DIGITAL TRANSMISSION SURVEILLANCE SYSTEM
CIRCUIT PACK INSTALLATION AND TEST PROCEDURES
DIGITAL DATA SYSTEM

1. GENERAL

1.01 This section describes the installation of circuit pack (CP) HL95 surveillance unit (SU) and CP HL16B sync circuit in a T1DM bay. After installation, testing of CP HL95 and CP HL16B(s) is made to verify proper operation of the circuit packs in the Digital Transmission Surveillance System (DTSS).

1.02 Whenever this section is reissued, the reason(s) for reissue will be given in this paragraph.

1.03 The DTSS provides the means for monitoring the performance of DS-1 facilities. The performance data which DTSS gathers allows improved maintenance and troubleshooting activities on DS-1 facilities. CP HL16B provides an 8 kb/s service channel that is derived from the DS-1 signal to transmit the performance data. Since a DS-1 facility is full duplex, the derived 8 kb/s service channel is also capable of full duplex operation. However, in DTSS the derived channel is used in a half duplex operation. The 8 kb/s service channel may have an SU at only one end. The distant end, terminated by CP HL16B, is optioned to the looped position which allows the performance data to be returned to the local SU via the local CP HL16B. The SU analyzes, categorizes, and temporarily stores the performance data until polled by the remotely located minicomputer. Then, the performance data is transmitted to the minicomputer. If the performance data is relayed from the local SU to one or more SUs before arriving at the minicomputer, the 8 kb/s service channel is referred to as a communications channel. To summarize, the 8 kb/s service channel has CP HL16B in a looped condition at one end and an SU at the other end. A communications channel is the 8 kb/s service channel that is used as a communications link between SUs or between an SU and the minicomputer.

1.04 This section consists of two charts that contain installation, optioning, and test procedures for DTSS. Chart 1 pertains to equipping a T1DM bay with CP HL95 and CP HL16Bs. This bay arrangement is called a surveillance unit equipped bay. Chart 2 pertains to equipping a T1DM bay with CP HL16B(s). This bay arrangement is called a nonsurveillance unit equipped bay.

Testing Prerequisites

1.05 The following prerequisites are items that require action prior to performing the procedures in the charts.

(a) Obtain employee assistance (craft person) at the T1DM bay and at the Network Administration Center (NAC) for test verification.

(b) Coordinate with the NAC before any testing or change activity is initiated to avoid recording and reporting erroneous trouble conditions.

(c) Establish and maintain voice communication for coordination between the NAC and the location under test. The telephone number of NAC will be indicated on the circuit layout record card (CLRC) or circuit layout order card (CLOC).

2. CIRCUIT PACK INSTALLATION AT T1DM BAY

2.01 This part is divided into two areas of CP installation: surveillance unit equipped bay and nonsurveillance unit equipped bay. A surveillance unit equipped bay consists of a CP HL95 and CP HL16Bs. A nonsurveillance unit equipped bay has only CP HL16Bs installed in all the T1DMs to be monitored in that bay.

SURVEILLANCE UNIT (CP HL95) EQUIPPED BAY

2.02 The T1DM bay equipped for DTSS operation has an SU in the protection spare T1DM along with a modified sync circuit pack (HL16B). The SU is physically located in slots 58, 60, and 62 along with the standard CPs (see Section 314-912-300) of the protection spare T1DM. ***Each T1DM, including the spare T1DM in an SU equipped bay must be equipped with CP HL16Bs and not CP HL16s. A mixture of CP HL16s and CP HL16Bs in an SU equipped bay causes an alarm condition, thus interrupting service.*** Circuit pack replacement is accomplished in a specified way to minimize bit errors in the working T1DMs. The replacement procedure is contained in the charts.

2.03 Figure 1 shows two views of CP HL95, one with the front cover closed and the other with the cover opened. The latter view shows the cross-connect field where strapping is performed. Before strapping is started at an SU location, the NAC must be notified so a change status can be entered into the minicomputer for that particular SU location. This causes the minicomputer to ignore the performance data from that SU until the change status is removed as coordinated by the NAC (after completion of strapping). The TST switch is depressed after the SU is inserted into the spare T1DM and before strapping starts. The S1 and S2 dip switches are used to set a binary address for the local SU.

A. Initial Tests of CP HL95

2.04 The initial tests of the SU are made after insertion into the bay but before addressing and strapping. The initial tests consist of an indicator test and a self test of the SU. The indicator test and the self test are activated by depressing and holding the TST pushbutton switch on the HL95 faceplate. After approximately 2 seconds, the light emitting diodes, POLL, IN SRV, FAIL, and TST OK, light as long as TST is depressed. The POLL indicator will blink or be on steadily if the SU is receiving polling messages from the minicomputer. Then, after releasing the TST button, the POLL, IN SRV, and FAIL indicators extinguish and the TST OK indicator lights to indicate a successful self test of the SU. If the FAIL indicator lights or if the IN SRV indicator fails to light after completion of tests, refer to Circuit Pack Maintenance in Part 3 for the replacement of the SU. The self test generates a local test within the multi-microprocessor of the SU. This test disrupts normal data collection activities of the SU; therefore, if the SU has been in service, it should only be made with the coordination of the NAC.

B. General Strapping Information for CP HL95

2.05 Table A lists the functional association to the physical layout of the terminals as they appear at the faceplate of CP HL95. Care must be taken to avoid a mistake on the terminal number designations. For example, the number 14 of R14 corresponds to the T1DM shelf position number and not to the working T1DM number in that bay (Fig. 2).

