

06AUG80 0103

PG-001

ORG LOC BLDG DEPT ADDRESSEE
K09 GREN YOUN 0041 KEITH IMISSON K IMISSON

FIELD ENGINEERING BILL-4520644 EC LEVEL- 857061 LOC-GREN

MACHINE TYPE-3614-001, 3614-002, 3614-011, 3614-012,

TITLE- INS FFBM VER 5 (DES DC9001) ON VER.3 MACHINES WITH TLA
FC 7820

MAINTENANCE REFERENCE MATERIAL

CHECK	PART NUMBER	QUANTITY	U/M	NAME	DESCRIPTION	REFERENCE/EC
	2222222	1	1	FORM NO	GA66-0004	
	4162541	1	1	MLM EJ1800	VOL R01	
	4520644	1	1	FFBM (FC)	INSTR 491723A	
	4520644	1	1	FFBM (FC)	BM	
	4790272	1	1	MLM EJ1500	VOL R01	
	4791649	1	1	MLM JCG900	VOL R01	
	4791650	1	1	MLM JC1800	VOL R01	
	4791651	1	1	MLM KD0600	VOL R02	
	4791652	1	1	MLM KQ0300	VOL R02	
	4791653	1	1	MLM LA0320	VOL R03	
	4791654	1	1	MLM LA0400	VOL R03	
	4791655	1	1	MLM LA0900	VOL R03	
	4791656	1	1	MLM LA0950	VOL R03	
	4791657	1	1	MLM LA1000	VOL R03	
	4791658	1	1	MLM LA1040	VOL R03	
	4791659	1	1	MLM LE0400	VOL R03	
	4791660	1	1	MLM LM2700	VOL R03	
	4791661	1	1	MLM JG0700	VOL R01	
	4791749	1	1	MLM JC0800	VOL R01	

PARTS AND ASSEMBLIES

CHECK	PART NUMBER	QUANTITY	U/M	NAME	DESCRIPTION	REFERENCE/EC
	2750638	1	1	INST INSTR	V5 NGHOST	
	2751448	1	1	CARD ASM	01AA1B2	
	4160881	1	1	CARD ASM	01AA1H2	
	4160882	1	1	CARD ASM	01AA1F2	
	4160883	1	1	CARD ASM	01AA1D2	
	4161595	1	1	CARD ASM	01AA1L2	
	4521682	1	1	GROUP B/M		
	5412746	1	1	LABEL CEM	416758 08	

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PG-002

ORG	LOC	BLDG	DEPT	ADDRESSEE
KC9	GREN	YOUN	0041	KEITH IMISSON K IMISSON

FIELD ENGINEERING BILL-4520644
COMMENTS- NONE

EC LEVEL- 857061 LOC-GREN

END OF BILL OF MATERIAL

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PG-001

ORG=C50-T.HAWTHORN LOC=GREN BLDG= DEPT=0873 REQUESTOR= REQUESTED ITEM=00 4521682

DESIGN BILL - TODAY'S LEVEL IMPLEMENTABLE

BILL NUMBER	D/P	CHANGE	IEC	CHG	LAB	ENG	U/M	ENG	RES	TEC	DES	DWG	SZ	FIELD	BASIC	DESCRIPTION
00 4521682	MFG	10 491723	06NOV78	EFF	963	A	1	A	A	0					GROUP B/M	
PREVIOUS	CRD	HP	WU	ALT	PC	RES	SR	SPEC	BILL					DOCUMENT / RECORD	CHANGE	LEVELS
CHANGE	CNT	CD	SP	CH	ANA	ENG	CD	SUPP	BASE	EC	DWG	INSTR		SPECS	DIAGNOSTICS	MDF
10 491620					083	MOB	F	947	10	491723	NONE	NONE		NONE	NONE	NONE

**** SECTION NO 000 ****

SEQ	CHANGE
NO	NUMBER
00	VERSION 5 LOOP MLM
01	PAGES

CHANGE	CONTENT	BILL	ENG	CONT	QTY	CONTENT	BASIC	MFG	DSB	SRC	SPEC	TCH	PC				
NUMBER	NUMBER	SEQ	PLN	CH	U/M	QTY	MD	LPI	REFERENCE	NAME	DESCRIPTION	PLN	CD	CD	SUPP	FLD	AN
I10	491723	00	4791092	000	R	S	01	1	U	MLM	JR0010	VOLR01		R	947		
I10	491723	00	4791436	000	R	S	01	1	U	MLM	JR0100	VOLR01		R	947		
I10	491723	00	4791437	000	R	S	01	1	U	MLM	JR0200	VOLR01		R	947		
I10	491723	00	4791438	000	R	S	01	1	U	MLM	JR0250	VOLR01		R	947		
I10	491723	00	4791439	000	R	S	01	1	U	MLM	JR0300	VOLR01		R	947		
I10	491723	00	4791440	000	R	S	01	1	U	MLM	JR0400	VOLR01		R	947		
I10	491723	00	4791441	000	R	S	01	1	U	MLM	JR0500	VOLR01		R	947		
I10	491723	00	4791442	000	R	S	01	1	U	MLM	JR0600	VOLR01		R	947		
I10	491723	00	4791443	000	R	S	01	1	U	MLM	JR0700	VOLR01		R	947		
I10	491723	00	4791444	000	R	S	01	1	U	MLM	JR0800	VOLR01		R	947		
I10	491723	00	4791445	000	R	S	01	1	U	MLM	JR0900	VOLR01		R	947		
I10	491723	00	4791446	000	R	S	01	1	U	MLM	JR1000	VOLR01		R	947		
I10	491723	00	4791447	000	R	S	01	1	U	MLM	JR1100	VOLR01		R	947		
I10	491723	00	4791448	000	R	S	01	1	U	MLM	JR1200	VOLR01		R	947		
I10	491723	00	4791449	000	R	S	01	1	U	MLM	JR1300	VOLR01		R	947		
I10	491723	00	4791450	000	R	S	01	1	U	MLM	JR1400	VOLR01		R	947		
I10	491723	00	4791451	000	R	S	01	1	U	MLM	JR1500	VOLR01		R	947		
I10	491723	00	4791452	000	R	S	01	1	U	MLM	JR1600	VOLR01		R	947		
I10	491723	00	4791453	000	R	S	01	1	U	MLM	JR1700	VOLR01		R	947		
I10	491723	00	4791454	000	R	S	01	1	U	MLM	JR1800	VOLR01		R	947		
I10	491723	00	4791455	000	R	S	01	1	U	MLM	JR1900	VOLR01		R	947		
I10	491723	00	4791456	000	R	S	01	1	U	MLM	JR2000	VOLR01		R	947		
I10	491723	00	4791457	000	R	S	01	1	U	MLM	JR2100	VOLR01		R	947		
I10	491723	00	4791458	000	R	S	01	1	U	MLM	JR2150	VOLR01		R	947		
I10	491723	00	4791459	000	R	S	01	1	U	MLM	JR2200	VOLR01		R	947		
I10	491723	00	4791460	000	R	S	01	1	U	MLM	JR2300	VOLR01		R	947		

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ORG=C50-T.HAWTHORN LOC=GREN BLDG= DEPT=0873 REQUESTOR= REQUESTED ITEM=00 4521682

CHANGE		CONTENT		BILL ENG				CONT QTY			CONTENT		BASIC		MFG DSB	SRC	SPEC	TCH	PC	
NUMBER		NUMBER		SEQ	PLN	CH	U/M	QTY	MD	LPI	REFERENCE	NAME		DESCRIPTION	PLN	CD	CD	SUPP	FLD	AN
I10	491723	00	4791461	000	R	S	01	1	U			MLM	JR2400	VOLR01			R	947		
I10	491723	00	4791462	000	R	S	01	1	U			MLM	JR2500	VOLR01			R	947		

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IBM INSTALLATION INSTRUCTIONS

Title: INSTALL FFB/M FOR VERSION 5 (DES
DC 9001) ON VERSION 3 MACHINES WITH
TLA (FC 7820).

Written by: G. Mead
Checked by: R. Kegley
Approved by: C. Batcheller
Field Support/DPCE Review: W. Wilkins

STATUS:

Before Installation

1.0 MACHINES AFFECTED

All 3614 machines at EC 491561 (version 3) with terminal loop feature (B/M 2252664) and without B/M 4162997 (Version 5). Verify logic card at board location D2. If card is P/N 4161322 then the physical requirements for installing this B/M are met.

2.0 PREREQUISITES/CONCURRENT/COMPANION

2.1 Prerequisites

MLM must be at EC 491723 level. Verify that MLM page INSTALL 4 is at EC 491723 or higher.

One of the following version 5 microcode DTR B/Ms must be installed on host CPU prior to installation of this B/M.

4520226	4520229
4520227	4520230
4520228	4520703

Check with the host PSR.

