel units, then continue with Step **14.**

    a. Check test connections and correct if needed.

    b. Replace the RT channel unit.

    c. Replace the COT channel unit.

14. NOTE:
    This test setup does not provide dialing or ringing.

    Lift the handset at the COT and RT at the same time and make normal talk tests.

15. Was the call completed with normal transmission quality in both directions?

    If **YES,** then proceed to Step **17.**

    If **NO,** then continue with Step **16.**

16. The following items may be used to clear trouble. Repeat from Step **14** after each item until voice quality is normal, then continue with Step **17.**

    a. Check the test connections and correct if needed.

    b. Replace the RT channel unit.

    c. Replace the COT channel unit.

17. Put both handsets on hook.

    Response: The **BUSY** indicator goes out on the AUA36 and AUA56 channel units.

18. At the COT, disconnect the test telephone from the 52A test extender. (Leave the RT test telephone connected.)

19. Get a volt-ohm-milliammeter (VOM) and condition to measure DC volts.

20. Connect the (+) red lead of the VOM to the tip conductor and the (–) black lead to the ring conductor of the channel being tested and measure normal battery.

21. Does the meter indicate between 30 and 56 V DC?

    If **YES,** then proceed to Step **22.**

    If **NO,** then continue with Step **23.**

22. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the meter indicates between 42 and 56 V DC at the COT. Continue with Step **23.**

    a. Check the test connections and correct if needed.

    b. Replace the RT channel unit.

    c. Replace the COT channel unit.

23. At the COT, set the switches on the 52A test extender as follows:

    - **BATTERY FEED/HOLD FUNCTION** to **2W ODD** (for the odd channel) or **2W EVEN** (for the even channel)
    - **FEED/HOLD** to **HOLD.**

    Response: The **BUSY** indicator lights on the AUA36 and AUA56 channel units.

24. At the RT on the 52A test extender, set the **FEED NORM/FEED REV** switch to **FEED REV.**

25. At the COT, reverse the red (+) and black (–) leads and measure reverse battery. Does the meter indicate between 30 and 56 V DC?

    If **YES,** then proceed to Step **27.**

    If **NO,** then continue with Step **26.**

26. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the meter indicates between 42 and 56 V DC at the COT. Continue with Step **27.**

    a. Check the test connections and correct if needed.

    b. Replace the RT channel unit.

    c. Replace the COT channel unit.

27. Is this the last DID channel to be tested on this system?

    If **YES,** then continue with Step **28.**

    If **NO,** then proceed to Step **1.**

28. At the COT and RT on the 52A test extenders, set the **BATTERY FEED/HOLD FUNCTION** switch to **OFF.**

    Response: The **BUSY** indicator goes out on the AUA36 and AUA56 channel units.

29. Remove the test connections. Remove the 52A test extenders from the channel slots and install the DID channel units.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Test AUA45(B) Manual Ringdown Channel on Universal System or Integrated System with Nail-Up

Summary: This procedure tests the AUA45(B) manual ringdown channels for transmission quality and proper ringing operation from the central office terminal (COT) or the distant D-bank to the remote terminal (RT). Ringing tests will be performed for both channels during the turn-up of the first channel; therefore, ringing will not have to be tested when service is added on the second channel.

NOTE 1:
If this is an integrated system with nail-up, follow these procedures by replacing "COT/AUA45(B)" with "D-bank/ringdown channel unit" as appropriate.

NOTE 2:
The 52A channel unit test extender can be used to get access to the T/R leads of the channel unit under test but it is not required. If it is used, the BATTERY FEED/HOLD FUNCTION switch should be set to the OFF position.

1. Establish communication between the terminating central office and the RT.

2. NOTE:
   Verify that the COT and RT channel units are provisioned properly. If necessary, provision the AUA45(B) COT and RT channel units (DLP-541). If only one of the channels on the AUA45(B) is being placed in service, the loss switches for the unterminated channel on both the COT and RT units must be set to the −3 dB position (that is, 6 dB end-to-end loss). This will prevent the unterminated channel from singing.

   Is this the second channel of the AUA45(B) being placed in service?

   If **YES,** then proceed to Step **13.**
   If **NO,** then continue with Step **3.**

3. At the selected channel T/R appearance on the main distributing frame (MDF), connect a temporary switched test line [a POTS (single party) line] (Figure 1).

4. At the RT connect the T/R of the odd channel to the T/R of the even channel. This can be done at either the faceplate jack using the special test cords or the protector block.

5. At the COT temporarily connect the telephone set to the faceplate T/R jack of the other channel on the AUA45(B).

6. From a local telephone, call the test line. Does the telephone ring normally?

   If **YES,** then proceed to Step **8.**
   If **NO,** then continue with Step **7.**

7. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the telephone rings normally, then continue with Step **8.**

   a. Check for ringing at the faceplate jack of the channel connected to the test line. If ringing is not present, check to make sure the test line is properly connected to the channel under test, and check the

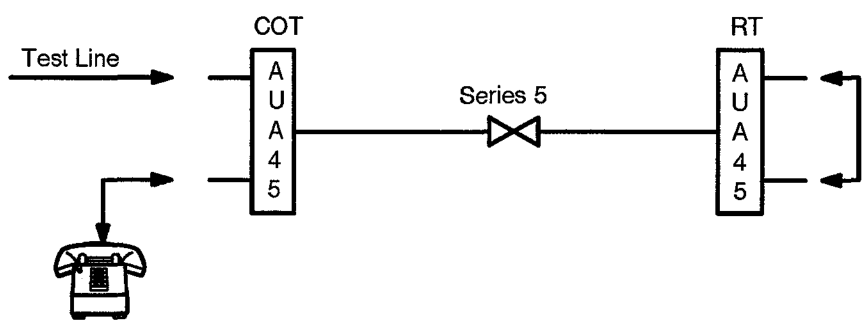


Figure 1—Test Arrangement for Ringing Tests

wiring between the COT and the mainframe. Correct wiring problems and repeat from Step **6.**

b. Check to make sure the T/R leads of the odd and even channels are connected at the RT. Correct wiring errors and repeat from Step **6.**
c. Replace the COT channel unit (provision the new channel unit, Step **2,** to match the unit being replaced), reconnect the telephone set and repeat from Step **6.**
d. Replace the RT channel unit (provision the new channel unit, Step **2,** to match the unit being replaced), reconnect the T/R leads of the odd and even channels and repeat from Step **6.**

8. Remove the test line and connect it to the other channel on the AUA45(B).

9. Remove the telephone from the faceplate jack and connect it to the faceplate jack for the other channel.

10. From a local telephone, call the test line. Does the telephone ring normally?

    If **YES,** then proceed to Step **12.**
    If **NO,** then continue with Step **11.**

11. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the telephone rings normally, then continue with Step **12.**

    a. Check for ringing at the faceplate jack of the channel connected to the test line. If ringing is not present, check to make sure the test line is properly connected to the channel under test, and check the wiring between the COT and the mainframe. Correct wiring problems and repeat from Step **10.**
    b. Check to make sure the T/R leads of the odd and even channels are connected at the RT. Correct wiring errors and repeat from Step **10.**
    c. Replace the COT channel unit (provision the new channel unit, Step **2,** to match the unit being replaced), reconnect the telephone set and repeat from Step **10.**

d. Replace the RT channel unit (provision the new channel unit, Step **2,** to match the unit being replaced), reconnect the T/R leads of the odd and even channels and repeat from Step **10.**

12. Remove all previous connections.

13. At the COT and RT, connect a transmission measuring set (TMS) to the T/R faceplate jack on the AUA45(B) for the circuit being turned up (Figure 2).

14. The following steps are based on A-Z direction being from the COT toward the RT. If the work order record detail (WORD) document defines this as Z-A, read A-Z as Z-A in the steps that follow.

15. At the COT, condition the TMS to send −TRMT (GN) dBm level (at 1 kHz) as follows:
    - Set the impedance to 900 ohms
    - Set the TRMT LEVEL to −TRMT (GN) value from the WORD.

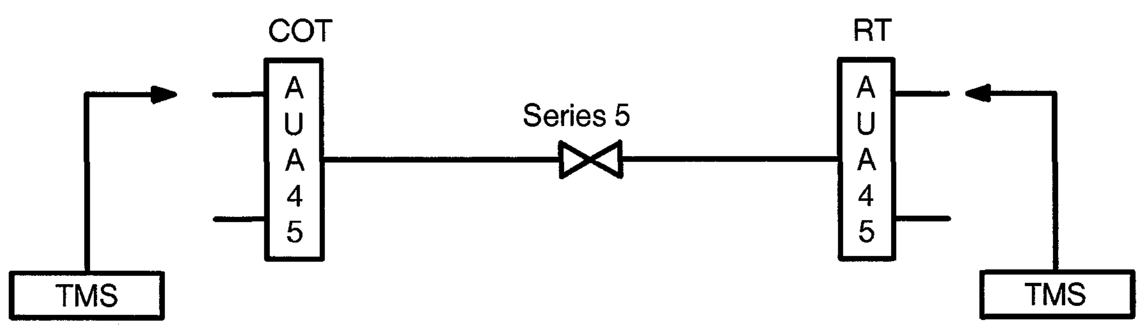


Figure 2—Test Arrangement for Transmission Measurements

16. At the RT, condition the TMS to measure the gain from the COT to the RT as follows:
    - Set the impedance to 900 ohms
    - Set the RCV LEVEL to 0.0 dBm

17. Send the tone through the COT and RT channel units and measure the level at the RT. Does the TMS indicate the RT level specified on the WORD ± 1.0 dB?

    If **YES,** then proceed to Step **19.**

    If **NO,** then continue with Step **18.**

18. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the correct level is obtained, then continue with Step **19.**
    a. Verify channel unit provisioning at the COT and RT and adjust if required.
    b. Replace the COT channel unit (provision the new channel unit, Step **2,** to match the unit being replaced), reconnect the TMS and repeat from Step **17.**
    c. Replace the RT channel unit (provision the new channel unit, Step **2,** to match the unit being replaced), reconnect the TMS and repeat from Step **17.**

19. Condition the TMS at the RT to send −TRMT (GN) dBm level (at 1 kHz) as follows:
    - Set the impedance to 900 ohms
    - Set the TRMT LEVEL to −TRMT (GN) value from the WORD.

20. Condition the TMS at the COT to measure the gain from the RT to the COT as follows:
    - Set the impedance to 900 ohms
    - Set the RCV LEVEL to 0.0 dBm.

21. Send the tone through the RT and COT channel units and measure the level at the COT. Does the TMS indicate the COT level specified on the WORD ± 1.0 dB?

    If **YES,** then proceed to Step **23.**

    If **NO,** then continue with Step **22.**

22. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the correct level is obtained, then continue with Step **23.**

    a. Verify channel unit provisioning at the RT and COT and adjust if required.

    b. Replace the RT channel unit (provision the new channel unit, Step **2,** to match the unit being replaced), reconnect the TMS and repeat from Step **21.**

    c. Replace the COT channel unit (provision the new channel unit, Step **2,** to match the unit being replaced), reconnect the TMS and repeat from Step **21.**

23. From customer location to customer location, verify the TLPs specified on the WORD. If the correct levels are not obtained, check the cable pair from the RT to the customer location, then check the cable pair from the COT to the customer location. The TMS should be set to 900 ohms impedance for these measurements.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Verify RT Channel Unit Settings and Loop Integrity — 2-Wire Loop to NCTE (FPB/SS System)

Summary: At the remote terminal (RT), all test access is through the digital bit stream with the craft interface unit (CIU). At the CIU, send 0 dBm level at 1 kHz to the network interface (NIF); the customer receive level from the RT should range from [(TLP A-Z) −0.5] dBm to [(TLP A-Z) +0.5] dBm. At the NIF, send 0 dBm level; receive level at the RT should range from −0.5 dBm to +0.5 dBm. At the RT, then at the NIF, send 0 dBm tones at 0.4 kHz and 2.8 kHz. At the NIF and at the RT, the low-end slope should range from −0.5 to +2.5, and the high-end slope should range from −0.5 to +3.8. The balance of the RT channel unit, measured in the bit stream, should be: RL>14 dB. The noise at the NIF should be less than [TLP (A-Z) + 23] dBrnc. At the RT, the NIF noise should be less than 21 dBrnc.

1. NOTE:
   If the function code = FXS or DPO, the channel unit at the RT must be conditioned for AC measurement; the customer location must have the equivalent of a test set with the HOLD feature in the send and receive modes.

   Arrange for channel alignment tests to the customer location.

2. Figure 1 shows the channel layout for the tests that follow. Refer to the circuit layout information or work order record detail (WORD) for circuit details.

3. If necessary, connect the CIU to the channel test unit (**CTU**) in the dual bank of the system being tested.

4. If necessary, provision the RT channel unit.

   Reference: **DLP-519**

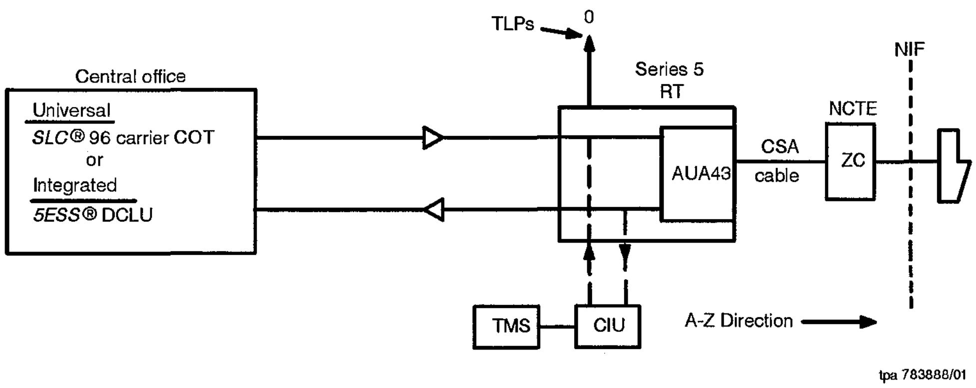


Figure 1—2-Wire Loop (RT End) with Network Channel Terminating Equipment (NCTE)

5. From the CONNECT-TA menu, select DIGITAL ONLY (item 1).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

6. Set the switches on the CIU as follows:

   - **BIT STREAM ACCESS - 0TLP - NE** depressed
   - **CHANNEL TYPE** to **VF**
   - If the function code = FXO, set **SIGNALING CONTROL - TRANSMIT A** and **C** to **1**, **B** and **D** to **0**
   - If the function code = FXS, set **SIGNALING CONTROL - TRANSMIT A** and **C** to **0**, **B** and **D** to **1**
   - If the function code = DPO or TO, set **SIGNALING CONTROL - TRANSMIT A**, **B**, **C**, and **D** to **1**
   - **SIGNALING CONTROL** to **ON**
   - **CIU LOOPBACK** to **OFF.**

7. This procedure is based on A-Z direction being from the RT toward the NIF. If the WORD defines this direction as Z-A, read A-Z as Z-A (and the reverse) in the following steps.

8. NOTE 1:

   Unless the channel unit function code = TO, the bit stream TLP is assumed to be 0.0 dB TLP. For circuits with a bit stream TLP other than zero, the test levels given must be modified. These levels are shown in parentheses after the normal test levels.

   NOTE 2:

   The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide the correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

   At the RT, connect the test equipment to send 1-kHz tone at 0.0 (or TLP A-Z) dBm toward the NIF (Figure 2):

   - Connect the transmission measuring set (TMS) **TRANSMIT** jack to the CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack
   - Set the TMS **TRMT** frequency to **1004**, **LEVEL** to 0.0 (or TLP A-Z) dBm, and impedance to **600.**

9. At the NIF at the customer location, measure the gain in the receive (RT channel unit) direction. Is the receive level between [(TLP A-Z) −0.7] and [(TLP A-Z) +0.7]?

   If **YES,** then proceed to Step **19.**

   If **NO,** then note the receive level at the NIF and continue with Step **10.**

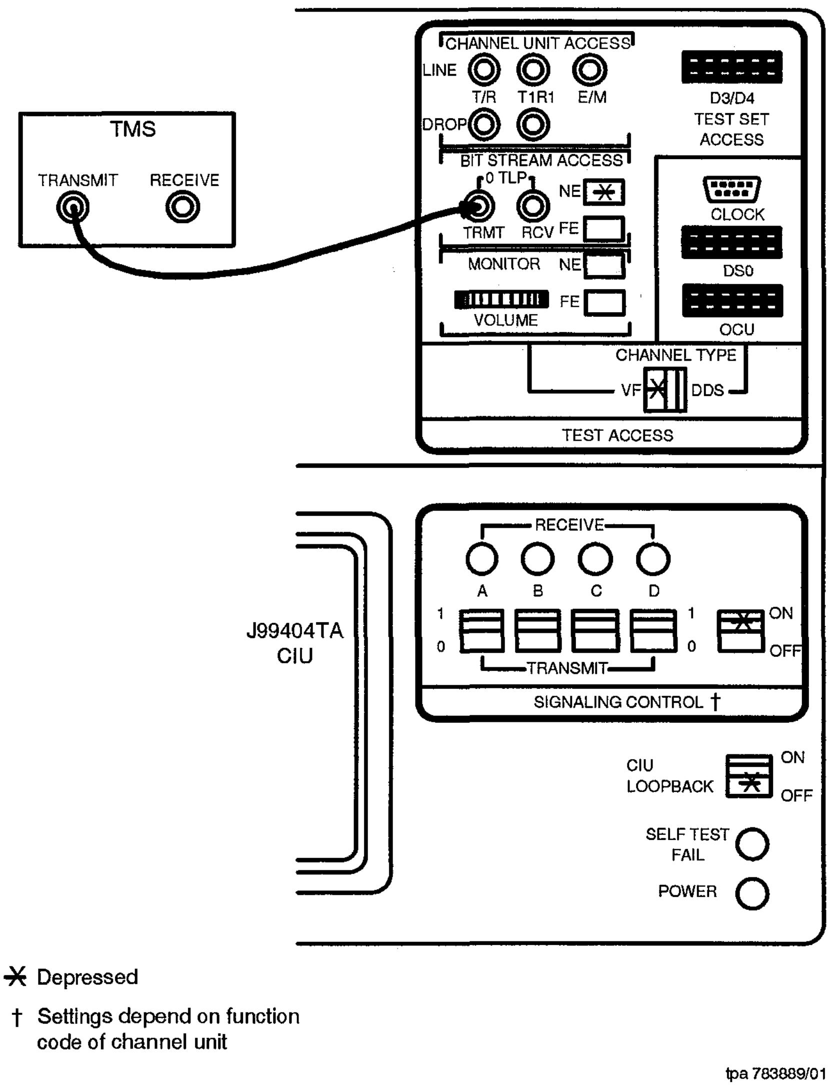


Figure 2— Test Connections for Testing RT Channel Unit

10. Measure the receive level at the loop interface of the NCTE. On the WORD, find the value of TLP A-Z listed for the NCTE, loop side. At the loop interface of the NCTE, is the receive level between [(TLP A-Z) −0.6] dBm and [(TLP A-Z) +0.6] dBm?

    If **YES,** then the NCTE is causing trouble; adjust or replace it and proceed to Step **19.**

    If **NO,** then note the result and continue with Step **11.**

11. Verify that the RT channel unit TRANSMIT GAIN is set to the WORD value. Adjust the RT channel unit TRANSMIT GAIN no more than 1 dB. At the loop interface of the NCTE, is the receive level between [(TLP A-Z) −0.6] dBm and [(TLP A-Z) +0.6] dBm?

    Reference: **DLP-525**

    If **YES,** then proceed to Step **17.**

    If **NO,** then reset the TRANSMIT GAIN to the WORD value and continue with Step **12.**

12. Change the test connections: disconnect the TMS from the CIU and connect the TMS **RECEIVE** jack to the **BIT STREAM ACCESS - 0TLP - RCV** on the CIU. Verify that the TMS impedance is 600 ohms.

13. At the loop interface of the NCTE, send TLP Z-A dBm tone toward the RT.

14. At the RT, measure the gain in the receive direction of the RT channel unit. Is the receive level between −0.6 dBm and +0.6 dBm (or within 0.6 dB of TLP Z-A)?

    If **YES,** then continue with Step **15.**

    If **NO,** then **refer trouble, possibly loop loss, to the circuit provisioning center for analysis.**

15. Ask the circuit provisioning center to validate the WORD. If the WORD is valid, continue; otherwise, wait for the new WORD.

16. Replace the RT channel unit and repeat from Step **8.**

17. Remeasure the receive level at the NIF (send tone from RT towards NIF). Is the receive level between [(TLP A-Z) −0.7] dBm and [(TLP A-Z) +0.7] dBm?

    If **YES,** then proceed to Step **19.**

    If **NO,** then continue with Step **18.**

18. Replace or adjust the NCTE until the receive level is within limits.

19. Write down the receive level (bit stream-to-NIF gain) for later use.

20. At the RT, disconnect the TMS from the CIU. Connect the TMS **RECEIVE** jack to the **BIT STREAM ACCESS - 0TLP - RCV** on the CIU.

21. At the NIF, send 1-kHz tone at TLP Z-A dBm toward the RT.

22. At the RT, measure the receive level (the gain in the transmit direction of the RT channel unit). Does the TMS indicate between −0.7 dBm and +0.7 dBm (or within 0.7 dB of TLP Z-A)?

    If **YES,** then proceed to Step **30.**

    If **NO,** then continue with Step **23.**

23. At the loop interface of the NCTE, send a tone at TLP Z-A dBm toward the RT.

24. At the RT, measure the receive level without the NCTE in the circuit. Does the TMS indicate between −0.4 dBm and +0.4 dBm (or within 0.4 dB of TLP Z-A)?

    If **YES,** then the NCTE is causing trouble; adjust or replace the NCTE and proceed to Step **30.**

    If **NO,** then continue with Step **25.**

25. Verify that the RT channel unit RECEIVE GAIN is set to the WORD value. Adjust the RECEIVE GAIN no more than 1 dB. Does the TMS indicate between −0.6 and +0.6 dBm (or within 0.6 dB of TLP Z-A)?

    Reference: **DLP-525**

    If **YES,** then proceed to Step **28.**

    If **NO,** then continue with Step **26.**

26. Reset the RECEIVE GAIN to the WORD value. Ask the circuit provisioning center to validate the WORD. If the WORD is valid, continue; otherwise, wait for new WORD.

27. Replace the RT channel unit and repeat from Step **21.**

28. Remeasure the receive level from the NIF. At the NIF, send 1-kHz tone at 0 dBm toward the RT. At the RT, does the TMS indicate between −0.7 dBm and +0.7 dBm (or within 0.7 dB of TLP Z-A)?

    If **YES,** then proceed to Step **30.**

    If **NO,** then continue with Step **29.**

29. Replace or adjust the NCTE or central office (CO) repeater until the TMS indicates between −0.7 and +0.7 (or within 0.7 dB of TLP Z-A) at RT.

30. Write down the receive level (1-kHz gain from the NIF to the bit stream) for later use.

31. On the TMS, set the **TRANSMIT** frequency to **404** and **LEVEL** to 0.0 (or TLP A-Z) dBm. Connect the TMS **TRANSMIT** jack to the **BIT STREAM ACCESS** - **0TLP** - **TRMT** on the CIU. Verify that the **BIT STREAM ACCESS** - **NE** is depressed.

