AT&T

SLC® Series 5 Carrier System

AUA90 T-BRITE Channel Unit for ISDN

Installation and Maintenance

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SLC® SERIES 5 CARRIER SYSTEM
AUA90 T-BRITE CHANNEL UNIT
INSTALLATION AND MAINTENANCE

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1. INTRODUCTION

This document contains installation and testing procedures for the **AUA90** T-BRITE (T interface - basic rate interface transmission extension) channel unit. The **AUA90** channel unit is a 4-wire channel unit which conforms to the AMI (alternate mark inversion) standard. It is not provisionable and does not have option switches. The **AUA90** channel unit provides an ISDN (integrated services digital network) basic access T-interface directly to a customer's ISDN terminal (TE1 - terminal equipment 1). The basic access T-interface does away with the need for an NT1 (network termination 1) at the customer location. Point-to-point and -multipoint arrangements are allowed for customer terminals.

The **AUA90** channel unit provides three fixed time slots (2B+D). The ISDN BRI (basic rate interface) is defined as 2B+D (two 64 kb/s B-channels and one 16 kb/s D-channel). The B-channels communicate digitized voice or data. The D-channel communicates control signaling and low speed packet-switched data.

References: The following documents provide additional information and details on the **AUA90** channel unit and related equipment.

DOCUMENT	TITLE
AT&T 363-005-129	AUA90 T-BRITE Channel Unit - Data Sheet
AT&T 363-005-238	950A Test Set - Data Sheet
AT&T 363-099-105TD	Technical Description - Integrated Network Access — Remote Terminal
AT&T 363-205-104	*SLC* Series 5 Carrier System, Integrated Network Access — Remote Terminal (INA-RT) - User's Manual
AT&T 365-170-502	AHG13, S2 BRITE and AHG19 KTTE Channel Units for ISDN and Digital Business Service Applications - Installation and Testing
AT&T 533-700-100	ISDN Customer Premises Planning Guide
AT&T 5D5-900-301	*5ESS* ® Switch ISDN Basic Rate Interface Specification

This document is divided into the following parts: **AUA90** T-BRITE channel unit applications, ISDN service prerequisites, transmission equipment preparation, test sets, ISDN channel unit installation, and maintenance procedures. References to other documents are provided as needed.

This document is intended for the technician who will install the **AUA90** T-BRITE channel unit(s), perform acceptance tests or verify certain requirements of the ISDN circuit, and locate and clear trouble at the T-BRITE channel unit level. This document is easier to understand if the user has a working knowledge of: the *SLC* Series 5 Carrier System and INA-RT, ISDN, and the **950A** test set. The **950A** test set is used by itself and with other test sets (**946A** or data test sets) for **AUA90** T-BRITE maintenance tests. AT&T 363-005-238 (data sheet) provides a detailed description of the **950A** test set, indicators, and switches.

2. AUA90 T-BRITE CHANNEL UNIT APPLICATIONS

The **AUA90** T-BRITE channel unit is a 4-wire circuit that supports ISDN 2B+D service only. It is used in the *SLC* Series 5 Carrier System INA-RT (integrated network access - remote terminal) and the Series 5 FPB (Feature Package B) RT (universal mode 1 only). To provide service over the T-interface, the Series 5 T-BRITE channel unit is installed in the Series 5 RT and interfaced with a D4/*SLC* 96 carrier AHG13, S2 (series 2) BRITE channel unit at the far end channel bank (D4 bank or *SLC* 96 carrier COT).

The **AUA90** T-BRITE channel unit provides the interface between the TE1 (customer ISDN terminal) and the ISDN channel unit in the far end channel bank. Figure 1 shows typical applications of T-BRITE in an INA-RT or a Series 5 FPB RT to provide ISDN basic rate service.
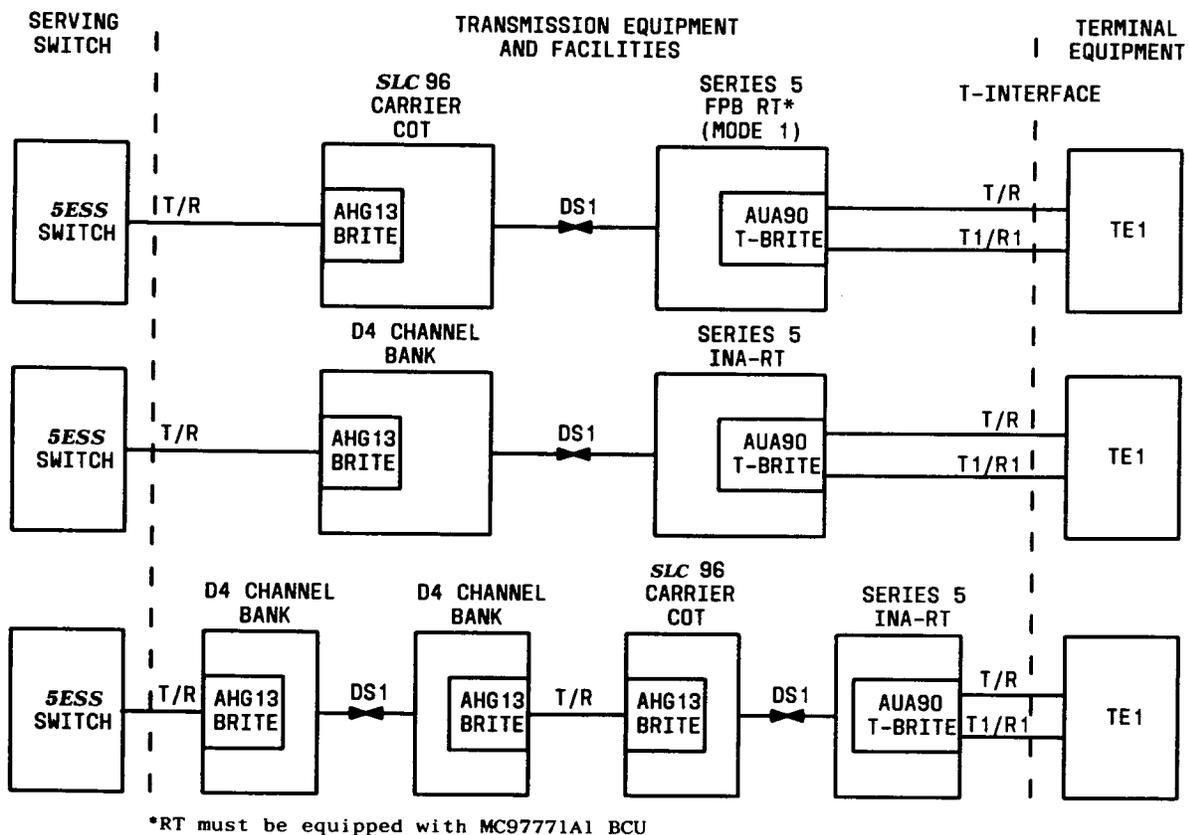
Figure 1 — Typical ISDN application with AUA90 T-BRITE in INA-RT or FPB RT

The INA-RT has two operating modes: Mode I and Mode III. The **AUA90** T-BRITE channel unit may be used in the INA-RT with either mode, as long as channel slot placement rules are followed (see Part 3 - ISDN Service Prerequisites). In the Series 5 FPB RT, the T-BRITE channel unit may be used only in Mode 1 (universal). (The Series 5 FPB modes are Mode 1 and Mode 2; they are not the same as the INA-RT Modes I and III.)

A. Far End Channel Bank Compatibility With INA-RT

Applications for the **AUA90** T-BRITE channel unit in an INA-RT include termination on a D4 bank or a *SLC* 96 carrier COT (central office terminal) (emulating a D4 bank) at the central office (far end).

D4 Channel Bank Compatibility: Five D4 operating modes exist. However, only D4 Mode III operates at the DS1 transmission rate used by the Series 5 INA-RT. The INA-RT provides compatible transmission and operations characteristics when interfaced to a Mode III D4 bank. In addition to compatibility with the usual superframe (F_s) format used by a D4 **LIU-3**, it is compatible with ESF (extended super frame) framing used by a D4 **AHG8 LIU-3 ESF** and **AHG9 LIU-3B** LIU.

SLC 96 Carrier System COT (D4 Emulator) Compatibility: The INA-RT is compatible with the transmission and operations characteristics of a *SLC* 96 carrier COT (central office terminal) utilizing the *SLC* 96 carrier F-62115 **DLU** (data link unit) for D4 emulation. The F-62115 **DLU** and other *SLC* 96 carrier plug-ins, properly optioned, eliminate the need for a SLIM (subscriber loop interface module). For more information, refer to AT&T 363-005-047 - F-62115 DLU Common Unit - Data Sheet - *SLC* 96 Carrier System.

B. Far End Channel Bank Compatibility With Series 5 FPB RT

The FPB system allows a Series 5 RT equipped with T-BRITE units to interface with the **AHG13, S2** BRITE channel units in the *SLC* 96 carrier COT. This system arrangement is compatible with the TR-08 (Bellcore TR-TSY 000008) interface, including superframe (F_s) format, data link, and protection switching.

3. ISDN SERVICE PREREQUISITES

Before an **AHG13** BRITE or **AUA90** T-BRITE channel unit can be installed into the transmission equipment for service, several prerequisites must be met. The prerequisites are divided into four areas: the serving switch, transmission equipment, customer-owned equipment, and loop qualification.

A. Serving Switch

ISDN service prerequisites at the serving switch are as follows:

- An ISLU (integrated services line unit) card or RISU (remote integrated services line unit) card must be available in the switch or one must be installed into the switch.

- Tip and ring cable must be connected to the distribution frame where the far end D4 bank or SLC 96 carrier terminal tip and ring cable connects.

- The proper switch translations for the line must be administered. The switch translations are made using the proper 5ESS switch generic software release (5E4 or later) translations data and the 5ESS Switch Translations Guide (TG-5).

- The B-channel assignments (voice or data) must be made according to the engineering work order, facilities work order, circuit/service order, WORD (work order record and details) document, or other type of document that specifies the service.