2.2 Concurrent

None

2.3 Companion

None

3.0 B/M TO BE INSTALLED

B/M 4520644

4.0 PREPARATION

- 4.1 Familiarize yourself with the purpose and details of this installation instruction.
- 4.2 Check that all items and parts on the B/M list were received.
- 4.3 Inform bank personnel to make sure machine is out of service, rear door unlocked, B key cleared and all money removed from the machine.

5.0 PROGRAM UPDATES

See step 2.1 of this installation instruction.

6.0 PURPOSE AND DESCRIPTION

6.1 Purpose

Update the hardware to Version 5.

6.2 Description

- 1. Version 3 ROS cards are replaced with Version 5 cards.
- 2. Basic monitor adapter card is replaced with feature select monitor card.
- 3. New MLM pages are added.
- 4. New NO-Host tape is provided.
- 5. New 3614 Operator Guide is provided.

7.0 INSTALLATION TIME

Man Hours	Machine Hours	System Hours	No. of CEs
1.8	1.8	0.0	1

8.0 SPECIAL TOOLS AND/OR MATERIALS
REQUIRED

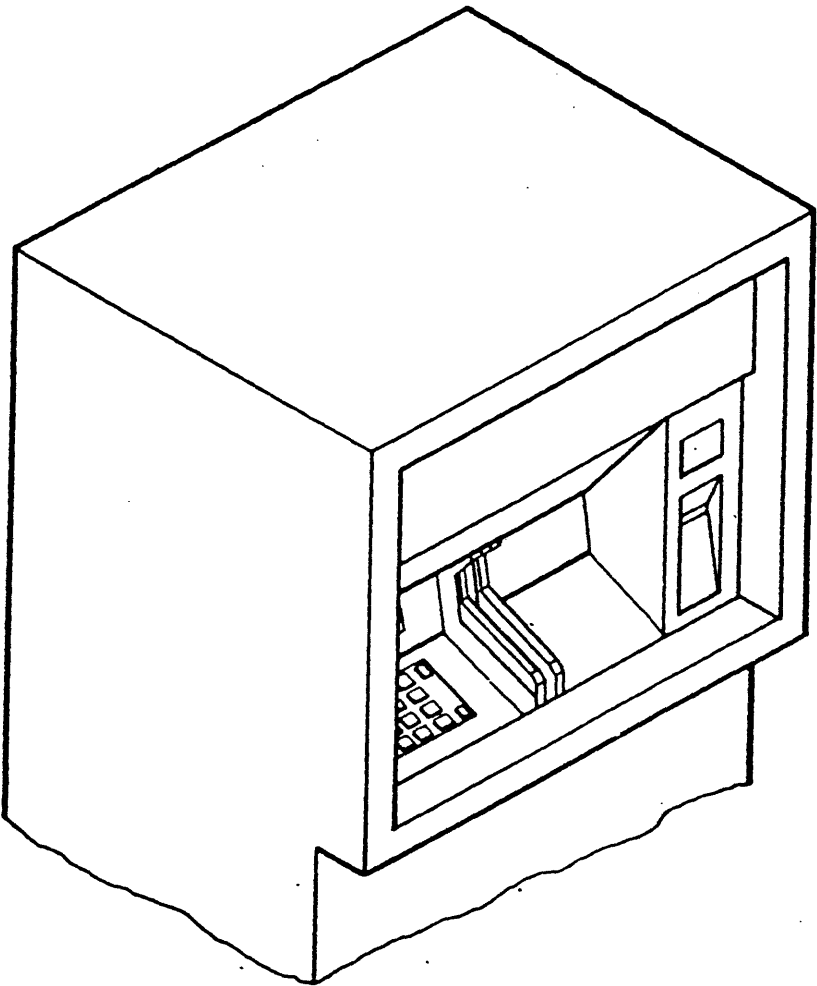
Cassette Recorder (P/N 5500746)

Installation

9.0 SAFETY

Remove all electrical power from the 3614 and associated machines by placing the Emergency Disconnect (CP1) switch below the power supply to the Off position. Tape CP1 in off position.

Caution: Removing power from the 3614 on a remote loop will disable all units attached to that loop if the 3614 contains MODEM.



10.0 DETAILS OF INSTALLATION

10.1 Safety and Covers

- 1. Open rear cover of 3614.
- 2. Remove power from the 3614 and associated machines (see step 9.0 of this installation instruction).
- 3. Loosen the screws 1 that attach the logic gate/power supply cover 2 to the rear of the 3614. Remove the cover.

10.2 Logic Board

- 1. Remove the following logic cards from the logic board.

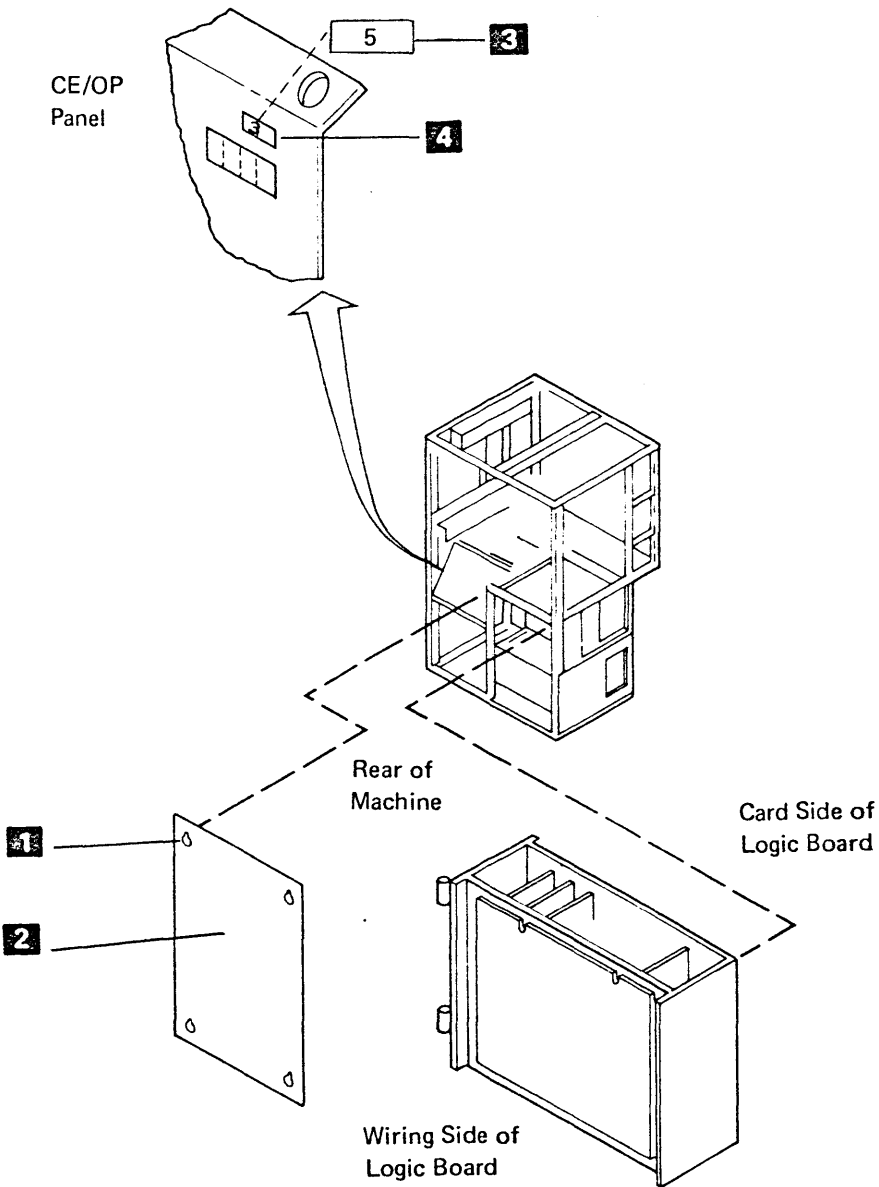
Location	P/N
H2	4161320
F2	2751442
D2	4161322
B2	8523065
L2	1706975 or 4161922

- 2. Save the 4-wide 3-high card holders removed in step 10.2.1. These card holders will be used for installation of new cards.
- 3. Install the following cards, using the card holders retained from step 10.2.1 in the following locations of logic board:

Location	P/N
H2	4160881
F2	4160882
D2	4160883
L2	4161595
B2	2751448

- 4. Remove Version 3 sticker 4 from upper right corner of CE/OP panel, above the display window.

- 5. Install Version 5 sticker 3 (P/N 5412746) onto upper right corner of CE/OP panel, above the display window.
- 6. Install the logic gate/power supply cover to the rear of the 3614 tightening screws loosened in step 10.1.3.