32. NOTE:
    The slope limits depend on whether the customer equipment is a PBX or other customer premises switching equipment, or a modem or other nonswitched termination.

    Note the measurement at the NIF. Calculate the low-end slope using this measurement (at 404 Hz) and measurement from the receive direction noted in Step **19**:

    Response: Slope = Meas(Step 19) – Meas(404 Hz)

33. Is the low-end slope between –0.5 and +1.5 (PBX) or +2.5 (modem); in other words, is the 404-Hz measured level between 0.5 dB hot and 1.5 dB or 2.5 dB long relative to the 1-kHz level?

    If **YES,** then continue with Step **34.**

    If **NO,** then **note the result for later referral to the circuit provisioning center.**

34. On the TMS, set the **TRMT** frequency to **2804.**

35. Note the measurement at the NIF. Calculate the high-end slope as done in Step **32**:

    Response: Slope = Meas(Step 19) – Meas(2804 Hz)

36. Is the high-end slope between −0.5 and +2.2 (PBX) or +3.7 (modem)?

    If **YES,** then continue with Step **37.**

    If **NO,** then **note the result for later referral to the circuit provisioning center.**

37. Disconnect the TMS **TRANSMIT** jack from the CIU. Verify that the TMS **RECEIVE** jack is connected to the **RCV** jack on the CIU.

38. At the NIF, send a 0.4-kHz tone at 0 dBm toward the RT.

39. At the RT, note the TMS indication. Calculate the low-end slope using this measurement (at 0.4 kHz) and the measurement from the transmit direction noted in Step **30**:

    Response: Slope = Meas(Step 30) − Meas(0.4 kHz)

40. Is the low-end slope between −0.5 and +1.5 (PBX) or +2.5 (modem)?

    If **YES,** then continue with Step **41.**

    If **NO,** then **note the result for later referral to the circuit provisioning center.**

41. At the customer location, send a 2.8-kHz tone toward the RT.

42. At the RT, note the TMS indication and calculate the high-end slope as done in Step **39**:

    Response: Slope = Meas(Step 30) − Meas(2.8 kHz)

43. Is the high-end slope between −0.5 and +2.2 (PBX) or +3.7 (modem)?

    If **YES,** then continue with Step **44.**

    If **NO,** then **note the result for later referral to the circuit provisioning center.**

44. NOTE:
    If the function code = FXS or DPO, termination must include the HOLD feature.

    At the NIF, terminate the loop with 600 ohms.

45. At the RT, connect the return loss measuring set to the **BIT STREAM ACCESS - 0TLP - RCV** and **TRMT** on CIU. Measure the return loss. Is SRL-HI > 13, SRL > 14, and ERL > 15?

    If **YES,** then proceed to Step **47.**

    If **NO,** then continue with Step **46.**

46. At RT, is SRL-HI > 9, SRL > 10, and ERL > 11?

    If **YES,** then note the result for later referral to the circuit provisioning center and continue with Step **47.**

    If **NO,** then **refer the trouble to the circuit provisioning center and wait for the new WORD.**

47. Disconnect the TMS from the CIU. Insert the 600-ohm terminating plug into the CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack.

48. ⇛ NOTE:
If the function code = FXS or DPO, the noise measuring set must have the HOLD feature.

At the NIF, measure noise. Is the noise less than [(TLP A-Z + 23] dBrnc?

If **YES,** then proceed to Step **52.**

If **NO,** then continue with Step **49.**

49. At the loop interface of the NCTE, measure noise. Is the noise less than [(TLP A-Z)] + 20 dBrnc?

If **YES,** then proceed to Step **52.**

If **NO,** then continue with Step **50.**

50. At the loop interface of the NCTE, terminate the loop with 600 ohms.

51. At the RT, connect the TMS **RECEIVE** jack to the CIU **BIT STREAM ACCESS** - **0TLP** - **RCV** jack. Is the noise less than 23 (or 23 + TLP Z-A) dBrnc?

If **YES,** then replace the noisy RT channel unit and proceed to Step **47.**

If **NO,** then **refer the trouble (possible noisy cable) to the appropriate repair forces.**

52. At the NIF, terminate the loop with either 600 or 900 ohms.

53. At the RT, connect the TMS **RECEIVE** jack to the CIU **BIT STREAM ACCESS** - **0TLP** - **RCV** jack. Is the noise less than 25 (or 25 + TLP Z-A) dBrnc?

    If **YES,** then proceed to Step **56.**

    If **NO,** then continue with Step **54.**

54. At the loop interface of the NCTE, terminate the loop with 600 ohms.

55. At the RT, is the noise less than 23 (or 23 + TLP Z-A) dBrnc?

    If **YES,** then replace the NCTE and repeat from Step **47.**

    If **NO,** then replace the noisy RT channel unit and proceed to Step **47.**

56. Was the RT channel unit replaced in the noise test?

    If **YES,** then repeat the RT channel alignment tests except for noise (Step 4 - Step 46).

    If **NO,** then continue with Step **57.**

57. Are any more 2-wire channels of this type to be tested in this system?

    If **YES,** then disconnect the TMS, address the next channel unit to be tested, and proceed to Step **4.**

    If **NO,** then continue with Step **58.**

58. On the CIU, select the DISCONNECT TA from the menu ***before*** unplugging the CIU from the **CTU**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Verify RT Channel Unit Settings and Loop Integrity 2-Wire Loop to PBX, Telephone Set, or Data Modem (FPB/SS System)

Summary: At the remote terminal (RT), all test access is through the digital bit stream using the craft interface unit (CIU). At the RT, send 0 dBm level at 1 kHz to the network interface (NIF); the customer receive level from the RT should range from [(TLP A-Z) −0.6] to [(TLP A-Z) +0.6] dBm. At the NIF, send 0 dBm level; the receive level at the RT should range from −0.6 to +0.6 dBm. At the RT, then at the NIF, send 0 dBm tones at 0.4 and 2.8 kHz. At the NIF and at the RT, the low-end slope should range from −0.5 to +2.5, and the high-end slope should range from −0.5 to +3.8. The balance of the RT channel unit measured in the bit stream should be ERL>15 dB. The noise at the NIF should be less than 20 dBrnc. At the RT, the NIF noise should be less than 23 dBrnc.

1. Arrange for channel alignment tests to the customer location.

2. Figure 1 shows the channel layout for the tests that follow. Refer to the circuit layout information or the work order record detail (WORD) for circuit details.

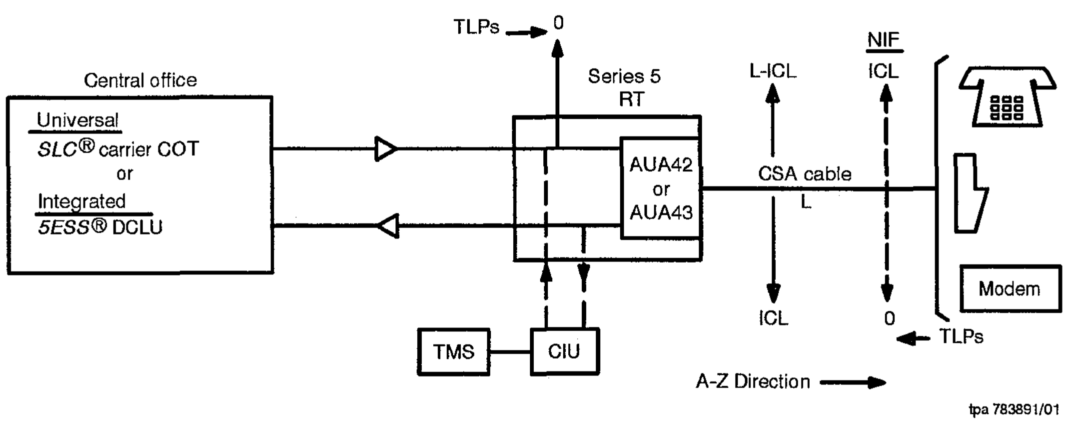


Figure 1 — 2-Wire Loop (RT End), No NCTE (Network Channel Terminating Equipment)

3. Connect the CIU to the channel test unit (**CTU**) and address the RT channel unit.

4. If necessary, provision the RT channel unit. From the CONNECT-TA menu, select DIGITAL ONLY (item 1).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

   Reference: **DLP-519**

5. Set the switches on the CIU as follows:
   - **BIT STREAM ACCESS** - **0TLP** - **NE** depressed
   - **CHANNEL TYPE** to **VF**
   - If the function code = FXS, set **SIGNALING CONTROL** - **TRANSMIT A** and **C** to **0**, **B** and **D** to **1**
   - If the function code = FXO, DPT, or TO, or if channel unit is **AUA56**, set **SIGNALING CONTROL** - **TRANSMIT A**, **B**, **C**, and **D** to **1**
   - **SIGNALING CONTROL** to **ON**
   - **CIU LOOPBACK** to **OFF**.

6. This procedure is based on A-Z direction being from the RT toward the NIF. If the WORD defines this direction as Z-A, read A-Z as Z-A in steps that follow.

7. ⇒ NOTE 1:
   Unless the channel unit function code = TO, the bit stream TLP is assumed to be 0.0 dB TLP. For circuits with a bit stream TLP other than zero, the test levels given must be modified. These levels are shown in parentheses after the normal test levels.

NOTE 2:
The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

At the RT, send a 1-kHz tone at 0 dBm toward the customer location. See Figure 2:

- Connect the transmission measuring set (TMS) **TRANSMIT** jack to the CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack
- Set the **TRMT** frequency to **1004**, **LEVEL** to 0.0 (or TLP A-Z) dBm, and the impedance to **600.**

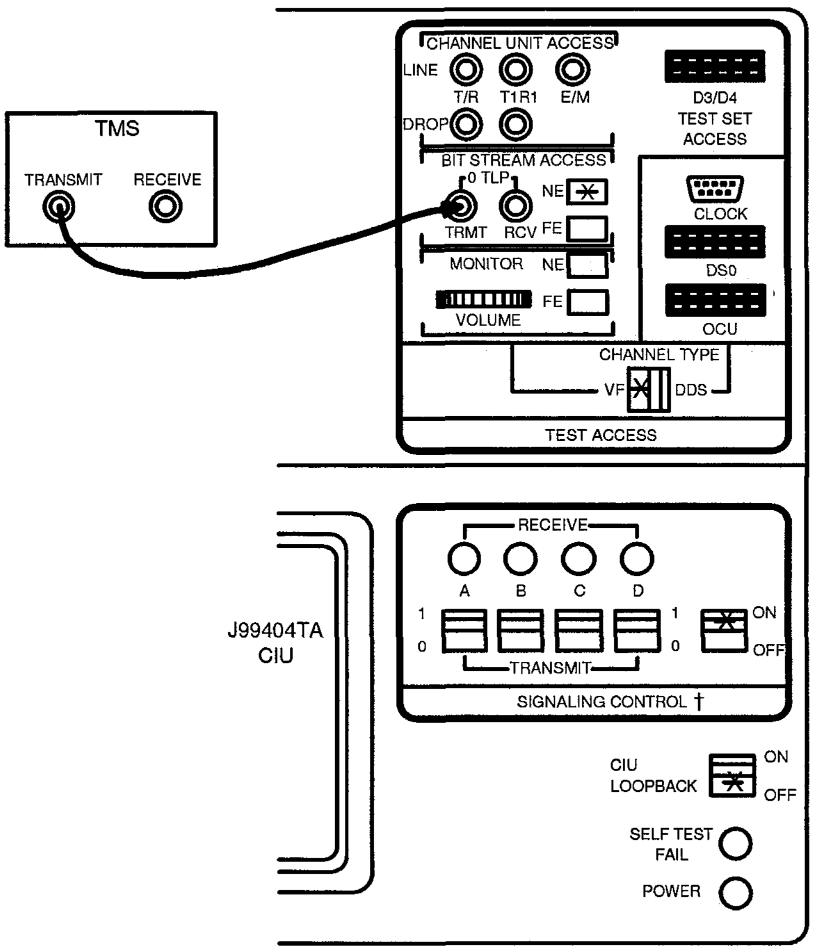
8.

NOTE:
If the function code of the RT channel unit is FXS or DPO, condition the RT channel unit from the customer location for AC measurement. This requires the equivalent of a test set with the HOLD feature in SEND and RECEIVE modes.

At the customer location, measure the gain in the receive direction. Is the receive level between [(TLP A-Z) −0.6] and [(TLP A-Z) +0.6]?

If **YES,** then proceed to Step **14.**

If **NO,** then note the receive level at the customer location and continue with Step **9.**



✱ Depressed

† Settings depend on function code of channel unit

tpa 783889/01

Figure 2 — Test Connections for Testing RT Channel Unit

9. At the RT, verify that the channel unit TRANSMIT GAIN is set to the WORD value. Adjust the RT channel unit TRANSMIT GAIN no more than 1 dB. At the customer location, is the receive level between [(TLP A-Z) −0.6] and [(TLP A-Z) +0.6]?

   Reference: **DLP-525**

   If **YES,** then proceed to Step **14.**

   If **NO,** then reset the TRANSMIT GAIN to the WORD value and continue with Step **10.**

10. Disconnect the TMS from the CIU and connect the TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on the CIU. On the TMS, set the **RCV LEVEL** to 0 dBm. At the customer location, send 0 dBm level (600-ohm impedance) toward the RT.

11. At the RT, measure the gain in the receive (RT channel unit) direction. Does the TMS indicate between −0.6 and +0.6 dBm (or within 0.6 dB of TLP Z-A)?

    If **YES,** then continue with Step **12.**

    If **NO,** then **note the TMS indication and refer loop loss trouble to the circuit provisioning center for analysis.**

12. Ask the circuit provisioning center to validate the WORD. If the WORD is valid, continue; otherwise, wait for the new WORD.

13. Replace the RT channel unit and repeat from Step **7.**

14. Write down the measurement in the receive direction (bit stream-to-NIF gain) for later use.

15. At the RT, disconnect the TMS from the CIU. Connect the TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on CIU.

16. At the customer location, send 0 dBm tone toward the RT.

17. At the RT, measure the gain in the transmit (RT channel unit) direction. Does the TMS indicate between −0.6 and +0.6 dBm (or within 0.6 dB of TLP Z-A)?

    If **YES,** then proceed to Step **21.**

    If **NO,** then continue with Step **18.**

18. Verify that the RT channel unit RECEIVE GAIN is set to the WORD value. Adjust the RT channel unit RECEIVE GAIN no more than 1 dB. Does the TMS indicate between +0.6 and −0.6 dBm (or within 0.6 dB of bit stream TLP Z-A)?

    Reference: **DLP-525**

    If **YES,** then proceed to Step **21.**

    If **NO,** then continue with Step **19.**

19. Ask the circuit provisioning center to validate the WORD. If the WORD is valid, continue; otherwise wait for the new WORD.

20. Replace the RT channel unit and repeat from Step **16.**

21. Write down the measurement in the transmit direction (1-kHz gain from the NIF to the bit stream) for later use.

22. At the RT on the TMS, set the **TRMT** frequency to **404** and **LEVEL** to 0.0 (or TLP A-Z) dBm. Connect the TMS **TRANSMIT** jack to the **BIT STREAM ACCESS** - **0TLP** - **TRMT** on the CIU. Verify **BIT STREAM ACCESS** - **NE** is depressed.

23. ⇒ NOTE:
Slope limits depend on whether customer equipment is a PBX or other customer premises switching equipment, or a telset or other nonswitched termination.

Note the measurement at the customer location. Calculate the low-end slope using this measurement (at 404 Hz) and measurement from the receive direction noted in Step **14**:

Response: Slope = Meas(Step 14) – Meas(404 Hz)

24. Is the low-end slope between –0.5 and +1.5 (PBX) or +2.5 (telset); in other words, is 404 Hz measured level between 0.5 dB hot and 1.5 dB or 2.5 dB long relative to 1 kHz level?

If **YES,** then continue with Step **25.**

If **NO,** then **note the result for later referral to the circuit provisioning center.**

25. On the TMS, set the TRMT frequency to **2804**.

26. Note the measurement at the customer location. Calculate the high-end slope as done in Step **23**:

Response: Slope = Meas(Step 14) – Meas(2804 Hz)

27. Is the high-end slope between –0.5 and +2.2 (PBX) or +3.7 (telset)?

If **YES,** then continue with Step **28.**

If **NO,** then **note the result for later referral to the circuit provisioning center.**

28. Disconnect the TMS **TRANSMIT** jack from the CIU. Verify that the TMS **RECEIVE** jack is connected to **RCV** on the CIU.

29. At the customer location, send a 0.4-kHz tone at 0 dBm toward the RT.

30. At the RT, note the TMS indication. Calculate the low-end slope using this measurement (at 0.4 kHz) and the measurement from the transmit direction noted in Step **21**:

    Response: Slope = Meas(Step 21) – Meas(0.4 kHz)

31. Is the low-end slope between −0.5 and +1.5 (PBX) or +2.5 (telset)?

    If **YES,** then continue with Step **32.**

    If **NO,** then **note the result for later referral to the circuit provisioning center.**

32. At the customer location, send 2.8-kHz tone toward the RT.

33. At the RT, note the TMS indication and calculate the result as done in Step **30.**

    Response: Slope = Meas(Step 21) – Meas(2.8 kHz)

34. Is the high-end slope between −0.5 and +2.2 (PBX) or +3.7 (telset)?

    If **YES,** then continue with Step **35.**

    If **NO,** then **note the result for later referral to the circuit provisioning center.**

35. At the customer location, terminate the loop with a 600-ohm terminating plug or a 600-ohm test set with the HOLD feature activated in the RECEIVE mode.

36. At the RT, connect the return loss measuring set to the **BIT STREAM ACCESS - 0TLP - RCV** and **TRMT** on the CIU. Measure the return loss. Is SRL-HI > 13, SRL > 14, ERL > 15?

    If **YES,** then proceed to Step **38.**

    If **NO,** then continue with Step **37.**

37. At the RT, is SRL-HI > 9, SRL > 10, and ERL > 11?

    If **YES,** then note the result for later referral to the circuit provisioning center and continue with Step **38.**

    If **NO,** then **refer the trouble to the circuit provisioning center and wait for the new WORD.**

38. At the RT, insert a 600- or 900-ohm terminating plug in the CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack. Depress the **BIT STREAM ACCESS - 0TLP - NE** switch.

39. NOTE:
    If the function code of the RT channel unit is FXS or DPO, condition the RT channel unit from the customer location for AC measurement. This requires the equivalent of a test set with the HOLD feature in SEND and RECEIVE modes.

    At the customer location, measure noise. Is noise less than 20 dBrnc?

    If **YES,** then continue with Step **40.**

    If **NO,** then proceed to Step **41.**

40. At the RT, connect the TMS to the **BIT STREAM ACCESS - 0TLP - RCV** jack. Measure the C-message noise. Is the noise less than 23 (or 23 + TLP Z-A) dBrnc?

    If **YES,** then proceed to Step **43.**

    If **NO,** then replace noisy the RT channel unit and proceed to Step **38.**

41. At the customer location, terminate the loop with a handset or 600-ohm test set with the HOLD feature activated in the RECEIVE mode.

42. At the RT, connect the TMS to the **BIT STREAM ACCESS - 0TLP - RCV** jack. Measure the C-message noise. Is the noise less than 23 (or 23 + TLP Z-A) dBrnc?

    If **YES,** then replace the noisy RT channel unit and proceed to Step **38.**

    If **NO,** then **report the noisy loop to the appropriate repair forces.**

43. Was the RT channel unit replaced in the noise test?

    If **YES,** then repeat the RT channel unit tests except noise (Step 4 - Step 37).

    If **NO,** then continue with Step **44.**

44. Are any more 2-wire channels of this type to be tested in this system?

    If **YES,** then disconnect the test set, address the next channel unit to be tested and proceed to Step **4.**

    If **NO,** then continue with Step **45.**

45. On the CIU, select DISCONNECT TA from the menu ***before*** unplugging CIU from **CTU.**

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Verify RT Channel Unit Settings and Loop Integrity - 4-Wire Loop to NCTE (FPB/SS System)

Summary: At the remote terminal (RT), all test access is through the digital bit stream with the craft interface unit (CIU). At the RT, send 0 dBm level at 1 kHz to the network interface (NIF); the customer receive level from the RT should range from [(TLP A-Z) −0.7] to [(TLP A-Z) +0.7] dBm. At the NIF, send 0 dBm level; the receive level at the RT should range from −0.7 to +0.7 dBm. At the RT, then at the NIF, send 0 dBm tones at 0.4 and 2.8 kHz. At the NIF and at the RT, the low-end slope should range from −0.5 to +2.5, and the high-end slope should range from −0.5 to +3.9. The noise at the NIF should be less than (TLP A-Z) + 23 dBrnc. At the RT, the NIF noise should be less than 23 dBrnc.

1. Arrange for channel alignment tests to the customer location.

2. Figure 1 shows the channel layout for the tests that follow. Refer to the circuit layout information or the work order record detail (WORD) for circuit details.

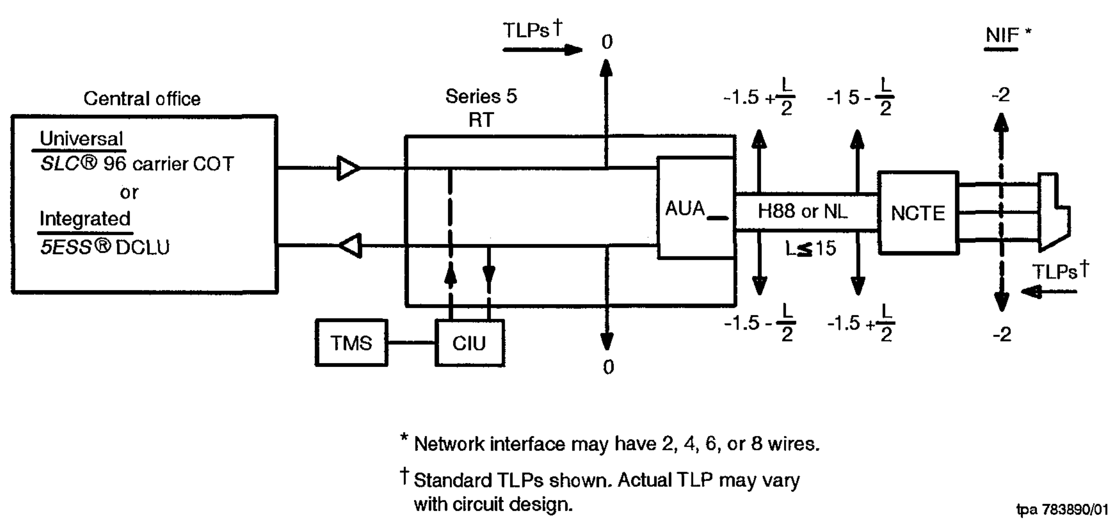


Figure 1—4-Wire Loop (RT End) with Network Channel Terminating Equipment (NCTE)

3. If necessary, connect the CIU to the channel test unit (**CTU**) and address the RT channel unit.

4. If necessary, provision the **AUA41** RT channel unit.

   Reference: **DLP-521**

5. If necessary, provision the **AUA44** RT channel unit.

   Reference: **DLP-520**

6. From the CONNECT-TA menu, select DIGITAL ONLY (item 1).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

7. Set the switches on the CIU as follows:

   - **BIT STREAM ACCESS - 0TLP - NE** depressed
   - **CHANNEL TYPE** to **VF**
   - If the function code = FXS(_) or FXT(_), set **SIGNALING CONTROL - TRANSMIT A** and **C** to **0**, **B** and **D** to **1**
   - If the function code = FXO(_), FXP(_), EM4(_), PLR(_), DX4(_), TO4, ETO4, TDO(_), or TDS(_), set **SIGNALING CONTROL - TRANSMIT A**, **B**, **C**, and **D** to **1**
   - All function codes except TO4 and ETO4, set **SIGNALING CONTROL** to **ON**
   - **CIU LOOPBACK** to **OFF.**

8. NOTE 1:
   The bit stream TLP is assumed to be 0.0 dB TLP. (The WORD may list bit stream TLPs as +4 and -8.5 dB, which is equivalent to 0.0 dB.) For circuits with a bit stream TLP other than zero, the test levels given must be modified. These levels are shown in parentheses after the normal test levels.