- **A common timing source must be established for the switch and transmission equipment so that synchronization will exist throughout the ISDN circuit.** Composite clock (64 kHz) must be used to time the transmission equipment. Suggested timing and synchronization methods are shown in Figure 2.

As shown in Figure 2, the 5ESS switch receives the clock source from the DS1 facility. The DS1 output is taken to the DSX terminating field where the SDEs (synchronization distribution expanders) in Office A and Office B extract timing from the DS1 facility and then generate the composite clock. The SDEs distribute the 64 kHz composite clock to the D4 channel banks or SLC 96 carrier central office terminals in both offices. The remote terminal channel bank (Series 5 INA-RT or FPB RT) is always loop timed to the far end channel bank.

B. Transmission Equipment

The transmission equipment provides the connection between the 5ESS switch and the TE1 and transports ISDN services to remote customers.

The requirements of the transmission equipment to transport the services are as follows:

- The tip and ring cable from the transmission equipment must be connected to the appropriate distribution frame or cross-connect blocks. (Connection to 5ESS switch must exist.)

- Transmission path continuity must exist through the equipment.

- The D4 channel bank(s) and/or SLC 96 carrier COT(s) **must be properly timed and synchronized** to the same clock source that provides timing to the 5ESS switch.

OFFICE A

SDE = SYNCHRONIZATION DISTRIBUTION EXPANDER
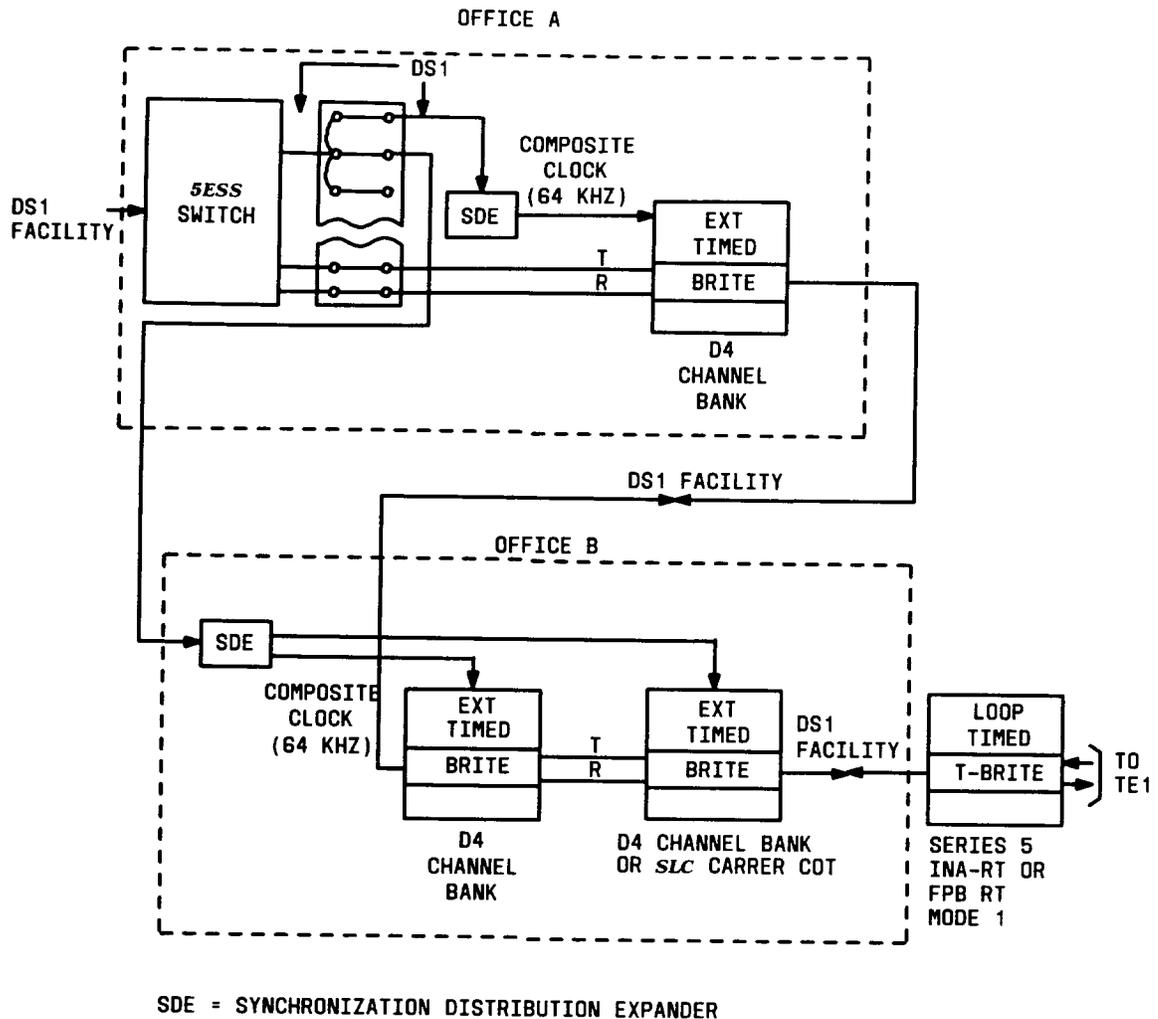
Figure 2 — Suggested method of timing and synchronization for ISDN circuits

* An **AHG13** BRITE channel unit must be properly optioned and installed into each D4 channel bank or *SLC* 96 COT for each ISDN circuit. The **AUA90** T-BRITE channel unit must be installed according to T-BRITE placement rules in the Series 5 INA-RT or FPB RT.

* The B channels and D channel must be properly assigned according to the engineering work order, facilities work order, circuit/service order, WORD document, or other type of document that specifies the service.

* Proper counting sequence and time slot alignment for the channel assignment must exist. The first B channel is carried by the first time slot. The D channel is carried by the second time slot. The second B channel is carried by the third time slot.

If a DACS (Digital Access Cross-Connect System) is in the ISDN circuit, time slot placement is very important for the B and D channels. The order in which the time slots enter the DACS must be the same when leaving the DACS.

Service Restrictions and Limitations at the Far End Channel Bank

For a description of requirements at the far end D4 bank or *SLC* 96 carrier COT, refer to AT&T 365-170-502.

T-BRITE Placement Rules in the Series 5 RT

The placement of **AUA90** T-BRITE channel units is restricted because ISDN 2B+D service requires three time slots per channel unit. Placement rules for T-BRITE channel units are based on a 3-slot (**tri-slot**) group. Each digroup of 12 **physical** slots is divided into 4 tri-slot groups. The tri-slot groups are physical slots 1, 2 and 3; 4, 5 and 6; 7, 8 and 9; and 10, 11 and 12. Figure 3 illustrates the following placement rules for T-BRITE channel units in a Series 5 RT:

A. In a Mode I RT (Series 5 INA-RT or FPB RT), a T-BRITE channel unit must not occupy the last slot in a tri-slot group. Therefore, a T-BRITE channel unit must not be installed in physical slots 3, 6, 9, or 12 in any digroup.

B. In a Mode I RT (Series 5 INA-RT or FPB RT), only another T-BRITE channel unit may occupy the slot to the immediate right of a T-BRITE channel unit.

C. In a Mode III INA-RT, a T-BRITE channel unit displaces three physical slots and must be placed only in the first slot of a tri-slot group. With a T-BRITE channel unit in the first slot, the last two slots of the tri-slot group must remain empty.

Power Requirements

There are no power consumption limitations associated with T-BRITE channel units. The **AUA90** T-BRITE channel unit requires about 0.5 W of power. The **950A** test set uses about 0.4 W of power through the **AUA90** channel unit.

C. Customer Owned Equipment

At the customer location, the TE1 equipment (customer ISDN terminal) must connect to the tip and ring cable from the transmission equipment for ISDN services.

D. Loop Qualification

These guidelines describe qualifying loops to provide ISDN basic access via the T-interface. Loop qualification ensures that the loop from the customer to the **AUA90** T-BRITE channel unit is within the specified range.

In all ISDN configurations, the loop loss must meet certain requirements. According to CCITT (International Telegraph and Telephone Consultative Committee) standards, loop loss from the channel unit to the TE1 should be limited to 6 dB loss at 96 kHz at 100 ohms (for the T-interface). TABLE A shows the loop limits according to CCITT standards for the **AUA90** T-BRITE channel unit.

For more information about ISDN customer premises equipment and loop qualification, refer to AT&T document 533-700-100, ISDN Customer Premises Planning Guide and AT&T document 5D5-900-301, *5ESS* Switch ISDN Basic Rate Interface Specification.

Tri-slot groups

T-BRITE	T-BRITE	empty
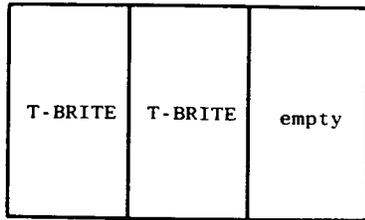
INA-RT Mode I or
FPB RT Universal Mode 1 only

Y or empty	Y or empty	Y or empty
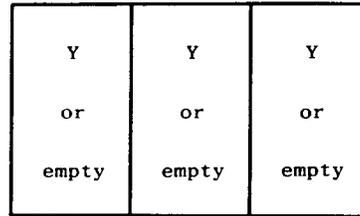
INA-RT Mode I or Mode III or
FPB RT Mode 1 or Mode 2

T-BRITE	empty	empty
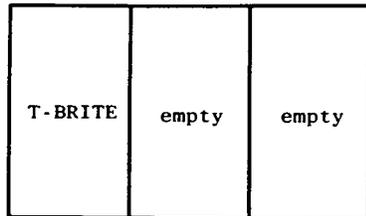
INA-RT Mode I or Mode III or
FPB RT Universal Mode 1 only
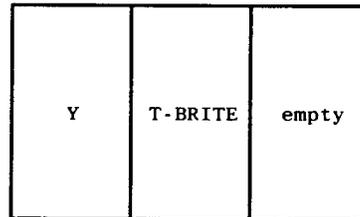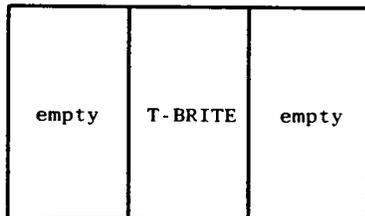
Y	T-BRITE	empty

INA-RT Mode I only or
FPB RT Universal Mode 1 only

empty	T-BRITE	empty

INA-RT Mode I only or
FPB RT Universal Mode 1 only

T-BRITE	empty	Y
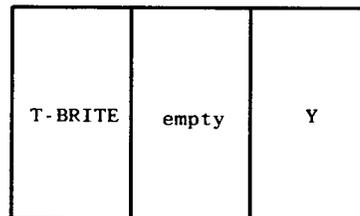
INA-RT Mode I only or
FPB RT Universal Mode 1 only

Y = any valid dual- or single-channel channel unit.