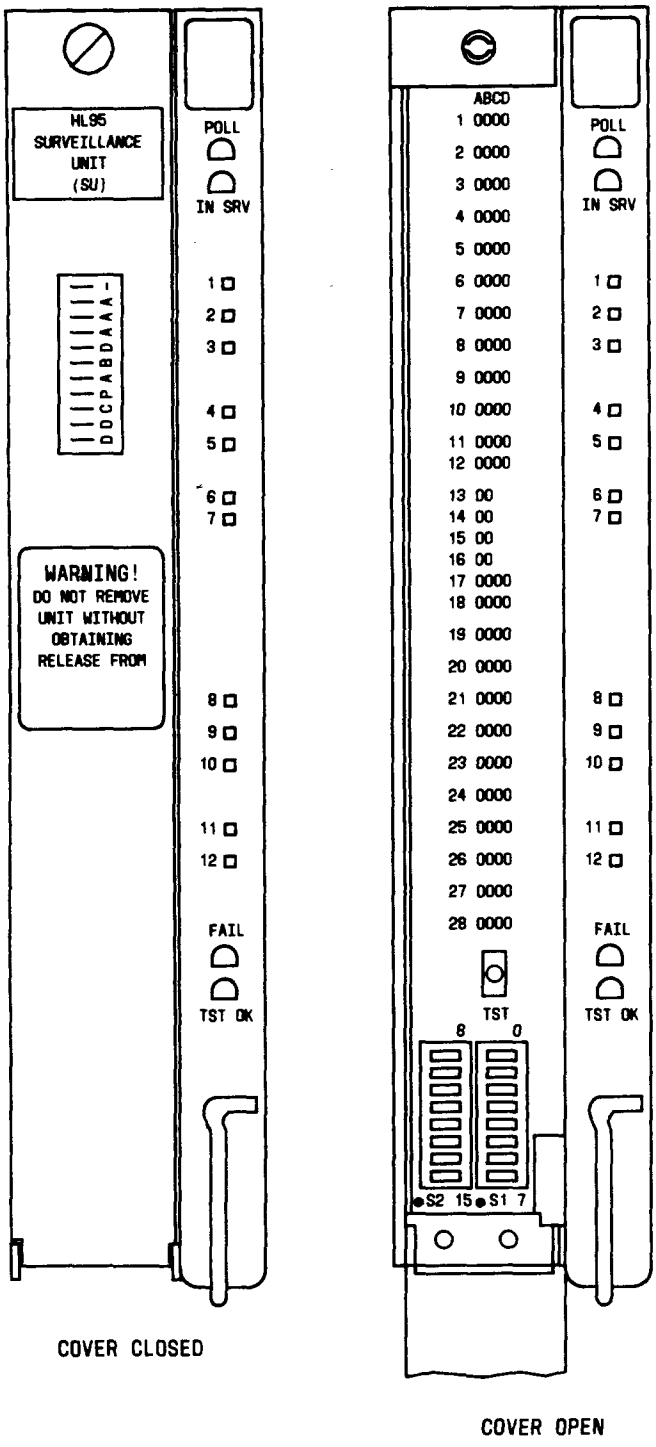

Fig. 1—Front View of CP HL95 Surveillance Unit

Strapping Aids

2.06 Figure 3 is an aid to help correctly strap the cross-connect field of CP HL95. It shows the functional and physical terminal designations and locations on CP HL95.

2.07 Table B lists the permissible connections between the input and output terminals at the cross-connect field. Some restrictions exist as indicated in the appropriate footnote of Table B. For example, in the asterisk (*) footnote, an MI terminal in column A is only strapped to the corresponding R terminal in column B, that is, M114 in column A is strapped to R14 in column B. Since strapping is always done in pairs, the T14 terminal in column B is strapped to the BO14 terminal in column A. In this example, the RSF14 terminal in column C must be strapped to the corresponding GRD14 terminal in column A.

C. Optioning CP HL16B

2.08 The charts given in Part 4 provide step-by-step instructions to option, install, and perform a dotting pattern test with CP HL16B in a specified order. Information supplemental to Chart 1 is provided in the following paragraphs.

2.09 The HL16B sync circuit is optioned to position 1 whenever the CP is plugged into a T1DM bay equipped with an SU (HL95). The position 1 option is the microprocessor option.

2.10 After optioning the HL16Bs, they are installed in the protection spare T1DM and all working T1DMs in that bay. The same option must be installed in all CP HL16Bs for a particular bay. The working T1DMs are equipped for DTSS operation one by one when each facility is switched to the spare T1DM.

NONSURVEILLANCE UNIT EQUIPPED BAY

2.11 This bay is equipped with ***CP HL16Bs*** in the spare and working T1DMs that are being monitored by DTSS but ***does not*** have the CP HL95 in the protection spare T1DM. A mixture of CP HL16 and CP HL16Bs is permitted in this bay. However, the T1DM(s) monitored by DTSS require CP HL16B(s). The procedure to equip the T1DMs is in Chart 2. Position 2, the looped option, must be used in optioning CP HL16B. Position 2 is used to loop the incoming performance data back to the SU in another office.

TABLE A

FUNCTIONAL AND PHYSICAL TERMINAL DESIGNATIONS

COLUMN A		COLUMN B		COLUMN C		COLUMN D	
FUNCTIONAL	PHYSICAL COLUMN-ROW	FUNCTIONAL	PHYSICAL COLUMN-ROW	FUNCTIONAL	PHYSICAL COLUMN-ROW	FUNCTIONAL	PHYSICAL COLUMN-ROW
MI14	A1	R14	B1	RSF14	C1	MB6	D1
BO14	A2	T14	B2	BO15	C2	DB6	D2
MI13	A3	R13	B3	RSF13	C3	MA6	D3
BO13	A4	T13	B4	MI15	C4	DA6	D4
MI12	A5	R12	B5	RSF12	C5	MB5	D5
BO12	A6	T12	B6	BO6	C6	DB5	D6
MI11	A7	R11	B7	RSF11	C7	MA5	D7
BO11	A8	T11	B8	MI6	C8	DA5	D8
MI10	A9	R10	B9	RSF10	C9	MB4	D9
BO10	A10	T10	B10	BO5	C10	DB4	D10
MI9	A11	T9	B11	RSF9	C11	MA4	D11
BO9	A12	R9	B12	MI5	C12	DA4	D12
GRD14	A13	---	B13				
GRD12	A14	GRD13	B14				
GRD10	A15	GRD11	B15				
GRD8	A16	GRD9	B16				
GRD3	A17	GRD7	B17	---	C17	MB3	D17
GRD1	A18	GRD2	B18	---	C18	DB3	D18
MI8	A19	R8	B19	RSF8	C19	MA3	D19
BO8	A20	T8	B20	BO4	C20	DA3	D20
MI7	A21	R7	B21	RSF7	C21	MB2	D21
BO7	A22	T7	B22	MI4	C22	DB2	D22
MI3	A23	R3	B23	RSF3	C23	MA2	D23
BO3	A24	T3	B24	---	C24	DA2	D24
MI2	A25	R2	B25	RSF2	C25	MB1	D25
BO2	A26	T2	B26	BI	C26	DB1	D26
MI1	A27	R1	B27	RSF1	C27	MA1	D27
BO1	A28	T1	B28	MO	C28	DA1	D28