11.0 TEST PROCEDURES

Note: Suggest doing step 13 and the concurrent B/M at this time. These new pages are required for testing.

- 1. Return power to the 3614 by untaping the Emergency Disconnect switch (CP1) and placing switch to the on position. This switch is located below the power supply.
- 2. Go to MLM page START 20 and do the basic check-out test including the 3614 test.
- 3. Run the NO-Host test using cassette B/M 2750638 provided in this B/M. Refer to MLM NO-HOST section.

11.1 Initial Program Load

- 1. Notify customer that the 3614 has been updated to Version 5 and that the 3614 must be IPLd with a new customization image which includes version 5 microcode patches. See step 2.1.

After Installation

12.0 FIELD UPDATING

None

13.0 FIELD SUPPORT PUBLICATIONS

- 1. Replace MLM pages supplied with this B/M and dispose of corresponding pages in accordance with local procedures. A list of pages to be replaced follows:

Sequence Number	Part Number	Description
JC0800	4791749	START 90-91
JC0900	4791649	START 92-94
JC1000	4791650	START 95-96
JG0700	4791661	CTLR 300-310
KD0600	4791651	SPEC 21-25
KQ0300	4791652	LOC 20-30
LA0320	4791653	OPER 342
LA0400	4791654	OPER 500-502
LA0900	4791655	OPER 540-545
LA0950	4791656	OPER 547
LA1000	4791657	OPER 550-555
LA1040	4791658	OPER 557-560
LE0400	4791659	WD 40-45
LM2700	4791660	COMM 600-610

- 2. Record installation of TLA (Version 5) B/M 4162997, on MLM page INSTALL 4.
- 3. Replace the 3614 Operator Guide (GA66-0001) with the new 3614 Operator Guide (GA66-0004) provided with this B/M.

14.0 PARTS DISPOSITION

- 1. Return parts to branch office for further processing, according to local instructions
- 2. When this B/M is installed on a customer owned machine, all parts become the property of the customer.

15.0 MACHINES RECORDS

- 1. Install updated machine history provided. Update rental records, etc., to reflect feature B/M 4160542 (TLA ROS Card Group), B/M 4521652 (DTR V3), B/M 4161676 (Ship Group), B/M 4160571 or B/M 4160574 (MLM Mod 11 and 12 or MLM Mod 1 and 2), B/M 4521657 (MLM Common), B/M 4160556 and 4520708 or 4160562 (TLA V-3 DTR), and B/M 4161499 (V-3 No Host Cassette Tape) as removed.

Reflect feature B/M 4162997 (V5 TLA Card Group), B/M 4521682 (MLM TLA V-5). If your 3614 is the primary controller (SC 9801) add B/M 4520703 and B/M 4520712 (DTR TLA V-5). If your 3614 is the secondary controller (SC 9802) add B/M 4520573 (DTR TLA V-5), B/M 2750638 (V-5 No Host Cassette Tape), B/M 4521687 (MLM Common V-5) and B/M 4520242 (Ship Group TLA), reflect above B/M's as installed according to existing procedures.
- 2. Report installation and quality according to existing procedure.

PROGRAM/FUNCTION DESCRIPTION	Set Function Select Switch to:								See DIAG 10 and DIAG 15 for a description of entering and executing programs.						
	1. Enter Program ID		3. Enter Parameters					5. Start/Stop							
	Set Data Switches to:								Display				Display Analysis	Log Code	MAP Reference
2. Program ID		4. Parameters													
			1	2	3	4	5								
Open Indicator/Lamp and Credit Card Reader (CCR) Lockout Gate Test <i>Reason:</i> Check mechanical operation of Open indicator and CCR lockout gate. Check user area lamp. Check all associated control, driver, and relay circuits. This program is on cassette (test P/N 4160601). The Program ID is '3500'. The test has two routines which control the Open (on) and Closed (off) functions. The test can be run with either the single pass or the loop option.															
Program ID '3500' – Single Pass Enter Program ID with parameters as shown. Turn the Function Select switch to Start/Stop. operate Execute. The Open indicator and lockout gate will turn to the Open position and the user area lamp will turn on. About one second later, the lamp will turn off and the indicator and gate will turn to the Closed position. <i>Note: There are no sense switches to be checked in this circuit.</i>	35	00	00	00	00	00	00	✓	3 A A	5 8 8	0 0 0	0 1 2	Routine is executing. Routine 3501 is completed. Routine 3502 is completed. <i>Note: The LEDs can contain a routine-completed display even though the mechanical sequence failed. Incorrect operation is detected visually.</i>		GUID 200
Program ID '3500' – Loop Enter Program ID with parameters as shown. Turn the Function Select switch to Start/Stop. Operate Execute. The same sequence will take place as described under single pass operation. However, the indicator and gate will automatically cycle through the Open and Closed positions (lamp will turn on and off) until the Execute switch is operated to stop the test. While the test is executing, the on and off cycles each take about one second. <i>Note: Since there are no sensing circuits, failures must be detected visually.</i>	35	00	01	00	00	00	00	✓	3 D D	5 8 8	0 0 0	0 1 2	Routine is executing in the first loop pass. Routine 3801 is completed in the loop. Routine 3802 is completed in the loop.		
Program ID 'F400'	F4	00	00	00	00	00	00	✓	A A A A A	E E E 8 E	F F F 0 F	F D C 0 E	Byte 1 of program ID is incorrect. Byte 2 of program ID is incorrect. Invalid RAM address for patch load. Proper completion. Cash Check and Travel Check Selected		NO-HOST 84
Program ID 'F401' Enter 'F401' to select Journaling feature.	F4	01	00	00	00	00	00	✓	A	8	0	0	Successful load.		NO-HOST 83

3614

EJ1500	4790272	491620						
Seq. 2 of 2	Part No. ()	7 Jan 77						

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USAGE

The Link test is used in the communications area for verification and definition of complex problems, as well as during installation. This test is primarily a tool for the 3704/3705 CE and will need the aid of a 3704/3705 CE whenever the test is run.

DEFINITION

The 3614 uses a 2-byte counter and '98' Error Log Record (Error Count) to record Link Test statistics. The 2-byte counter is located at RAM address '3FFE' and contains the number of test transmissions correctly received at the 3614 end. The '98' Error Log Record(s) contain the number of transmissions incorrectly received.

Note: The Link Test may be run at the 3704/3705 without intervention from the 3614 end. If, however, the 3614 CE is required to read out the 2-byte counter at '3FFE', he should add a jumper from K2M05 to any D08 (end) pin to ensure accurate counter readings during test. At the completion of Link Test the jumper must be removed before trying to read out the counter, reset the 3614, run 3614 test etc. (jumper prevents interrupts from other adapters during link test and will cause a hang state if other operations are tried while the jumper is installed).

The 3704/3705 uses various 2-byte counters to record Link test statistics. One counter contains the total transmissions (number of Read-Write Start I/Os issued by the 3704/3705). One counter contains the number of correct transmissions (messages sent and echoed correctly). One counter contains the number of transmissions echoed in error or the number of timeouts waiting for a response from the 3614. Other counters are used in the 3704/3705 but are not needed by the 3614 CE.

Note: The counts at the 3704/3705 may not match those at the 3614 because a line hit (noise) which affects the Flag or Address field in the Link Test message header will not be recognized as a valid Link Test message and will not be logged at the 3614.

Upon execution from a CE at the host location, the SDLC Test command is sent from the 3704/3705 over the link to the 3614. If the 3614 recognizes the test command and the Burst Check Character (BCC) tests OK, it will update its statistical counter at '3FFE' and send a Frame Received message back to the 3704/3705. The 3704/3705 updates its counters after receiving and verifying the echoed message or until a timeout has occurred.

The 3704/3705 CE has the ability to select and send a known pattern to the 3614. This pattern will be echoed as received by the 3614, if no errors are sensed. No try is made by the 3614 to echo a message received in error.

TEST RESULT REPORTING

The 3614 CE determines the contents of the 2-byte counter by doing the following procedure:

- a. Set the Function Select switch to Set Address.
- b. Set the Data Entry switches to '3F'.
- c. Press Execute once; Display = '3Fbb'
- d. Set the Data Entry switches to 'FE'.
- e. Press Execute once; Display = '3FFE'.
- f. Set the Function Select switch to Display Data.
- g. Press Execute once and record the data. The 2-byte count represents the number of correct transmissions received.

To reset the counter at '3FFE', press the Reset switch and wait for the display of '14bb'.

The 3614 CE determines if any errors occurred by doing the following procedure:

- a. Set the Function Select switch to Display Log.
- b. Set the Data Entry switches to '01'.
- c. Press Execute ten times and record the number of each log entry which contains a '98' error code.
- d. Set the Data Entry switches to 'x0' and press Execute three times while recording the entire '98' error log record. (The value of x should be the log number(s) which contain '98' error codes. Do this step (d) for each '98' log record you find. The total error log counts (byte 3 of each record) represent the number of Link test failures.