Figure 3 — Placement rules for the AUA90 T-BRITE channel unit

TABLE A			
AUA90 T-BRITE LOOP LIMITS			
REFERENCE	PIC CABLE	DISTANCE	
		POINT-TO-POINT	POINT-TO-MULTIPOINT (5E5 Generic or later)
6 dB at 96 kHz	22 ga.	1.1 km (3.6 kft)	0.55 km (1.8 kft)
	24 ga.	0.8 km (2.6 kft)	0.40 km (1.3 kft)
	26 ga.	0.5 km (1.6 kft)	0.25 km (0.8 kft)

4. TRANSMISSION EQUIPMENT PREPARATION

A. Overview

This part contains general information needed to prepare the far end channel bank and the Series 5 RT for ISDN service.

B. D4 Channel Bank Preparation

Before ISDN service is provided, a service work order (circuit, service, or engineering work order), WORD (work order record detail) document or similar document is prepared by the appropriate organization. One of the items that the circuit/service order or WORD document will specify is the proper timing source to be used and which digroup will be used as the reference. An **OIU** (office interface unit) -2, **OIU-4**, or **OIU-4A** must be available at the D4 channel bank or one must be installed.

Caution: Digital service will be interrupted if the D4 channel bank is already in service and the OIU has to be changed out or if the timing option has to be changed.

The D4 channel bank must be externally timed or be loop timed to a common timing source. Figure 2 shows a suggested method of properly timing the D4 channel bank to insure proper synchronization.

For loop timing, the **LT** option is selected on the **OIU-2** or **OIU-4** by positioning the white plugs in the front window on the faceplate. One plug must be installed in the **LT** position and another plug installed in the applicable referenced digroup (**A DGP/B DGP**) position. On the **OIU-4A**, the loop timing option and digroup reference are selected by turning the faceplate rotary switch to the **LT A/LT B** position.

External timing of the D4 channel bank requires the timing leads to be connected to the terminal strip **TS8** at the top right rear of the D4 channel bank. The timing leads connect to terminal pins **9** and **10**. The shield for the leads connects to terminal pin **14**. After the timing leads have been connected, the **OIU-2**, **OIU-4**, or **OIU-4A** must be optioned for **EXT** timing.

C. SLC 96 Carrier System COT Preparation

An engineering work order or other similar document must be initiated to establish proper timing for the ISDN circuit. For *SLC* 96 carrier terminals, an **SSU** (special service unit) and a **TRU** (transmission receive unit) must be installed. The **SSU** should be a **WP2C**, S5 (series 5) and must be optioned for external timing in the COT. The **TRU** must be a **WM1D**, S2 (series 2) or later.

Caution: Digital service will be interrupted in a SLC 96 carrier COT if the SSU plug-in has to be replaced or removed to change the timing option.

Procedures at the *SLC* 96 carrier COT to select the internal/external timing options are contained in the DLPs (detailed level procedures) of AT&T 363-202-400.

D. Series 5 Carrier System RT Preparation

The **LIU**s (line interface units) installed in the INA-RT or FPB Series 5 RT provide loop timing derived from the DS1 facility. The loop timing is automatic and no special action is needed at the RT to activate it. The MC97771A1 **BCU** (bank control unit) must be installed in the Series 5 FPB RT to use the **AUA90** channel unit.

5. TEST SETS

Several test sets are used for installation and maintenance testing of ISDN circuits. The **946A** test set (Figure 4) is used to test from an **AHG13, S2** BRITE channel unit at the (D4) channel bank or *SLC* 96 carrier terminal. The **950A** test set (Figure 5) is used to test from an **AUA90** T-BRITE (Series 5) channel unit. Both test sets perform similar test functions. The **KS-20908** receiver and **KS-20909** transmitter data test sets must be used with the **946A** test set for some tests. Although the **KS-20908** receiver and **KS-20909** transmitter data test sets may be used with either test set to verify data transmission, they are not required with the **950A** test set. The **950A** test set can generate data locally to check for gross failures. The data test sets can be used with the **950A** test set to check slow error rates (displayed) or when the customer complains of errors which are not easily diagnosed using only the **950A** test set.

A. 946A and 950A Test Sets

The **946A** and **950A** test sets allow a tester to:

- Check the condition of remote access loops (up to three channel units beyond the channel unit connected to the test set)

- Activate loopback tests

- Insert pseudorandom data patterns into the customer's data channels

- Check the echo canceling hybrid circuit in the **AHG13, S2** BRITE channel unit.

The **946A** can be inserted into any vacant channel slot in a D4 (or *SLC* 96 carrier) channel bank and connected to any **AHG13** BRITE channel unit (within reach of the **946A** test cord). The **950A** can be inserted into any vacant slot in the Series 5 INA-RT or FPB RT and connected to any **AUA90** T-BRITE channel unit (within reach of the connectorized cable). Either test set can be partially inserted into any vacant channel bank slot, but will seat fully only in a channel unit slot. Either test set can operate without being plugged into the backplane connector. Once the appropriate switches are set and the test set is activated, a loopback connection can be established in the BRITE or T-BRITE channel unit connected to the test set or in any other ISDN channel unit in the circuit.

The **950A** and **946A** test sets are functionally similar, contain similar test and status indicators, and have control switches and jacks for connecting the **KS-20908** receiver and **KS-20909** transmitter data test sets. AT&T 365-170-502 practice provides a detailed description of the **946A** test set. AT&T 363-005-238 data sheet provides a detailed description of the **950A** test set. The data test sets are described in AT&T 107-600-100 (transmitter) and AT&T 107-601-100 (receiver).

B. ISDN Terminal Used for Testing

Testing the ringing, ring trip, and voice transmission on an ISDN circuit requires an ISDN terminal or ISDN telephone, or BRITS (basic rate interface test set) (ITE 6601 — COMCODE 200155109). For testing purposes, the ISDN terminal is equivalent to the customer premises equipment connected to the digital interface (for example, the U-interface or T-interface) for an ISDN application. It usually includes an ISDN telephone, which may be a digital telephone set or an integrated voice/data terminal. Depending on the interface, an NT1 termination may be required for 2-wire to 4-wire conversion (for example, to a U-interface).

For testing from an **AHG13** BRITE channel unit, the ISDN terminal should include an ISDN telephone, an NT1 termination, power supply, and connecting cables. For testing from an **AUA90** T-BRITE channel unit, the ISDN terminal should include an ISDN telephone (the NT1 is

946A

2B + D

BRI   NT1

NONE   EC

1   ADDR   2

4   3

LLF	○
RLF	○
LCF	○
RCF	○
COS	○
ECF	○
OOS	○
ACT	○

XMT ○ ○ RCV

T/R ◯ R ◉ ACT

B1
B2

LP
CR
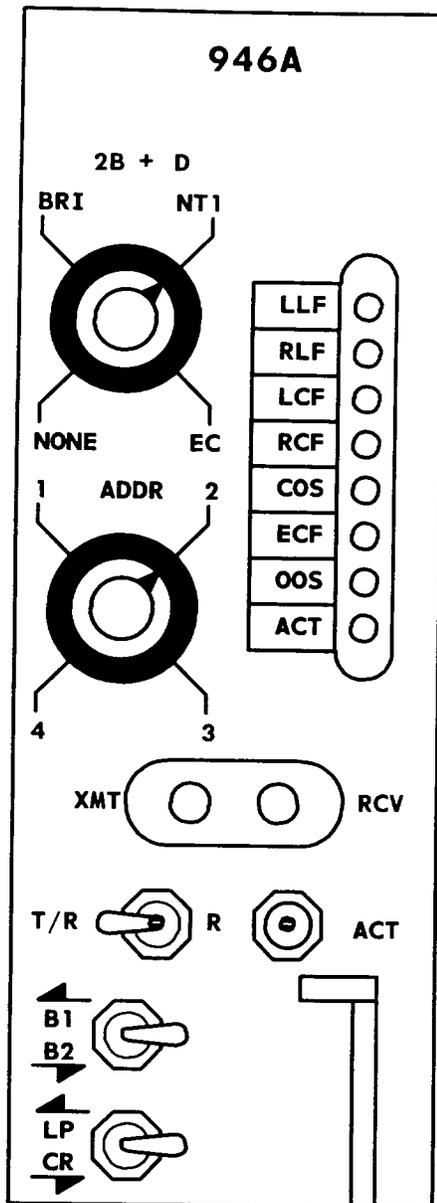
Figure 4 — 946A test set faceplate

not needed), power supply, and connecting cables. The BRITS (ITE 6601 — COMCODE 200155109) is a portable, self-contained ISDN terminal complete with NT1 termination, power supply, and test cord.
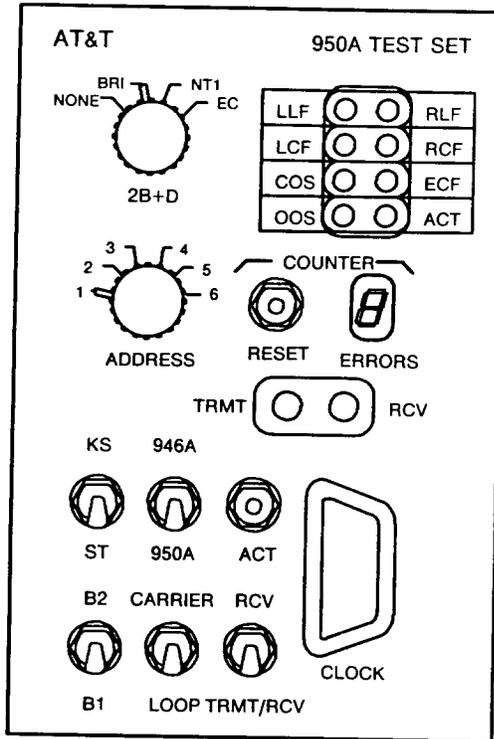
Figure 5 — 950A test set faceplate

6. ISDN CHANNEL UNIT INSTALLATION TESTS

This part contains the procedures to install the BRITE and T-BRITE channel units, verify that the circuit is synchronized, and verify continuity between the 5ESS switch and the transmission equipment.