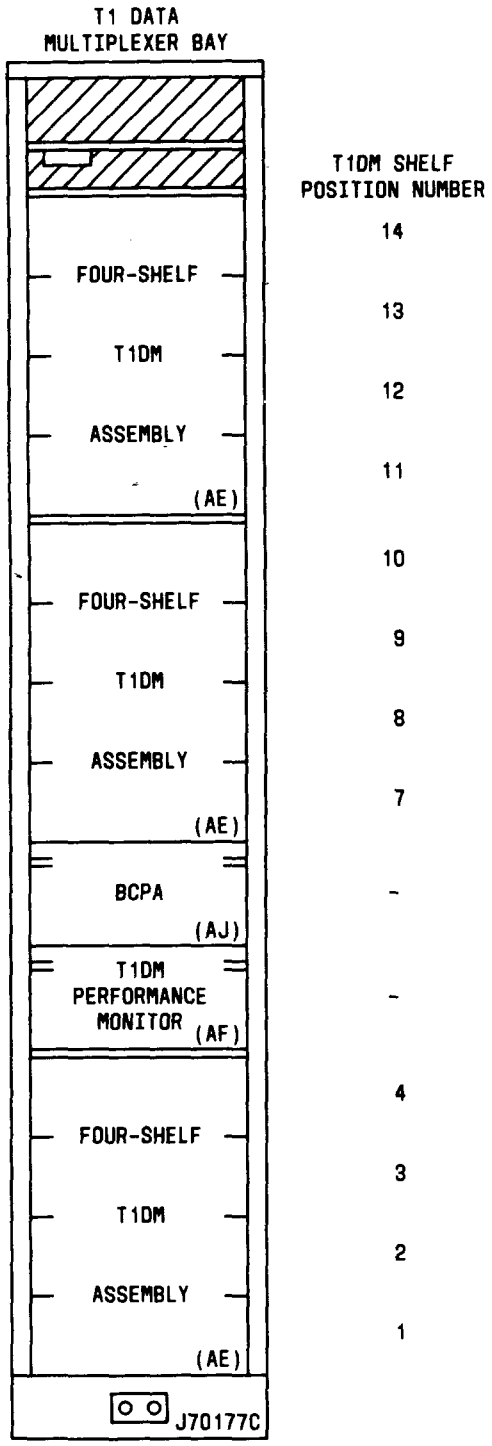

Fig. 2—Relationship Between Bay and T1DM Shelf Position Number

3. CIRCUIT PACK MAINTENANCE

3.01 The surveillance unit (CP HL95) is not repairable in the field. Therefore, the replacement of a faulty CP HL95 is required to restore the DTSS to full monitoring capability. A faulty CP HL95 should not be removed until a replacement is available if the SU has been in service. The SU may be removed if this is the initial installation. A faulty CP HL95 can still permit monitoring of some DS-1 facilities because some of the strapping may provide bypass circuits which ignore the microprocessor circuitry. To minimize outage time, the replacement CP HL95 should be strapped before plugging into the bay.

3.02 A replacement HL95 will be kept in any office having three or more CP HL95s in service. In addition, the replacement HL95s will be controlled by the NAC regardless of the number of CP HL95s in service. The NAC will control and initiate shipment of replacement CP HL95s.

4. PROCEDURAL CHARTS

4.01 This part includes DTSS installation and test procedures for a T1DM bay ***equipped*** with an SU and for a T1DM bay ***not equipped*** with an SU. The test procedures verify the correctness of the address assignment of each SU and the correctness of the system's configurations with the minicomputer. The test procedures are performed at the initial system installation or when a communications channel or an 8 kb/s service channel is added to the existing system. Each location will perform at least one of the test procedures (chart), and some locations will perform both test procedures (Chart 1 and 2).

	A	B	C	D
1	MI14	R14	RSF14	MB6
2	BO14	T14	BO15	DB6
3	MI13	R13	RSF13	MA6
4	BO13	T13	MI15	DA6
5	MI12	R12	RSF12	MB5
6	BO12	T12	BO6	DB5
7	MI11	R11	RSF11	MA5
8	BO11	T11	MI6	DA5
9	MI10	R10	RSF10	MB4
10	BO10	T10	BO5	DB4
11	MI9	R9	RSF9	MA4
12	BO9	T9	MI5	DA4
13	GRD14	---		
14	GRD12	GRD13		
15	GRD10	GRD11		
16	GRD8	GRD9		
17	GRD3	GRD7	---	MB3
18	GRD1	GRD2	---	DB3
19	MI8	R8	RSF8	MA3
20	BO8	T8	BO4	DA3
21	MI7	R7	RSF7	MB2
22	BO7	T7	MI4	DB2
23	MI3	R3	RSF3	MA2
24	BO3	T3	----	DA2
25	MI2	R2	RSF2	MB1
26	BO2	T2	BI	DB1
27	MI1	R1	RSF1	MA1
28	BO1	T1	MO	DA1

TERMINAL DESIGNATIONS

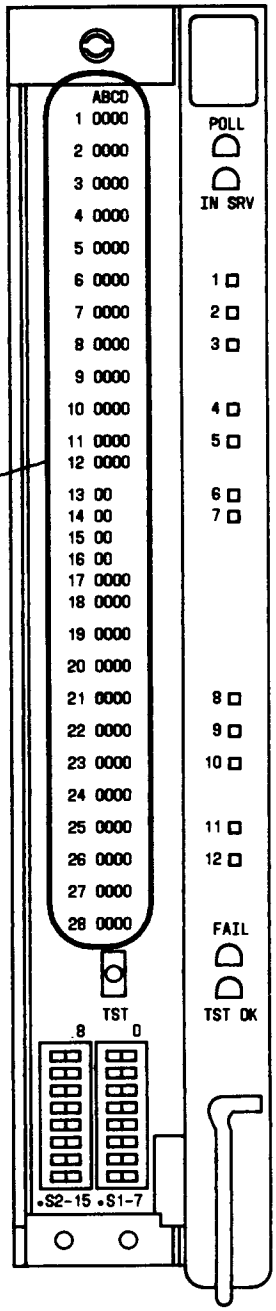

Fig. 3—CP HL95 Terminal Designations

TABLE B

PERMISSIBLE CONNECTIONS AT CP HL95 CROSS-CONNECT FIELD

TERMINALS IN COLUMN A	MAY BE STRAPPED TO ANY TERMINAL IN (COLUMN)	TERMINALS IN COLUMN B	MAY BE STRAPPED TO ANY TERMINAL IN (COLUMN)	TERMINALS IN COLUMN C	MAY BE STRAPPED TO ANY TERMINAL IN (COLUMN)	TERMINALS IN COLUMN D	MAY BE STRAPPED TO ANY TERMINAL IN (COLUMN)
MI	R(B)*	R	MI(A)*	RSF	GRD(A)*	MD	R(B)
			T(B)†		GRD(B)*		BO(C)
BO	T(B)*		BI(C)		R(B)*		MO(C)
			RSF(C)*				DA(D)
GRD	T(B)*		MA(D)				
	RSF(C)*		MB(D)	BO	MA(D)	DB	T(B)
					MB(D)		MI(C)
		T	BO(A)*				BI(C)
			GRD(A)*				
			GRD(B)*	MI	DA(D)		MA(D)
			R(B)†			MA	R(B)
			MO(C)	BI	R(B)		BO(C)
			DA(D)		DA(D)		MO(C)
			DB(D)		DB(D)		DB(D)
		GRD(B)	RSF(C)*	MO	T(B)	DA	T(B)
			T(B)*		MA(D)		MI(C)
					MB(D)		BI(C)
							MB(D)

* STRAP TO CORRESPONDING TERMINAL NUMBER, eg, MI14 STRAPPED TO R14.

† DO NOT STRAP TO CORRESPONDING NUMBER, eg, R14 MUST NOT BE STRAPPED TO T14.

4.02 Table C lists the basic elements that make up the charts. Remember that Chart 1 is used when an SU is in a T1DM bay and Chart 2 is used when a T1DM bay is without an SU. Note that all the elements in Chart 1 are performed at initial installation but only selected elements are performed to add a communications channel or an 8 kb/s service channel to an existing system, as shown in Table C.