NOTE 2:
The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

Connect the test equipment to send a 1-kHz tone at 0 dBm toward the NIF (Figure 2):

- Connect the transmission measuring set (TMS) TRANSMIT jack to the CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack
- Set the TRMT frequency to **1004**
- Set the TRMT LEVEL to 0.0 (or TLP A-Z) dBm
- Set the TMS impedance to **600.**

9.

NOTE:
Test values at the NIF at the customer location depend on the type of circuit. Refer to the WORD for the actual value.

At the NIF, measure the gain in the receive (RT channel unit) direction. Is the receive level between [(TLP A-Z) −0.7] and [(TLP A-Z) +0.7]?

If **YES,** then proceed to Step **20.**

If **NO,** then note the receive level at the NIF and continue with Step **10.**

10.

NOTE:
If the cable is loaded and the customer location test set impedance is 600 ohms, the level must be corrected — add 0.7 dB to the test indication.

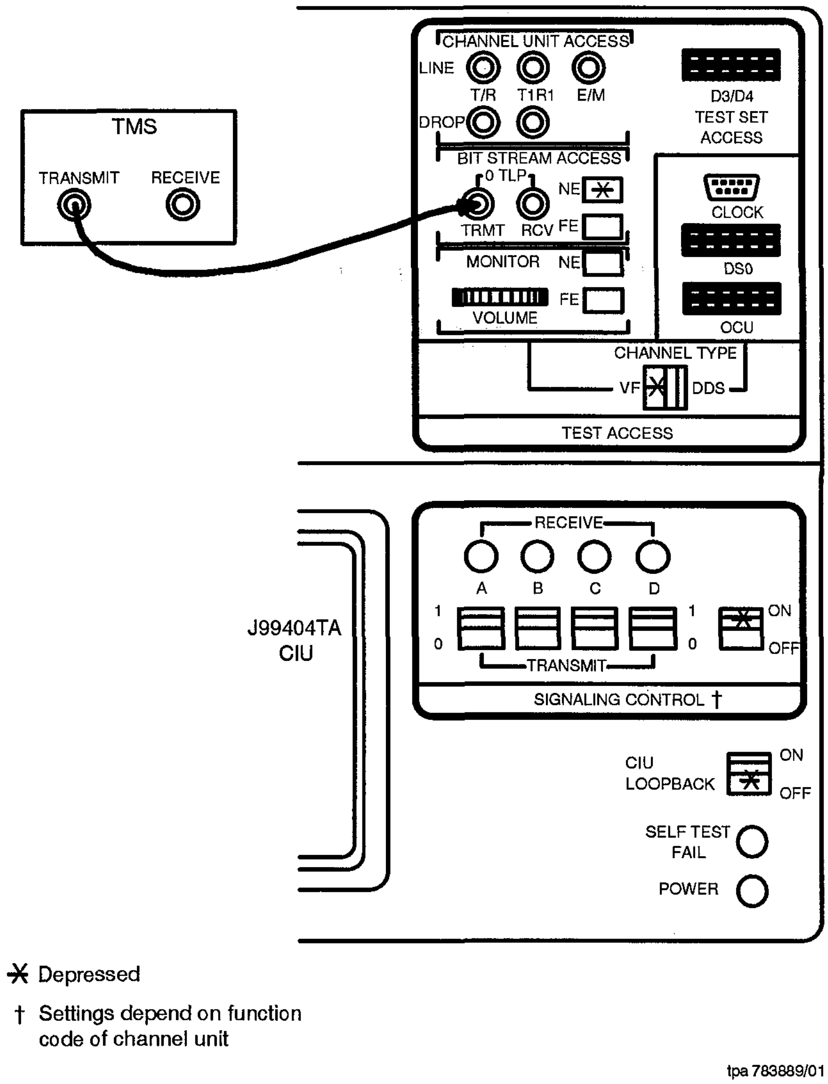


Figure 2 — Test Connections for Testing RT Channel Unit

Check the circuit without the NCTE (to find trouble) as follows: On the WORD, find TLP A-Z for the NCTE (RT side). At the loop interface of the NCTE, measure the receive level. Is the receive level between [(TLP A-Z) −0.6] dBm and [(TLP A-Z) +0.6] dBm?

If **YES,** then the NCTE is causing trouble; adjust or replace it and proceed to Step **20.**

If **NO,** then the RT channel unit may be causing trouble; note the result and continue with Step **11.**

11. At the RT, verify that the channel unit TRANSMIT ATTENUATOR is set to the WORD value. Adjust the TRANSMIT ATTENUATOR no more than 1 dB.

    Reference: **DLP-526**

12. At the loop interface of the NCTE, is the receive level now between [(TLP A-Z) −0.6] dBm and [(TLP A-Z) +0.6] dBm?

    If **YES,** then proceed to Step **18.**

    If **NO,** then reset the TRANSMIT ATTENUATOR to the WORD value and continue with Step **13.**

13. Change the test connections: disconnect the TMS from the CIU and connect the TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on the CIU. Verify that the TMS impedance is 600 ohms.

14. At the loop interface of the NCTE, send TLP Z-A dBm tone toward the RT.

15. ⇒ NOTE:
    If the cable is loaded and the customer location test set impedance is 600 ohms, the level must be corrected — add 0.7 dB to the test indication.

At the RT, measure the gain in the receive direction of the RT channel unit. Is the receive level between −0.6 and +0.6 dBm (or within 0.6 dB of TLP Z-A)?

If **YES,** then continue with Step **16.**

If **NO,** then **refer trouble, possibly loop loss, to the circuit provisioning center for analysis.**

16. Ask the circuit provisioning center to validate the WORD. If the WORD is valid, continue; otherwise, wait for the new WORD.

17. Replace the RT channel unit and repeat from Step **9.**

18. Remeasure the receive level at the NIF (send the tone from the RT toward the NIF). Is the receive level between [(TLP A-Z) −0.7] dBm and [(TLP A-Z) +0.7] dBm?

    If **YES,** then proceed to Step **20.**

    If **NO,** then continue with Step **19.**

19. Replace or adjust the NCTE until the receive level is within limits.

20. Write down the receive level (bit stream-to-NIF gain) for later use.

21. At the RT, disconnect the TMS from the CIU. Connect the TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on the CIU. Verify that the TMS impedance is 600 ohms.

22. At the NIF, send a 1-kHz tone at TLP Z-A dBm toward the RT.

23. At the RT, measure the receive level (the gain in the receive direction of the RT channel unit). Does the TMS indicate between −0.7 and +0.7 dBm (or within 0.7 dB of TLP Z-A)?

    If **YES,** then proceed to Step **31.**

    If **NO,** then continue with Step **24.**

24. At the loop interface of the NCTE, send a tone at TLP Z-A dBm toward the RT.

25. ⇒ NOTE:
    If the cable is loaded and the customer location test set impedance is 600 ohms, the level must be corrected — add 0.7 dB to the test indication.

    At the RT, measure the receive level without the NCTE in the circuit. Does the TMS indicate between −0.6 and +0.6 dBm (or within 0.6 dB of the bit stream TLP Z-A)?

    If **YES,** then the NCTE is causing trouble; adjust or replace the NCTE and proceed to Step **31.**

    If **NO,** then continue with Step **26.**

26. Verify that the RT channel unit RCV ATTENUATOR is set to the WORD value. Adjust the RCV ATTENUATOR no more than 1 dB. Does the TMS indicate between −0.6 and +0.6 dBm (or within 0.6 dB of the bit stream TLP Z-A)?

    Reference: **DLP-526**

    If **YES,** then proceed to Step **29.**

    If **NO,** then continue with Step **27.**

27. Reset the RCV ATTENUATOR to the WORD value. Ask the circuit provisioning center (CPC) to validate the WORD. If the WORD is valid, continue; otherwise, wait for the new WORD.

28. Replace the RT channel unit and repeat from Step **22.**

29. Remeasure the receive level from the NIF. At the NIF, send a 1-kHz tone at (TLP A-Z) dBm toward the RT. At the RT, does the TMS indicate between −0.7 and +0.7 dBm (or within 0.7 dB of the bit stream TLP Z-A)?

    If **YES,** then proceed to Step **31.**

    If **NO,** then continue with Step **30.**

30. Replace or adjust the NCTE until the TMS indicates between −0.7 and +0.7 dBm (or within 0.7 dB of the bit stream TLP Z-A) at the RT.

31. Write down the receive level (1-kHz gain from the NIF to bit stream) for later use.

32. Verify that the TMS **RECEIVE** jack is connected to the CIU **BIT STREAM ACCESS - 0TLP - RCV** jack.

33. At the NIF, send a 0.4-kHz tone at 0 dBm toward the RT.

34. ⇒ NOTE:
    Slope limits depend on whether customer equipment is a PBX or other customer premises switching equipment, or a telset or other nonswitched termination.

At the RT, note the TMS indication. Calculate the low-end slope using this measurement (at 0.4 kHz) and the measurement from the receive direction noted in Step **31**. The result must fall between −0.5 and +1.5 (PBX) or +2.5 (telset):

Response: Slope = Meas(Step 31) − Meas(0.4 kHz)

35. Is the low-end slope between −0.5 and +1.5 (PBX) or +2.5 (telset); in other words, is the measured 0.4 kHz level between 0.5 dB hot and 1.5 dB or 2.5 dB long relative to 1 kHz level?

    If **YES,** then proceed to Step **41.**

    If **NO,** then continue with Step **36.**

36. Does the WORD list an NCTE equalization setting (other than zero) in the Z-A direction?

    If **YES,** then note the low-end slope for later referral to the CPC and proceed to Step **40.**

    If **NO,** then continue with Step **37.**

37. NOTE:
    If the cable is loaded and the customer location test set impedance is 600 ohms, the level must be corrected — add 0.7 dB to the test indication.

    Measure the receive gain at 1 kHz from the loop interface of the NCTE to the RT bit stream.

38. Measure the receive gain at 0.4 kHz from the loop interface of the NCTE to the RT bit stream. Calculate the low-end slope using this measurement (0.4 kHz) and the receive gain measurement at 1 kHz. Is the calculated low-end slope between −0.5 and +1.5 (PBX) or +2.5 (telset)?

    If **YES,** then replace or adjust the NCTE and proceed to Step **33.**

    If **NO,** then note the result for later referral to the circuit provisioning center and continue with Step **39.**

39. At the loop interface of the NCTE, send 2.8 kHz and measure at the RT bit stream. Calculate the high-end slope and note the result for later referral to the circuit provisioning center and proceed to Step **46.**

40. At the NIF, send a 2.8-kHz tone toward the RT.

41. At the RT, note the TMS indication and calculate the high-end slope as done in Step **34**. The result must fall between −0.5 and +2.2 (PBX) or +3.7 (telset):

    Response: Slope = Meas(Step 31) − Meas(2.8 kHz)

42. Is the high-end slope between −0.5 and +2.2 (PBX) or +3.7 (telset)?

    If **YES,** then proceed to Step **46.**

    If **NO,** then continue with Step **43.**

43. Does the WORD list an NCTE equalization setting (other than zero) in the Z-A direction?

    If **YES,** then note the high-end slope for later referral to the CPC and proceed to Step **46.**

    If **NO,** then continue with Step **44.**

44. Measure the receive gain at 1 kHz (if not previously measured and noted) from the loop interface of the NCTE to the RT bit stream.

45. Measure the receive gain at 2.8 kHz from the loop interface of the NCTE to the RT bit stream. Calculate the high-end slope using this measurement (at 2.8 kHz) and the measurement from the receive direction noted in Step **44.** Is the calculated high-end slope between −0.5 and +2.2 (PBX) or +3.7 (telset)?

    If **YES,** then replace or adjust the NCTE and proceed to Step **41.**

    If **NO,** then note the result for later referral to the circuit provisioning center and continue with Step **46.**

46. On the TMS, set the **TRMT** frequency to **404** Hz and **LEVEL** to 0.0 (or TLP A-Z) dBm. Connect the TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on the CIU.

47. Note the measurement at the NIF. Calculate the low-end slope using this measurement (at 404 Hz) and the measurement from the receive direction noted in Step **20**:

    Response: Slope = Meas(Step 20) − Meas(404 Hz)

48. Is the low-end slope between −0.5 and +1.5 (PBX) or +2.5 (telset)?

    If **YES,** then continue with Step **49.**

    If **NO,** then **note the result for later referral to the circuit provisioning center.**

49. On the TMS, set the **TRMT** frequency to **2804.**

50. Note the measurement at the NIF. Calculate the high-end slope as done in Step **47:**

    Response: Slope = Meas(Step 20) − Meas(2804 Hz)

51. Is the high-end slope between −0.5 and +2.2 (PBX) or +3.7 (telset)?

    If **YES,** then continue with Step **52.**

    If **NO,** then **note the result for later referral to the circuit provisioning center.**

52. Disconnect TMS from CIU. Insert 600-ohm terminating plug into CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack.

53. At the NIF, measure the noise on the receive pair. Is the noise less than [(TLP A-Z) + 23] dBrnc?

    If **YES,** then proceed to Step **57.**

    If **NO,** then continue with Step **54.**

54. NOTE:
    If the cable is loaded, the impedance of the noise measuring set should be 900 or 1200 ohms.

    At the loop interface of the NCTE, is the noise less than [(TLP A-Z) + 20] dBrnc?

    If **YES,** then replace the NCTE and proceed to Step **57.**

    If **NO,** then continue with Step **55.**

55. At the loop interface of the NCTE, terminate the transmit pair with 600 ohms (nonloaded cable) or 1200 ohms (loaded cable).

56. At the RT, connect the TMS **RECEIVE** jack to the CIU **BIT STREAM ACCESS - 0TLP - RCV** jack. Is the noise less than 23 (or 23 + TLP Z-A) dBrnc?

    If **YES,** then replace the noisy RT channel unit and proceed to Step **52.**

    If **NO,** then **refer trouble (possible noisy cable) to the appropriate repair forces.**

57. At the NIF, terminate the transmit pair with either 600 or 900 ohms.

58. At the RT, connect the TMS **RECEIVE** jack to the CIU **BIT STREAM ACCESS - 0TLP - RCV** jack. Is the noise less than 25 (or 25 + TLP Z-A) dBrnc?

    If **YES,** then proceed to Step **61.**

    If **NO,** then continue with Step **59.**

59. At the loop interface of the NCTE, terminate the transmit pair with 600 ohms (nonloaded cable) or 1200 ohms (loaded cable).

60. At the RT, measure the noise. If the noise is less than 23 (or 23 + TLP Z-A) dBrnc, replace the NCTE and proceed to Step **61.** If the noise is more than 23 (or 23 + TLP Z-A) dBrnc, replace the noisy RT channel unit and repeat from Step **52.**

61. Was the RT channel unit or the NCTE replaced in the noise test?

    If **YES,** then repeat the RT channel unit and NCTE tests except noise (Step 4 - Step 51).

    If **NO,** then continue with Step **62.**

62. Are any more 4-wire channels of this type to be tested, in this system?

    If **YES,** then disconnect test set, address next channel unit to be tested and proceed to Step **4.**

    If **NO,** then continue with Step **63.**

63. On the CIU, select DISCONNECT TA from the menu ***before*** unplugging the CIU from the **CTU**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Verify RT Channel Unit Settings and Loop Integrity 4-Wire Loop Without NCTE (to PBX or Data Terminal) (FPB/SS System)

Summary: At the remote terminal (RT), all test access is through the digital bit stream using craft interface unit (CIU). At the RT, send 0 dBm level at 1 kHz to the network interface (NIF); the customer receive level from the RT should range from [(TLP A-Z) −0.6] to [(TLP A-Z) +0.6] dBm. At the NIF, send (TLP Z-A) dBm level; the receive level at the RT should range from −0.6 to +0.6 dBm. At the RT, then at the NIF, send 0 dBm tones at 0.4 and 2.8 kHz. At the NIF and at the RT, the low-end slope should range from −0.3 to +1.5, and the high-end slope should range from −0.3 to +2.2. The noise at the NIF should be less than 19 dBrnc. At the RT, the NIF noise should be less than 23 dBrnc.

1. Arrange for channel alignment tests to the customer location.

2. NOTE:
   This procedure applies when the RT is located close enough to the NIF that the RT channel unit does not have to be equalized. For longer loops requiring equalization, the RT channel unit is equalized in the Z-A direction, and network channel terminating equipment (NCTE) must be added to equalize the A-Z direction; that is covered in another procedure.

   Figure 1 shows a typical channel layout for the tests that follow. Refer to the circuit layout information or the work order record detail (WORD) for circuit details.

3. If necessary, connect the CIU to the channel test unit (**CTU**) and address the RT channel unit.

4. If necessary, provision the **AUA41/AUA141** RT channel unit.

   Reference: **DLP-521**

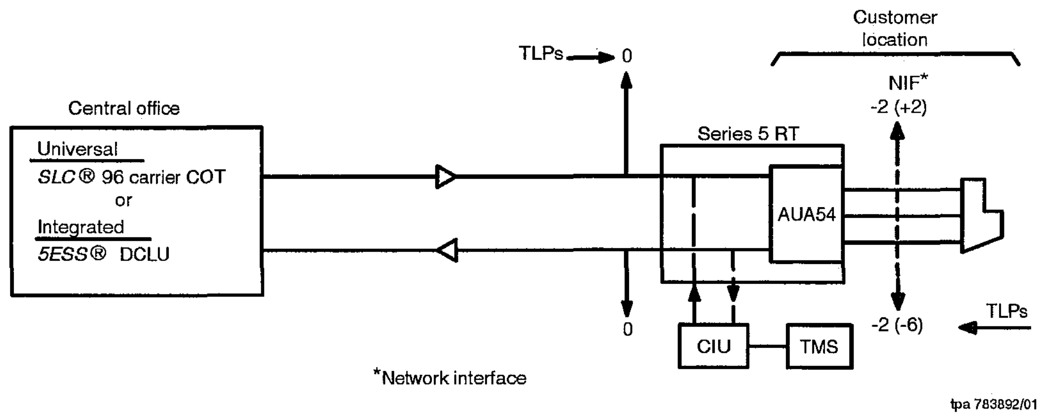


Figure 1—4-Wire Loop (RT End), No NCTE

5. If necessary, provision the **AUA44** or **AUA54** RT channel unit.

   Reference: **DLP-520**

6. From the CONNECT-TA menu, select DIGITAL ONLY (item 1).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

7. Set the switches on the CIU as follows:

   - **BIT STREAM ACCESS** - **0TLP** - **NE** depressed
   - **CHANNEL TYPE** to **VF**
   - If the function code = FXS_ or FXT_, set **SIGNALING CONTROL - TRANSMIT A** and **C** to **0**, **B** and **D** to **1**
   - If the function code = FXO_, FXP_, EM4_, PLR_, TD__, TO4, or ETO4, set **SIGNALING CONTROL - TRANSMIT A**, **B**, **C**, and **D** to **1**
   - **SIGNALING CONTROL** to **ON**
   - **CIU LOOPBACK** to **OFF**.

8.

NOTE 1:

The bit stream TLP is assumed to be 0.0 dB TLP. (The WORD may list bit stream TLPs as +4 and −8.5 dB, which is equivalent to 0.0 dB.) For circuits with a bit stream TLP other than zero, the test levels given must be modified. These levels are shown in parentheses after the normal test levels.

NOTE 2:

The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

Connect the test equipment to send a tone toward the customer location (Figure 2):

- Transmission measuring set (TMS) **TRANSMIT** jack to the CIU **BIT STREAM ACCESS - 0TLP - TRMT** on the CIU
- Set the TMS **TRMT LEVEL** to 0.0 (or TLP A-Z) dBm.

9.

NOTE:

The test values at the NIF at the customer location depend on the type of circuit; refer to the WORD for the value.

At the NIF, measure the receive level. On the WORD, find TLP A-Z for the NIF. Is the receive level between [(TLP A-Z) −0.6] dBm and [(TLP A-Z) +0.6] dBm?

If **YES,** then proceed to Step **14.**

If **NO,** then continue with Step **10.**

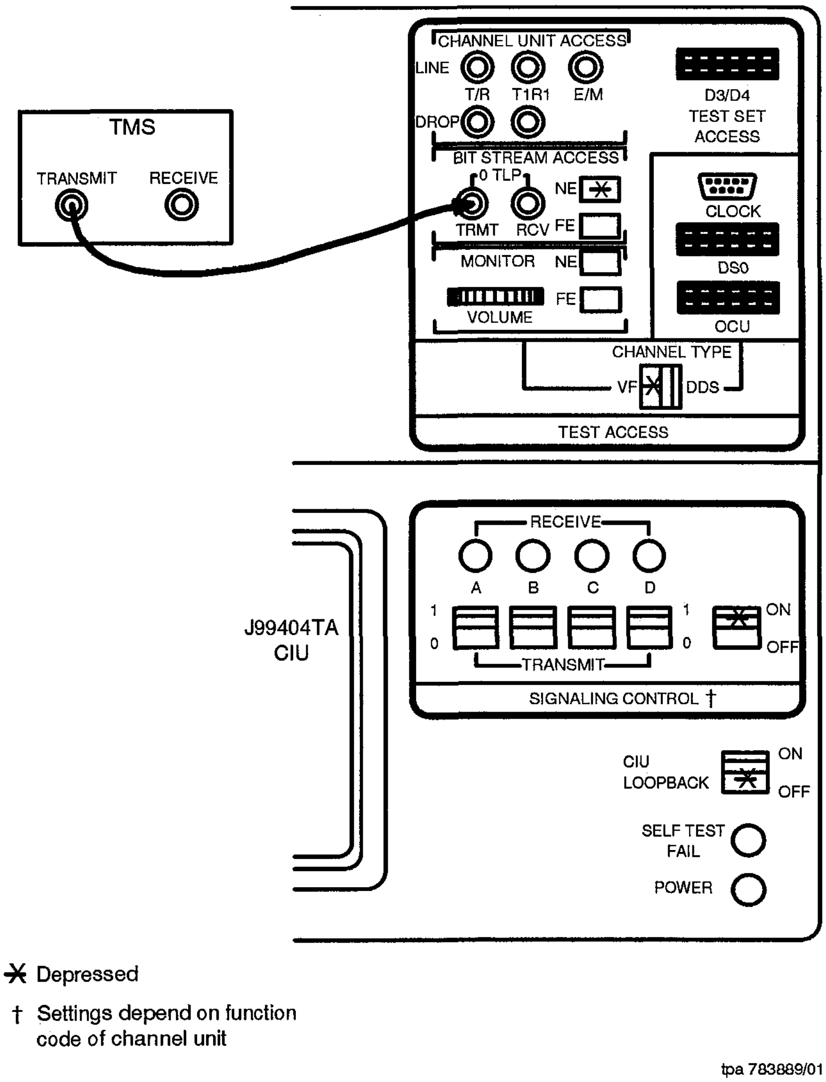


Figure 2 — Test Connections for Testing RT Channel Unit

10. Verify that the RT channel unit TRANSMIT ATTENUATOR is set to the WORD value. Adjust the RT channel unit TRANSMIT ATTENUATOR no more than 1 dB. At the NIF, is the receive level between [(TLP A-Z) −0.6] dBm and [(TLP A-Z) +0.6] dBm?