Note: Procedures for the far end channel bank (D4 or SLC 96 carrier) are given in AT&T 365-170-502 - AHG13, S2 BRITE and AHG19 KTTE Channel Units for ISDN and Digital Business Service Applications - Installation and Testing. Procedures 1, 2, and 3 (from AT&T 365-170-502) are included here for reference. Procedure 1 is a suggested method to verify that the 5ESS switch translations have been accomplished and that metallic continuity exists between the switch and the far end D4/SLC 96 carrier bank. Procedure 2 contains **AHG13** BRITE channel unit option setting information and installation procedures. Procedure 3 contains steps to verify the synchronization between the far end channel bank and the 5ESS switch.

Procedures 4, 5, and 6 are done at the Series 5 RT. Procedure 4 may be used to install and test the **AUA90** T-BRITE channel unit in the Series 5 RT. Procedure 5 may be used to verify the continuity of the ISDN circuit from the Series 5 RT to the 5ESS switch. It also tests the ISDN circuit for proper operation. Procedure 6 checks the complete ISDN circuit for proper operation.

PROCEDURE 1 — VERIFY CONTINUITY FROM FAR END D4 CHANNEL BANK OR SLC 96 CARRIER COT TO THE 5ESS® SWITCH AND VERIFY THAT SWITCH TRANSLATIONS HAVE BEEN PERFORMED

SUMMARY

This procedure may be used to verify continuity of the connections between the first channel bank (far end from the RT) and the 5ESS switch. It also verifies that the line and ISDN terminal translations have been performed at the switch. Connect ISDN terminal (telephone) to tip and ring of channel. Verify dial tone on channel. Dial test number and verify special tone.

STEP	PROCEDURE 1 — VERIFY CONTINUITY TO 5ESS SWITCH

---

1. **Note:** The BRITS (basic rate interface test set) (ITE 6601 — COMCODE 200155109) is a portable, self-contained ISDN terminal complete with power supply and test cord. The ITE 6601 may be used in place of the ISDN terminal equipment listed below. (The channel unit extender is used in either case to connect the terminal equipment or test set to the channel unit.)

    Obtain test equipment (shown in Figure 6):

    - 353A power unit

    - NT1 unit

    - ISDN terminal

    - Modified telephone cord approximately 12 feet long or long enough to reach the top shelf of a bay. The tip and ring leads must be terminated at one end to tip and ring on a 310 plug and terminated at the other end to tip (pin 4) and ring (pin 3) on a 6-pin modular telephone plug. See Figure 6.

    - D8W-87 cord

    - D6AP-87 cord

    - Channel unit extender - J98726MF (for D4 channel bank only), J1C141MF (for SLC 96 carrier COT only), or J98726MP (for either one). The J98726MP is recommended.

2. At the D4 channel bank or SLC 96 carrier COT, remove the **AHG13** BRITE channel unit (if present) and insert the channel unit extender into the channel slot. (On the J98726MP channel unit extender, set the D4/SLC 96 carrier switch to the appropriate position). See Figure 6.

3. Are you using the ITE 6601 test set?

    If **YES,** then proceed to Step 7.

    If **NO,** then continue with Step 4.

Figure 6 — Test connections to verify continuity between *5ESS* switch and D4 channel bank or *SLC* 96 carrier terminal

Labels in figure:
353A POWER UNIT
TO PHONE / TO NT1 / TO LINE
RING (PIN 3)
TIP (PIN 4)
D6AP-87 CORD
TO 115 V AC OUTLET
NT1
ISDN TERMINAL
D8W-87 CORD
TELEPHONE CORD
D4/ *SLC* 96 CARRIER SWITCH
CHANNEL UNIT EXTENDER
TIP
RING
310 PLUG

STEP	PROCEDURE 1 — VERIFY CONTINUITY TO 5ESS SWITCH

4. Connect test apparatus as shown in Figure 6.

5. Insert the 310 plug on the modified telephone cord into the **DROP T/R** jack on the channel unit extender.

6. Insert the 6-pin modular telephone plug on the modified telephone cord into the **TO LINE** jack on the 353A power unit (Figure 6). Proceed to Step **8**.

7. Connect the ITE 6601 test set tip and ring to the **DROP T/R** jack on the channel unit extender and connect the power unit to 115 V ac outlet.

8. Lift handset of the ISDN terminal (telephone). Do you hear dial tone?

      If **YES,** then continue with Step **9.**

      If **NO,** then **STOP.** The circuit is not working. The problem may be due to a lack of continuity between the 5ESS switch and the D4 channel bank or SLC 96 carrier COT or a lack of line translations at the 5ESS switch.

9. Dial the 5ESS switch test number. Do you hear a special tone?

      If **YES,** then continue with Step **10.**

      If **NO,** then **STOP.** The 5ESS switch translations have not been performed.

10. Disconnect apparatus or ITE 6601 test set and remove the channel unit extender. If the **AHG13** BRITE channel unit was in the slot originally, insert the BRITE channel unit into the slot.

      STOP. YOU HAVE COMPLETED THIS PROCEDURE.

PROCEDURE 2 — SET CHANNEL UNIT OPTIONS AND INSTALL AHG13 BRITE CHANNEL UNIT

SUMMARY

This procedure may be used to set the options on the **AHG13** BRITE channel unit and to install the channel unit. This procedure is used at either the D4 channel bank or *SLC* 96 carrier COT that is connected to the Series 5 RT. Set **MODE** switches for the channel bank or terminal's mode of operation. Set **SERVICE** switches for ISDN 2B+D service. Set **POS** (position) switches for the BRITE channel unit position. Install channel unit.

STEP	PROCEDURE 2 — SET OPTIONS AND INSTALL AHG13 BRITE CHANNEL UNIT
1.	Obtain an **AHG13**, Series 2 BRITE channel unit for each ISDN service specified in the circuit/service order, WORD document, or similar document.
2.	Locate the option switch on the component side of the channel unit (Figure 7).
3.	Set the option switch rocker sections 3, 4, and 5 (**SERVICE**) to OOC (section 3 to open, section 4 to open, and section 5 to closed) for 2B+D service (TABLE B). Set the option switch rocker sections 1 and 2, 6 and 7 for **MODE** and **POS** as listed in TABLES C and D.
4.	Install the **AHG13** BRITE channel unit into the channel slot as specified on the circuit/service order, WORD document, or similar document.
5.	If blank cards are available, install the blank card(s) into any vacant slots adjacent to the **AHG13** BRITE channel unit that carry 2B+D service. This is a safety precaution to prevent installation of channel units into these particular channel slots. For example, if channel slot 1 has a BRITE channel unit installed with 2B+D service, place blank cards into channel slots 2 and 3.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.
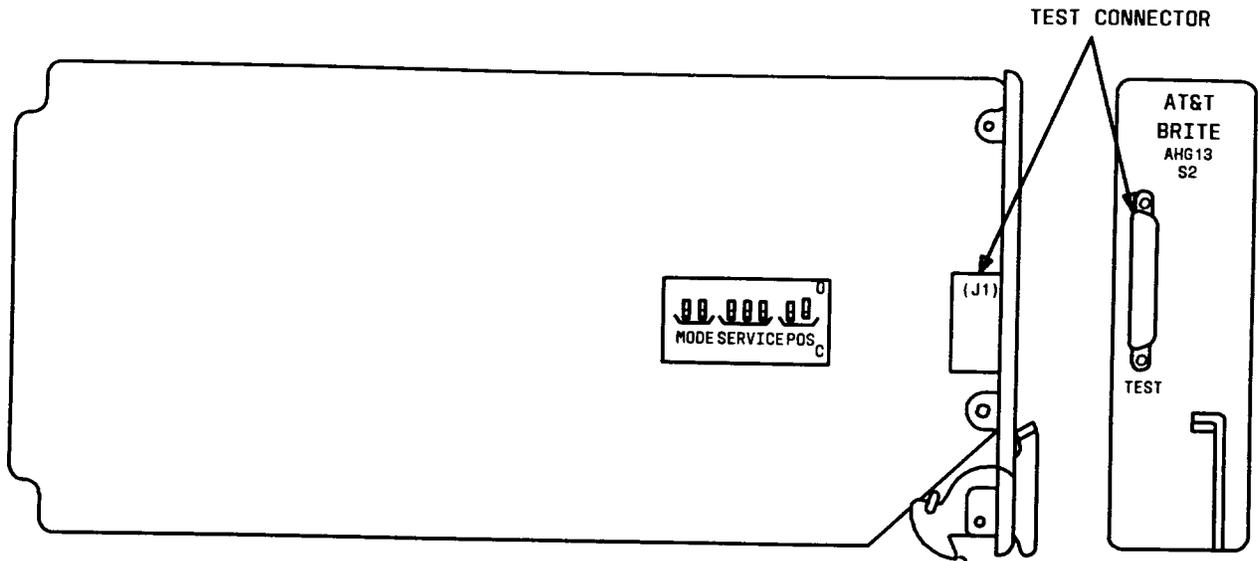
D4	D1D COUNT		CC	**M O D E**
	D4 COUNT		CO	
SLC 96	MODE I	1,4,7,10	CC	
		2,5,8,11	OO	
	MODE III	D1D CNT	OC	
		D4 CNT	CC	
DGTL PIPE	56	2B	OCC	**S E R V I C E**
	64		OCO	
	56	B	COC	
	64		COO	
	IDSN	2B+D	OOC	
		B+D	OOO	
		D	CCO	
TDM OFC	SINK		CO	**P O S**
	SOURCE		CC	
5ESS	SINK		OO	
NT1	SOURCE		OC	

NOTE: THE DECAL IS LOCATED ON THE BACK SIDE OF THE FACEPLATE

Figure 7 — AHG13 BRITE channel unit option switch location

TABLE B				
SERVICE OPTIONS FOR AHG13 BRITE CHANNEL UNIT (CONNECTED TO AUA90 T-BRITE CHANNEL UNIT)				
SERVICE	CHANNELS	RATE	SERVICE SWITCHES (NOTE)	
			3	4	5
ISDN	2B+D	-	O	O	C

Note: C = Closed; O = Open.