TABLE C

CHART ELEMENTS

CHART 1 ELEMENTS (T1DM BAY WITH SU)	INITIAL INSTALLATION	ADD CHANNEL
OPTION CP HL16BS	YES	YES
INSTALL CP HL16B IN SPARE T1DM	YES	NO
SWITCH TO SPARE T1DM	YES	YES
INSTALL CP HL16B IN WORKING T1DMS	YES	YES
SWITCH BACK TO ORIGINAL WORKING T1DM	YES	YES
INSTALL CP HL95	YES	NO
INITIAL TEST OF CP HL95	YES	NO
ADDRESS CP HL95	YES	NO
STRAP CP HL95	YES	YES
TEST CP HL16B	YES	YES
VERIFY MICROPROCESSOR OPTION AND TEST*	YES	YES
CHART 2 ELEMENTS (T1DM BAY WITHOUT SU)	**INITIAL INSTALLATION**	**ADD CHANNEL**
OPTION CP HL16BS	YES	YES
INSTALL CP HL16B IN SPARE T1DM	YES	NO
SWITCH TO SPARE T1DM	YES	YES
INSTALL CP HL16B IN WORKING T1DM	YES	YES
SWITCH BACK TO ORIGINAL WORKING T1DM	YES	YES
TEST CP HL16B	YES	YES
VERIFY LOOPED OPTION AND TEST*	YES	YES

* Use when T1DM bay has been previously equipped with CP HL16Bs.

4.03 If trouble is encountered while performing a test procedure, troubleshoot and correct the problem using Sections 314-912-300 and 314-984-500.

CHART 1

EQUIP T1DM BAY WITH CP HL95 AND CP HL16B(s)

APPARATUS:

Two W1BF straps or equivalent single conductor straps with Digital Data System (DDS) test point plugs for HL faceplates

Insulation displacement push-in wire tool and 10 feet of oxy-free, high copper, 30 gauge Teflon coated wire (provided with CP HL95 inside front cover)

KS-19053 screwdriver or equivalent straight blade screwdriver

Needle nose pliers or equivalent

Diagonal cutters or equivalent

STEP	SURVEILLANCE UNIT LOCATION	NETWORK ADMINISTRATION CENTER
	Caution: Perform this procedure only when the protection spare T1DM is available.	
1	Establish and maintain a telephone call to the NAC indicating that you are ready to start circuit pack installation. The telephone number is indicated on the CLRC or the CLOC.	Update the minicomputer data base by inputting the address of the SU (CP HL95) (approximately 15 minutes).
2	Locate the designated T1DM bay used in the DTSS and the protection spare T1DM shelf (fourth shelf position) per CLRC.	No action.
3	If bay is already equipped with CP HL16Bs, proceed to Step 25.	No Action.
4	Inspect CP HL95 and all CP HL16Bs for physical damage.	No Action.
Option CP HL16Bs		
5	Place shorting plug to position 1 (microprocessor option) for every CP HL16B to be used in a T1DM bay equipped with an SU (Fig. 4).	No Action.

CHART 1 (Contd)

STEP	SURVEILLANCE UNIT LOCATION	NETWORK ADMINISTRATION CENTER

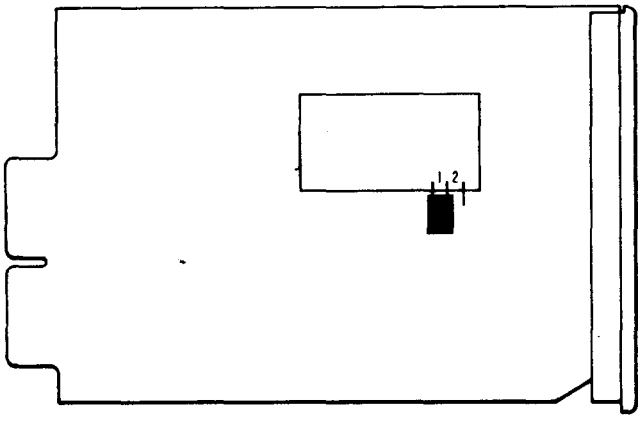

Fig. 4—CP HL16B Shown in Microprocessor Option

6	Wait for approval from NAC before continuing with the procedures.	After receiving verification of data base update, notify the SU (CP HL95) location to proceed.

Install CP HL16B in Spare T1DM

7	Set NORMAL/NO ALARM switch at CP HL34 of T1DM-PM (performance monitor) to NO ALARM. ***Requirement:*** Red NO ALARM indicator blinks at CP HL34.	No Action.
8	Observe that all CP HL15s display H (on continuously) except CP HL15 at spare T1DM, which is flashing H.	No Action.
9	Remove CP HL16 from slot 37 of the protection spare T1DM. ***Requirement:*** CP HL15 at spare T1DM displays F.	No Action.
10	Insert the optioned CP HL16B into slot 37 of protection spare T1DM. ***Requirement:*** CP HL15 at spare T1DM displays H.	No Action.

CHART 1 (Contd)

STEP	SURVEILLANCE UNIT LOCATION	NETWORK ADMINISTRATION CENTER
11	Set NORMAL/NO ALARM switch at CP HL34 to NORMAL. ***Requirement:*** CP HL15 display clears at all T1DMs in that bay.	No Action.
Switch to Spare T1DM		
12	Verify that there are no alarms in the bay by visually checking the bay clock, power, and alarm (BCPA) lights and the display of CP HL34 of the T1DM-PM.	No Action.
13	No Action.	Indicate to the SU location the working T1DM to be switched. Usually the sequence is from bottom to top.
14	Verify that the selected T1DM has the NORM/NO ALM/LOOP switch on CP HL10 or HL90 in the NORM position.	No Action.
15	Set the NORM/NO ALM/LOOP swich on all CP HL10s or HL90s to the NO ALM position except the T1DM selected in Step 14. ***Requirement:*** All working T1DMs display H except the T1DM selected in Step 14, which displays E.	
16	Switch the working T1DM to the protection spare T1DM by disengaging CP HL11, HL12, or HL14. ***Requirement:*** CP HL15 displays flashing E at working T1DM, and yellow alarm lights on BCPA.	No Action.
17	Depress the ACO pushbutton switch on CP HL50 of the T1DM-PM.	No Action.
Install CP HL16B in Working T1DM		
18	Remove CP HL16 from slot 37 of the T1DM selected in Step 14. ***Requirement:*** CP HL15 displays flashing 8.	No Action.