    Reference: **DLP-526**

    If **YES,** then proceed to Step **14.**

    If **NO,** then reset the TRANSMIT ATTENUATOR to the WORD value and continue with Step **11.**

11. Change the test setup to measure the gain in the receive direction (of RT channel unit):
    - Disconnect the TMS from the CIU
    - Connect the TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on the CIU.

12. At the NIF, send a 1-kHz tone at (TLP Z-A) dBm toward the RT.

13. At the RT, does the TMS indicate between +0.6 and −0.6 dBm (or within 0.6 dB of TLP Z-A)?

    If **YES,** then **note the TMS reading. Ask the circuit provisioning center (CPC) to validate the WORD; if the WORD is valid, refer the cable pair loss trouble to the appropriate repair forces.**

    If **NO,** then **there may be error in the cable loss record; refer trouble to the CPC for analysis.**

14. Write down the receive level (bit stream-to-NIF gain) for later use.

15. Change the test setup to measure the gain in the receive direction (of the RT channel unit):

    - Disconnect the TMS from the CIU
    - Connect the TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on the CIU.

16. At NIF, send a 1-kHz tone at (TLP Z-A) dBm toward the RT.

17. At the RT, does the TMS indicate between +0.6 and −0.6 dBm (or within 0.6 dB of TLP Z-A)?

    If **YES,** then proceed to Step **19.**

    If **NO,** then continue with Step **18.**

18. Verify that the RT channel unit RECEIVE ATTENUATOR is set to the WORD value. Adjust the RT channel unit RECEIVE ATTENUATOR no more than 1 dB. Does the TMS indicate between +0.6 and −0.6 dBm (or within 0.6 dB of the bit stream TLP Z-A)?

    Reference: **DLP-526**

    If **YES,** then continue with Step **19.**

    If **NO,** then **ask the CPC to validate the WORD; if the WORD is valid, reset the RECEIVE ATTENUATOR to the WORD value and refer the cable pair loss trouble to the appropriate repair forces.**

19. Write down the transmit level (1-kHz gain from the NIF to bit stream) for later use.

20. At the NIF, send a 0.4-kHz tone at 0 dBm toward the RT.

21. At the RT, note the TMS indication. Calculate the low-end slope using this measurement (0.4 kHz) and the transmit level measurement noted in Step **19**. The result must fall between −0.3 and +1.0 or between −0.5 and +1.5:

    Response: Slope = Meas(Step 19) − Meas(0.4 kHz)

22. Is the low-end slope between −0.3 and +1.0 (for a circuit that extends beyond the foreign central office) or −0.5 and +1.5 (for other circuits) (in other words, is 404 Hz measured level between 0.3 dB hot and 1.0 dB long or between 0.5 dB hot and 1.5 dB long relative to 1-kHz level)?

    If **YES,** then continue with Step **23.**

    If **NO,** then **note the result for later referral to the CPC.**

23. At the NIF, send a 2.8-kHz tone toward the RT.

24. At the RT, note the TMS indication and calculate the slope as done in Step **21**. The result must fall between −0.3 and +1.5 or between −0.5 and 2.2:

    Response: Slope = Meas(Step 19) − Meas(2.8 kHz)

25. Is the high-end slope between −0.3 and +1.5 (for circuit that extends beyond foreign central office) or −0.5 and +2.2 (for other circuits)?

    If **YES,** then continue with Step **26.**

    If **NO,** then **note the result for later referral to the CPC.**

26. On the TMS, set the **TRMT** frequency to **404** and **LEVEL** to 0.0 (or TLP A-Z) dBm. Connect the TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on the CIU.

27. Note the measurement at the NIF. Calculate the low-end slope using this measurement (404 Hz) and the receive level measurement noted in Step **14**:

    Response: Slope = Meas(Step 14) − Meas(404 Hz)

28. Is the low-end slope between −0.3 and +1.0 (for circuit that extends beyond the foreign central office) or −0.5 and +1.5 (for other circuits)?

    If **YES,** then continue with Step **29.**

    If **NO,** then **note the result for later referral to the CPC.**

29. On the TMS, set the **TRMT** frequency to **2804.**

30. Note the measurement at the NIF. Calculate the high-end slope as done in Step **24**:

    Response: Slope = Meas(Step 24) − Meas(2804 Hz)

31. Is the high-end slope between −0.3 and +1.5 (for circuit that extends beyond the foreign central office) or −0.5 and +2.2 (for other circuits)?

    If **YES,** then continue with Step **32.**

    If **NO,** then **note the result for later referral to the CPC.**

32. Disconnect the test set from the CIU. Insert a 600-ohm terminating plug into the CIU **BIT STREAM ACCESS - 0TLP - TRMT** jack.

33. At the NIF, measure the noise. Is the noise less than 19 dBrnc?

    If **YES,** then proceed to Step **36.**

    If **NO,** then continue with Step **34.**

34. At the NIF, terminate the transmit pair with either 600 or 900 ohms.

35. At the RT, connect the TMS **RECEIVE** jack to the CIU **BIT STREAM ACCESS - 0TLP - RCV** jack. Is the noise less than 23 (or 23 + TLP Z-A) dBrnc?

    If **YES,** then **report the noisy cable pair or the RT channel unit to the appropriate repair forces.**

    If **NO,** then **report the noisy cable trouble to the appropriate repair forces.**

36. At the NIF, terminate the transmit pair with either 600 or 900 ohms.

37. At the RT, connect the TMS **RECEIVE** jack to the CIU **BIT STREAM ACCESS - 0TLP - RCV** jack. Is the noise less than 23 (or 23 + TLP Z-A) dBrnc?

    If **YES,** then continue with Step **38.**

    If **NO,** then **report the noisy cable pair or the RT channel unit to the appropriate repair forces.**

38. Are any more 4-wire channels of this type to be tested in this system?

    If **YES,** then disconnect the test set, address the next channel unit to be tested, and proceed to Step **5.**

    If **NO,** then continue with Step **39.**

39. On the CIU, select DISCONNECT TA from the menu ***before*** unplugging the CIU from the **CTU.**

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Perform OCU and Channel Loopback Test at RT (FPB/SS System)

Summary: This procedure tests the customer loop part of a Digital Data System (DDS) circuit through a *SLC*® Series 5 Carrier System. Digital test access is required at the Series 5 remote terminal (RT) for this test. With the test sets connected to the craft interface unit (CIU) at the RT, loop back the channel at the network interface at the customer location. The counter should indicate 000 (no errors). If no data service unit (DSU) is connected at the network interface, loop back the office channel unit (OCU) at the RT. Repeat for all the dataport channels to be tested in this system.

NOTE:
This procedure uses the KS-20908 and KS-20909 data test sets to perform the OCU and channel loopback tests at 2.4, 4,8, 9.6, or 56 kb/s. Other test equipment, such as the Telepath Industries TPI 108/109 RT II data test unit (DTU), can also be used to perform these tests at these same rates along with the capability of testing 19.2 kb/s DDS and 64 kb/s clear channel circuits. Therefore, references to the TPI 108/109 DTU and interconnection diagrams are also included in this procedure.

1. Arrange for channel tests to the network interface at the customer location. At the network interface, terminate the loop with a channel service unit (CSU) or equivalent test set, or verify that the data service unit (DSU) is connected. Figure 1 shows the circuit layout for the tests that follow.

2. Make sure the channel is out of service.

3. If the OCU dataport is provisioned for error correction, reprovision it for NONE for this test.

   Reference DLP-522

4. Select DIGITAL ONLY from the CONNECT-TA menu.

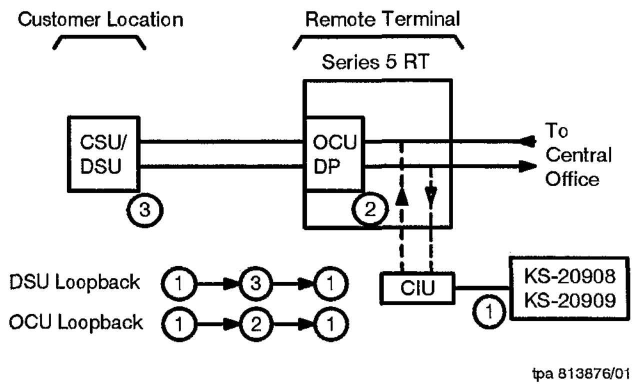


Figure 1—DSU and OCU Loopback Testing Using Digital Test Access at the RT

Response: /* COMPLETED,SYSTEM =____ ...
DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

5. If tests are being performed using a TPI 108/109 DTU, connect the test equipment to the CIU (Figure 2). Otherwise, proceed to Step **9.**

6. Set the switches on the CIU as follows:
   - CIU LOOPBACK to OFF
   - SIGNALING CONTROL to OFF
   - CHANNEL TYPE to DDS.

7. **NOTE:**
   The customer location equipment must be installed for the channel or DSU loopback test; otherwise, the circuit is to be looped back only at the OCU dataport.

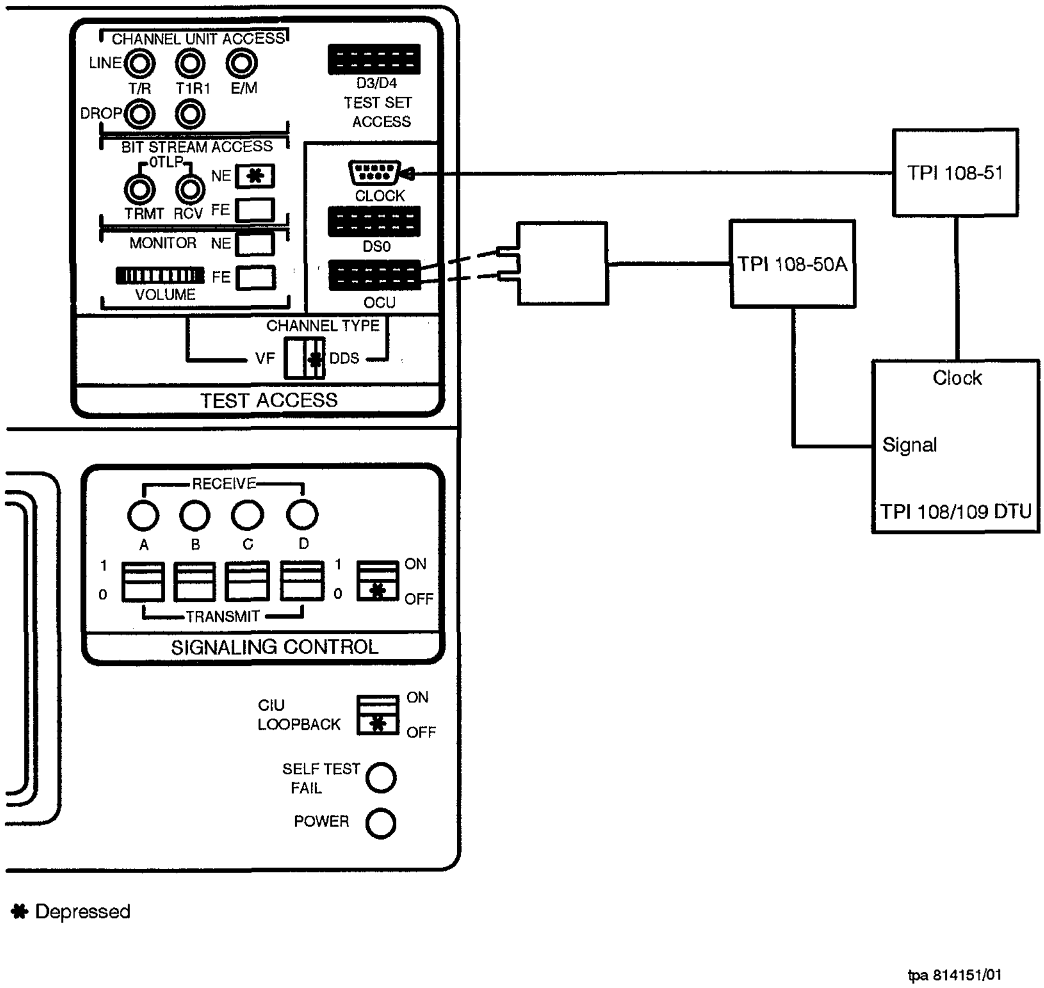


Figure 2—Test Connections for OCU Loopback Test Using TPI 108/109 DTU

At the network interface at the customer location, is the loop terminated with a CSU or equivalent test set, or is the DSU connected?

If YES, then continue with Step **8.**

If NO, then proceed to Step **22.**

8. Refer to the TPI 108/109 DTU user's manual to set up and perform the channel/DSU loopback test and then proceed to Step **21.**

9. Connect the KS-20908 receiver/KS-20909 transmitter to the CIU (Figure 3) as follows:
   - KS-20909 transmitter clock cord to TO TRMTR on the ED-3C792 interface test set
   - KS-20908 receiver clock cord to TO REC on the ED-3C792 test set
   - Cable assembly between TO CH BK on the ED-3C792 test set and TEST ACCESS - DDS - CLOCK on the CIU (which provides clock to synchronize the data test sets)
   - KS-20909 transmitter signal cord to the white jack on the ED-3C793 loopback connector
   - KS-20908 receiver signal cord to the red jack on the ED-3C793 loopback connector.

10. Depress the POWER switches on the transmitter and receiver.

11. Are the CLOCK indicators lighted on the transmitter and receiver?

    If YES, then proceed to Step **13.**

    If NO, then continue with Step **12.**

12. Verify the clock connections between the CIU and the data test sets (transmitter and receiver). Revise the clock connections until the CLOCK indicators are lighted on the DDS test sets.

13. Set the switches on the CIU as follows:
    - CIU LOOPBACK to OFF
    - SIGNALING CONTROL to OFF
    - CHANNEL TYPE to DDS.

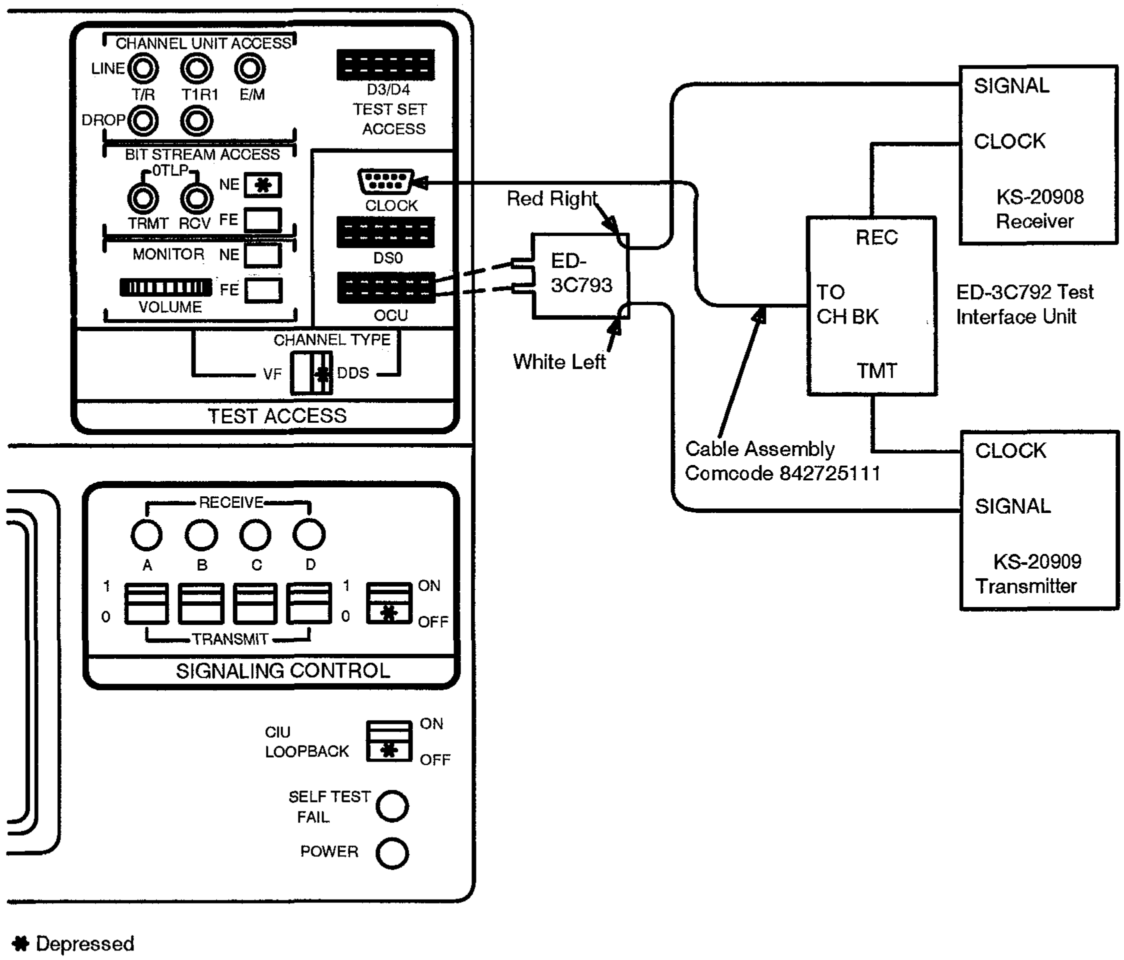


Figure 3 — Test Connections for OCU Loopback Test Using KS-20908/KS-20909 Test Sets

14. Set the switches on the KS-20909 transmitter and KS-20908 receiver as follows:

    - Transmitter MODE to REPEAT
    - Transmitter FUNCTION to LOOPBACK TEST
    - DATA RATE to customer data rate on both test sets
    - Transmitter OUTPUT to LOGIC - NEAR END

- Receiver INPUT to LOGIC - NEAR END
- Receiver SUBRATE CHANNEL to SINGLE
- Receiver TEST WORD to LOOPED
- Receiver COUNTER to BIT ERRORS.

15. On the receiver, depress the TERMINATE switch next to the POWER switch (if present).

    Response: TERMINATED indicator lights (if present).

16. With the red jack on the right, insert the ED-3C793 connector into the TEST ACCESS - DDS - OCU on the CIU.

17. ⇛ NOTE:
    The customer location equipment must be installed for the channel or DSU loopback test; otherwise, the circuit is looped back at the OCU dataport.

    At the network interface at the customer location, is the loop terminated with a CSU or equivalent test set, or is the DSU connected?

    If YES, then continue with Step **18.**

    If NO, then proceed to Step **22.**

18. Start the channel/DSU loopback test as follows: On the transmitter, depress the RESET pushbutton, then depress the CHAN LOOPBACK or DSU LOOPBACK pushbutton.

    Response: Transmitter CHAN LOOPBACK indicator lights; receiver BYTE PATTERN indicators 1 thru 7 flicker for 56 kb/s or 2 through 7 flicker for subrates when pushbutton is released.

19. On the receiver, operate the COUNTER MODE to RESET.

    Response: Counter indicates 000

20. After 60 seconds, operate the COUNTER MODE to HOLD.

21. Does the counter indicate 000?

    If YES, then the channel/DSU loopback test passed; proceed to Step **22**.

    If NO, then do the OCU loopback test to isolate the problem; continue with Step **22**.

22. **NOTE:**
    This OCU loopback test is done for two conditions:

    - The channel/DSU loopback test resulted in errors (trouble).
    - Customer location equipment does not provide for a channel/DSU loopback.

    If tests are being performed using the TPI 108/109 DTU, perform the OCU loopback test and proceed to Step **26.** Otherwise, continue with Step **23.**

23. Start the OCU loopback test as follows: On the transmitter, depress the RESET pushbutton, then depress the OCU pushbutton for 1 second.

    Response: Transmitter OCU LOOPBACK indicator lights; receiver BYTE PATTERN indicators 1 through 7 flicker for 56 kb/s or 2 through 7 flicker for subrates when pushbutton is released.

24. On the receiver, operate the COUNTER MODE to RESET.

    Response: Counter indicates 000.

25. After 60 seconds, operate the COUNTER MODE to HOLD.

26. ⇒ NOTE:
    If the counter indicates no errors for the OCU loopback and did show errors for the channel/DSU loopback, then a problem exists between the OCU dataport and the customer equipment. Refer the trouble to the appropriate repair forces. If the counter indicates no errors for the OCU loopback and no customer location equipment was available for the channel/DSU loopback, the OCU dataport test passed. If the counter indicates errors and the OCU dataport has been replaced already, the replacement dataport is faulty, the wrong dataport was replaced, or the CIU setup is incorrect. Try again.

    Does the counter indicate 000?

    If YES, then continue with Step **27**.

    If NO, then replace the OCU dataport and proceed to Step **17**.

27. If the OCU dataport was provisioned initially for error correction, reprovision it for error correction.

28. Are any more dataport channels to be tested?

    If YES, then address the next channel to be tested, and proceed to Step **3**.

    If NO, then continue with Step **29**.

29. Disconnect the transmitter and receiver from the CIU. On the CIU, select DISCONNECT TA from the menu ***before*** unplugging the CIU from the channel test unit (CTU).

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Verify COT Channel Unit Settings — 2-Wire Interface to Carrier Terminal, Metallic Repeater, or Central Office Switch (FPB/SS System)

Summary: At the remote terminal (RT), all test access is through the digital bit stream using the craft interface unit (CIU). At the central office terminal (COT), send −TRMT(GN) level at 1 kHz; the transmit gain of the COT channel unit (line level) should range from −0.6 to +0.2 dBm. Send 0 dBm level from the RT; at the COT the receive gain (T/R level) should range from [RCV(GN) −0.6] to [RCV(GN) +0.2] dBm. Verify the connection between the COT and the back-to-back terminal. Noise at the COT channel unit should be less than 22 dBrnc. At the RT, the trans-hybrid loss (THL) should be: THL>21 dB.

1. Figure 1 shows the channel layout for the tests that follow. Refer to the circuit layout information or the work order record detail (WORD) for circuit details.