TABLE C				
MODE OPTIONS FOR BRITE CHANNEL UNIT (CONNECTED TO AUA90 T-BRITE CHANNEL UNIT)				
BANK OR TERMINAL	COUNTING AND MODE	MODE SWITCHES (NOTE)	
		1	2
D4	D4 Counting	C	O
SLC 96	D1D Mode 1	C *	C *
SLC 96	D1D Mode 1	O †	O †

Note: C = Closed; O = Open.

* These switch settings are for a channel unit that requires time slot counting to begin with the first of the two time slots assigned to a physical slot.

† These switch settings are for a channel unit that requires time slot counting to begin with the second of the two time slots assigned to a physical slot. This is the case when the first time slot is already taken by another channel unit to the left.

TABLE D		
AHG13 BRITE CHANNEL UNIT CIRCUIT POSITION (SINK OR SOURCE)		
BRITE POSITION IN CIRCUIT	POS (POSITION) SWITCHES (NOTE)	
	6	7
Adjacent to 5ESS Switch (Sink)	O	O
Adjacent to NT1 (Source)	O	C
Tandem Office (Sink) *	C	O
Tandem Office (Source) *	C	C

Note: C = Closed; O = Open.

* Use the **sink** setting for a tandem **AHG13** BRITE channel unit which is closer to the 5ESS switch than to the NT1. Use the **source** setting for a tandem **AHG13** BRITE channel unit which is closer to the NT1 than to the 5ESS switch.

PROCEDURE 3 — VERIFY SYNCHRONIZATION BETWEEN FIRST D4 CHANNEL BANK OR *SLC* 96 CARRIER SYSTEM TERMINAL AND *5ESS* SWITCH

SUMMARY

This procedure may be used to verify synchronization between the first D4 channel bank or *SLC* 96 carrier COT in the circuit and the *5ESS* switch. ("First" refers to the D4 channel bank or *SLC* 96 carrier COT that is connected to the Series 5 RT.) This procedure assumes that the **AHG13** BRITE channel unit has been properly optioned and installed in the first D4 channel bank or *SLC* 96 carrier COT and that the circuit is working from the *5ESS* switch. Set switches on **946A** test set for BRITE loopback test. At trunk/line work station, run an external loopback test for 15 minutes. Results should be 0 (zero) errors.

STEP	PROCEDURE 3 — VERIFY SYNCHRONIZATION

1. Insert **946A** test set into the nearest available channel slot.

2. Connect the ribbon cable connector to the **AHG13** BRITE channel unit faceplate test connector.

3. Set switches on the **946A** test set (Figure 4), as follows:

    - **2B+D** switch to the **BRI** position

    - **ADDR** switch to the **1** position

    - **T/R** switch to the **R** position (receive only)

    - **B1/B2** switch to either position (does not matter)

    - **LP/CR** switch to the **CR** position (carrier).

4. At the *5ESS* switch trunk/line work station, perform an external loopback test. This loopback should run for 15 minutes. No errors in 15 minutes is a good indication that the circuit is synchronized.

5. Did the loopback test result in 0 (zero) errors?

    If **YES**, then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

    If **NO**, then continue with Step 6.

6. Check the timing and synchronization of the circuit. For a D4 channel bank, verify that the **OIU** card is properly set for external timing and that the external clock leads are connected to terminal strip **TS8** at the right top on the rear side of the channel bank. The wires should be connected to **terminal pins 9 and 10**. Replace the **OIU** card if it is suspected of causing trouble.

STEP	PROCEDURE 3 — VERIFY SYNCHRONIZATION

For a *SLC* 96 carrier COT, verify that the **SSU** is properly set for external timing and that the backplane is properly wired according to procedures in AT&T 363-202-400. Replace the **SSU** if it is suspected of causing trouble.

Verify that the *5ESS* switch has the same source of timing as the transmission equipment.

Correct the problem and repeat test from Step **4**.

PROCEDURE 4 — INSTALL AUA90 T-BRITE CHANNEL UNIT IN SERIES 5 RT

SUMMARY

This procedure may be used to install and verify placement of the **AUA90** T-BRITE channel unit in the Series 5 FPB RT or INA-RT. The **AUA90** T-BRITE channel unit has no options or switch settings. Verify that the channel unit slot number is correct and install the T-BRITE channel unit. Verify that channel unit placement is correct (no indicators lighted).

STEP	PROCEDURE 4 — INSTALL AUA90 T-BRITE CHANNEL UNIT IN SERIES 5 RT

1. Obtain **AUA90** T-BRITE channel unit for each ISDN service specified in the circuit/service order or WORD document.

2. Verify that channel slot number specified on circuit/service order or WORD document conforms to the placement rules for T-BRITE. (See Figure 3.)

3. Install the **AUA90** channel unit into the specified channel slot.

   Response: Channel unit **FAIL** indicator lights for about 2 seconds, then goes off (for JPU — "just powered up" indication).

4. Did the channel unit **FAIL** indicator light and go off as specified in the response?

   If **YES**, then proceed to Step **8**.

   If **NO**, then continue with Step **5**.

5. On the **ADU**, press the **LED TEST** pushbutton and hold it down. Does the **FAIL** indicator on the **AUA90** channel unit go off?

   If **YES**, then continue with Step **6**.

   If **NO**, then proceed to Step **7**.

6. Channel unit placement is incorrect according to T-BRITE placement rules (Figure 3). Make sure channel unit is installed in channel slot specified on circuit/service order or WORD document. If channel unit is installed in specified slot, refer trouble to installation and maintenance or to the circuit provisioning center. If channel unit is not installed as specified, remove it and return to Step **3**.

7. Channel unit is failed. Replace channel unit; if **FAIL** indicator still remains lighted, refer trouble to installation and maintenance. Otherwise, continue with Step **8**.

8. Perform Procedure 5 as required to verify continuity from the Series 5 RT after the **AUA90** channel unit is installed.

   STOP. YOU HAVE COMPLETED THIS PROCEDURE.

PROCEDURE 5 — VERIFY ISDN CIRCUIT CONTINUITY FROM THE SERIES 5 RT TO 5ESS SWITCH

SUMMARY

This procedure may be used to verify continuity of connections between the Series 5 FPB RT or INA-RT and the 5ESS switch. This procedure assumes that Procedures 1 through 4 have been done as applicable at each terminal in the circuit between the RT and the 5ESS switch.

STEP	PROCEDURE 5 — VERIFY ISDN CIRCUIT FROM SERIES 5 RT TO 5ESS SWITCH

1. Obtain test equipment (shown in Figure 8):

   * 353A power unit

   * ISDN telephone

   * 52A channel unit test extender (for Series 5 channel units)

   * Modified telephone cord approximately 8 feet long or long enough to reach the top shelf of a 7-foot RT bay. The T (pin 2) and R leads (pin 5) of the 6-pin modular telephone plug must be terminated at the other end to tip and ring of a 310 plug. The T1 (pin 3) and R1 leads (pin 4) of the telephone plug must be terminated at the other end to tip and ring of a 310 plug. See Figure 8.

   * D8W-87 cord.

2. On the 52A test extender, turn off **BATTERY FEED/HOLD FUNCTION** by depressing **OFF** pushbutton.

3. At the RT, remove the **AUA90** T-BRITE channel unit and insert the 52A test extender into the channel slot.

4. Insert the **AUA90** channel unit into the 52A test extender.

5. Connect apparatus as shown in Figure 8:

   * Insert the 310 plug (T,R) on the modified telephone cord into the **4W/TRMT** jack under **CU I/O** on 52A test extender.

   * Insert the 310 plug (T1,R1) on the modified telephone cord into the **4W/RCV** jack under **CU I/O** on 52A test extender.

   * Insert the 6-pin modular telephone plug on the modified telephone cord into the **TO LINE** jack on the 353A power unit.

   * Connect the ISDN telephone to 353A power unit using the D8W-87 cord and connect the 353A power unit to 115 V AC outlet.