To reset the log record area, do the following procedure:

- a. Set the Function Select switch to Enter Address.
- b. Set the Data Entry switches to '00'. Press Execute; Display = '00bb'.
- c. Set the Data Entry switches to '09'. Press Execute; Display = '0009'.
- d. Set the Function Select switch to Enter Data.
- e. Set the Data Entry switches to '00'. Press Execute switch 60 times. This will clear the entire Error Log area.

TEST INVOCATION

Link test to the 3614 may be executed only from the System 370. A Link test command is entered from the system console. This command entry consists of the Link test ID, the network name of the link to be tested, the number of test runs wanted, the service level, and (optionally) the data field to be attached to the test message. For more details, see below.

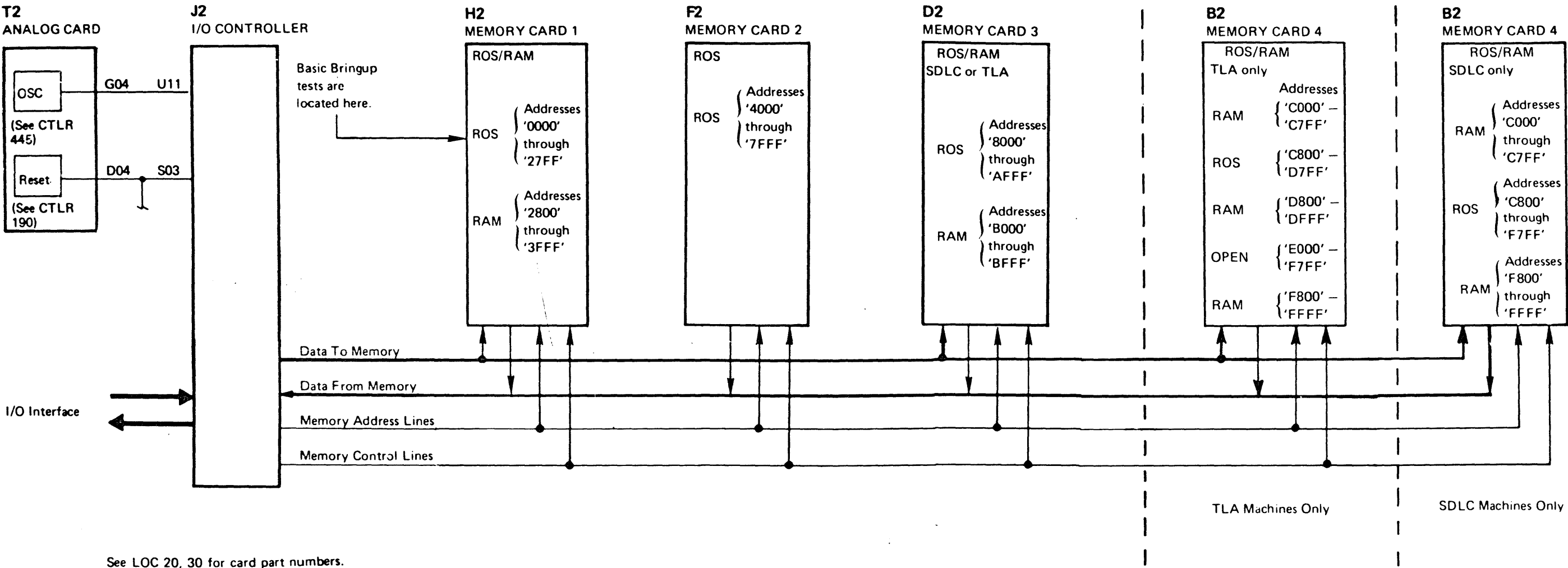
Note: The Link Test may be run at the 3704/3705 without intervention from the 3614 end. If, however, the 3614 CE is required to read out the 2-byte counter at '3FFE', he should add a jumper from K2M05 to any D08 (end) pin to ensure accurate counter readings during test. At the completion of Link Test the jumper must be removed before trying to read out the counter, reset the 3614, run 3614 test etc. (jumper prevents interrupts from other adapters during Link test and will cause a hang state if other operations are tried while the jumper is installed).

The Data Link Service Levels are as follows:

Link-Level 0	Dedicated 370x Dedicated lines Dedicated stations
Link-Level 1	On-line 370x Dedicated lines Dedicated stations
Link-Level 2	On-line 370x On-line lines Dedicated stations
Link-Level 3 (see note below)	On-line 370x On-line lines On-line stations

Note: Use Link Level 0 as normal service level. At a future time, Link Level 1 and 2 will be supported. Present support is in place for Link Level 0 only.

PROGRAM/FUNCTION DESCRIPTION			Set Function Select Switch to:					See DIAG 10 and DIAG 15 for instructions on entering and running programs.													
			1. Enter Program ID		3. Enter Parameters			5. Start/Stop													
			Set Data Switches to:																		
			2. Program ID		4. Parameters					Display				Display Analysis				Error Log Data		MAP Reference	
					12345													Byte 1Byte 4			
Cassette Test Program P/N 4160602			0445		04000000000400000005000000			✓		04445A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800A800											



From		To Step (this page)
Page	Step	
GUID 300	Symptom 6 and 7	10
GUID 510	Symptom 15	10

MAP STEPS

- 10 The bank must specify several options in the data loaded during IPL. Each option is selected or changed by loading one to three bytes of hexadecimal data in a specified Random Access Memory (RAM) address.

Note: Most addresses must contain a hexadecimal data byte (other than '00' for correct 3614 operation).

If all resident tests, cassette tests, and MAP procedures have been used, and the reported problem has not been corrected, the problem may be due to incorrect programming of options by the customer.

IBM has developed a set of recommended option data. The option data are those used in the No-Host Function test. RAM addresses, option data bytes, and option meanings used in the No-Host Function test are shown in the Option RAM Address Table. Detailed descriptions of each option byte can be found on START 92.

Go to _____20
- 20 Did you run the No-Host Function test?
____Yes
____No _____40
- 30 Did the No-Host Function test run OK?
____Yes _____50
____No _____ Request technical aid.
- 40 Load and run the No-Host Function test (refer to NO-HOST 10 for procedure).
Did test run OK?
____Yes
____No _____ Request technical aid.
- 50 Display and record each option data byte at each RAM address shown in the Option RAM Address Table.

Request that the customer start an IPL. When the IPL is completed, compare customer option data bytes with those shown in the Option RAM Address Table, and with descriptions on START 92.

Large differences at RAM addresses are noted in the Option RAM Address Table i.. the Option RAM Address Table with an asterisk (*). Differences may be caused by feature configuration, money amounts selected by bank, or bank identification data. Consult with customer on differences.

NOTES:

1. An Engineering Change (EC) to the Control program may affect option byte addresses. The program EC level can be determined by displaying address '3C7A'. Press Execute. Record display data (first four digits of EC number). Press Execute again. Record the last two digits of the EC number and suffix in EBCDIC code (if any). Ignore the last two digits - '00'. Verify that the EC level of the Control program is correct. (You may find the current EC level of this 3614 in the Machine Level Control (MLC) sheets at the front of this MLM). For further information refer to START 88.
2. The Bank Option Bytes shown here are for display purposes only, and they cannot be altered at the 3614. If changes to the Bank Option Bytes are required, they must be initiated by the Host.

Host IPL** Program Code	RAM Address	No-Host Option Byte	Option Byte Meaning
OPT	'3B9A'*	'93'	Security and feature controls.
IDL	'3B9B'	'06'	Length of identification number (4 to 6 digits).
NRCID	'3B9C'	'06'	Number of digits checked in ID number.
DISP	'3B9D'*	'00'	ID number check starting point (see description).
RETRY	'3B9E'	'02'	Bank retry count.
VFK	'3B9F'	'FF F0 F0'	Keyboard field mask, determines available keys.
AMT	'3BA2'*	'00 01 90'	Maximum money amount available (see hexadecimal table on START 780).
DEN	'3BA5'	'00 14'	Amount of each document issued (see table to the right).
BKID	'3BA7'*	'00 00'	Bank identification.
TMO	'3BA9'	'80'	† Communication timeout.
TMK	'3BAA'	'50'	† Keyboard timeout.
DPT	'3BAB'	'14'	† Display timeout.
SPT1	'3BAC'*	'00'	Special Function 1.
SPT2	'3BAD'*	'00'	Special Function 2.
SPT3	'3BAE'*	'00'	Special Function 3.
DEPTM	'3BAF'*	'C0'	† User deposit timeout.
KTP	'3BB0'	'20'	Terminal Character '20' = Change Key.
DENL	'3BB1'	'00' }	Denomination of hopper no. 2
DENL	'3BB2'	'05' }	
MAX	'3BB3'	'14'	Maximum number of bills per transaction.