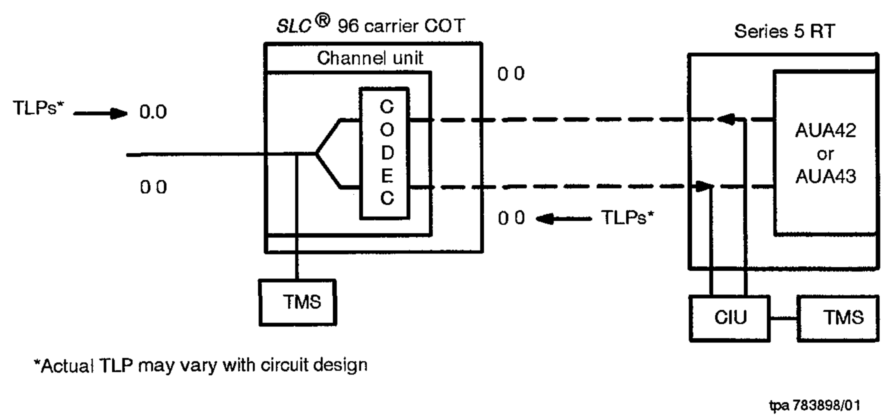


Figure 1—2-Wire Circuit, COT End with Carrier Interface

2. At the COT, verify that the channel unit has been optioned and installed.

   Reference: AT&T 363-202-402

3. NOTE:
   The RT channel unit does not have to be installed or provisioned for this test.

   At the RT, connect the CIU to the channel test unit (**CTU**) and the address channel to be tested.

4. At the RT from the CONNECT-TA menu, select DIGITAL ONLY (item 1).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

5. NOTE:
   The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

   At the RT, connect the test equipment (Figure 2) as follows:

   - TMS **RECEIVE** jack to **BIT STREAM ACCESS** - **0TLP** - **RCV** on the CIU
   - TMS **IMPEDANCE** to **600** ohms.

6. Set the switches on the CIU as follows:

   - **BIT STREAM ACCESS** - **FE** depressed
   - **CHANNEL TYPE** to **VF**
   - If the COT channel unit function is FXS, set **SIGNALING CONTROL** - **TRANSMIT A** and **C** to **0**, **B** and **D** to **1**

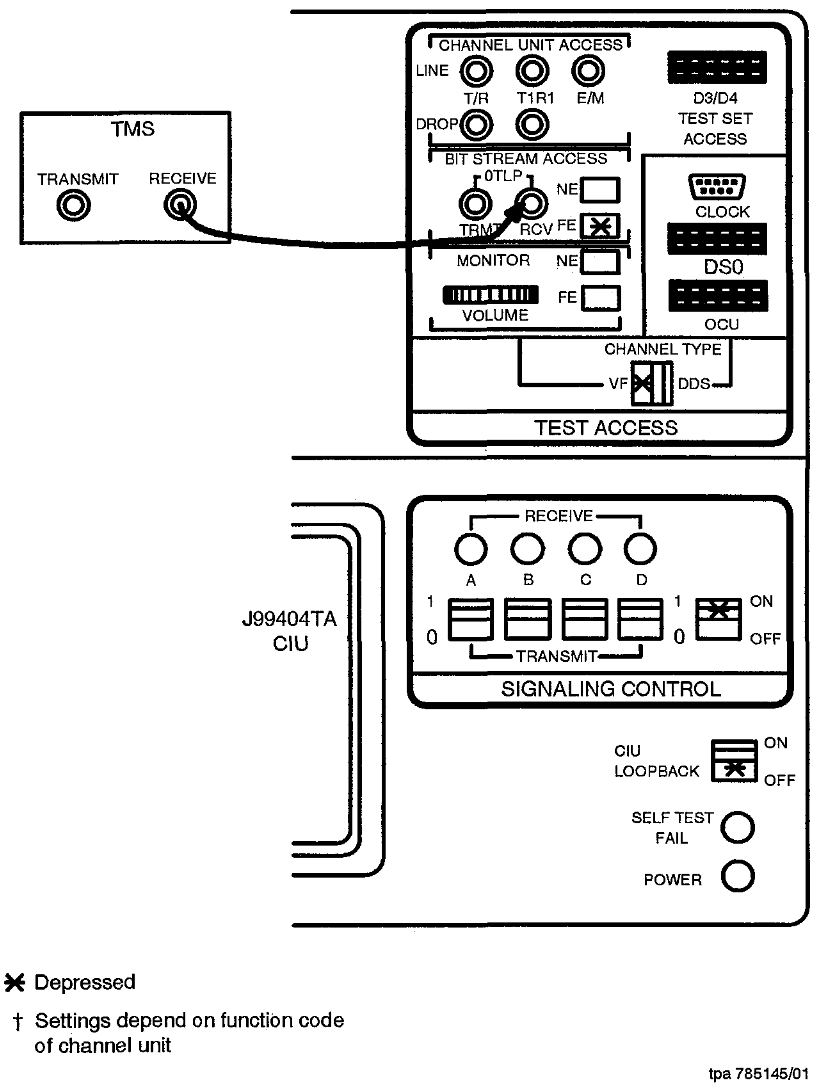


Figure 2—Test Connections for Testing COT Channel Unit

- If the COT channel unit function is FXO, DPO, or TO, set **SIGNALING CONTROL** - **TRANSMIT A, B, C,** and **D** to **1**
- **SIGNALING CONTROL** to **ON**
- **CIU LOOPBACK** to **OFF**.

7. ⇛ NOTE:
If the COT channel unit function code = FXS or DPO, select the TMS HOLD feature or use the holding coil between the TMS jack and the channel unit extender **LINE** - **T/R** jack.

At the COT, connect the TMS to the channel unit tip and ring by means of the channel unit extender or the **TST** connector on the channel unit faceplate.

Reference: AT&T 363-202-402

8. ⇛ NOTE:
If the TMS impedance cannot be set to match the channel unit, 1-kHz level measurements will be 0.2 dB less than actual level; levels specified for measurement include this offset.

At the COT, condition the TMS to send −TRMT(GN) dBm level (at 1 kHz) as follows:

- Set the impedance to **600** or **900** ohms as specified on the WORD.
- Set the **TRMT LEVEL** to −TRMT(GN) value from the WORD.

9. At the RT, measure the transmit gain (receive level). Does the TMS indicate between −0.6 and +0.2 dBm?

   If **YES,** then proceed to Step **16.**

   If **NO,** then continue with Step **10.**

10. Verify the COT channel unit option settings: match the WORD entries for each channel unit setting. If the transmit gain setting is revised, repeat from Step **9**; otherwise, continue with Step **11.**

11. Replace the COT channel unit. Does the RT TMS indicate between −0.6 and +0.2 dBm?

    If **YES,** then proceed to Step **16.**

    If **NO,** then continue with Step **12.**

12. At the RT, disconnect the CIU, replace the **CTU**, and reconnect the CIU. Repeat the channel unit dialog and request for test access. If the TMS still does not indicate within limits, replace the digital test unit - left [**DTU-L** (**AUA18**)] and digital test unit - right [**DTU-R** (**AUA19**)].

13. Does the RT TMS indicate between −0.6 and +0.2 dBm?

    If **YES,** then proceed to Step **16.**

    If **NO,** then continue with Step **14.**

14. At the RT, clear the test bus to the **CTU** and the channel unit.

    Reference: **DLP-534**

15. Does the RT TMS indicate between −0.6 and +0.2 dBm?

    If **YES,** then continue with Step **16.**

    If **NO,** then **refer the trouble to the appropriate repair forces.**

16. At the RT, verify that the TMS is set to receive and the impedance is set to 600 ohms.

17. At the COT, measure the noise on the TMS. Is the noise less than 22 dBrnc?

    If **YES,** then proceed to Step **20.**

    If **NO,** then continue with Step **18.**

18. Replace the COT channel unit. Is the noise less than 22 dBrnc?

    If **YES,** then proceed to Step **20.**

    If **NO,** then reinstall the original channel unit and continue with Step **19.**

19. At the RT, replace the CIU. If a spare CIU is not available, is the noise less than 24 dBrnc (or 22 dBrnc with a spare CIU)?

    If **YES,** then note the result and continue with Step **20.**

    If **NO,** then **refer the trouble to the appropriate repair forces.**

20. At the RT, change test connections:

    - Remove the TMS connection to **BIT STREAM ACCESS - 0TLP - RCV** on the CIU.
    - Connect the TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on the CIU
    - Set the TMS **TRMT LEVEL** to 0.

21. At the COT, connect the **RECEIVE** jack to the channel unit.

22. Measure the COT channel unit receive gain at T/R. Does the TMS indicate between [RCV(GN) −0.6] dBm and [RCV(GN) +0.2] dBm?

    If **YES,** then proceed to Step **29.**

    If **NO,** then continue with Step **23.**

23. Verify COT channel unit option settings: Match the WORD entries for each channel unit setting. If the receive gain setting is revised, repeat from Step **22**; otherwise continue with Step **24.**

24. Replace the COT channel unit. Does the COT TMS indicate between [RCV(GN) −0.6] dBm and [RCV(GN) +0.2] dBm?

    If **YES,** then proceed to Step **29.**

    If **NO,** then continue with Step **25.**

25. At the RT, disconnect the CIU, replace the **CTU**, and reconnect the CIU. Repeat the channel unit dialog and request for test access. If the TMS still does not indicate within limits, replace the **DTU-L** and **DTU-R** (**AUA18** and **AUA19**).

26. Does the COT TMS indicate between [RCV(GN) −0.6] dBm and [RCV(GN) +0.2] dBm?

    If **YES,** then proceed to Step **29.**

    If **NO,** then continue with Step **27.**

27. At the RT, clear the test bus to the **CTU** and the channel unit.

    Reference: **DLP-534**

28. Does the COT TMS indicate between [RCV(GN) −0.6] dBm and [RCV(GN) +0.2] dBm?

    If **YES,** then continue with Step **29.**

    If **NO,** then **refer the trouble to the appropriate repair forces.**

29. Terminate the COT channel unit transmit side for noise measurement: At the COT, verify that the TMS **TRANSMIT** jack is connected, that the TMS is set to receive, and that the impedance is set to the WORD value.

30. At the RT, measure the noise on the TMS. Is the noise less than [20 + RCV(GN)] dBrnc?

    If **YES,** then proceed to Step **32.**

    If **NO,** then continue with Step **31.**

31. Replace the COT channel unit. Is the noise less than [20 + RCV(GN)] dBrnc?

    If **YES,** then continue with Step **32.**

    If **NO,** then **refer the trouble to the appropriate repair forces.**

32. Verify the connection between the COT and the back-to-back terminal (Figure 1). Consult office records or circuit records, if necessary. Are the terminals connected?

    If **YES,** then continue with Step **33.**

    If **NO,** then proceed to Step **37.**

33. To measure the return loss (balance) at the RT, change the test connections as follows:

    - TMS **RECEIVE** jack to **BIT STREAM ACCESS** - **0TLP** - **RCV** on the CIU
    - TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP** - **TRMT** on CIU
    - Set the TMS **TRMT LEVEL** to 0 dBm
    - Verify that the TMS impedance is **600.**

34. At the RT, note the TMS indication. (Ignore + or –.) Add RCV(GN) and TRMT(GN) (from the WORD) to the noted value. (Negative values from the WORD should be subtracted.) The result is trans-hybrid loss (THL).

    Response: THL = TMS(meas) + RCV(GN) + TRMT(GN)

35. Is the THL greater than 21 dB?

    If **YES,** then proceed to Step **37.**

    If **NO,** then continue with Step **36.**

36. Revise the balance setting of the COT channel unit. If the THL is still less than 21 dB, check the central office (CO) wiring, look for noisy termination of the channel, or refer the trouble to the appropriate repair forces.

37. Are any more 2-wire channels of this type to be tested in this system?

    If **YES,** then disconnect the TMS at the COT and RT and proceed to Step **2.**

    If **NO,** then continue with Step **38.**

38. At the RT on CIU, select DISCONNECT TA from the menu ***before*** unplugging the CIU from the **CTU**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Verify COT Channel Unit Settings — 2-Wire COT Interface to Loop to PBX, Telephone Set, or Data Modem (FPB/SS System)

Summary: At the remote terminal (RT), all test access is through the digital bit stream using the craft interface unit (CIU). At the central office terminal (COT), send −TRMT(GN) level at 1 kHz toward the RT; the transmit gain of the COT channel unit (line level) should range from −0.4 to +0.4 dBm. At the RT, send 0 dBm level at 1 kHz toward the COT. The receive gain of the COT channel unit (T/R level) should range from [RCV(GN) −0.4] to [RCV(GN) +0.4] dBm. At the network interface (NIF), the customer receive level should range from [(TLP Z-A) −0.6] to [(TLP Z-A) +0.6] dBm. At the NIF, send TLP A-Z dBm level; the transmit line level at the RT should range from −0.6 to +0.6 dBm. At the RT, then at the NIF, send 0 dBm tones at 0.4 and 2.8 kHz. At the NIF and at the RT, the low-end slope should range from −0.5 to +2.5, and the high-end slope should range from −0.5 to +3.74. The noise at the customer location should be less than 20 dBrnc. The noise at the RT should be less than 23 dBrnc.

1. Arrange for channel alignment tests to the NIF at the customer location. Figure 1 shows the channel layout for the tests that follow. Refer to the circuit layout information or the work order record detail (WORD) for circuit details.

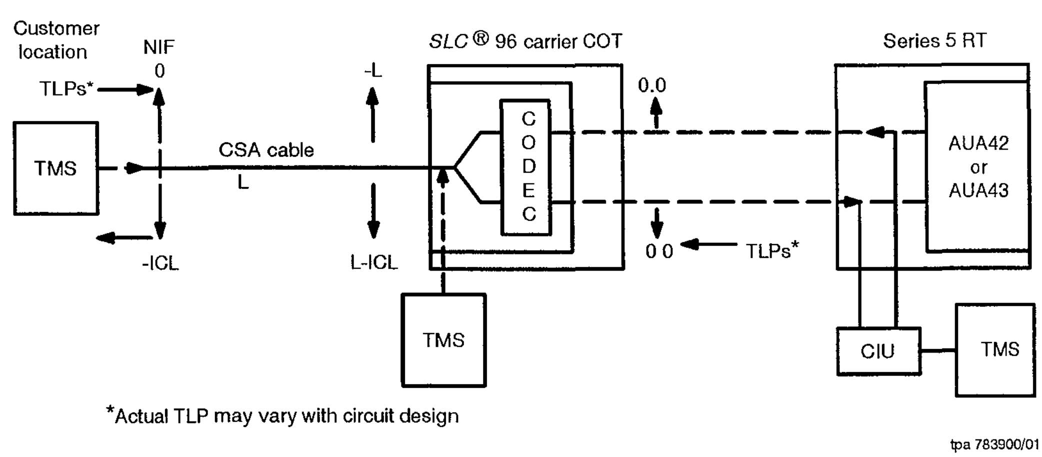


Figure 1 — 2-Wire Circuit with Loop at COT End

2. At the COT, verify that the channel unit has been optioned and installed.

   Reference: AT&T 363-202-402

3. NOTE:
   The RT channel unit does not have to be installed or provisioned for this test.

   At the RT, connect the CIU to the channel test unit (**CTU**) and address the channel to be tested.

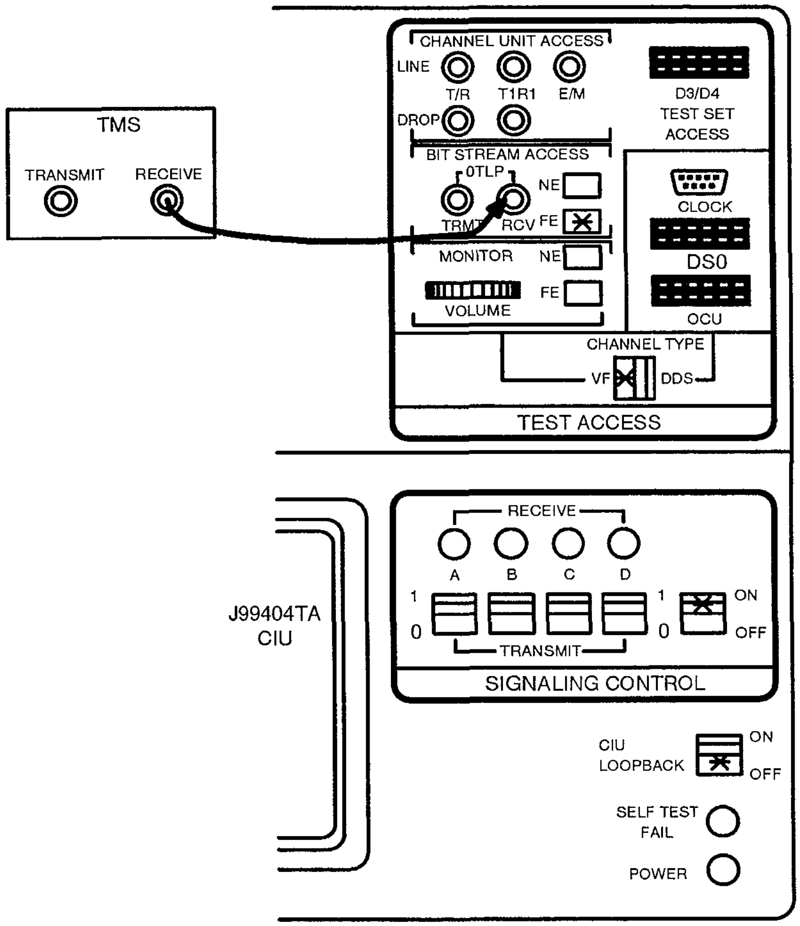
4. From the CONNECT-TA menu, select DIGITAL ONLY (item 1).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

5. NOTE:
   The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

   At the RT, connect the test equipment (Figure 2) as follows:

   - Transmission measuring set (TMS) **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on the CIU
   - TMS **IMPEDANCE** to **600** ohms.



✱ Depressed

† Settings depend on function code of channel unit

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Figure 2—Test Connections for Testing COT Channel Unit

6. Set the switches on the CIU as follows:
   - **BIT STREAM ACCESS** - **FE** depressed
   - **CHANNEL TYPE** to **VF**

- If the COT channel unit function is FXS, set **SIGNALING CONTROL** - **TRANSMIT A** and **C** to **0**, **B** and **D** to **1**
- If the COT channel unit function is FXO or TO, set **SIGNALING CONTROL** - **TRANSMIT A**, **B**, **C**, and **D** to **1**
- **SIGNALING CONTROL** to **ON**
- **CIU LOOPBACK** to **OFF**.

7. ⇛ NOTE:
If the COT channel unit function code = FXS or DPO, select the TMS HOLD feature or use the holding coil between the TMS jack and the channel unit extender **LINE** - **T/R** jack.

At the COT, connect the TMS to the channel unit tip and ring by means of the channel unit extender or the **TST** connector on the channel unit faceplate.

Reference: AT&T 363-202-402

8. ⇛ NOTE:
This procedure is based on A-Z direction being from the COT toward the RT. If the WORD defines this direction as Z-A, read A-Z as Z-A (and the reverse) in steps that follow.

At the COT, condition the TMS to send –TRMT(GN) dBm level (at 1 kHz) toward the RT as follows:

- Set the impedance to **600** ohms
- Set the **TRMT LEVEL** to –TRMT(GN) value from the WORD.

9. At the RT, measure the transmit gain (receive level). Does the TMS indicate between −0.4 and +0.4 dBm?

   If **YES,** then proceed to Step **16.**

   If **NO,** then continue with Step **10.**

10. Verify the COT channel unit options: Match the WORD entries for each channel unit setting. If the transmit gain setting is revised, repeat from Step **8**; otherwise continue with Step **11.**

11. Replace the COT channel unit. Does the RT TMS indicate between −0.4 and +0.4 dBm?

    If **YES,** then proceed to Step **16.**

    If **NO,** then continue with Step **12.**

12. At the RT, disconnect the CIU, replace the **CTU** and reconnect the CIU. Repeat the channel unit dialog and request for test access. If the TMS still does not indicate within limits, replace the digital test unit - left [**DTU-L** (**AUA18**)] and the digital test unit - right [**DTU-R** (**AUA19**)].

13. Does the RT TMS indicate between −0.4 and +0.4 dBm?

    If **YES,** then proceed to Step **16.**

    If **NO,** then continue with Step **14.**

14. At the RT, clear the test bus to the **CTU** and the channel unit.

    Reference: **DLP-534**

15. Does the TMS indicate between −0.4 and +0.4 dBm?

    If **YES,** then continue with Step **16.**

    If **NO,** then **refer the trouble to the appropriate repair forces.**

16. At the RT, change test connections:

    - Remove the TMS connection to **BIT STREAM ACCESS - 0TLP - RCV** on the CIU.
    - Connect the TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on the CIU
    - Set the TMS **TRMT LEVEL** to 0.
    - Verify that the **IMPEDANCE** is set to **600** ohms.

17. At the COT, connect the **RECEIVE** jack to the channel unit. Measure the channel unit receive gain. Does the COT TMS indicate between [RCV(GN) −0.4] dBm and [RCV(GN) +0.4] dBm?

    If **YES,** then proceed to Step **24.**

    If **NO,** then continue with Step **18.**

18. Verify the COT channel unit option settings: Match the WORD entries for each channel unit setting. If the receive gain setting is revised, repeat from Step **17**; otherwise, continue with Step **19.**

19. Replace the COT channel unit. Does the COT TMS indicate between [RCV(GN) −0.4] dBm and [RCV(GN) +0.4] dBm?

    If **YES,** then proceed to Step **24.**

    If **NO,** then continue with Step **20.**

20. At the RT, disconnect the CIU, replace the **CTU**, and reconnect the CIU. Repeat the channel unit dialog and request for test access. If the COT TMS still does not indicate within limits, replace the **DTU-L** and **DTU-R** (**AUA18** and **AUA19**).

21. At the COT, does the TMS indicate between [RCV(GN) −0.4] dBm and [RCV(GN) +0.4] dBm?

    If **YES,** then proceed to Step **24.**

    If **NO,** then continue with Step **22.**

22. At the RT, clear the test bus to the **CTU** and the channel unit.

    Reference: **DLP-534**

23. At the COT, does the TMS indicate between [RCV(GN) −0.4] dBm and [RCV(GN) +0.4] dBm?

    If **YES,** then continue with Step **24.**

    If **NO,** then **refer the trouble to the appropriate repair forces.**

24. At the COT, disconnect the TMS from the channel unit and reconnect the TMS at the NIF. Set the TMS to receive and verify that the impedance is set to 600 ohms.

25. **NOTE:**
    Unless the channel unit function code = TO, the bit stream TLP is assumed to be 0.0 dB TLP. For circuits with a bit stream TLP other than zero, the test levels given must be modified. These levels are shown in parentheses after the normal test levels.

    On the RT TMS, reset **TRMT LEVEL** to 0 (or TLP Z-A) dBm.

26. At the customer location, is the receive level between [(TLP Z-A) −0.6] dBm and [(TLP Z-A) +0.6] dBm?

    If **YES,** then proceed to Step **30.**

    If **NO,** then note the receive level at the customer location and continue with Step **27.**

27. At the COT, verify that the COT channel unit receive gain is set to the WORD value. Adjust the COT channel unit receive gain no more than 1 dB. At the customer location, is the receive level between [(TLP Z-A) −0.6] dBm and [(TLP Z-A) +0.6] dBm?