—

353A POWER UNIT

TO
PHONE TO
TO UNI TO
LINE

TO
115 V AC
OUTLET

ISDN
TERMINAL

D8W-87
CORD

TELEPHONE CORD

52A TEST EXTENDER

MON   CU
I/O

FEED   FEED
NORM

2W ODD/4W TRMT   FEED
REV

HOLD

2W EVEN/4W RCV

2W
ODD

2W
EVEN

4W

OFF

E/M

310
PLUG

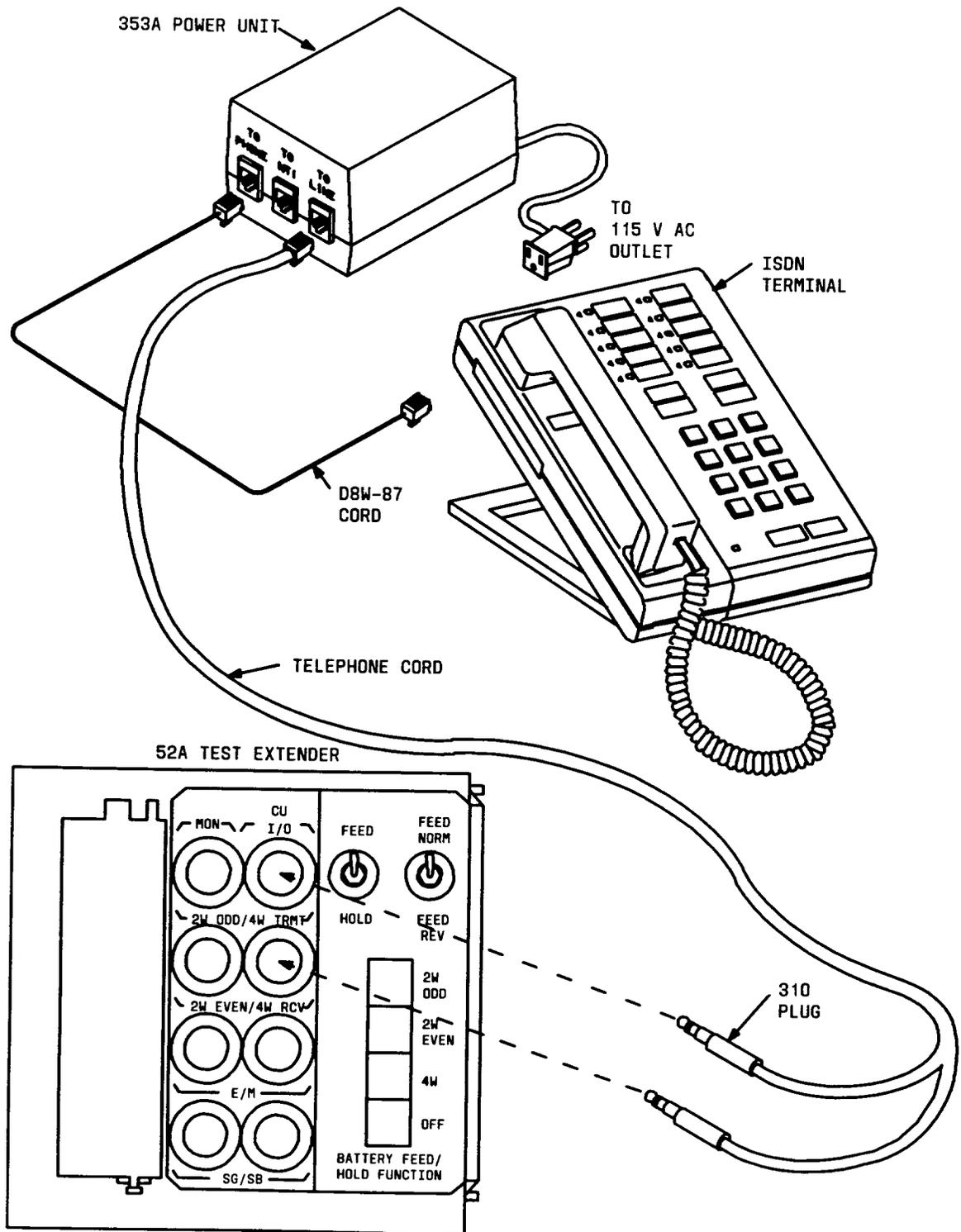SG/SB   BATTERY FEED/
HOLD FUNCTION

Figure 8 — Test connections to verify continuity between Series 5 RT and *5ESS* switch

STEP	PROCEDURE 5 — VERIFY ISDN CIRCUIT FROM SERIES 5 RT TO 5ESS SWITCH

6. Lift handset of the ISDN telephone. Do you hear dial tone?

　　If **YES**, then proceed to Step 8.

　　If **NO**, then continue with Step 7.

7. Check test connections and switch settings and correct if needed. Verify that terminal at central office (D4 channel bank or SLC 96 carrier COT) is synchronized. Continue when dial tone is present.

8. Dial the 5ESS switch test number. Do you hear a special tone?

　　If **YES**, then continue with Step 9.

　　If **NO**, then **STOP.** The 5ESS switch translations are not correct. Refer trouble to the SCC (switching control center).

9. Disconnect apparatus and remove 52A test extender.

10. Reinstall the **AUA90** channel unit in the channel slot.

　　STOP. YOU HAVE COMPLETED THIS PROCEDURE.

PROCEDURE 6 — TEST ISDN CIRCUIT FOR OPERATION

SUMMARY

This procedure may be used to test the ISDN circuit in both directions (requires two ISDN terminals — refer to Part 5 - Test Sets) to verify that the circuit is operational and error-free. A loopback test that runs for 15 minutes with no errors indicates a good circuit. This procedure assumes that Procedures 1 through 5 have been performed as applicable and that loop qualification has been done. If the circuit does not perform properly, refer to Part 7 - Maintenance Tests for procedures to isolate the trouble.

STEP	PROCEDURE 6 — TEST ISDN CIRCUIT FOR OPERATION

1.   Arrange for end-to-end tests from customer premises or Series 5 RT to any location where an ISDN call is routed through the *5ESS* switch.

2.   **Note:** The Series 5 **AUA90** T-BRITE channel unit provides the NT1 interface. An NT1 is not required on customer premises. In an NT1 loopback test, the circuit will be looped back at the **AUA90** T-BRITE channel unit.

   At the *5ESS* switch, perform NT1 loopback tests to the **AUA90** T-BRITE in the RT on both the B1 and B2 channels. These loopback tests should be run for at least 15 minutes to obtain an average error rate.

3.   Make an ISDN call through the *5ESS* switch to an ISDN terminal on the customer premises or at the Series 5 RT cross-connect. The call should be made from another ISDN terminal which may be located at any convenient point that allows the call to be routed through the *5ESS* switch.

4.   Was the call completed?

   If **YES,** then continue with Step **5.**

   If **NO,** then repeat Step **3** several times. If the call is not completed each time, refer to Part 7 - Maintenance Tests for procedures to isolate the trouble.

5.   From an ISDN terminal either on customer premises or at the Series 5 RT cross-connect, make an ISDN call through the *5ESS* switch to the other ISDN terminal.

6.   Was the call completed?

   If **YES,** then **STOP. YOU HAVE COMPLETED THIS PROCEDURE.**

   If **NO,** then repeat Step **5** several times. If the call is not completed each time, refer to Part 7 - Maintenance Tests for procedures to isolate the trouble.

7. MAINTENANCE TESTS

This part provides maintenance information and procedures for trouble clearing ISDN circuits containing ISDN channel units. Procedure 7 is an echo canceler test (optional) that may be performed as applicable on the **AHG13** BRITE channel units during installation or maintenance. Procedure 8 is a BRITE loopback test from the Series 5 RT which may be used to isolate trouble in the circuit as a result of a trouble report or during installation testing.

The NT1 loopback test is equivalent to a BRITE loopback test when a T-BRITE channel unit is at the end of the circuit (customer interface). Since the T-BRITE unit provides the NT1 function, an NT1 loopback test from the far end D bank will loop the circuit back at the loop interface of the T-BRITE channel unit.

For maintenance procedures using the **946A** test set at an **AHG13** BRITE channel unit, refer to Procedure 7 (NT1 Loopback Test) and Procedure 8 (BRITE Loopback Test) in AT&T Practice 365-170-502.

A. General Information

In most cases, maintenance on BRITE channel units in the ISDN circuit is performed as a reaction to a customer complaint. Presently, when a customer calls the telephone center in charge of maintaining the BRITE channel unit in that area and has a complaint, the SSC (special service center) will dispatch a technician to resolve the trouble. Later, whenever BRITE channel unit maintenance capabilities are added to the 5ESS switch and to LMOS (Loop Maintenance Operation System), an ISDN customer will be able to dial 611 to report trouble. Then, the maintenance can be performed from an ARSB (automated repair service bureau). Figure 9 shows typical organizations responsible for the maintenance of different portions of an ISDN circuit.

The first step in maintenance of an ISDN circuit is to isolate the trouble to:

(a) the switch equipment

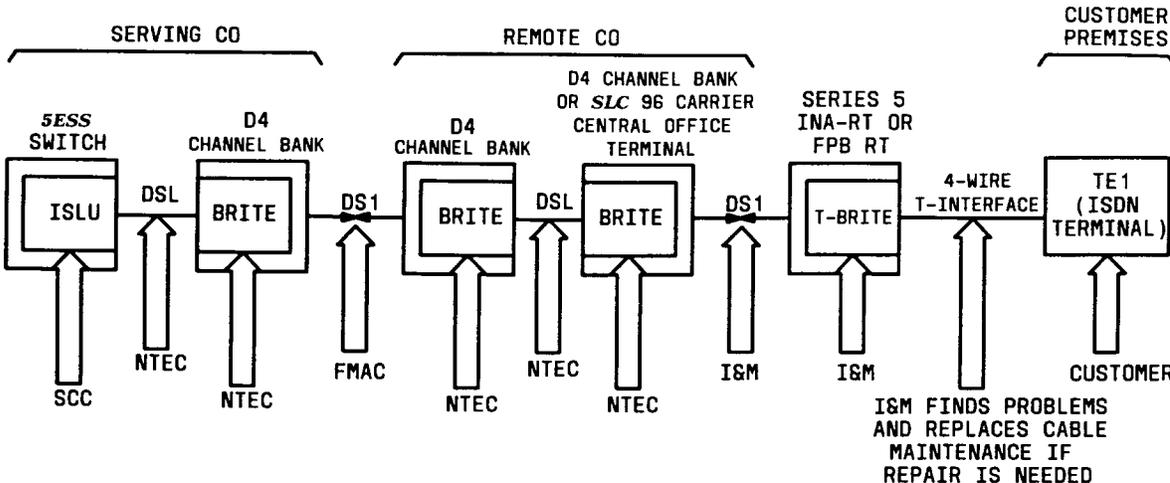(b) the transmission equipment, and/or

(c) customer-owned equipment.

If the problem is isolated to either the switch or customer-owned equipment, the normal course of action is taken. That is, the SCC (switching control center) will make arrangements to fix problems in the serving switch. For customer-owned equipment troubles, the customer will be informed about the problem so that corrective action can be taken.

If the trouble is diagnosed to be in the transmission equipment, then further tests must be run to isolate the trouble.

For testing and trouble isolation, the BRITE channel units provide two different loopbacks (Figure 10). These loopbacks are as follows:

• 2B+D channels looped back at the drop side or loop interface

• 2B+D channels looped back at the carrier interface.

The loopbacks can be activated using the **946A** or **950A** test set (Figure 4 and Figure 5).