* See step 50
† Timeout is measured in quarter seconds (.25 seconds).
Example: '28' = 40 x .25 seconds = 10 seconds.
** See SYSTEM 300-320 for in-depth programmers' code explanation.

Country	Document Amount	Data Byte Address '3BA5'
England	1 Pound (United Kingdom)	'0001'
Scotland	1 Pound (Bank of Scotland)	
Canada	5 Dollar	'0005'
England	5 Pound (United Kingdom)	
South Africa	5 Rand	'000A'
United States	5 Dollar	
Canada	10 Dollar	
Israel	10 Pound	
Netherlands	10 Guilder	'0014'
United States	10 Dollar	
Canada	20 Dollar	'0019'
United States	20 Dollar	
Netherlands	25 Guilder	'0032'
Brazil	50 Cruzeiro	
Finland	50 Mark	
Germany	50 Deutsche Mark	
Israel	50 Pound	
Venezuela	50 Bolivar	
Austria	100 Shilling	
Brazil	100 Cruzeiro	
France	100 Franc	
Germany	100 Deutsche Mark	
Mexico	100 Peso	'01F4'
Norway	100 Krona	
Spain	100 Peseta	
Sweden	100 Krona	
Switzerland	100 Franc	'03E8'
Brazil	500 Cruzeiro	
Belgium	1 000 Franc	
Japan	1 000 Yen	'2710'
Spain	1 000 Peseta	
Italy	10 000 Lira	
*Japan	10 000 Yen	

* The Triple Zero option (address '3BB0') is used in Japan.

A description of each option byte follows. In each case, if a bit is on (1), the option is selected.

' 3B9A ' Address — Security and Feature Controls

- Bit 0 = 1 Offline (3614) check of identification number is required.
- Bit 1 = 1 Bank check of credit card is required.
- Bit 2 Unused.
- Bit 3 = 1 Transmission of host system is required to verify identification number entered at the 3614 keyboard.
- Bit 4 = 1 Message to host system is required if deposit door is open.
- Bit 5 = 1 Two statements are given for a Payments Enclosed transaction.
- Bit 6 = 1 Two statements are given for a Payment By Transfer transaction.
- Bit 7 = 1 Two statements are given for a Deposit transaction.

' 3B9E ' Address — Customer (Bank) Retry Count

Option defines the number of retries allowed for credit card insertions or keyboard entries. Transaction will be terminated if retries are in excess of option number.

' 3B9F ' Address — Keyboard Field Mask

Defines keyboard keys which are available for use.

Byte 1

- Bit 0 = 1 Withdraw key available.
- Bit 1 = 1 Special key available.
- Bit 2 = 1 Account Inquiry key available.
- Bit 3 = 1 Transfer key available.
- Bit 4 = 1 Deposit key available.
- Bit 5 = 1 Payment Enclosed key available.
- Bit 6 = 1 Pay From Account key available.
- Bit 7 Not used.

Byte 2

- Bit 0 = 1 From Checking key available.
- Bit 1 = 1 From Savings key available.
- Bit 2 = 1 From Credit Card key available.
- Bit 3 = 1 From Other Account key available.
- Bit 4-7 Not Used.

Byte 3

- Bit 0 = 1 To Checking key available.
- Bit 1 = 1 To Savings key available.
- Bit 2 = 1 To Credit Card key available.
- Bit 3 = 1 To Other Account key available.
- Bit 4-7 Not Used.

' 3BA2 ' Address — Maximum Amount of Local Currency Dispensable by the 3614

The customer (bank) can set a limit on the maximum amount of currency which can be dispensed (issued) on a transaction. See hexadecimal table, START 780.

' 3BA5 ' Address — Denomination (Amount of Dollar, Franc, Peso, etc.) Issued by a 3614 (Model 1 or 2), or Hopper No. 1 (Model 11 or 12).

See Denomination Table, START 91

' 3BA7 ' Address — Bank Identification Number

A number assigned by each customer (bank).

' 3BA9 ' Address — Communication Timeout Length

If communication between 3614 and host system is not established in the system timeout period specified by this option, transaction will be terminated. Time is measured in quarter seconds (0.25 seconds).

Example: ' 28 ' = 40₁₀ x 0.25 seconds = 10 seconds.

' 3BAA ' Address — Keyboard Timeout Length

This option determines the amount of time a user has to enter the first digit after any display message normally followed by a key depression. If the user does not enter the first digit of the personal identification number within the time specified by the option, the transaction is terminated. Time is measured in quarter seconds (0.25 seconds).

Example: ' 70 ' = 112₁₀ x 0.25 seconds = 28 seconds.

There is another timeout (not a customer option) associated with keyboard operation. The timeout allowed between each keystroke is 9 seconds. After entering the first digit, the user must press each following key as needed to complete the transaction within 9 seconds of each other. If more than 9 seconds pass between pressing of each key, the 3614 times out and the transaction is terminated.

' 3BAB ' Address — Display Timeout Length

Option applies to messages not normally followed by a key depression. Some examples are: Wait – You Entered the Wrong...; Time Out; Too Many Retries, or Remove Cash. Timeout periods should be long enough for user to read and understand the message. Recommended timeout period is 5 seconds or more.

Example: ' 14 ' = 20₁₀ x 0.25 seconds = 5 seconds.

' 3BAC ' Address — Special Function 1

' 3BAD ' Address — Special Function 2

' 3BAE ' Address — Special Function 3

There are three special functions available to the customer (bank). The customer may name and code the meaning of each option byte to fit a particular need. You cannot correct or repair a 3614 failure resulting from an incorrectly programmed special function byte. You can suggest to the customer that a programming problem can exist if special functions are failing.

' 3BAF ' Address — User Deposit Timeout

If Deposit feature is installed, this byte must contain a hexadecimal number (not ' 00 ') specifying the amount of time between the opening and closing of deposit door. If user does not insert deposit envelope in this time period, deposit door closes and transaction is terminated.

' 3BB0 ' Address — Terminal Characteristics

If bit 1 = 1, three 0s are substituted for the decimal point when the decimal key is pressed. If bit 2 = 1, the change key is installed. (Model 11 or 12.)

' 3BB1 ' Denomination of Hopper No. 2 (Model 11 or 12).

' 3BB3 ' Maximum Number of Bills per Transaction.

' 3BB7 ' Address – Configuration Mismatch

During the bring-up sequence open processing, and write bank option processing, the 3614 checks the configuration byte and option data to assure opening under valid conditions. Any invalid condition sets an error code in this address, identifying the exact error. See START 96 for mismatch error codes and conditions.

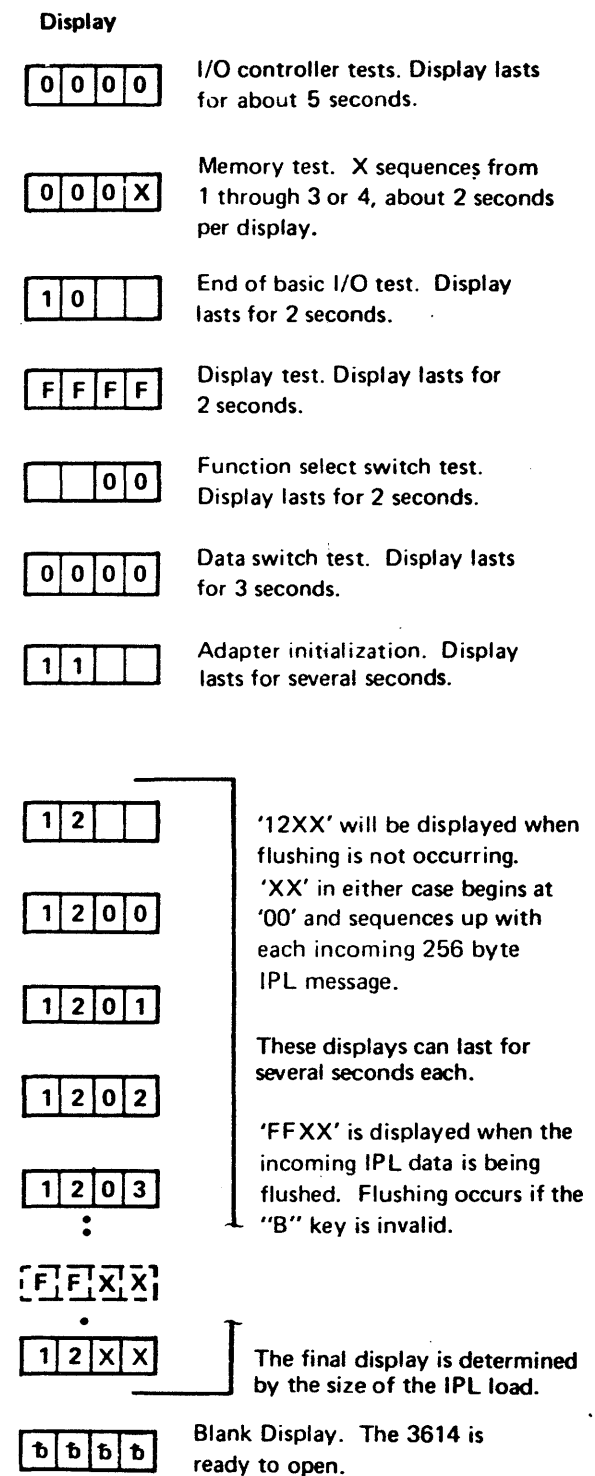
Note: The Bank Option Bytes shown here are for display purposes only and they cannot be altered at the 3614. If changes to the Bank Option Bytes are required, they must be initiated by the Host.