    If **YES,** then proceed to Step **30.**

    If **NO,** then reset the receive gain to the WORD value and continue with Step **28.**

28. At the RT, set the TMS to receive and verify that the impedance is 600 ohms. At the customer location, send 0 dBm level (600 ohms impedance) toward the COT.

29. At the RT, measure the gain of the loop and the COT channel unit in the transmit direction. Note the TMS indication and refer the trouble to the circuit provisioning center for analysis.

30. Write down the receive level at the customer location for later use.

31. At the RT, change the test connections:

    - Remove the TMS connection to the **TRANSMIT** jack to **BIT STREAM ACCESS** - **0TLP** - **TRMT** on the CIU
    - Connect the TMS **BIT STREAM ACCESS** - **0TLP** - **RCV** on the CIU.
    - Verify the **IMPEDANCE** is set to **600** ohms.

32. At the customer location, send TLP A-Z dBm level (600 ohms impedance) toward the RT. At the RT, measure the gain of the loop and the COT channel unit in the transmit direction. Does the TMS indicate between −0.6 and +0.6 dBm (or within 0.6 dB of the bit stream TLP A-Z)?

    If **YES,** then proceed to Step **34.**

    If **NO,** then note the transmit level in the bit stream and continue with Step **33.**

33. Verify that the COT channel unit transmit gain is set to the WORD value. Adjust the COT channel unit transmit gain no more than 1 dB. Does the RT TMS indicate between +0.6 and −0.6 dBm (or within 0.6 dB of the bit stream TLP A-Z)?

    If **YES,** then continue with Step **34.**

    If **NO,** then **refer the trouble to the circuit provisioning center for analysis.**

34. Write down the transmit level (1-kHz gain from the NIF to bit stream) for later use.

35. At the customer location, send 0.4 kHz tone at TLP A-Z dBm toward the RT.

36. NOTE:
    The slope limits depend on whether customer equipment is a PBX or other customer premises switching equipment, or a telset or other nonswitched termination.

    At the RT, note the TMS indication. Calculate the low-end slope using this measurement (at 0.4 kHz) and measurement from the transmit direction noted in Step **34.** The result must fall between −0.5 and +1.5 (PBX) or +2.5 (telset):

    Response: Slope = Meas(Step 34) − Meas(0.4 kHz)

37. Is the low-end slope between −0.5 and +1.5 (PBX) or +2.5 (telset); in other words, is 404 Hz measured level between 0.5 dB hot and 1.5 dB or 2.5 dB long relative to the level at 1 kHz?

    If **YES,** then continue with Step **38.**

    If **NO,** then **note the result for later referral to the circuit provisioning center.**

38. At the customer location, send a 2.8-kHz tone toward the RT.

39. At the RT, note the TMS indication and calculate the high-end slope as done in Step **36**. The result must fall between −0.5 and +2.2 (PBX) or +3.7 (telset):

    Response: Slope = Meas(Step 34) − Meas(2.8 kHz)

40. Is the high-end slope between −0.5 and +2.2 (PBX) or +3.7 (telset)?

    If **YES,** then continue with Step **41.**

    If **NO,** then **note the result for later referral to the circuit provisioning center.**

41. At the RT, change the test connections:

    - Remove the TMS connection to **BIT STREAM ACCESS - 0TLP - RCV** on the CIU.
    - Connect the TMS **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on the CIU
    - Set the TMS **TRMT LEVEL** to 0.0 (TLP A-Z) dBm
    - Set the **TRMT** frequency to **404**
    - Verify that the **IMPEDANCE** is set to **600** ohms.

42. Note the measurement at the customer location. Calculate the low-end slope using this measurement (at 404 Hz) and the measurement from the receive direction noted in Step **30**:

    Response: Slope = Meas(Step 30) – Meas(404 Hz)

43. Is the low-end slope between −0.5 and +1.5 (PBX) or +2.5 (telset)?

    If **YES,** then continue with Step **44.**

    If **NO,** then **note the result for later referral to the circuit provisioning center.**

44. On the RT TMS, set the **TRMT** frequency to **2804.**

45. Note the measurement at the customer location. Calculate the high-end slope as done in Step **42**:

    Response: Slope = Meas(Step 30) – Meas(2804 Hz)

46. Is the high-end slope between −0.5 and +2.2 (PBX) or +3.7 (telset)?

    If **YES,** then continue with Step **47.**

    If **NO,** then **note the result for later referral to the circuit provisioning center.**

47. NOTE:
    If the channel unit function is FXS or DPO, the termination must include battery feed.

    At the customer location, terminate the loop with 600 ohms (verify that the TMS impedance is set to 600 ohms).

48. At the RT, disconnect the TMS and connect the return loss measuring set to **BIT STREAM ACCESS** - **0TLP** - **RCV** and **TRMT** on the CIU. Measure the return loss. Is SRL-HI > 13, SRL > 14, ERL > 15?

    If **YES,** then proceed to Step **50.**

    If **NO,** then continue with Step **49.**

49. At the RT is SRL-HI > 9, SRL > 11, ERL > 11?

    If **YES,** then note the result for later referral to the circuit provisioning center and continue with Step **50.**

    If **NO,** then **refer the trouble to the circuit provisioning center and wait for new the WORD.**

50. At the customer location, remove the termination (or set the TMS to measure noise). At the RT, disconnect the return loss measuring set and insert a 600- or 900-ohm terminating plug in the CIU **BIT STREAM ACCESS** - **0TLP** - **TRMT** jack.

51. At the customer location, measure the noise. Is the noise less than 20 dBrnc?

    If **YES,** then proceed to Step **57.**

    If **NO,** then continue with Step **52.**

52. At the customer location, terminate the loop with either 600 or 900 ohms.

53. At the RT, measure the noise: Connect the TMS to the CIU **BIT STREAM ACCESS** - **0TLP** - **RCV** jack. Is noise less than 23 dBrnc?

    If **YES,** then proceed to Step **57.**

    If **NO,** then continue with Step **54.**

54. Replace the COT channel unit. Is the noise less than 22 dBrnc?

    If **YES,** then proceed to Step **56.**

    If **NO,** then reinstall the original channel unit and continue with Step **55.**

55. At the RT, replace the CIU. If the spare CIU is not available, is the noise less than 24 dBrnc (or 22 dBrnc with the spare CIU)?

    If **YES,** then note the result and continue with Step **56.**

    If **NO,** then **refer the trouble to the appropriate repair forces.**

56. Was the COT channel unit replaced in the noise test (Step 54)?

    If **YES,** then proceed to Step **5.**

    If **NO,** then continue with Step **57.**

57. Are any more 2-wire channels of this type to be tested in this system?

    If **YES,** then disconnect the test sets at both ends and proceed to Step **2.**

    If **NO,** then continue with Step **58.**

58. At the RT on the CIU, select DISCONNECT TA from the menu ***before*** unplugging the CIU from the **CTU.**

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Verify COT Channel Unit Settings — 4-Wire Interface to Carrier Terminal (FPB/SS System)

Summary: At the remote terminal (RT), all test access is through the digital bit stream using the craft interface unit (CIU). At the central office terminal (COT), send TLP A-Z level at 1 kHz toward the RT; the transmit gain of the COT channel unit (line level) should range from −0.4 to +0.4 dBm. At the RT, send 0 dBm level at 1 kHz. At the COT, the channel unit receive gain (T/R level) should range from [(TLP Z-A) −0.4] to [(TLP Z-A) +0.4] dBm. Noise at the COT should be less than [(TLP Z-A) + 20] dBrnc.

1. Figure 1 shows the channel layout for the tests that follow. Refer to the circuit layout information or the work order record detail (WORD) for circuit details.

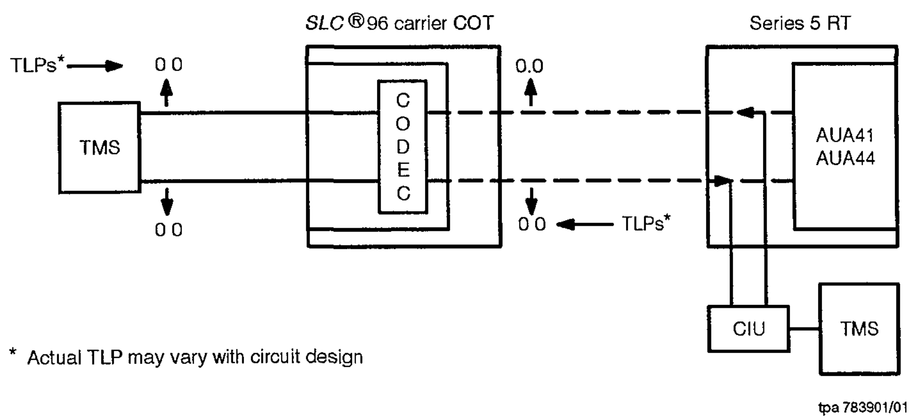

Figure 1—4-Wire Circuit, COT End with Carrier Interface

2. At the COT, verify that the channel unit has been optioned and installed.

   Reference: AT&T 363-202-402

3. NOTE:
The RT channel unit does not have to be installed or provisioned for this test.

At the RT, connect the CIU to the channel test unit (**CTU**) and address the channel to be tested.

4. From the CONNECT-TA menu, select DIGITAL ONLY (item 1).

Response: /* COMPLETED,SYSTEM=____ ...
DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

5. NOTE:
The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

At the RT, connect the test equipment (Figure 2) as follows:

- Transmission measuring set (TMS) **TRANSMIT** jack to **BIT STREAM ACCESS** - **0TLP** - **TRMT** on the CIU
- TMS **RECEIVE** jack to **BIT STREAM ACCESS** - **0TLP** - **RCV** on the CIU.
- TMS **IMPEDANCE** to **600** ohms.

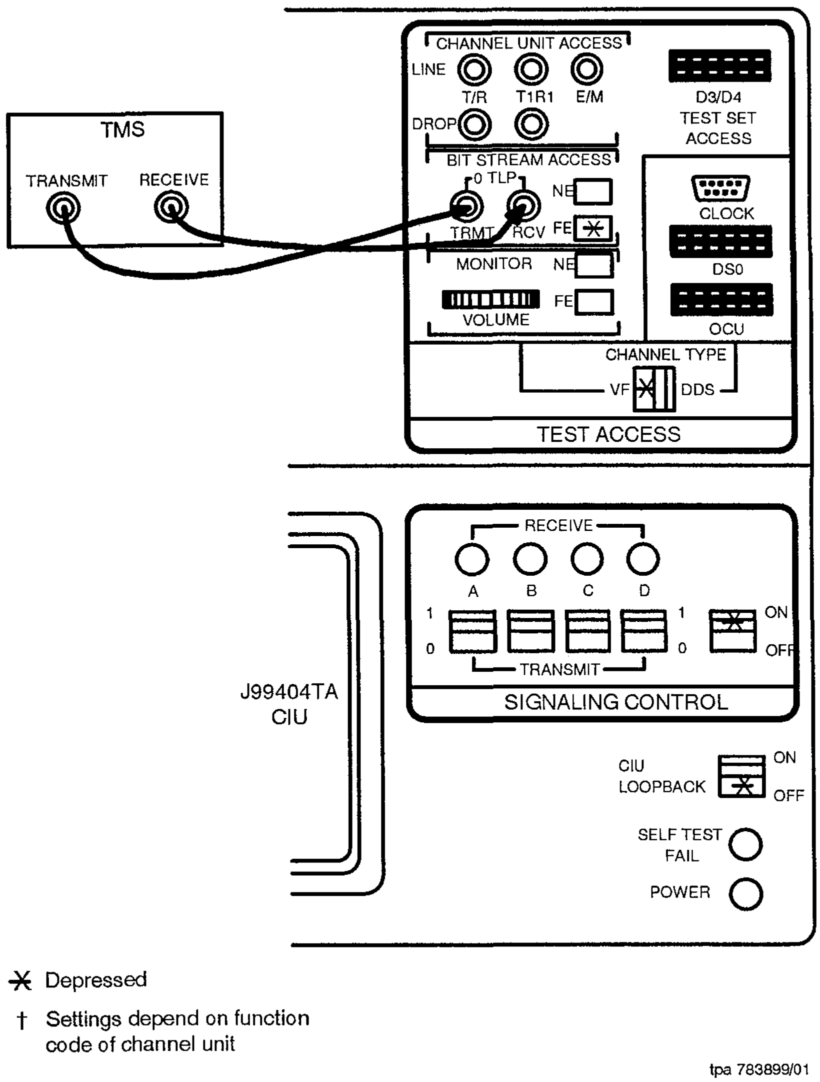

Figure 2—Test Connections for Testing COT Channel Unit

6. Set the switches on the CIU as follows:
   - **BIT STREAM ACCESS** - **FE** depressed
   - **CHANNEL TYPE** to **VF**

- If the COT channel unit function is 4FXO, 4DX, 4TO, or 4ETO, set **SIGNALING CONTROL - TRANSMIT A**, **B**, **C**, and **D** to **1**
- If the COT channel unit function is 4FXS, set **SIGNALING CONTROL - TRANSMIT A** and **C** to 0, **B** and **D** to 1
- **SIGNALING CONTROL** to **ON**
- **CIU LOOPBACK** to **OFF**.

7. At the COT, connect the TMS to the channel unit tip and ring by means of the 4-wire channel unit extender or the **TST** connector on the channel unit faceplate.

   Reference: AT&T 363-202-402

8. ⇛ NOTE:
   This procedure is based on A-Z direction being from the COT toward the RT. If WORD defines this direction as Z-A, read A-Z as Z-A (and the reverse) in the steps that follow.

   On the WORD, find TLP A-Z for the COT channel unit.

9. At the COT, condition the TMS to send TLP A-Z dBm level at 1 kHz (to the T/R input to the channel unit) as follows:
   - Set the impedance to **600** ohms
   - Set the **TRMT** frequency to **1004**
   - Set the **TRMT LEVEL** to TLP A-Z dBm level.

10. ⇛ NOTE:
    The bit stream TLP is assumed to be 0.0 dB TLP. (The WORD may list bit stream TLPs as +4 and −8.5 dB, which is equivalent to 0.0 dB.) For circuits with a bit stream TLP other than zero, the test levels given must be modified. These levels are shown in parentheses after the normal test levels.

At the RT, measure the COT channel unit transmit gain (**RCV LEVEL** on TMS). Does the TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of the bit stream TLP A-Z)?

If **YES,** then proceed to Step **17.**

If **NO,** then continue with Step **11.**

11. Verify the COT channel unit option settings: match the WORD entries for each channel unit setting. If the transmit attenuator setting is revised, repeat from Step **10**; otherwise continue with Step **12**.

12. Replace the COT channel unit. Does the TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of the bit stream TLP A-Z)?

    If **YES,** then proceed to Step **17.**

    If **NO,** then continue with Step **13.**

13. At the RT, disconnect the CIU, replace the **CTU**, and reconnect the CIU. Repeat the channel unit dialog and request for test access. If the TMS still does not indicate within the limits, replace the digital test unit - left [**DTU-L** (**AUA18**)] and digital test unit - right [**DTU-R** (**AUA19**)].

14. Does the TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of the bit stream TLP A-Z)?

    If **YES,** then proceed to Step **17.**

    If **NO,** then continue with Step **15.**

15. At the RT, clear the test bus to the **CTU** and the channel unit.

    Reference: **DLP-534**

16. Does the TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of the bit stream TLP A-Z)?

    If **YES,** then continue with Step **17.**

    If **NO,** then **refer the trouble to the appropriate repair forces.**

17. At the RT, set the TMS **TRMT LEVEL** to 0.0 (or bit stream TLP Z-A) dBm.

18. On the WORD, find TLP Z-A for the COT channel unit.

19. At the COT, measure the channel unit receive gain. Does the TMS indicate between [(TLP Z-A) −0.4] dBm and [(TLP Z-A) +0.4] dBm?

    If **YES,** then proceed to Step **26.**

    If **NO,** then continue with Step **20.**

20. Verify the COT channel unit option settings: Match the WORD entries for each channel unit setting. If the receive attenuator setting is revised, repeat from Step **19**; otherwise continue with Step **21.**

21. Replace the COT channel unit. Does the COT TMS indicate between [(TLP Z-A) −0.4] dBm and [(TLP Z-A) +0.4] dBm?

    If **YES,** then proceed to Step **26.**

    If **NO,** then continue with Step **22.**

22. At the RT, disconnect the CIU, replace the **CTU**, and reconnect the CIU. Repeat the channel unit dialog and request for test access. If the COT TMS still does not indicate within limits, replace the RT **DTU-L** and **DTU-R** (**AUA18** and **AUA19**).

23. Does the TMS indicate between [(TLP Z-A) −0.4] dBm and [(TLP Z-A) +0.4] dBm?

    If **YES,** then proceed to Step **26.**

    If **NO,** then continue with Step **24.**

24. At the RT, clear the test bus to the **CTU** and the channel unit.

    Reference: **DLP-534**

25. Does the COT TMS indicate between [(TLP Z-A) −0.4] dBm and [(TLP Z-A) +0.4] dBm?

    If **YES,** then continue with Step **26.**

    If **NO,** then **refer the trouble to the appropriate repair forces.**

26. At the RT, set the TMS to receive and verify that the impedance is set to 600 ohms.

27. At the COT, measure the noise on the TMS. Is the noise less than [(TLP Z-A) +20] dBrnc?

    If **YES,** then proceed to Step **29.**

    If **NO,** then continue with Step **28.**

28. Replace the COT channel unit. Is the noise less than [(TLP Z-A) +20] dBrnc?

    If **YES,** then continue with Step **29.**

    If **NO,** then **consult the appropriate repair forces.**

29. Are any more 4-wire channels of this type to be tested in this system?

    If **YES,** then disconnect the TMS at the COT and the RT and proceed to Step **2.**

    If **NO,** then continue with Step **30.**

30. At the RT on the CIU, select DISCONNECT TA from the menu ***before*** unplugging the CIU from the **CTU**.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Verify COT Channel Unit Settings and Metallic Extension Integrity — 4-Wire Metallic Extension to Customer Location or Foreign CO (FPB/SS System)

Summary: At the remote terminal (RT), all test access is through the digital bit stream using the craft interface unit (CIU). At the central office terminal (COT), send TLP A-Z level at 1 kHz; at the RT, the transmit gain of the COT channel unit (line level) should range from −0.4 to +0.4 dBm. At the RT, send 0 dBm level at 1 kHz. At the COT, the channel unit receive gain (T/R level) should range from [(TLP Z-A) −0.4] to [(TLP Z-A) +0.4] dBm. At the network interface (NIF), the customer receive level should range from [(TLP Z-A) −0.7] to [(TLP Z-A) +0.7]. At the NIF, send (TLP A-Z) dBm level; the transmit level at the RT should range from −0.7 to +0.7 dBm. At the RT, then at the NIF, send 0 dBm tones at 0.4 and 2.8 kHz. At the NIF and at the RT, the low-end slope should range from −0.3 to +1.5, and the high-end slope should range from −0.3 to +2.26. The noise at the NIF should be less than 21 dBrnc. The noise at the RT should be less than 24 dBrnc.

1. Arrange for channel alignment tests to the customer location or foreign central office. Figure 1 shows the channel layout for the tests that follow. Refer to the circuit layout information or the work order record detail (WORD) for circuit details.

2. At the COT, verify that the channel unit has been optioned and installed.

   Reference: AT&T 363-202-402

3. ⇛ NOTE:
   The RT channel unit does not have to be installed or provisioned for this test.

   At the RT, connect the CIU to the channel test unit (**CTU**) and address the channel to be tested.

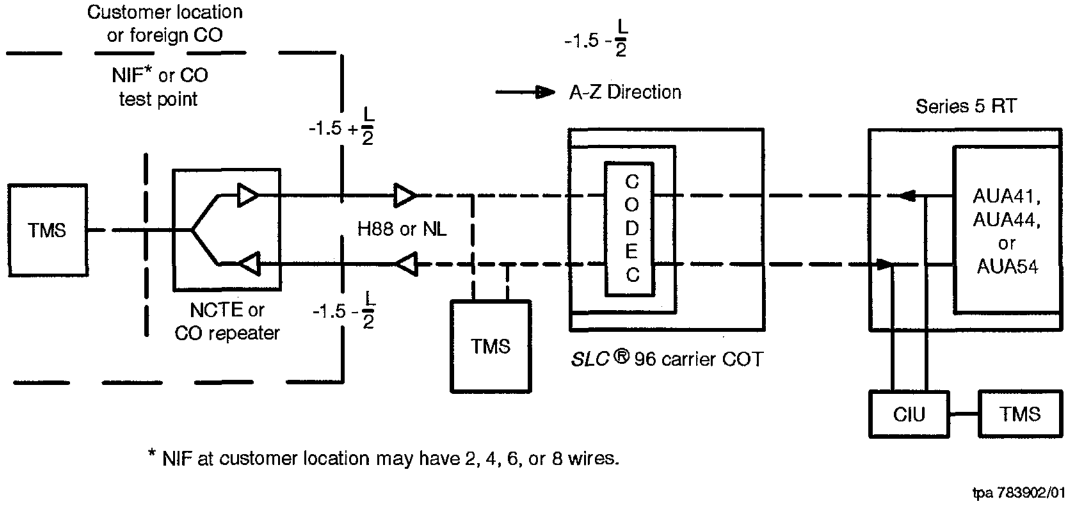

Figure 1—4-Wire Circuit with Metallic Extension at COT End

4. At the RT from the CONNECT-TA menu, select DIGITAL ONLY (item 1).

   Response: /* COMPLETED,SYSTEM=____ ...
   DIGITAL TEST ACCESS WAS ACCOMPLISHED /*

5. **NOTE:**
   The BIT STREAM ACCESS jacks on the CIU are 600-ohm unbalanced test points. Most test sets will provide the correct measurements when set for 600-ohm operation. However, the **600-ohm unbalanced** setting should be used if it is available.

   At the RT, connect the test equipment (Figure 2) as follows:

   - Transmission measuring set (TMS) **TRANSMIT** jack to **BIT STREAM ACCESS - 0TLP - TRMT** on the CIU
   - TMS **RECEIVE** jack to **BIT STREAM ACCESS - 0TLP - RCV** on the CIU
   - TMS **IMPEDANCE** to **600** ohms.