CHART 1 (Contd)

STEP	SURVEILLANCE UNIT LOCATION	NETWORK ADMINISTRATION CENTER
19	Insert the optioned CP HL16B into slot 37 of the working T1DM selected in Step 14.	No Action.
20	Engage CP HL11, HL12 or HL14.	No Action.
Switch Back to Original Working T1DM		
	Caution: The RESET button on the T1DM-PM should not be depressed unless a flashing 8 appears on the original working T1DM.	
21	Depress the RESET button on CP HL34 of the T1DM-PM to switch back to the original working T1DM selected in Step 14. ***Note:*** CP HL34 SER III requires the NORMAL/NO ALARM switch to be in the NO ALARM position for resetting. ***Requirement:*** CP HL15 displays H.	No Action.
22	Set NORM/NO ALM/LOOP switch on CP HL10 or HL90 at T1DM selected in Step 14 to NO ALM position. ***Requirement:*** CP HL15 display clears.	No Action.
23	Repeat Steps 12 through 22 for the remaining working T1DMs in that bay.	No Action.
24	Set the NORM/NO ALM/LOOP switches on all T1DMs in that bay to the NORM position.	No Action.
Install CP HL95		
25	Visually verify that three 940A connectors are wired in CP slots 58, 60, and 62 on the protection spare shelf (bay modified for DTSS). If not, notify Western Electric installation force or your supervisor and the NAC.	No Action.
26	Set NORMAL/NO ALARM switch on CP HL34 of the T1DM-PM to the NO ALARM position. ***Requirement:*** T1DMs display H; flashing H at spare T1DM.	No Action.

CHART 1 (Contd)

STEP	SURVEILLANCE UNIT LOCATION	NETWORK ADMINISTRATION CENTER
27	Remove the two CP HL18s from slots 53 and 56 of the protection spare T1DM. ***Requirement:*** CP HL15 of spare T1DM displays flashing C.	No Action.
28	Carefully remove the plastic key from the 940A connector in slot 62 using needle nose pliers or equivalent.	No Action.
29	Insert the two CP HL18s that were removed in Step 27 into slots 53 and 56.	No Action.
30	Set NORMAL/NO ALARM switch on CP HL34 of the T1DM-PM to the NORMAL position. ***Caution: Before inserting CP HL95, make sure bay contains CP HL16Bs and not CP HL16s.*** ***Warning: Handle by edges to prevent static discharge damage to circuitry of CP HL95.***	No Action.
31	Carefully insert CP HL95 into slots 58, 60, and 62 of the protection spare T1DM (engage three 940A connectors). ***Requirement:*** IN SRV indicator is lighted; POLL, FAIL, and TST OK indicators are extinguished. ***Note:*** It may be necessary to reengage CP HL95 one more time to make proper contact with the three connectors.	No Action.
32	Using a straight shank screwdriver, turn captive screw at top of CP HL95 to open the faceplate cover.	No Action.
Initial Test of CP HL95		
33	Depress and hold for approximately 2 seconds the TST pushbutton switch of CP HL95. ***Requirement:*** POLL, IN SRV, TST OK, and FAIL indicators are lighted.	No Action.

CHART 1 (Contd)

STEP	SURVEILLANCE UNIT LOCATION	NETWORK ADMINISTRATION CENTER
34	Release TST pushbutton switch. ***Requirement:*** After another 2 seconds, the TST OK indicator remains lighted. Observe that the TST OK indicator extinguishes and the IN SRV indicator lights again and remains on. ***Note:*** It is normal for the FAIL indicator to briefly blink before the IN SRV indicator lights. If the FAIL indicator remains lighted or if the test sequence is not observed, replace CP HL95 according to Part 3.	No Action.
Address CP HL95		
35	Set S1 and S2 switches to address assigned per CLRC, CLOC, or strapping sheet for that SU. ***Note 1:*** Address switches S1 and S2: 0 = Rocker up at side of dots. 1 = Rocker down at side of dots. ***Note 2:*** Whenever S1 and S2 switch positions are changed, the test sequence of Steps 33 and 34 must be repeated.	No Action.
Strap CP HL95		
36	Obtain push-in wire tool and single conductor 30-gauge Teflon coated wire provided with CP HL95.	No Action.
37	Indicate to the NAC that you are ready to start strapping CP HL95.	Update the minicomputer by entering the change status for that SU location. After receiving verification of change status, notify the SU location to proceed with the next step.
38	Remove all factory provided straps, if any, using the needle nose pliers.	No Action.
39	Install straps as designated on the CLRC, CLOC, or strapping sheet using Fig. 3 as an aid in strapping.	No Action.

CHART 1 (Contd)

STEP	SURVEILLANCE UNIT LOCATION	NETWORK ADMINISTRATION CENTER
	Note: Only one wire should be strapped to a terminal.	
40	If Steps 4 through 39 were performed, proceed to Step 41; otherwise, proceed to Step 62.	***Note:*** Voice contact with the SU location or the remote looped location is still required during this part of the procedure.
Test CP HL16B		
	Note: Voice contact with the NAC is still required during this part of the procedure.	
41	Verify POLL indicator on CP HL95 blinks (SU is being polled by minicomputer).	No action unless minicomputer is not polling SU (check address update).
42	No Action.	Indicate to the SU location to test the spare T1DM first, then the working T1DMs.
43	Insert a test point (TP) W1BF strap between TP5 and TP12 at the faceplate of CP HL16B of the spare T1DM.	No Action.
44	Verify that there are no alarms in the bay by visually checking the BCPA lights and the display of CP HL34 of the T1DM-PM.	No Action.
45	No Action.	Indicate to the SU location the working T1DM to be switched. Usually the sequence is from bottom to top.
46	Verify that the selected T1DM has the NORM/NO ALM/LOOP switch on CP HL10 or HL90 in the NORM position.	No Action.
47	Set the NORM/NO ALM/LOOP switch on all CP HL10s or HL90s to the NO ALM position except the T1DM selected in Step 46. ***Requirement:*** All working T1DMs display H except T1DM selected in Step 46, which displays E.	No Action.
48	Switch the working T1DM to the protection spare T1DM by disengaging CP HL11, HL12, or HL14.	Verify receiving 4000 errors from the SU location as shown in Fig. 5.

CHART 1 (Contd)

STEP	SURVEILLANCE UNIT LOCATION	NETWORK ADMINISTRATION CENTER

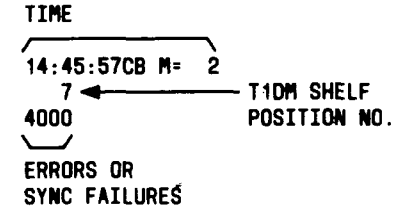

Fig. 5—Example of Test Response

Requirement: CP HL15 displays flashing E at working T1DM, and yellow alarm lights on BCPA.

49	Depress ACO pushbutton switch on CP HL50 of the T1DM-PM.	No Action.
50	Wait until NAC indicates to proceed.	Indicate to the SU location to proceed with the next step after receiving 4000 errors from that T1DM.
51	Engage CP HL11, HL12, or HL14. ***Requirement:*** CP HL15 displays 8. ***Caution: The RESET button on the T1DM-PM should not be depressed unless a flashing 8 appears on the original working T1DM.***	No Action.
52	Depress the RESET button or CP HL34 of the T1DM-PM in order to switch to the original working T1DM selected in Step 46. ***Requirement:*** CP HL15 display clears.	Verify receipt of low or no errors from the T1DM under test.
53	Wait until NAC indicates to proceed.	Indicate to the SU location to proceed to the next step after receiving low or no errors from that T1DM.