Figure 9 — Typical maintenance and installation organizations responsible for an ISDN circuit

LEGEND:

BRITE – BASIC RATE INTERFACE TRANSMISSION EXTENSION
 DS1 – DIGITAL SIGNAL 1 (DS1 FACILITIES)
 DSL – DIGITAL SUBSCRIBER LINE
FMAC – FACILITIES MAINTENANCE & ADMINISTRATION CENTER
 I&M – INSTALLATION & MAINTENANCE
ISLU – INTEGRATED SERVICES LINE UNIT
NTEC – NETWORK TERMINAL EQUIPMENT CENTER
 SCC – SWITCHING CONTROL CENTER

(A) 2B+D BRI ADDRESS 2 CARRIER LOOPBACK (B1 OR B2)

(B) 2B+D BRI ADDRESS 1 CARRIER LOOPBACK (B1 OR B2)

(C) 2B+D BRI ADDRESS 1 LOOP LOOPBACK (B1 OR B2)
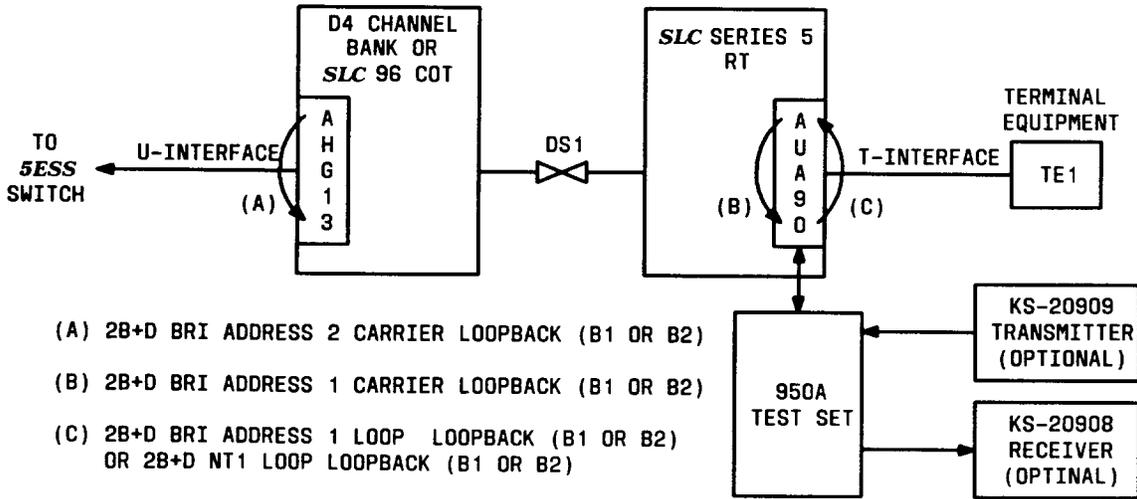   OR 2B+D NT1 LOOP LOOPBACK (B1 OR B2)

Figure 10 — BRITE channel unit 2B+D channel loopback

B. 946A and 950A Test Sets

See Part 5 - Test Sets for a brief functional description of the test sets. The switches, indicators, and jacks on the faceplate of each test set are described below. Where the **950A** test set is labeled differently, the labeling is given in parentheses ( ).

2B+D: This switch has four positions:

> **NONE** In this position, the test set performs circuit monitoring but no test loopback is established.

> **BRI** In this position, a 2B+D loopback is set up in a BRITE channel unit. The specific channel unit is determined by the **LP-CR** (loop - carrier) switch and **ADDR** (address) switch.

> **EC** In this position, the test set will test the echo canceling hybrid circuit in a D4/SLC 96 carrier **AHG13** AMI U-BRITE channel unit. The test cannot be performed on the **AUA90** T-BRITE channel unit, but can be requested for an **AHG13** BRITE channel unit from the Series 5 RT.

> **NT1** In this position, the test set requests a loopback at the NT1.

ADDR (ADDRESS): This switch selects the address of the applicable BRITE or T-BRITE channel unit in the circuit for test. Position **1** selects the channel unit connected to the **946A** or **950A** test set. Position **2** selects the next BRITE channel unit in the circuit in the direction specified by the **LP-CR** switch. Position **3** selects the BRITE channel unit beyond the position **2** channel unit, and position **4** does likewise. The **950A** test set switch has two additional positions (**5** and **6**) for future applications.

XMT-RCV (TRMT-RCV): The **XMT (TRMT)** jack provides access for the **KS-20909** transmitter data test set. The **RCV** jack provides access for the **KS-20908** receiver data test set.

T/R - R (TRMT/RCV - RCV): In the **T/R (TRMT/RCV)** position, this switch allows transmit and receive testing on the B channels. The **R (RCV)** position allows receive testing only. The B channel being tested (B1 or B2) depends on the position of the **B1-B2** switch.

ACT: After the test set is connected to the channel unit (BRITE or T-BRITE), this momentary pushbutton type switch activates the test set and lights the **ACT** lamp. Service is interrupted when the test set is activated.

B1-B2: This switch allows transmission testing on the selected channel (B1 or B2).

LP-CR (LOOP-CARRIER): This 2-position switch sends the loopback code either toward the loop side [**LP (LOOP)** position] or toward the carrier side [**CR (CARRIER)** position].

These switches and the connector are available only on the **950A** test set:

KS-ST: This switch selects the source for the data to be transmitted and monitored by the test set. The **KS** position selects the **TRMT-RCV** jacks as the data source for the channel unit. The **ST** position selects a self-test mode which generates data on the test set to send to the channel unit. If the **946A** test set is used with the **950A** test set for end-to-end testing, this switch must be set to the **KS** position.

946A-950A: When set to the **946A** position, this switch allows the **950A** test set to communicate end-to-end with a **946A** test set. To communicate with a **950A** or equivalent test set, the switch should be set to the **950A** position. When this switch is set to the **946A** position, the **KS-ST** switch **must** be set to the **KS** position in order to test end-to-end with the **946A** test set.

CLOCK: This 9-pin clock connector provides the 8 kHz and 64 kHz clocks to the data test sets via the ED-3C792 test unit and a cable assembly (COMCODE 842725111).

TABLE E lists the indicators on the test sets and what each indicator means when lighted.

TABLE E 946A AND 950A TEST SET INDICATORS (NOTE)		
INDICATOR	**NAME**	**DESCRIPTION**
LLF	Local Loop Failure	Indicates that the BRITE channel unit connected to the test set (**ADDR** or **ADDRESS** = **1**) has lost framing or signal on the drop (loop) side.
RLF	Remote Loop Failure	Indicates that the far end (**ADDR** or **ADDRESS** = **2 - 6**) BRITE channel unit has lost framing or signal on its drop (loop) side.
LCF	Local Channel Failure	Indicates that N (maintenance) channel framing has been lost on the carrier side of the local (**ADDR** or **ADDRESS** = **1**) channel unit. May be caused by a channel unit or carrier failure.
RCF	Remote Channel Failure	Indicates that N (maintenance) channel framing has been lost on the carrier side of a remote (**ADDR** or **ADDRESS** = **2 - 6**) channel unit on a tandem carrier. May be caused by a BRITE channel unit or carrier failure.
COS	Carrier Out of Service	Indicates a loss of framing in the carrier (failure of the DS1 facility). The **COS** indicator takes precedence over **LCF** indicator.
ECF	Echo Canceler Failure	Indicates that the echo canceler test is active on the channel unit hybrid circuit. Normally the light goes out after 2 seconds. If it does not go out, either the BRITE channel unit on which the test is run is not functioning properly or the loopback was performed at the 4-wire interface of a BRITE channel unit.
OOS	Out of Service	Indicates that the 5ESS switch has taken the circuit out-of-service or that maintenance is being performed.
ACT	Active	Indicates that a test has been started (test set activated) by depressing the **ACT** switch. The indicator goes off when the **ACT** switch is depressed again.
COUNTER - ERRORS	Error Counter (**950A** test set only)	This 7-segment display shows the number of errors in the received data compared to the expected sequence. The counter will count to nine and hold the count until reset by the **COUNTER RESET** button. This display is active only in the ST mode.

Note: All indicators off means that the ISDN circuit operation is normal and the BRITE channel units are working. The description applies to the lighted indicator.

C. Using the Test Sets

The **946A** and **950A** test sets indicate trouble and help isolate trouble in an ISDN circuit. To use either test set effectively, the loopback circuit must be analyzed from end-to-end and the tester must be familiar with the test set indications. The circuit may be analyzed from either end, but the 5ESS switch office usually provides the most efficient location for testing the circuit. Refer to AT&T 365-170-502 for procedures using the **946A** test set.

Figure 11 shows an example of an ISDN circuit with tandem offices between the 5ESS switch and the terminating equipment (TE1). In Figure 11, a **946A** test set is connected to the BRITE channel unit in the D4 channel bank at the 5ESS switch office. A **KS-20908** receiver data test set and a **KS-20909** transmitter data test set are connected to the **946A** test set. Each D4 channel bank in the loopback circuit is equipped with a BRITE channel unit and numbered corresponding to the **ADDR** switch positions on the **946A** test set.

Once the customer calls the office about trouble in the circuit, the technician must find out what equipment is in the circuit. The technician checks for failure indication(s) on the **946A** test set and determines if there is loop, carrier, or possibly intermittent trouble.

Lighted indicators on the **946A** test set for trouble conditions depend upon the BRITE channel unit position to which the test set is connected. For example, a BRITE channel unit that detects trouble (bad framing) at the loop interface sends an LLF (local loop failure) message to the test interface and an RLF (remote loop failure) message to the carrier interface. The LLF message causes the **LLF** indicator to light on the **946A** test set connected to the channel unit. If there are other test sets connected to other BRITE channel units on the carrier side, the RLF message causes the **RLF** indicator to light on these test sets. Similarly, a BRITE channel unit that detects bad framing at the carrier interface sends an LCF (local channel failure) message to the test interface and an RCF (remote channel failure) message toward the loop interface. These failure messages cause the LCF indicator to light on a test set connected to the failed BRITE channel unit and cause the RCF indicator to light on a test set connected to a BRITE unit on the loop side of the failed unit.