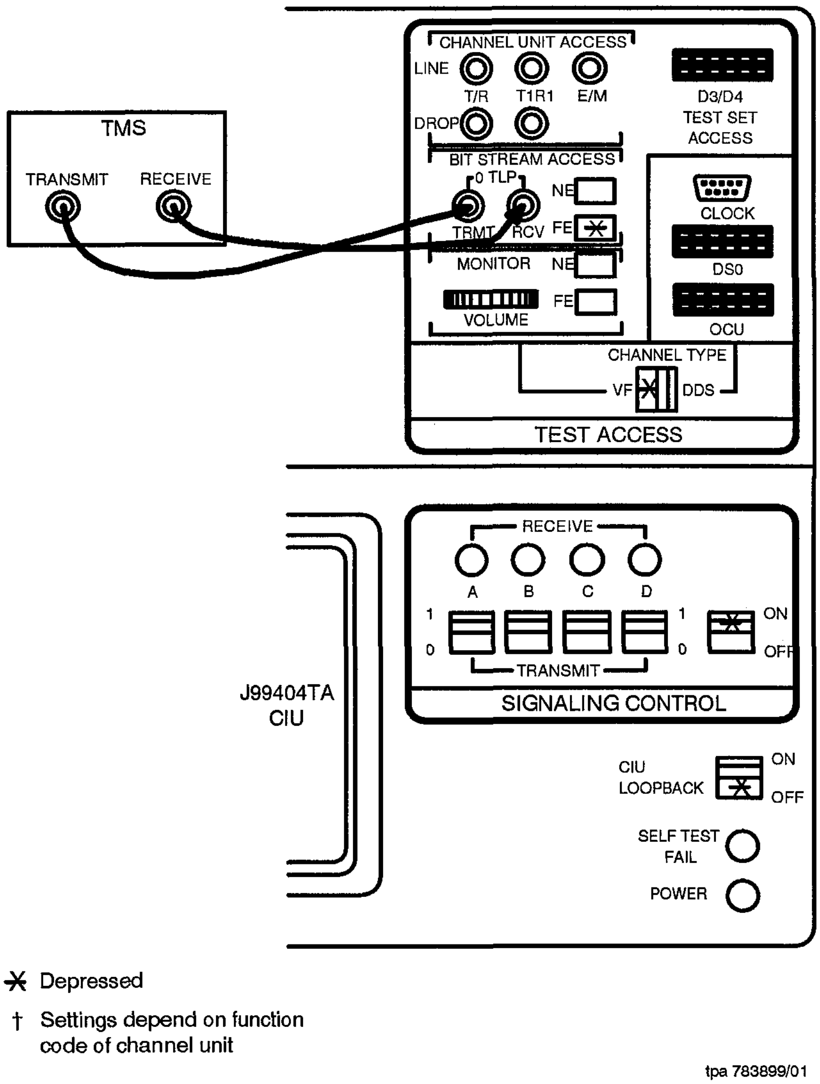

Figure 2— Test Connections for Testing COT Channel Unit

6. At the RT, set the switches on the CIU as follows:
   - **BIT STREAM ACCESS - FE** depressed
   - **CHANNEL TYPE** to **VF**

- If the COT channel unit function is 4FXO, 4DX, 4TO, or 4ETO, set **SIGNALING CONTROL - TRANSMIT A**, **B**, **C**, and **D** to **1**
- If the COT channel unit function is 4FXS, set **SIGNALING CONTROL - TRANSMIT A** and **C** to 0**, B** and **D** to 1
- **SIGNALING CONTROL** to **ON**
- **CIU LOOPBACK** to **OFF.**

7. At the COT, connect the TMS to the channel unit tip and ring using the 4-wire channel unit extender or the **TST** connector on the channel unit faceplate.

8. NOTE:
   This procedure is based on A-Z direction being from COT toward RT. If the WORD defines this direction as Z-A, read A-Z as Z-A (and the reverse) in the steps that follow.

   If the channel unit impedance is not 600 ohms, the TLP level must be corrected as follows:

   - On the WORD, find TLP A-Z for the COT channel unit.
   - If the channel unit impedance=1200 ohms, add +0.5 to the TLP listed and label the new value (TLP A-Z)1200.
   - If the channel unit impedance=150 ohms (mismatch equalization), add +2.8 to the TLP listed and label the new value (TLP A-Z)150.

9. At the COT, condition the TMS to send TLP A-Z dBm level at 1 kHz (to T/R input to the channel unit) as follows:

   - Set the **IMPEDANCE** to **600** ohms
   - Set the **TRMT** frequency to **1004**
   - If the channel unit impedance is 600 ohms, set the **TRMT LEVEL** to TLP A-Z dBm level

- If the channel unit impedance is 1200 ohms, set the **TRMT LEVEL** to (TLP A-Z)1200 dBm level
- If the channel unit impedance is 150 ohms, set the **TRMT LEVEL** to (TLP A-Z)150 dBm level.

10. NOTE:
The bit stream TLP is assumed to be 0.0 dB TLP. (The WORD may list bit stream TLPs as +4 and −8.5 dB, which is equivalent to 0.0 dB.) For circuits with a bit stream TLP other than zero, the test levels given must be modified. These levels are shown in parentheses after the normal test levels.

At the RT, measure the COT channel unit transmit gain (**RCV LEVEL**). Does the TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of the bit stream TLP A-Z)?

If **YES,** then proceed to Step **17.**

If **NO,** then continue with Step **11.**

11. Verify the COT channel unit option settings: Match the WORD entries for each channel unit setting. If the transmit attenuator setting is revised, repeat from Step **10**; otherwise continue with Step **12**.

12. Replace the COT channel unit. At the RT, does the TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of the bit stream TLP A-Z)?

If **YES,** then proceed to Step **17.**

If **NO,** then continue with Step **13.**

13. At the RT, disconnect the CIU, replace the **CTU**, and reconnect the CIU. Repeat the channel unit dialog and request for test access. If the TMS still does not indicate within limits, replace the digital test unit - left [**DTU-L** (**AUA18**)] and the digital test unit - right [**DTU-R** (**AUA19**)].

14. At the RT, does the TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of the bit stream TLP A-Z)?

    If **YES,** then proceed to Step **17.**

    If **NO,** then continue with Step **15.**

15. At the RT, clear the test bus to the **CTU** and the channel unit.

    Reference: **DLP-534**

16. At the RT, does the TMS indicate between −0.4 and +0.4 dBm (or within 0.4 dB of the bit stream TLP A-Z)?

    If **YES,** then continue with Step **17.**

    If **NO,** then refer the trouble to the appropriate repair forces.

17. On the RT TMS, set the **TRMT LEVEL** to 0.0 (or bit stream TLP Z-A) dB and verify that the impedance is 600 ohms.

18. On the WORD, find TLP Z-A for the COT channel unit.

19. NOTE:
    If the channel unit impedance is not 600 ohms, the level must be corrected: if the impedance=1200 ohms, add +0.5 to the TMS indication; if the impedance=150 ohms, add +2.8 to the TMS indication.

    At the COT, measure the channel unit receive gain. Does the TMS indicate between [(TLP Z-A) −0.4] and [(TLP Z-A) +0.4] dBm?

    If **YES,** then proceed to Step **26.**

    If **NO,** then continue with Step **20.**

20. Verify the COT channel unit option settings: Match the WORD entries for each channel unit setting. If the receive attenuator setting is revised, repeat from Step **19**; otherwise continue with Step **21**.

21. Replace the COT channel unit. Does the COT TMS indicate between [(TLP Z-A) −0.4] and [(TLP Z-A) +0.4] dBm?

    If **YES,** then proceed to Step **26.**

    If **NO,** then continue with Step **22.**

22. At the RT, disconnect the CIU, replace the **CTU**, and reconnect the CIU. Repeat the channel unit dialog and request for test access. If the COT TMS still does not indicate within the limits, replace the RT **DTU-L** and **DTU-R** (**AUA18** and **AUA19**).

23. At the COT, does the TMS indicate between [(TLP Z-A) −0.4] and [(TLP Z-A) +0.4] dBm?

    If **YES,** then proceed to Step **26.**

    If **NO,** then continue with Step **24.**

24. At the RT, clear the test bus to the **CTU** and the channel unit.

    Reference: **DLP-534**

25. Does the COT TMS indicate between [(TLP Z-A) −0.4] and [(TLP Z-A) +0.4] dBm?

    If **YES,** then continue with Step **26.**

    If **NO,** then refer the trouble to the appropriate repair forces.

26. Change the test setup to receive the tone at the customer location or the foreign (distant) central office:

    - At the COT, disconnect the TMS from the channel unit and reconnect the TMS at the NIF or the foreign central office

    - At the RT, verify that the TMS **TRMT LEVEL** is 0.0 (or bit stream TLP Z-A) dBm.

27. At the NIF (customer location) or the foreign (distant) CO (central office) test point, measure the receive level. Is the receive level between [(TLP Z-A) −0.7] and [(TLP Z-A) +0.7] dBm?

    If **YES,** then proceed to Step **36.**

    If **NO,** then continue with Step **28.**

28. If the network channel terminating equipment (NCTE) or CO impedance is 150 ohms, proceed to Step **36**; otherwise continue with Step **29.**

29. **NOTE:**
    If the cable is loaded and the customer location test set impedance is 600 ohms, the level must be corrected; add +0.7 to the test indication.

    (Check the circuit without the NCTE or CO repeater to see if it is causing trouble.) At the loop interface of the NCTE or metallic extension interface of the CO repeater, measure the receive level. On the WORD, find TLP Z-A for the NCTE or CO repeater (COT side). Is the receive level between [(TLP Z-A) −0.6] and [(TLP Z-A) +0.6] dBm?

    If **YES,** then the NCTE or CO repeater is causing trouble; adjust or replace it and proceed to Step **27.**

    If **NO,** then the COT channel unit may be causing trouble; note the result and continue with Step **30.**

30. Verify that the COT channel unit receive attenuator is set to the WORD value. Adjust the receive attenuator no more than 1 dB.

31. At the loop or metallic interface, is the receive level now between [(TLP Z-A) −0.6] and [(TLP Z-A) +0.6] dBm?

    If **YES,** then proceed to Step **34.**

    If **NO,** then reset the receive attenuator to the WORD value and continue with Step **32.**

32. At the loop interface of the NCTE or metallic extension interface of the CO repeater, send TLP A-Z dBm tone toward the COT.

33. NOTE:
    If the cable is loaded and the customer location test set impedance is 600 ohms, the level must be corrected; add +0.7 to the test indication.

    At the RT, measure the gain in the transmit direction of the COT channel unit. Is the bit stream level between −0.6 and +0.6 dBm (or within 0.6 dB of the bit stream TLP A-Z)?

    If **YES,** then note the TMS reading. Ask the circuit provisioning to validate the WORD: If the WORD is valid, refer the trouble in cable pair loss to the appropriate repair forces.

    If **NO,** then there may be error in the cable loss record; refer trouble to the circuit provisioning center.

34. Remeasure the receive level at the NIF or CO test point. (Send a tone from the RT toward the customer location or foreign CO.) Is the receive level between [(TLP Z-A) −0.7] and [(TLP Z-A) +0.7] dBm?

    If **YES,** then proceed to Step **36.**

    If **NO,** then continue with Step **35.**

35. Replace or adjust the NCTE or CO repeater until the receive level is within limits.

36. Write down the receive level (bit stream-to-NIF gain) for later use.

37. At the RT, verify that the TMS is set to receive and the impedance is set to 600 ohms.

38. At the NIF or CO test point, send 1-kHz tone at TLP A-Z dBm toward the COT.

39. NOTE:
    If the cable is loaded and the customer location test set impedance is 600 ohms, the level must be corrected; add +0.7 to the test indication.

    At the RT, measure the transmit level. Does the RT TMS indicate between −0.7 and +0.7 dBm (or within 0.6 dB of the bit stream TLP A-Z)?

    If **YES,** then proceed to Step **46.**

    If **NO,** then continue with Step **40.**

40. At the loop interface of the NCTE or the metallic extension interface of the CO repeater, send tone at TLP A-Z dBm toward the COT.

41. **NOTE:**
If the cable is loaded and the customer location test set impedance is 600 ohms, the level must be corrected; add +0.7 to the test indication.

At the RT, measure the transmit level without the NCTE or CO repeater in the circuit. Does the TMS indicate between −0.6 and +0.6 dBm (or within 0.6 dB of the bit stream TLP A-Z)?

If **YES,** then the NCTE or CO repeater is causing the trouble; send tone from the NIF again and proceed to Step **45.**

If **NO,** then continue with Step **42.**

42. Verify that the COT channel unit transmit attenuator is set to the WORD value. Adjust the transmit attenuator no more than 1 dB.

43. Does the TMS indicate between −0.6 and +0.6 dBm (or within 0.6 dB of the bit stream TLP A-Z)?

If **YES,** then note the TMS indication and continue with Step **44.**

If **NO,** then ask the circuit provisioning to validate the WORD. If the WORD is valid, reset the TRMT ATTENUATOR to the WORD value and refer the trouble in the cable pair loss to the appropriate repair forces.

44. Remeasure the overall transmit gain by sending tone from the NIF or CO test point. At the RT, does the TMS indicate between −0.7 and +0.7 dBm (or within 0.6 dB of the bit stream TLP A-Z)?

If **YES,** then proceed to Step **46.**

If **NO,** then continue with Step **45.**

45. Replace or adjust the NCTE or CO repeater until the RT TMS indicates between −0.7 and +0.7 (or within 0.7 dB of the bit stream TLP A-Z) at the COT.

46. Write down the transmit level (1-kHz gain from the NIF to bit stream) for later use.

47. At the NIF or CO test point, send a 0.4-kHz tone at TLP A-Z dBm toward the COT.

48. At the RT, note the TMS indication. Calculate the low-end slope using this measurement (0.4 kHz) and the transmit level measurement noted in Step **46.** The result must fall between −0.3 and +1.0 or between −0.5 and +1.5:

    Response: Slope = Meas(Step 46) – Meas(0.4 kHz)

49. Is the low-end slope between −0.3 and +1.0 (for circuit that extends beyond the foreign CO) or −0.5 and +1.5 (for other circuits) (in other words, is the 404-Hz measured level between 0.3 dB hot and 1.0 dB long or between 0.5 dB hot and 1.5 dB long relative to the 1-kHz level)?

    If **YES,** then continue with Step **50.**

    If **NO,** then note the result for later referral to the circuit provisioning center.

50. At the NIF or CO test point, send a 2.8-kHz tone toward the COT.

51. At the RT, note the TMS indication and calculate the result as done in Step **48.** The result must fall between −0.3 and +1.5 or between −0.5 and +2.2:

    Response: Slope = Meas(Step 46) – Meas(2.8 kHz)

52. Is the high-end slope between −0.3 and +1.5 (for circuit that extends beyond the foreign CO) or −0.5 and +2.2 (for other circuits)?

    If **YES,** then continue with Step **53.**

    If **NO,** then note the result for later referral to the circuit provisioning center.

53. On the RT TMS, set the **TRMT** frequency to **404** and the **LEVEL** to 0.0 (or TLP A-Z) dBm.

54. Note the measurement at the NIF or CO test point. Calculate the low-end slope using this measurement (at 404 Hz) and the receive level measurement noted in Step **36**:

    Response: Slope = Meas(Step 36) − Meas(404 Hz)

55. Is the low-end slope between −0.3 and +1.0 (for circuit that extends beyond the foreign CO) or −0.5 and +1.5 (for other circuits)?

    If **YES,** then continue with Step **56.**

    If **NO,** then **note the result for later referral to the circuit provisioning center.**

56. On the RT TMS, set the **TRMT** frequency to **2804**.

57. Note the measurement at the NIF or CO test point. Calculate the high-end slope as done in Step **54**:

    Response: Slope = Meas(Step 36) − Meas(2804 Hz)

58. Is the high-end slope between −0.3 and +1.5 (for circuit that extends beyond the foreign CO) or −0.5 and +2.2 (for other circuits)?

    If **YES,** then continue with Step **59.**

    If **NO,** then note the result for later referral to the circuit provisioning center.

59. At the RT, terminate the channel for noise measurement. (Set the TMS to receive and verify that the impedance is set to 600 ohms.)

60. At the NIF or CO test point, measure the noise. Is the noise less than 21 dBrnc?

    If **YES,** then proceed to Step **64.**

    If **NO,** then continue with Step **61.**

61. At the loop interface of the NCTE or the metallic extension interface of the CO repeater, measure the noise. Is the noise less than [(TLP Z-A) + 20] dBrnc?

    If **YES,** then replace or adjust the noisy NCTE or CO repeater and proceed to Step **64.**

    If **NO,** then continue with Step **62.**

62. At the COT, terminate the channel on the line side of the channel unit. (At the RT on the CIU, disconnect the test access for this measurement. When the measurement is completed, remove the termination at the COT and reconnect the test access at the RT.)

63. At the loop interface of the NCTE or the metallic extension interface of the CO repeater, is the noise less than [(TLP Z-A) + 20] dBrnc?

    If **YES,** then replace the COT channel unit and proceed to Step **60.**

    If **NO,** then note the result and proceed to Step **66.**

64. At the NIF or CO test point, terminate the circuit with either 600 or 900 ohms.

65. At the RT, measure the noise. Is the noise less than 24 (or 24 + TLP A-Z) dBrnc?

    If **YES,** then proceed to Step **70.**

    If **NO,** then proceed to Step **68.**

66. At the NIF or CO test point, terminate the circuit with either 600 or 900 ohms.

67. At the RT, connect the TMS **RECEIVE** jack to the CIU **BIT STREAM ACCESS 0TLP - RCV** jack. Is the noise less than 24 (or 24 + TLP A-Z) dBrnc?

    If **YES,** then report the noisy Z-A loop or the metallic extension in Z-A direction to the appropriate repair forces and proceed to Step **70.**

    If **NO,** then proceed to Step **64.**

68. At the loop interface of the NCTE or the metallic extension interface of the CO repeater, terminate the transmit pair with 600 ohms (nonloaded cable) or 1200 ohms (loaded cable).

69. At the RT, is the noise level less than 21 (or 21 + TLP A-Z) dBrnc?

    If **YES,** then replace or adjust the noisy NCTE or CO repeater and proceed to Step **70.**

    If **NO,** then report the noisy Z-A (or Z-A and A-Z) loop or the metallic extension to the appropriate repair forces.

70. Was any apparatus replaced in the noise test (from Step 59)?

    If **YES,** then proceed to Step **5.**

    If **NO,** then continue with Step **71.**

71. Are any more 4-wire channels of this type to be tested in this system?

    If **YES,** then disconnect TMS at both ends and proceed to Step **2.**

    If **NO,** then continue with Step **72.**

72. At the RT, on the CIU, select DISCONNECT TA from the menu ***before*** unplugging the CIU from the **CTU.**

73. At the RT and the customer location or foreign (distant) CO, disconnect the test equipment.

STOP. YOU HAVE COMPLETED THIS PROCEDURE

Perform Trunk Line Work Station Tests
Integrated FPB/SS System

1.

CAUTION:
Verify that the RT does not have the craft interface unit (CIU) session in progress when test access is requested; it can cause problems in gaining test access.

NOTE:
These tests must be done *before* the circuit is nailed up at the *5ESS*®
switch.

Establish communication with the RT personnel and determine the channel to be tested.

2.

NOTE:
The trunk line work station (TLWS) terminal can be used instead of the master control center (MCC) terminal. If the TLWS terminal is used, this page is automatically displayed.

On the MCC terminal, enter **160** to get the TLWS status page.

3. Choose an idle test position by entering **16x.**

   Where x = Position 1 to 8 (162 selects position 2).

4.

NOTE:
If the directory number is used, consult the office records to find the corresponding channel number.

Enter **DN** (directory number) or **SLEN** (*SLC*® carrier line equipment number).

Where DN = **4001,DN** (example: 4001,5551111)

SLEN = **4003,SLEN** [example: 4003,(SM),(DCLU),(RT),(line)]

Where switch module (SM) = 001 to 192

digital carrier line unit (DCLU) = 0 to 7

remote terminal (RT) = 1 to 32

line = 01 to 96 (the channel number in the *SLC* carrier channel bank).

5. At the RT, connect the test equipment [test telephone or transmission measuring set (TMS)].

6. When the RT has made test connections, enter **5000** to select the transmission menu.

   Comment: Entering 4301 will allow you to monitor, on a monitor phone, the selected test position circuit. 4300 will drop the monitor.
   If the RT personnel has connected a phone to the circuit, entering 5202 will ring the line and 5999 will stop ringing.

7. Enter **5005** to send 1004 Hz at 0 dBm tone to the RT.

8. Enter **5990** to stop the tone after the RT has made measurement.

9. At the RT, send a 1004 Hz tone (as required).

10. Enter **5100** to measure the 1004 Hz tone level.

    Response: Measurement is displayed under RESULT on the page.

11. Enter **5999** to stop the measurement.

12. Did RESULT indicate nominal level specified on the work order record detail (WORD)?

    If **YES,** then continue with Step **13.**

    If **NO,** then request the RT personnel to consult the trouble clearing practice (AT&T 363-205-500) to clear problem, then proceed to Step **4.**

13. Enter **9500** if a printout of the result is required.

    Comment: Refer to the MCC screen menu or AT&T 5D5-105-220 for additional TLWS measurement command options.

14. Enter **4999** to release the connection from the channel.

15. Enter **160** to return to the trunk line work station menu.

16. Enter **20x** to release the test position.

    Where x = Position 1 to 8 just used during test.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Measure Signal Level End-To-End on Single-Party Channel (ALC Channel Unit Inserting Maximum Loss)

Summary: This procedure measures the loss between the central office and the remote terminal (RT) on a channel that uses an automatic loss compensation (ALC) channel unit. Condition the circuit so that the ALC channel unit inserts maximum loss. Using the office milliwatt source or a transmission measuring set with signaling unit (TMS/SU) at the central office, send tone to the RT. The signal level measured at the RT should be within limits listed in Table A for the ALC channel unit in the circuit. If the TMS/SU is used at the central office, send tone from the RT. The signal level measured at the central office should be within limits listed in Table A for the ALC channel unit in the circuit.

1. Is this an office milliwatt measurement?

   If **YES,** then continue with Step **2**.
   If **NO,** then proceed to Step **10**.

2. At the RT, connect the transmission measuring set with signaling unit (TMS/SU) **RECEIVE** jack to the tip and ring of the channel to be tested.

3. Set the impedance level of the TMS to **900** ohms for the **AUA158** channel unit or **600** ohms for the **AUA159** channel unit. Set the signaling unit (SU) for **LOOP/ORIGINATE** signaling, on-hook.

4. Connect a telephone set (or butt set) across the tip and ring of the same channel.

5. ⇛ NOTE:
   A jumper wire can be used as the low resistance.

Connect a resistance of less than 200 ohms across the tip and ring of the channel and wait for the channel unit **BUSY** indicator to light.

Comment: This low resistance takes the channel unit off-hook and serves as the shortest possible loop (resulting in the maximum loss insertion).

6. Lift the telephone handset off-hook (or set the switch to off-hook for the butt set) and remove the low resistance.

7. Verify dial tone and dial the office milliwatt.

8. When the tone is received, set the SU to off-hook and put the telephone handset on hook (or set the switch to on-hook for the butt set).

9. Measure the receive level and frequency. The level should fall within the range given in Table A for the appropriate channel unit. The frequency should be 1,004 Hz.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Table A. 1,004 Hz Signal Levels for Automatic Loss Compensation (ALC) Channel Units (Measured Between the Central Office and the RT)

Universal		Integrated		
RT CU	COT CU	*GTD-5** *EAX* Card ID	*5ESS*® Switch Code for CU	Signal Level (dBM)
AUA158	AUA38	POTS	SP (POTS)	−7 to −5
AUA159	AUA38	POTS	SP (POTS)	−7 to −5
AUA158	AUA39	SPTS	*SPOTS*®	−7 to −5
AUA159	AUA39	SPTS	*SPOTS*	−4.4 to −2.4

* Registered trademark used under license from the GTE Corporation.

10. At the central office, connect the TMS **TRANSMIT** jack and the SU to the tip and ring of channel to be tested. Set the switches on the TMS/SU as follows:

    - Set the SU for **LOOP/TERMINATE** signaling.
    - Set the TMS for 1,004 Hz, 0.0 dBm, **TRANSMIT** impedance to **900** ohms, and **RECEIVE** impedance to **900** ohms.