CHART 1 (Contd)

STEP	SURVEILLANCE UNIT LOCATION	NETWORK ADMINISTRATION CENTER
54	No Action.	Indicate to the SU location which working T1DM is to be tested (usually from the bottom of the bay to the top).
55	Locate T1DM to be tested.	No Action.
56	Insert the other TP W1BF strap between TP5 and TP12 at the faceplate of CP HL16B of the working T1DM under test. ***Note:*** A dotting pattern consisting of 4000 errors (50 percent) is being transmitted from that CP HL16B. This test does not introduce errors into the DS-1 signal associated with the T1DM.	Verify receipt of 4000 errors from the SU location via a particular channel as shown in Fig. 5.
57	No Action.	Indicate to the SU location that the strap should be removed.
58	Remove the W1BF strap from TP5 and TP12 of CP HL16B of the working T1DM under test.	Verify receipt of low or no errors from the T1DM under test.
59	No Action.	Indicate to the SU location the next T1DM to be tested.
60	Repeat Steps 54 through 59 for the remaining working T1DMs in that bay.	Repeat Steps 54 through 59 for the remaining working T1DMs in that bay.
61	Test completed for this SU location (bay); remove all W1BF straps.	Test completed for that SU location. Proceed to Chart 2 to test the remote looped location(s) that is homed in on the SU location just tested.
Verify Microprocessor Option and Test		
62	No Action.	Indicate to the SU location to proceed with the next step as it applies to the spare T1DM.
63	Set NORMAL/NO ALARM switch at HL34 of the T1DM-PM to NO ALARM. ***Requirement:*** NO ALARM indicator (red) blinks at CP HL34.	No Action.
64	Observe that all CP HL15s display H (on continuously) except CP HL15 at spare T1DM (flashing H).	No Action.

CHART 1 (Contd)

STEP	SURVEILLANCE UNIT LOCATION	NETWORK ADMINISTRATION CENTER
65	Remove CP HL16B from slot 37 of the protection spare T1DM. ***Requirement:*** CP HL15 at spare T1DM displays flashing F.	No Action.
66	Verify that microprocessor option is installed (shorting plug in position 1, see Fig. 4).	No Action.
67	Reinsert CP HL16B into slot 37 of spare T1DM. ***Requirement:*** CP HL15 at spare T1DM displays flashing H.	No Action.
68	Set NORMAL/NO ALARM switch at CP HL34 to NORMAL. ***Requirement:*** CP HL15 display clears at all T1DMs in that bay.	No Action.
69	Insert a test point W1BF strap between TP5 and TP12 at the faceplate of CP HL16B of the spare T1DM.	No Action.
70	Verify that there are no alarms in the bay by visually checking the BCPA lights and the diplay of CP HL34 of the T1DM-PM.	No Action.
71	No Action.	Indicate to the SU location the working T1DM to be switched. Usually the sequence is from bottom to top.
72	Verify that the selected T1DM has the NORM/NO ALM/LOOP switch on CP HL10 or HL90 in the NORM position.	No Action.
73	Set the NORM/NO ALM/LOOP switch on all CP HL10s or HL90s to the NO ALM position except the T1DM selected in Step 72. ***Requirement:*** All working T1DMs display H except the T1DM selected in Step 72, which displays E.	No Action.

CHART 1 (Contd)

STEP	SURVEILLANCE UNIT LOCATION	NETWORK ADMINISTRATION CENTER
74	Switch the working T1DM to the protection spare T1DM by disengaging CP HL11, HL12, or HL14. ***Requirement:*** CP HL15 displays flashing E at working T1DM, and yellow alarm lights on BCPA.	No Action.
75	Depress ACO pushbutton switch on CP HL50 of the T1DM-PM.	Verify receiving 4000 errors from the SU location as shown in Fig. 5.
76	Wait until NAC indicates to proceed.	Indicate to the SU location to proceed with the next step after receiving 4000 errors from that T1DM under test.
77	Remove CP HL16B from slot 37 of the working T1DM selected in Step 72. ***Requirement:*** CP HL15 displays flashing F.	No Action.
78	Verify that microprocessor option is installed (shorting plug in position 1, see Fig. 4).	No Action.
79	Reinsert CP HL16B into slot 37 of the working T1DM. ***Requirement:*** CP HL15 of working T1DM displays E.	No Action.
80	Engage CP HL11, HL12, or HL14. ***Requirement:*** CP HL15 displays 8. ***Caution: The RESET button on the T1DM-PM should not be depressed unless a flashing 8 appears on the original working T1DM.***	No Action.
81	Depress the RESET button on CP HL34 of the T1DM-PM in order to switch to the original working T1DM selected in Step 72.	Verify receipt of low or no errors from the T1DM under test.

CHART 1 (Contd)

STEP	SURVEILLANCE UNIT LOCATION	NETWORK ADMINISTRATION CENTER
	Requirement: CP HL15 display clears.	
82	Insert the other test point W1BF strap between TP5 and TP12 at the faceplate of CP HL16B of the T1DM selected in Step 72. ***Note:*** A dotting pattern test consisting of 4000 errors (50 percent) is being transmitted from that CP HL16B. This test does not introduce errors into the DS-1 signal associated with the T1DM.	Verify receiving 4000 errors from the SU location as shown in Fig. 5.
83	Wait until NAC indicates to proceed.	Indicate to the SU location to proceed with the next step, receiving 4000 errors from that T1DM.
84	Remove the W1BF strap from the working T1DM selected in Step 72.	No Action.
85	Set the NORM/NO ALM/LOOP switch to the NO ALM position of the working T1DM selected in Step 72.	No Action.
86	Repeat Steps 70 through 85 for the remaining working T1DMs.	Repeat Steps 70 through 85 for the remaining working T1DMs to be tested.
87	No Action.	Indicate to the SU location that testing has been completed.
88	Set the NORM/NO ALM/LOOP switch on all CP HL10s or HL90s to the NORM position.	No Action.
89	Test completed for this SU location (bay), remove all W1BF straps.	Test completed for that SU location. Proceed to Chart 2 to test the remote looped location(s) that is homing on the SU location just tested.

CHART 2

EQUIP T1DM BAY WITH CP HL16B(s) (NO SU IN BAY)

APPARATUS:

Two W1BF straps or equivalent single conductor straps with DDS test point plugs for HL faceplate.

CHART 2 (Contd)

STEP	REMOTE LOOPED LOCATION	NETWORK ADMINISTRATION CENTER
	Caution: Perform this procedure only when the protection spare T1DM is available.	
1	No Action.	Establish and maintain a telephone call to the remote looped location and state that you are ready to begin CP installation and/or testing. Verify the minicomputer data base has been updated by inputting the address of the SU (CP HL95) (approximately 15 minutes) that is being homed in by the remote looped location.
2	Locate the designated T1DM bay used in the DTSS and the protection spare T1DM shelf (fourth shelf position) per CLRC.	No Action.
3	If bay is already equipped with CP HL16Bs, proceed to verify looped option and test (Step 49).	No Action.
4	Inspect all CP HL16Bs for physical damage.	No Action.
Option CP HL16Bs		
5	Place shorting plug to position 2 (looped option) for every CP HL16B to be used in a T1DM bay not equipped with an SU (Fig. 6).	No Action.