The D4 channel bank and SLC 96 carrier terminal use a framing pattern to monitor the integrity of the entire DS1 facility. A failure of the DS1 facility causes the BRITE channel unit to send a COS (carrier-out-of-service) message to the test interface and to the loop interface. An LCF message is also sent to the test interface because the individual BRITE channel units in the circuit lose framing. These simultaneous messages cause the **COS** and **LCF** indicators to light on connected test sets. In this case, the LCF indication should be ignored and attention be given to carrier trouble.

Further loopback tests can be run to verify trouble indications. However, there are some limitations on testing. For example, the echo canceler loopback test will not pass on the number 3 position BRITE channel unit in Figure 11 because the loopback is at the 4-wire (carrier) interface. The echo canceler loopback test provides valid test results only from 2-wire reflective loopbacks. There are some cases where the loopback test passes, but the channel unit could be bad. Such cases could be a result of intermittent trouble, or a loopback transmitted toward the carrier side of the number 1 BRITE channel unit may provide a pass indication even though the number 1 BRITE channel unit is bad.
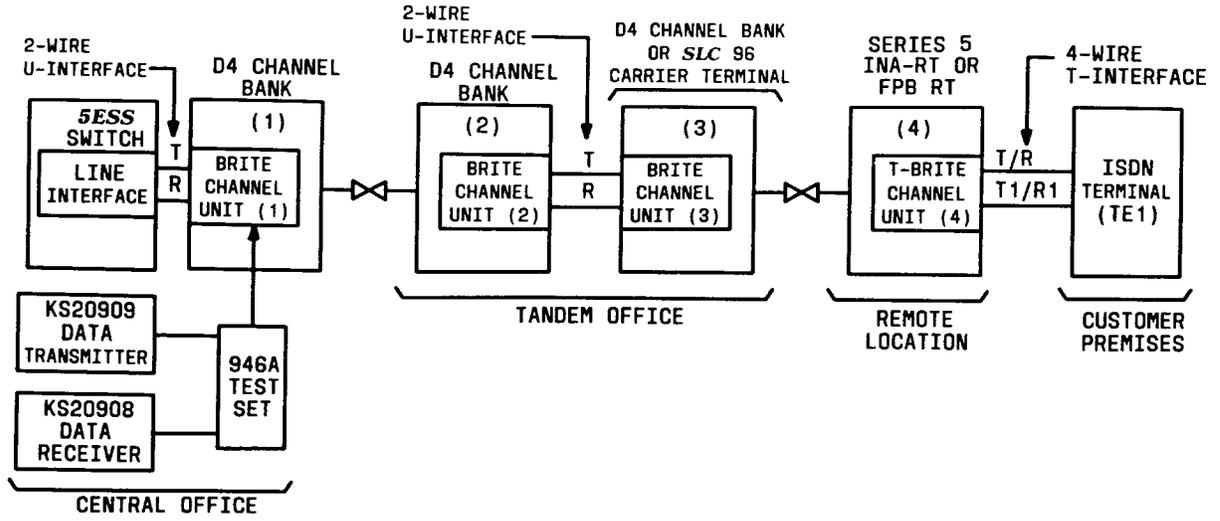
Figure 11 — ISDN circuit with tandem D4 channel banks

PROCEDURE 7 — ECHO CANCELER LOOPBACK TEST FOR AHG13 BRITE CHANNEL UNITS

SUMMARY

This procedure is optional and can be performed only on BRITE channel units with 2-wire reflective loopback toward the test set. If tandem **AHG13** BRITE channel units are used in the circuit, the second tandem unit (number 3 in Figure 11) will fail the echo canceler test because the reflective loopback is from the 4-wire carrier side of the unit. At **946A** test set, set switches for EC (echo canceler) test. Press **ACT** to start the test. The **ECF** indicator should light for about 2 seconds, then go off. Press **ACT** to end the test.

STEP	PROCEDURE 7 — ECHO CANCELER LOOPBACK TEST

1. Insert **946A** test set into the unused channel slot closest to the **AHG13** BRITE channel unit in the circuit being tested. Connect ribbon cable connector on the test set to the connector on the faceplate of the BRITE channel unit.

2. On **946A** test set, set the **2B+D** switch to **EC** position (Figure 4).

3. *Note:* If tandem **AHG13** BRITE channel units are used in the circuit, the second tandem unit (number 3 in Figure 11) will fail the echo canceler test because the reflective loopback is from the 4-wire carrier side of the unit.

   Set **ADDR** switch to the number representing the BRITE channel unit position in the circuit to be tested.

4. Set the **LP - CR** switch to **LP** (loop) position for number 1 BRITE channel unit or to **CR** (carrier) position for number 2 or 4 BRITE channel units. (The echo canceler test is valid only for BRITE channel units with 2-wire reflective loopback toward the test set.)

5. Press **ACT** button. The **ECF** lamp lights for about 2 seconds and goes off if the echo canceler circuit is working properly. If the circuit is not working properly, the lamp remains lighted.

6. Press the **ACT** button to end the test.

7. Repeat test as required for other BRITE channel units in the circuit.

STOP. YOU HAVE COMPLETED THIS PROCEDURE.

PROCEDURE 8 — BRITE LOOPBACK TEST FROM SERIES 5 RT

SUMMARY

This procedure may be used at the Series 5 RT to perform a BRITE loopback test for the **AUA90** T-BRITE channel unit and for each **AHG13** BRITE channel unit in the circuit.

STEP	PROCEDURE 8 — BRITE LOOPBACK TEST FROM SERIES 5 RT

1. Insert **950A** test set into the nearest available unused channel slot relative to channel unit in circuit to be tested. (It will seat in the backplane connector when inserted in a channel slot.) If channel slot is not available, test set may be inserted into any other slot, but cannot be inserted into the backplane connector.

2. Plug cable from **950A** test set into connector on faceplate of **AUA90** T-BRITE channel unit in circuit to be tested.

3. Condition **950A** test set [Figure 5] as follows:

   • Set the **2B+D** switch to the **BRI** position.

   • Set the **ADDRESS** switch to **1** (for the T-BRITE channel unit in the circuit being tested).

   • Set the **LOOP-CARRIER** switch to the **LOOP** position for the T-BRITE channel unit (**ADDRESS = 1**)

   • Set the **TRMT/RCV - RCV** switch to the **TRMT/RCV** position.

   • Set the **B1-B2** switch to select the data channel (either channel may be used).

   • Set the **KS-ST** switch to the **ST** position.

4. On the **950A** test set, press the **ACT** button to start the test.

5. Press the **COUNTER-RESET** button.

6. **Note:** If the **950A** test set display indicates errors (counts up to 9 as soon as the **COUNTER-RESET** button is pressed), wait at least 15 seconds, then press the **COUNTER-RESET** button again.

   After 3 minutes, press the **ACT** button on the **950A** test set to end the test. Observe the **COUNTER-ERRORS** display on the **950A** test set. No errors in 3 minutes indicates an error rate better than 10^{-6}, which is suitable for data transmission.

7. Does the **COUNTER-ERRORS** display indicate errors?

   If **YES**, then continue with Step **8**.

   If **NO**, then proceed to Step **15**.

STEP	PROCEDURE 8 — BRITE LOOPBACK TEST FROM SERIES 5 RT

8. Does the **COUNTER-ERRORS** display indicate gross errors (immediately counts up to 9) or a slow error rate (1 second or more between error counts)?

   If **gross errors** are indicated, check test connections and repeat test. If test set still shows gross errors, refer trouble to installation and maintenance.

   If a **slow error rate** is indicated, continue with Step **9**.

9. On the **950A** test set, set the **KS-ST** switch to the **KS** position. Connect the data test sets [Figure 12] to the **950A** test set as follows:

   - **KS-20909 TRANSMITTER** clock cord to **TMT** on **ED-3C792 TEST UNIT**

   - **KS-20908 RECEIVER** clock cord to **REC** on **ED-3C792 TEST UNIT**

   - Cable assembly between **ED-3C792 TEST UNIT** and **CLOCK** on **950A** test set

   - **KS-20909 TRANSMITTER** signal cord to **TRMT** jack on **950A** test set

   - **KS-20908 RECEIVER** signal cord to **RCV** jack on **950A** test set

Figure 12—Test connections for data test sets

10. Depress **POWER** switches on **TRANSMITTER** and **RECEIVER** and verify **CLOCK** indicators are lighted.

11. Set switches on **TRANSMITTER** and **RECEIVER** as follows:

   - **TRANSMITTER MODE** to **REPEAT**

   - **TRANSMITTER FUNCTION** to **2047**

   - **DATA RATE** to **56** (kb/s) on both test sets

   - **TRANSMITTER OUTPUT** to **LOGIC NEAR**

   - **RECEIVER INPUT** to **LOGIC NEAR**

   - **RECEIVER CHANNEL** to **SINGLE** (or any position; it does not matter)

   - **RECEIVER TEST WORD** to **2047**

   - **RECEIVER COUNTER** to **BIT ERRORS**

12. On the **950A** test set, press the **ACT** button to activate the test set.

13. On the **RECEIVER**, operate **COUNTER MODE** to **RESET**.

14. After 3 minutes, press the **ACT** button on the **950A** test set to end the test. Note the number of errors displayed on the **RECEIVER** and refer trouble to installation and maintenance.

<center>**STOP. YOU HAVE COMPLETED THIS PROCEDURE.**</center>

15. If the T-BRITE channel unit is being tested (**ADDRESS = 1**), set the **LOOP-CARRIER** switch to the **CARRIER** position (direction) and repeat Step 4 through Step 6.

16. Is this the last BRITE channel unit to be tested?

   If **YES**, then proceed to Step **18**.

   If **NO**, then continue with Step **17**.

17. Set the **ADDRESS** switch to **2, 3,** or **4** representing the position of the next BRITE channel unit to be tested in the circuit. Verify the **LOOP-CARRIER** switch is set to the **CARRIER** position (direction) and return to Step 5.

18. Press the **ACT** button to end the loopback test.

<center>**STOP. YOU HAVE COMPLETED THIS PROCEDURE.**</center>