' 3E12 ' Address — Pin Key Option

Bit 0 = 1 Key "A" is used as Pin Key

' 3E3C ' Address Bank ID Starting Point

This option defines the number of the first bank identification number measured from the first character on the credit card.



Note: The **b** symbol represents a blank or dark display position.
The **X** symbol represents an undefined or variable character position.

- Entry from START 94.
- The 3614 stops with a '1210', '1220', or '1230' error display.

During the IPL load process certain error conditions are detected and recorded in the error log. Display the error log and record all 6-bytes of the 12xx type records. See START 710 for reference to display log.

Byte 5 of these records is the error descriptor byte. Use the chart to find the loading error which has occurred.

Error Log Records					
Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
Error Code	Transaction Number	Error Count	Error Descriptor	Error Descriptor	Error Descriptor
12	XX	XX	10	See Table 1	XX
12	XX	XX	20	See Table 1	XX
12	XX	XX	30	See Table 1	XX

X = Undefined or variable
Error Code = Bytes 1 and 4

If byte 5 contains an "Ex" error descriptor code, locate the type of error from table 1 and notify the customer programmer of your findings. Then,
Go to —▶▶▶ START 850

If byte 5 does not contain an "Ex" error descriptor, go to one of the following MAPs:

If 3614 is attached to a 3600 system (TA adaptor)
Go to —▶▶▶ LOOP 100

If 3614 is attached to a SDLC adaptor,
Go to —▶▶▶ SDLC 100

Table 1. Error Log, Byte 5

Error Descriptor	Type of Error	Error Descriptor	Type of Error
E0	Error on output. Status message could not be sent, loss of communication during loading, or a format error detected within the IBM supplied controller data portion of the load image.	E6	A hash total, which checks the IBM supplied controller data portion of the load image, has failed to check.
E1	A load data message contains other than 256 bytes, or there was a hardware error on the loop.	E7	The cumulative length of the display messagees in the image has exceeded the space available. A maximum of 49 messages, each no more than 44 bytes long, is acceptable provided message pairs 13/14 and 31/32, which are concatenated for display, total no more than 44 bytes per pair. This indication can result from an error or incorrect format in the customization portion of the load image.
E2	A load initialization message (Class 0D) has subclass other than 01.		
E3	A length of zero was specified in bytes 8 and 9 of the load initialization message.		
E4	A known field in the first 256 byte load data message, after deciphering, failed to contain the correct data. Could result: <ul style="list-style-type: none">• if B-key entered at 3614 Operator/CE Panel differs from the key used to encipher the load image,• if the current key has been changed to the wrong value prior to sending the load,• if data other than a valid load image is being sent,• if invalid backup key, status byte 3, bit 2 is set to 1.	E8	The number of fonts specified in the load image is greater than 82.
		E9	The load image length specified in the load initialization message is greater than the implied length of the image based on its format and content.
		EA	Superfluous data detected within the IBM supplied controller data portion of the load image.
		EB	A format error detected within the IBM supplied controller data portion of the load image.
E5	Same as E4 except that a different known field is tested, and invalid backup key status is not set to 1.	EC	The load image length specified in the load initialization message is less than the implied length of the image based on its format and content.

- Entry from START 94 or START 97.
- The 3614 completes an IPL but does not 'Open'.

The bank must specify several options in the data loaded during IPL. Each option is selected or changed by loading one to three bytes of hexadecimal data in a specified random access memory (RAM) address.

Note: Most addresses must contain a hexadecimal data byte (other than '00') for correct 3614 operation.

- 10 First display transaction status byte '00' in NVM RAM image:

Turn Function Select switch to Enter Address.
Turn Data Entry switches to '3A'.
Operate Execute.
Turn Data Entry switches to '00'.
Operate Execute.
Turn Function Select switch to Display Data.
Operate Execute.

Compare the displayed data with the data in Table 1. Does the 2nd digit of the displayed data match any of the 2nd digits in Table 1?

Yes
No ————— 30

- 20 Display configuration mismatch option byte:

Turn Function Select switch to Enter Address.
Turn Data Entry switches to '3B'.
Operate Execute
Turn Data Entry switches to 'B7'.
Operate Execute
Turn Function Select switch to Display Data.
Operate Execute.

This two digit display is the mismatch code (in hex). Locate this code in Table 2 for the condition causing mismatch.

Is this display '28' or '29'?

Yes —————>>> CTLR 402-230
No

- 25 Notify the customer programmer of your findings. Then,
Go to —————>>> START 850

- 30 3614 not opening does not appear to be due to an option byte mismatch.
Go to —————>>> START 10

Table 1

X	4	X	X
X	5	X	X
X	6	X	X
X	7	X	X
X	C	X	X
X	D	X	X
X	E	X	X
X	F	X	X

2nd digit

X = Unreliable or variable

Configuration Mismatch

When accepting a load image, when executing a Change Customized Option Data command, and before executing an Open command, the 3614 makes a number of tests. These tests involve the values and proposed changed values of the Customized Option Data, the value of configuration byte 3, and the out-of-cash sensors. When a transaction reply message is received, the 3614 tests the action byte in the transaction reply message and the configuration byte.

If any of these tests fail, configuration mismatch status (byte 0, bit 5), is set to '1'. A mismatch code is placed in Customized Option Data byte 29, and the 3614 closes. If all tests pass, the configuration mismatch status bit will be 0.

The following chart lists the mismatch codes in Customized Option Data byte 29 and the failing test which caused the mismatch.

Table 2

Mismatch Code (Hex)	Condition Causing Mismatch	Mismatch Code (Hex)	Condition Causing Mismatch
01	OPT reserved bit is a '1'	1A	Byte 22 reserved bit is a '1'
02	OPT specifies 2 statement option and no printer configured	1B	Change Key specified and dual model not configured
03	Reserved	1C	MAX is greater than 20
04	Reserved	1D	THRVAL is greater than 21
05	Reserved	1E	Reserved bytes are non-zero
06	Reserved	1F	Configuration reserved bit is a '1'
07	No function key specified in VFK	20	Withdraw Cash specified in VFK, DENL is greater than DEN, and dual denomination and no over-size bill option configured
08	VFK reserved bit is a '1'	21	Withdraw cash specified in VFK, DENL is less than or equal to DEN, and dual denomination and oversize bill option configured
09	Withdraw Cash specified and MAX = 0	22	(Reserved)
0A	Withdraw Cash specified and AMT = 0	23	Attempt to change DEN or DENL to X'8000', or attempt to change DEN or DENL from a value other than X'7FFF' to a value other than the negative of its present value, or attempt to change DEN to X'0000'
0B	Withdraw Cash specified and DEN and DENL both negative	24	Transaction Reply action byte specifies print data present. (Bit 2 is a '1') and no printer is configured
0C	Transfer or Deposit specified in VFK and no To Account specified	25	Configuration entered bit is '0'
0D	Deposit, Payment Enclosed, or Payment From Account specified in VFK and no depository configured	26	Withdraw Cash specified in VFK, DEN is negative, and dual model is not configured
0E	Withdraw Cash specified in VFK, DEN is negative, and Change Key is specified	27	Withdraw Cash specified in VFK, DEN is zero, and dual model is configured
0F	Withdraw Cash specified in VFK, DENL is negative, and Change Key is specified	28	Check Cashing or Traveler's Checks specified in VFK, but neither is actually installed.
10	Withdraw Cash specified in VFK, DEN is positive and hopper no. 1 is out-of-cash	29	Check Cashing or Traveler's Checks specified in VFK, but corresponding function is not correctly installed. Contact IBM Customer Engineer.
11	Withdraw Cash specified in VFK, and DEN = X'7FFF', and dual model configured	2A	The "A" key has not been entered.
12	Withdraw Cash specified in VFK, DENL is positive, and hopper no. 2 is out of cash	30	Traveler's Check feature is installed and dual model not configured.
13	Withdraw Cash specified in VFK; and either DENL = X'7FFF', and dual model configured; or DEN = X'7FFF' and no dual model configured	31	Traveler's Check feature is installed, Withdraw Cash is specified in VFK, and DENL is negative.
14	Withdraw Cash specified in VFK, DENL is non-zero, and dual model not configured	32	Traveler's Check feature is installed, and specified in VFK, and DEN is negative.
15	Withdraw Cash specified in VFK; and either DENL is zero, and dual model configured; or DEN is configured		
16	No From Account specified in VFA		
17	VFA reserved bit is a '1'		
18	VTA reserved bit is a '1'		
19	AMT is negative		

For definition of programming terms VFK, DENL, etc., see SYSTEM 300 to 320.