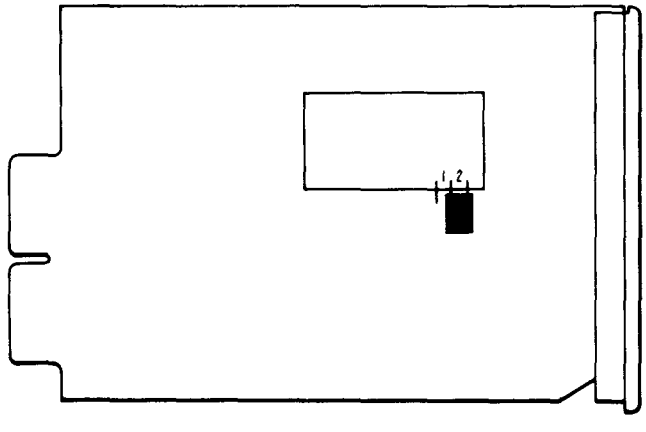

Fig. 6—CP HL16B Shown in Looped Option

CHART 2 (Contd)

STEP	REMOTE LOOPED LOCATION	NETWORK ADMINISTRATION CENTER
6	Wait for approval from NAC before continuing with the procedures.	After receiving verification of data base update, notify the remote looped location to proceed.
Install CP HL16B in Spare T1DM		
7	Set NORMAL/NO ALARM switch at CP HL34 of T1DM-PM (performance monitor) to NO ALARM. ***Requirement:*** Red NO ALARM indicator blinks at CP HL34.	No Action.
8	Observe that all CP HL15s display H (on continuously) except CP HL15 at spare T1DM, which is flashing H.	No Action.
9	Remove CP HL16 from slot 37 of the protection spare T1DM. ***Requirement:*** CP HL15 at spare T1DM displays F.	No Action.
10	Insert the optioned CP HL16B into slot 37 of protection spare T1DM. ***Requirement:*** CP HL15 at spare T1DM displays H.	No Action.
11	Set NORMAL/NO ALARM switch at CP HL34 to NORMAL. ***Requirement:*** CP HL15 display clears at all T1DMs in that bay.	No Action.
Switch to Spare T1DM		
12	Verify that there are no alarms in the bay by visually checking the BCPA lights and the display of CP HL34 of the T1DM-PM.	No Action.
13	No Action.	Indicate to the remote looped location the working T1DM to be switched. Usually, the sequence is from bottom to top.
14	Verify that the selected T1DM has the NORM/NO ALM/LOOP switch on CP HL10 or HL90 in the NORM position.	No Action.

CHART 2 (Contd)

STEP	REMOTE LOOPED LOCATION	NETWORK ADMINISTRATION CENTER
15	Set the NORM/NO ALM/LOOP switch on all CP HL10s or HL90s to the NO ALM position except the T1DM selected in Step 14. ***Requirement:*** All working T1DMs display H except the T1DM selected in Step 14, which displays E.	No Action.
16	Switch the working T1DM to the protection spare T1DM by disengaging CP HL11, HL12, or HL14. ***Requirement:*** CP HL15 displays flashing E at working T1DM, and yellow alarm lights on BCPA.	No Action.
17	Depress the ACO pushbutton switch on CP HL50 of the T1DM-PM.	No Action.
Install CP HL16B in Working T1DM		
18	Remove CP HL16 from slot 37 of the T1DM selected in Step 14. ***Requirement:*** CP HL15 displays flashing 8.	No Action.
19	Insert the optioned CP HL16B into slot 37 of the working T1DM selected in Step 14.	No Action.
20	Engage CP HL11, HL12, or HL14.	No Action.
Switch to Original Working T1DM		
	Caution: The RESET button on the T1DM-PM should not be depressed unless a flashing 8 appears on the original working T1DM.	
21	Depress the RESET button on CP HL34 of the T1DM-PM to switch to the original working T1DM selected in Step 14. ***Note:*** CP HL34 SER III requires the NORMAL/NO ALARM switch to be in the NO ALARM position for resetting.	No Action.

CHART 2 (Contd)

STEP	REMOTE LOOPED LOCATION	NETWORK ADMINISTRATION CENTER
	Requirement: CP HL15 displays H.	
22	Set NORM/NO ALM/LOOP switch on CP HL10 or HL90 at T1DM selected in Step 14 to NO ALM position.	No Action.
	Requirement: CP HL15 display clears.	
23	Repeat Steps 12 through 22 for the remaining working T1DMs in that bay.	No Action.
24	Set the NORM/NO ALM/LOOP switches on all T1DMs in that bay to the NORM position.	No Action.
Test CP HL16B		
	Note: Voice contact with the NAC is still required during this part of the procedures.	
		Note: Voice contact with the remote looped location is still required during this part of the procedure.
25	No Action.	Indicate to the remote looped location to test the spare T1DM first, then the working T1DMs.
26	Insert a TP W1BF strap between TP5 and TP12 at the faceplate of CP HL16B of the spare T1DM.	No Action.
27	Verify that there are no alarms in the bay by visually checking the BCPA lights and the display of CP HL34 of the T1DM-PM.	No Action.
28	No Action.	Indicate to the remote looped location the working T1DM to be switched. Usually, the sequence is from bottom to top.
29	Verify that the selected T1DM has the NORM/NO ALM/LOOP switch on CP HL10 or HL90 in the NORM position.	No Action.
30	Set the NORM/NO ALM/LOOP switch on remaining CP HL10 or HL90 to the NO ALM position except the T1DM selected in Step 29.	No Action.

CHART 2 (Contd)

STEP	REMOTE LOOPED LOCATION	NETWORK ADMINISTRATION CENTER
	Requirement: All working T1DMs display H except T1DM selected in Step 29, which displays E.	
31	Switch the working T1DM to the protection spare T1DM by disengaging CP HL11, HL12, or HL14. ***Requirement:*** CP HL15 displays flashing E at working T1DM, and yellow alarm lights on BCPA.	Verify receiving 4000 errors from the remote looped location as shown in Fig. 5.
32	Depress ACO pushbutton switch on CP HL50 of the T1DM-PM.	No Action.
33	Wait until NAC indicates to proceed.	After receiving 4000 errors from that T1DM, indicate to the remote looped location to proceed with the next step.
34	Engage CP HL11, HL12, or HL14. ***Requirement:*** CP HL15 displays 8. ***Caution: The RESET button on the T1DM-PM should not be depressed unless a flashing 8 appears on the original working T1DM.***	No Action.
35	Depress the RESET button on CP HL34 of the T1DM-PM to switch to the original working T1DM selected in Step 29. ***Requirement:*** CP HL15 display clears.	Verify receipt of low or no errors from the T1DM under test.
36	Wait until NAC indicates to proceed.	After receiving low or no errors from that T1DM, indicate to the remote looped location to proceed to the next step.
37	No Action.	Indicate to the remote looped location the working T1DM to be tested (the sequence is usually from bottom to top of the bay).
38	Locate T1DM to be tested.	No Action.
39	Insert the other TP W1BF between TP5 and TP12 at the faceplate of CP HL16B.	Verify receipt of 4000 errors from the remote looped location as shown in Fig. 6.