11. At the RT, connect the TMS **RECEIVE** jack to the tip and ring of the channel to be tested.

12. Set the TMS **TRANSMIT** and **RECEIVE** impedance levels to **900** ohms for the **AUA158** channel unit or to **600** ohms for the **AUA159** channel unit. Set the SU for **LOOP/ORIGINATE** signaling, on hook.

13. NOTE:
    A jumper wire can be used as the low resistance.

    Connect a resistance of less than 200 ohms across the tip and ring of the channel and wait for the channel unit **BUSY** indicator to light.

    Comment: This low resistance takes the channel unit off-hook and serves as the shortest possible loop (resulting in the maximum loss insertion).

14. Set the SU to off-hook and remove the low resistance.

15. Measure the received signal level and frequency. The level should fall within the range given in Table A for the appropriate channel unit. The frequency should be 1,004 Hz.

16. At the central office and RT, press the **REVERSE** pushbutton to reverse the transmit and receive functions of the TMS (*do not change* the signaling settings) and continue with Step **17.** If the TMS does not have this pushbutton, reverse the connections to the **TRANSMIT** and **RECEIVE**

jacks on the TMS and continue with Step **17.** If the jack connections are reversed at the RT, repeat Steps **12**, **13**, and **14** to recondition the circuit for maximum loss, then continue with Step **17.**

17. At the RT, set the TMS to transmit 1,004 Hz at 0.0 dBm.

18. At the central office, measure the received signal level and frequency. The level should fall within the range given in Table A for the appropriate channel unit. The frequency should be 1,004 Hz.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Measure Signal Level from Central Office to Network Interface (NIF) on Single-Party Channel (ALC Channel Unit Inserting Expected Loss)

Summary: This procedure measures the loss between the central office and the network interface (NIF) on a channel that uses an automatic loss compensation (ALC) channel unit. Condition the circuit so that the ALC channel unit inserts expected loss (equivalent to the actual operation). Using the office milliwatt source or a transmission measuring set with a signaling unit (TMS/SU) at the central office, send a tone to the NIF. The signal level measured at the NIF should be within the limits listed in Table A for the ALC channel unit in the circuit. If the TMS/SU is used at the central office, send a tone from the NIF. The signal level measured at the central office should be within the limits listed in Table A for the ALC channel unit in the circuit.

1. Is this an office milliwatt measurement?

   If **YES,** then continue with Step **2.**
   If **NO,** then proceed to Step **9.**

2. At the NIF, connect the TMS/SU **RECEIVE** jack to the tip and ring of the channel to be tested.

3. Set the impedance level of the TMS to **900** ohms for the **AUA158** channel unit or **600** ohms for the **AUA159** channel unit. Set the SU for **LOOP/ORIGINATE** signaling, on hook.

4. Connect a telephone set (or butt set) across the tip and ring of the same channel.

5. ⇒ NOTE:
   A loop circuit should be terminated with customer equipment, if possible, or with a resistance similar to the real termination in the off-hook state. A telephone set (or butt set) at the NIF may be used to

terminate the circuit; however, then the channel unit will provide only an approximate loss.

If a termination (other than a telephone) is used, take it off-hook for about 2 seconds (to condition the channel unit to insert the proper loss). Then, take the telephone set (or butt set) off-hook and remove the termination.

If a telephone is used to terminate circuit, take the telephone set off-hook and wait about 2 seconds.

6. Verify dial tone and dial the office milliwatt.

7. When the tone is received, set the SU to off-hook and put the telephone set (or butt set) on-hook.

8. Measure the received level and frequency. The level should fall within the range given in Table A for the appropriate channel unit. The frequency should be 1,004 Hz.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Table A. 1,004 Hz Signal Levels for Automatic Loss Compensation (ALC) Channel Units (Measured Between the Network Interface and the Central Office)

Universal		Integrated		
RT CU	**COT CU**	***GTD-5* EAX*** **Card ID**	***5ESS®*** **Switch Code for CU**	**Signal Level (dBM)**
AUA158	AUA38	POTS	SP (POTS)	−8.5 to −4
AUA159	AUA38	POTS	SP (POTS)	−8.5 to −4
AUA158	AUA39	SPTS	*SPOTS®*	−8.5 to −4
AUA159	AUA39	SPTS	*SPOTS*	−5.5 to −2

* Registered trademark used under license from the GTE Corporation.

9. At the central office, connect the TMS **TRANSMIT** jack and the SU to the tip and ring of the channel to be tested. Set the switches on the TMS/SU as follows:

   - Set the SU for **LOOP/TERMINATE** signaling.
   - Set the TMS for 1,004 Hz, 0.0 dBm, **TRANSMIT** impedance to **900** ohms, and **RECEIVE** impedance to **900** ohms.

10. At the NIF, connect the TMS **RECEIVE** jack to the tip and ring of the channel to be tested.

11. Set the TMS **TRANSMIT** and **RECEIVE** impedance levels to **900** ohms for the **AUA158** channel unit or to **600** ohms for the **AUA159** channel unit. Set the SU for **LOOP/ORIGINATE** signaling, on hook.

12. NOTE:
    A loop circuit should be terminated with customer equipment, if possible, or with a resistance similar to the real termination in the off-hook state. A telephone set (or butt set) at the NIF may be used to terminate the circuit; however, then the channel unit will provide only an approximate loss.

    If a termination (other than a telephone) is used, take it off-hook for about 2 seconds (to condition the channel unit to insert the proper loss). Then, take the telephone set (or butt set) off-hook and remove the termination.

    If the telephone at the NIF is used to terminate the circuit, take the telephone set off-hook and wait about 2 seconds.

13. At the NIF, measure the received level and frequency. The level should fall within the range given in Table A for the appropriate channel units. The frequency should be 1,004 Hz.

14. At the central office and the NIF, press the **REVERSE** pushbutton to reverse the transmit and receive functions of the TMS (*do not change* the signaling settings) and continue with Step **15.** If the TMS does not have

this pushbutton, reverse the connections to the **TRANSMIT** and **RECEIVE** jacks on the TMS. If the jacks are reversed at the NIF, repeat Steps **11** and **12** to recondition the circuit for expected loss, then continue with Step **15.**

15. At the NIF, set the TMS to transmit 1,004 Hz at 0.0 dBm.

16. At the central office, measure the received level and frequency. The level should fall within the range given in Table A for the appropriate channel unit. The frequency should be 1,004 Hz.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

Set Option Switches on AUA34B DS0 Dataport Channel Unit

1. Get one AUA34B DS0 dataport channel unit and inspect for possible damage.

2. On the AUA34B unit, set option switch **19.2** (Figure 1) to **ENABLE** to allow the 19.2 kb/s error correction. Otherwise, set option switch **19.2** to **DISABLE.**

3. Install the DS0 dataport channel unit in the central office terminal (COT).

   Response: If option switch **19.2** is set to **ENABLE**, the green **19.2** indicator will be lighted.

4. NOTE:
   To activate the 19.2 kb/s error correction, select MVEC error correction when provisioning the AUA34B.

   Provision the AUA34B DS0 dataport channel unit.

   Reference: DLP-522

STOP. YOU HAVE COMPLETED THIS PROCEDURE

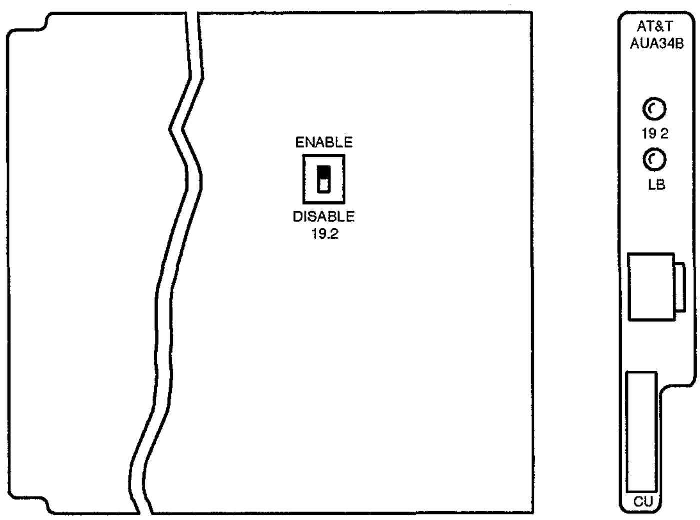

Figure 1 — AUA34B DS0 Dataport Channel Unit Faceplate and Switch Location

Set Option Switches AUA52B Office Channel Unit (OCU) Dataport

1. Get one AUA52B office channel unit (OCU) dataport and inspect for possible damage.

2. On the AUA52B unit, set option switch **19.2** (Figure 1) to **ENABLE** to provide the 19.2 kb/s data rate. (This switch setting overrides the subscriber data rate selected when provisioning the AUA52B). Otherwise, set option switch **19.2** to **DISABLE.**

3. Set option switch **CC** (Figure 1) to **ENABLE** to allow the 64 kb/s clear channel operation. Otherwise, set option switch **CC** to **DISABLE.**

4. Install the OCU dataport in the remote terminal (RT) or central office terminal (COT) as specified on the work order record detail (WORD) document.

   Response: If option switch **19.2** is set to **ENABLE**, the green **19.2/LB** indicator will be lighted.

5. ⇛ NOTE:
   To activate the 64 kb/s clear channel operation, select the 56 kb/s subscriber data rate when provisioning the AUA52B channel unit.

   Provision and test the AUA52B OCU dataport channel unit.

   Reference: DLP-522

STOP. YOU HAVE COMPLETED THIS PROCEDURE

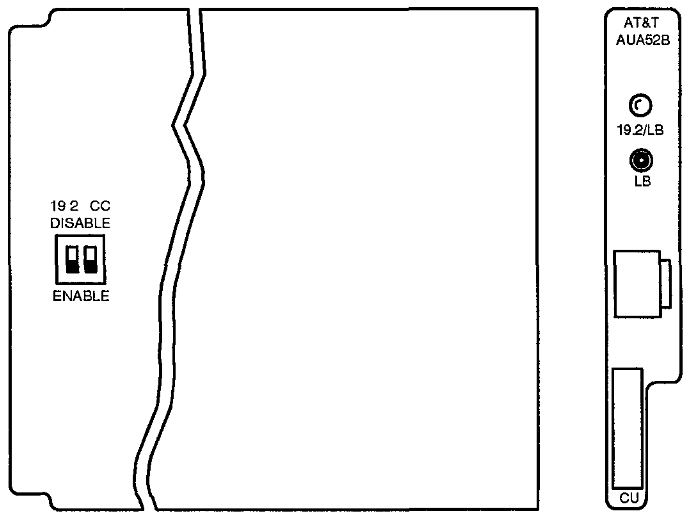

Figure 1 — AUA52B OCU Dataport Faceplate and Switch Location

Set Option Switches on Dual Private Line Auto Ring (PLAR) Channel Unit

1. Obtain one dual AUA75 PLAR channel unit and inspect for possible damage.

2. On the dual PLAR channel unit at the COT, set option switch **COT/RT** (Figure 1) to the **COT** position.

3. On the dual PLAR channel unit at the COT, set option switch **D3/D4** (Figure 1) to the **D4** position.

4. On the dual PLAR channel unit at the RT, set option switch **COT/RT** (Figure 1) to the **RT** position.

5. On the dual PLAR channel unit at the RT, set option switch **D3/D4** (Figure 1) to the **D4** position unless the channel unit will be installed in an integrated network access - remote terminal (INA-RT). In an INA-RT where both channels from the RT channel unit terminate in D3 PLAR CUs in a *remote* D3 bank, set option switch **D3/D4** on the RT channel unit to **D3.**

6. On the dual PLAR channel unit, set option switch **ODD** (Figure 1) to **0DB** or −**3DB** to agree with the WORD document or the facility record for the odd channel. Set option switch **EVEN** (Figure 1) to **0DB** or −**3DB** to agree with the WORD document or the facility record for the even channel.

7. Install the dual PLAR channel unit in the COT and/or RT.

8. **STOP. YOU HAVE COMPLETED THIS PROCEDURE**

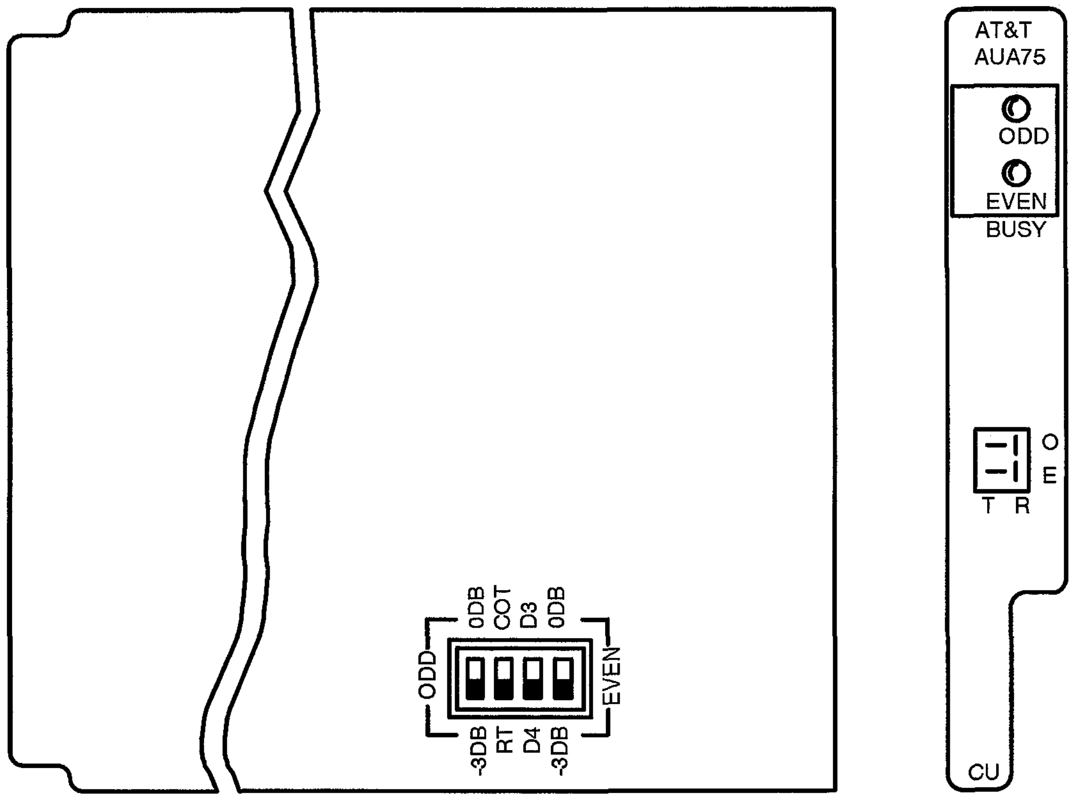

Figure 1 — AUA75 2W PLAR Channel Unit Faceplate and Option Switches

Test AUA75 Private Line Auto Ring (PLAR) Channel on Universal System or Integrated System with Nail-Up

Summary: This procedure tests the AUA75 2W PLAR channel for transmission performance and proper ringing operation between the central office terminal (COT) or distant D-bank and the remote terminal (RT).

NOTE 1:
If this is an integrated system with nail-up, follow these procedures by replacing "COT/AUA75" with "D-bank/PLAR channel unit" as appropriate.

NOTE 2:
The 52A channel unit test extender can be used to access the T/R leads of the channel unit being tested, but it is not required. If the 52A test extender is used, set the **BATTERY FEED/HOLD FUNCTION** switch to the **OFF** position.

1. Establish communication between the central office and the remote terminal.

2. Verify that the COT and RT channel units are provisioned properly and installed. If necessary, provision (set option switches on) the AUA75 COT and RT channel units.

   Reference: DLP-563

3. At the COT, temporarily connect a telephone set to the T/R of the selected channel (Figure 1). This can be done using the special test cord (comcode 405525809) inserted in the faceplate jack of the channel unit.

4. At the RT, temporarily connect another telephone set to the T/R of the selected channel. This can be done either at the faceplate jack using the special test cord or at the protector block.

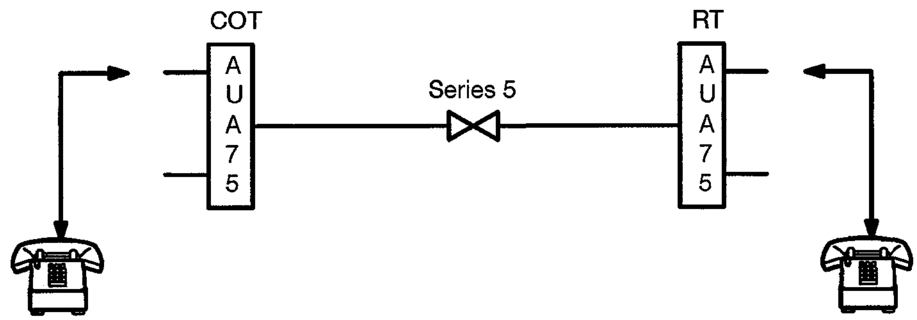

Figure 1—Test Arrangement for Ringing/Talking Tests

5. The following items are used to test the auto ring and talking capabilities of the AUA75 channel unit. All items must be completed in sequence.

   If all items are completed in sequence with **YES,** then proceed to Step **7.**
   If any item is completed with **NO,** then continue with Step **6.**

   a. Pick up the COT phone. Does the RT telephone ring normally (2 sec *on*, 4 sec *off*)?

   b. Is an audible ringback tone heard in the COT phone?

   c. Answer the RT phone. Is the talk quality between the RT and COT phones acceptable?

   d. Hang up only the COT phone (do *not* hang up RT phone). Does the COT phone remain silent (*not* ring)?

   e. Lift up the COT phone after about 30 seconds. Is talking reestablished between the COT and RT, and is talk quality acceptable?

f. Hang up only the RT phone (do *not* hang up COT phone). Does the RT phone remain silent (*not* ring)?

g. Lift up the RT phone after about 30 seconds. Is talking reestablished between the COT and RT, and is talk quality acceptable?

h. Hang up both phones.

i. Pick up the RT phone. Does the COT phone ring normally (2 sec *on*, 4 sec *off*)?

j. Is an audible ringback tone heard in the RT phone?

k. Answer the COT phone. Is talk quality between the RT and COT phones acceptable?

l. Hang up both phones.

6. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the trouble is cleared and all items of Step **5** are completed in sequence from start to finish, then proceed to Step **7.**

   a. Make sure the test telephone is properly connected to the COT channel under test. Correct the wiring problems and repeat all items in Step **5.**

   b. Make sure the test telephone is properly connected to the RT channel under test. Correct the wiring problems and repeat all items in Step **5.**

   c. Check provisioning of both COT and RT channel units.

   d. Make sure the ringing supply is properly connected and operating at the COT bank. Then repeat all items in Step **5**.

e. Make sure the ringing supply is operating properly at the RT. Then repeat all items in Step **5.**

f. Replace the COT channel unit (provision the new channel unit, Step **2**, to match the unit being replaced), reconnect the telephone set to the channel being tested, and repeat all items in Step **5.**

g. Replace the RT channel unit (provision the new channel unit, Step **2**, to match the unit being replaced), reconnect the telephone set to the channel being tested, and repeat all items in Step **5.**

7. Remove all previous test connections.

8. At the COT and RT, connect a transmission measuring set (TMS) to the T/R faceplate jack on the AUA75 for the circuit being turned up (Figure 2).

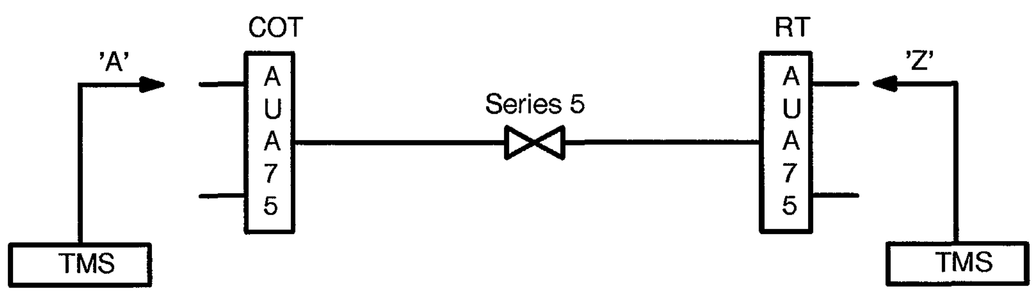

Figure 2 — Test Arrangement for Transmission Measurements

9. The following steps are based on A-Z direction being from the COT toward the RT. If the Work Order Record Detail (WORD) defines this as Z-A, read A-Z as Z-A in the steps that follow.

10. Condition the TMS at the COT to send TRMT (GN) dBm level (at 1 kHz):
    - Set the impedance to 900 ohms
    - Set the **TRMT LEVEL** to TRMT (GN) value from the WORD.

11. Condition the TMS at the RT to measure the gain from the COT to RT:
    - Set the impedance to 900 ohms
    - Set to read the **RCV LEVEL** from the TMS at the COT.

12. Send a tone through the COT and RT channel units and measure the level at the RT. Does the TMS indicate the RT level specified on the WORD ±1.0 dB?

    If **YES**, then proceed to Step **14**.

    If **NO**, then continue with Step **13**.

13. The following items may be used to clear trouble. If the first item does not clear the trouble, try the remaining items in sequence until the correct level is obtained, then continue with Step **14.**
    a. Verify the channel unit provisioning at the COT and RT and adjust if required.
    b. Replace the COT channel unit (provision the new channel unit, Step **2**, to match the unit being replaced), reconnect the TMS, and repeat from Step **12.**
    c. Replace the RT channel unit (provision the new channel unit, Step **2**, to match the unit being replaced), reconnect the TMS, and repeat from Step **12.**

14. Condition the TMS at the RT to send TRMT (GN) dBm level (at 1 kHz):
    - Set the impedance to 900 ohms
    - Set the **TRMT LEVEL** to TRMT (GN) value from the WORD.

15. Condition the TMS at the COT to measure gain from the RT to the COT:
    - Set the impedance to 900 ohms
    - Set to read the **RCV LEVEL** from the TMS at the RT.

16. Send a tone through the RT and COT channel units and measure the level at the COT. Does the TMS indicate the COT level specified on the WORD $\pm$1.0 dB?

    If **YES,** then proceed to Step **18.**

    If **NO,** then continue with Step **17.**

17. The following items may be used to clear the trouble. If the first item does not clear the trouble, try the remaining items in sequence until the correct level is obtained, then continue with Step **18.**

    a. Verify channel unit provisioning at the RT and COT and adjust if required.

    b. Replace the RT channel unit (provision the new channel unit, Step **2,** to match the unit being replaced), reconnect the TMS, and repeat from Step **17.**

    c. Replace the COT channel unit (provision the new channel unit, Step **2,** to match the unit being replaced), reconnect the TMS, and repeat from Step **17.**

18. From the customer location to the customer location verify the TLPs specified on the WORD. If the correct levels are not obtained, check the cable pair from the RT to the customer location, then check the cable pair from the COT to the customer location. The TMS should be set to 900 ohms impedance for these measurements.

STOP. YOU HAVE COMPLETED THIS PROCEDURE