From		To Step (this page)
Page	Step	
START 100	Multiple	10
START 80		10
CTLR 10	80	10
CTLR 20	60,110	10
CTLR 30	10	10
CTLR 40	10	200

ENTRY CONDITIONS

- Display stops at '000x' or '1Exx' in the bringup sequence.
- A memory failure is suspected.
- '1E' log records exist.

MAP STEPS

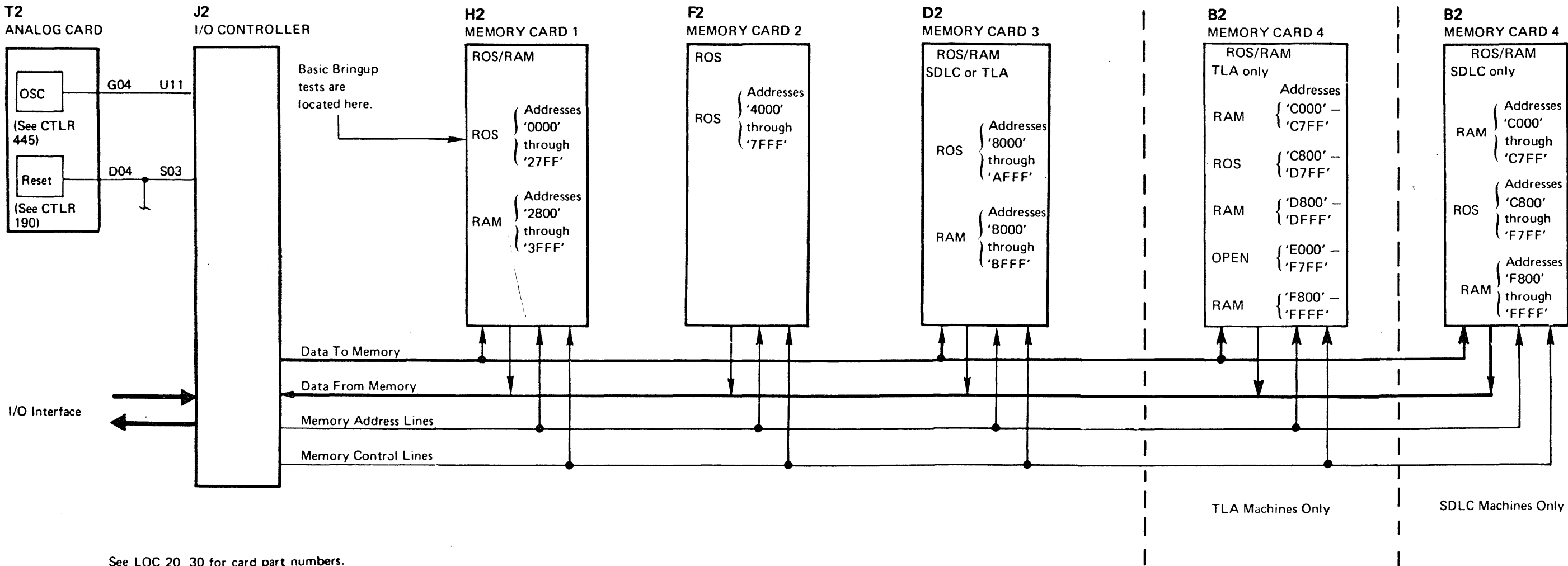
- 10 Power-off the 3614. Reseat all the cards listed in the chart at the right. Power-on the 3614. Is bring-up sequence OK?
- Yes —————▶▶▶ START 20
- No —————
- 20 Using the chart at the right, identify the cards listed for higher number displays than the failure display you are experiencing. Power-off the 3614. Unseat the identified cards about one inch from their sockets. Not all cards may be installed in your machine. Power-on the 3614. Is the failure display a higher hex number than before?
- Yes —————
- No —————40
- 30 One of the unseated cards is bad. Re-install the cards one at a time and test (power-off the 3614 for each card installed). The first card to cause the display to revert to the original failure display is the bad card — replace it.
- Go to —————▶▶▶ START 20
- 40 Power-off the 3614. Replace the card listed for the failure display. Power-on the 3614.
- Is the bringup sequence OK now?

- Yes —————▶▶▶ START 20
- No —————
- 50 Power-off the 3614. Replace the J2 card (I/O Controller). Power-on the 3614.
- Is the bringup sequence OK now?
- Yes —————▶▶▶ START 20
- No —————
- 60 The trouble could be one of the memory cards in the chart below not yet replaced. Replace them one at a time and retest (power-off the 3614 for each replacement). Did you find a bad card?
- Yes —————▶▶▶ START 20
- No —————
- 70 The trouble could be a bad card socket or logic board (refer to CTLR 310 for card addressing). Power-off the 3614. Inspect each memory card socket. Repair as necessary. Power-on the 3614.
- Did you find trouble?
- Yes —————▶▶▶ START 20
- No —————▶▶▶ START 800-10

Display (See Note)	Card
'1EFX'	B2
'1EEX'	B2
'1EDX'	B2
'1ECX'	B2
'1EBX'	D2
'1EAX'	D2
'0004'	B2
'0003'	D2
'0002'	F2
'0001'	H2
'0000'	J2

Note: An error log may have been stored in NVM containing Error Code and Byte 4 data as shown above.

- 200 A '1E' log record is created and a hang reset is generated when the post IPL memory test fails. Bytes 1 and 4 of the log record make up the error code and most useful descriptor data. Use the chart on this page to identify the suspected card and then replace it. Power-off the 3614 for card replacements.
- Are '1E' log records still being created?
- Yes —————60
- No —————▶▶▶ START 20



CASSETTE LOADING PROCEDURE

- Place correct cassette in the player (file P/N side up). Rewind the tape. Set volume control to 3.
- Attach jumper between T2J06 and T2J08 (disables Hang Reset).
- Plug cassette player cable into the player and Op/CE panel jacks.
- Enter program ID:
Program ID = 'CECE'
Parameters = '00 00 00 00 00'
Turn Function Select switch to Start/Stop. Operate Execute. Display should be 'D0CE'. If display is 'CECE', 'CEAA', or 'CEFF', operate Reset, reload test when display reaches '14 b b'.

Caution: Pressing the Reset switch will destroy the loaded file.

- Turn cassette player on. Display remains as 'D0CE' for 15 to 20 seconds, then should change to 'D8xx'. The right display position (xx) changes at approximately 1-second intervals, displaying the first byte of each record read from the cassette tape. If display remains 'D0CE', the test is not loading into the 3614; go to RDR 800.

'DC02' or 'DC84' in the display indicates the tape read an error. Leave the player on. The 3614 load program automatically searches for the next file on the tape, resets the error condition, and tries the load operation again.

- When display is 'AA40' (End of File) or 'AA20' (End of Tape), turn the player off. Disconnect cassette player. The file is loaded and the Service Aid programs are ready for use.

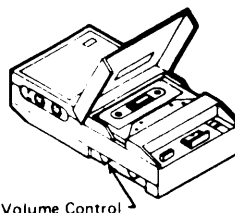
- Has the cassette program loaded correctly?

Yes
No —————▶▶▶ RDR 800

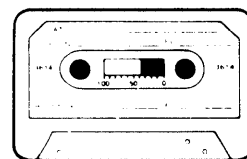
Return to MAP step from which you came.

1420 Recorder/Player

Diagnostic
(Cassette Tapes)

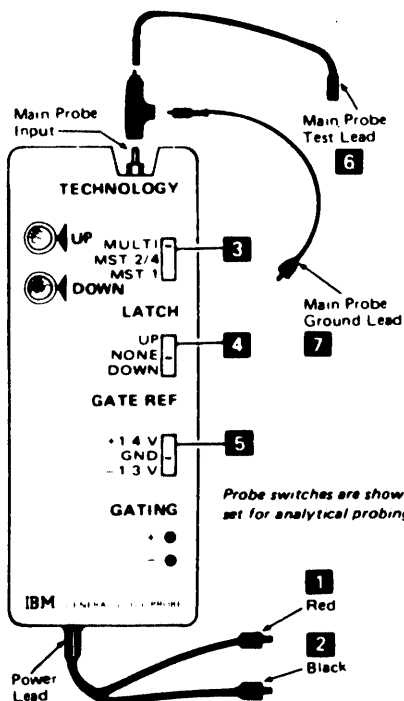


Volume Control



Note: Each diagnostic is recorded 5 successive times on the tape. Cassette P/Ns, functions, and additional information is on RDR 850.