CHART 2 (Contd)

STEP	REMOTE LOOPED LOCATION	NETWORK ADMINISTRATION CENTER
	Note: A dotting pattern consisting of 4000 errors (50 percent) is being transmitted from that CP HL16B. This test does not introduce errors into the DS-1 signal associted with the T1DM.	
40	No Action.	Indicate to the remote looped location to remove the strap.
41	Remove the W1BF strap from TP5 and TP12 of CP HL16B of the working T1DM under test.	Verify receipt of low or no errors from the same T1DM as tested in Step 39.
42	No Action.	Indicate to the remote looped location the next T1DM to be tested.
43	Repeat Steps 38 through 42 for the remaining T1DMs in that bay that are part of DTSS.	Repeat Steps 38 through 42 for the remaining T1DMs in that bay that are part of DTSS.
44	Set the NORM/NO ALM/LOOP switch on all HL10 or HL90 CPs to the NORM position.	No Action.
45	Test completed for that remote looped location (bay), remove all W1BF straps.	Indicate to the remote looped location that testing is completed.
46	No Action.	Repeat Steps 25 through 44 for each remote looped location that is homed on a particular SU location.
47	No Action.	Update the minicomputer by terminating the change status for the SU location that is being homed on by the remote looped locations just tested.
48	No Action.	Test completed for the remote looped locations homed on a particular SU location.
Verify Looped Option and Test		
49	No Action.	Indicate to the remote looped location to proceed with the next step as it applies to the spare T1DM.
50	Set NORMAL/NO ALARM switch at CP HL34 of the T1DM-PM to NO ALARM.	No Action.

CHART 2 (Contd)

STEP	REMOTE LOOPED LOCATION	NETWORK ADMINISTRATION CENTER
	Requirement: NO ALARM indicator (red) blinks at CP HL34.	
51	Observe that all CP HL15s display H (on continuously) except CP HL15 at spare T1DM (flashing H).	No Action.
52	Remove CP HL16B from slot 37 of the protection spare T1DM.	No Action.
	Requirement: CP HL15 at spare T1DM displays flashing F.	
53	Verify that looped option is installed (shorting plug-in position 2, see Fig. 6).	No Action.
54	Reinsert CP HL16B into slot 37 of spare T1DM.	No Action.
	Requirement: CP HL15 at spare T1DM displays flashing H.	
55	Set NORMAL/NO ALARM switch at CP HL34 to NORMAL.	No Action.
	Requirement: CP HL15 display clears at all T1DMs in that bay.	
56	Insert a test point W1BF strap between TP5 and TP12 at the faceplate of CP HL16B of the spare T1DM.	No Action.
57	Verify that there are no alarms in the bay by visually checking the BCPA lights and the display of CP HL34 of the T1DM-PM.	No Action.
58	No Action.	Indicate to the remote looped location the working T1DM to be switched. Usually the sequence is from bottom to top.
59	Verify that the selected T1DM has the NORM/NO ALM/LOOP switch on CP HL10 or HL90 in the NORM position.	No Action.
60	Set the NORM/NO ALM/LOOP switch on all CP HL10s or HL90s to the NO ALM position except the T1DM selected in Step 59.	No Action.

CHART 2 (Contd)

STEP	REMOTE LOOPED LOCATION	NETWORK ADMINISTRATION CENTER
	Requirement: All working T1DMs display H except tht T1DM selected in Step 59, which displays E.	
61	Switch the working T1DM to the protection spare T1DM by disengaging CP HL11, HL12, or HL14. ***Requirement:*** CP HL15 displays flashing E at working T1DM, and yellow alarm lights on BCPA.	No Action.
62	Depress ACO pushbutton switch on CP HL50 of the T1DM-PM.	Verify receiving 4000 errors from the remote looped location as shown in Fig. 5.
63	Wait until NAC indicates to proceed.	After receiving 4000 errors from that T1DM under test, indicate to the remote looped location to proceed with the next step.
64	Remove CP HL16B from slot 37 of the working T1DM selected in Step 59. ***Requirement:*** CP HL15 displays flashing F.	No Action.
65	Verify that looped option is installed (shorting plug-in position 2, see Fig. 5).	No Action.
66	Reinsert CP HL16B into slot 37 of the working T1DM. ***Requirement:*** CP HL15 of working T1DM displays E.	No Action.
67	Engage CP HL11, HL12, or HL14. ***Requirement:*** CP HL15 displays 8. ***Caution: The RESET button on the T1DM-PM should not be depressed unless a flashing 8 appears on the original working T1DM.***	No Action.
68	Depress the RESET button on CP HL34 of the T1DM-PM to switch to the original working T1DM selected in Step 59.	Verify receipt of low or no errors from the T1DM under test.

CHART 2 (Contd)

STEP	REMOTE LOOPED LOCATION	NETWORK ADMINISTRATION CENTER
	Requirement: CP HL15 display clears.	
69	Insert the other test point W1BF strap between TP5 and TP12 at the faceplate of CP HL16B of the T1DM selected in Step 59. ***Note:*** A dotting pattern test consisting of 4000 errors (50 percent) is being transmitted from that CP HL16B. This test does not introduce errors into the DS-1 signal associated with the T1DM.	Verify receiving 4000 errors from the remote looped location as shown in Fig. 5.
70	Wait until NAC indicates to proceed.	After receiving 4000 errors from that T1DM, indicate to the remote looped location to proceed with the next step.
71	Remove the W1BF strap from the working T1DM selected in Step 59.	No Action.
72	Set the NORM/NO ALM/LOOP switch to the NO ALM position of the working T1DM selected in Step 59.	No Action.
73	Repeat Steps 57 through 72 for the remaining working T1DMs.	Repeat Steps 57 through 72 for the remaining working T1DMs to be tested.
74	No Action.	Indicate to the remote looped location that testing has been completed.
75	Set the NORM/NO ALM/LOOP switch on all CP HL10s or HL90s to the NORM position.	No Action.
76	Test completed for this remote looped location (bay); remove all W1BF straps.	Test completed for that remote looped location.
77	No Action.	Repeat Steps 1 through 3 and 4 through 48 or 49 through 76 for each remote looped location that is homed on a particular SU location.
78	No Action.	Update the minicomputer by terminating the change status for the SU location that is being homed on by the remote looped locations just tested.
79	No Action.	Test completed for the remote looped locations homed on a particular SU location.