GENERAL LOGIC PROBE



Set the general logic probe for analytical probing as follows:

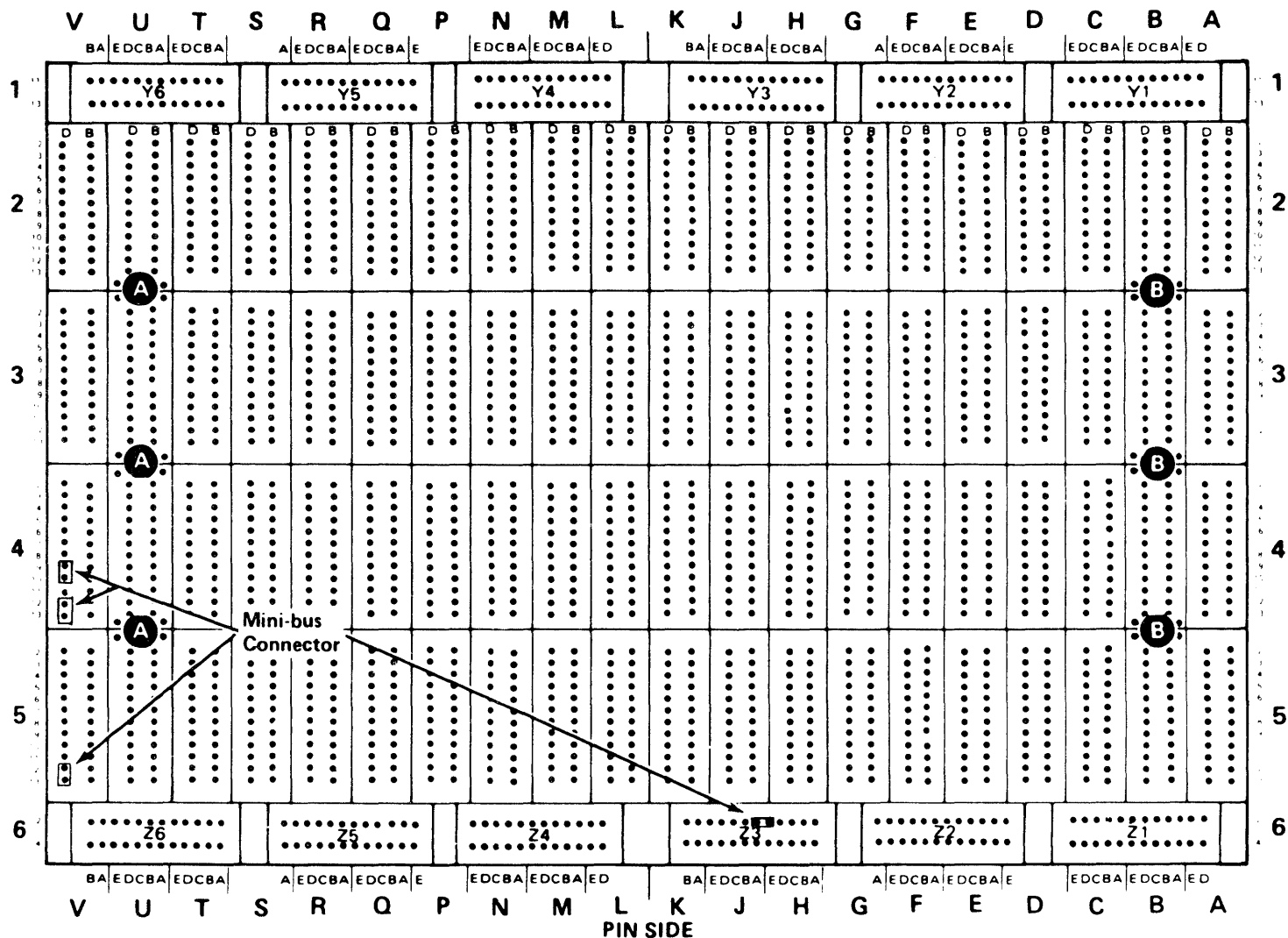
- Connect the red power lead **1** to any D03 logic board pin (+5 Vdc).
- Connect the black power lead **2** to any D08 logic board pin (ground).
- Set the Technology switch to MULTI **3**.
- Set the Latch switch to NONE **4**.
- Set the Gate Ref switch to GND **5**.
- Connect the main probe ground lead **7** to a convenient ground pin (D08).
- Connect the main probe test lead **6** to the pin to be tested.
- Test the probe as follows:
 - With nothing connected to the test lead, neither the Up nor Down light should come on.
 - With the test lead connected to any D08 (ground), the Down light should come on.
 - With the test lead connected to any D03 (+5 Vdc), the Up light should come on.

If the main probe test lead **6** length is increased, neither the 3614 logic nor the probe may work correctly.

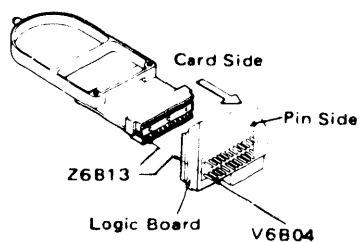
When an Up or Down signal is detected, the associated light is held on by the probe circuits for enough time to see it, even though the signal may be very short.

For further instructions, refer to *General Logic Probe Manual*, Order Number SY27-0113.

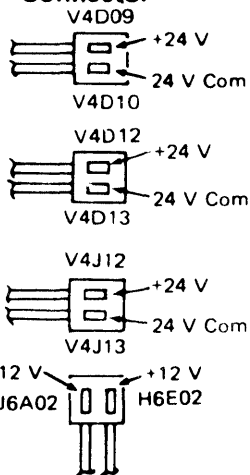
LOGIC BOARD PIN ASSIGNMENTS



Cable Connector



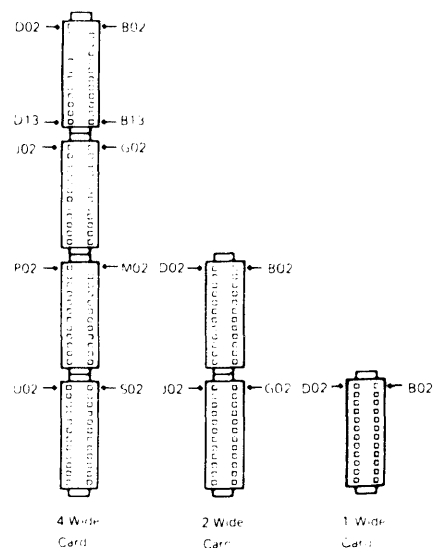
Mini-bus Connector



Logic Voltage Locations

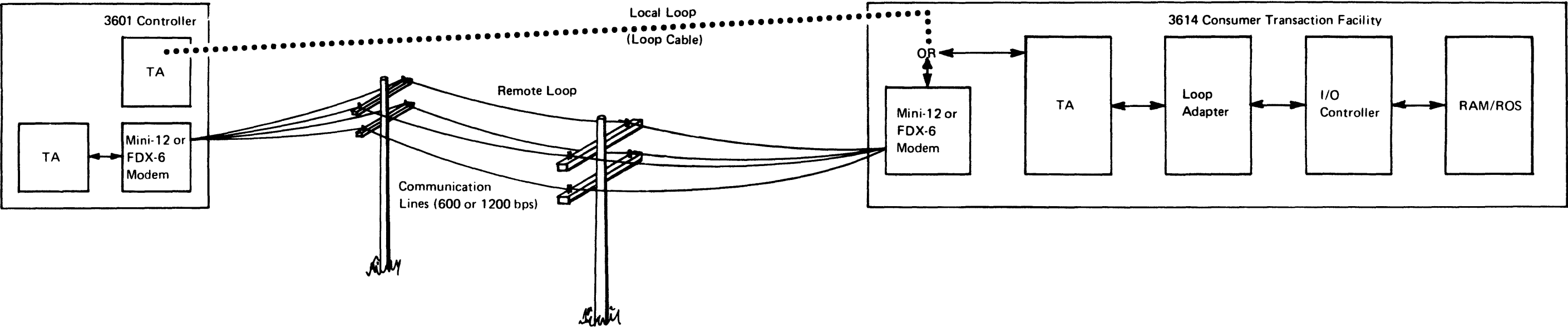
Voltage	Pins
-5.0 V	B06
-5.0 V	G06
-5.0 V	M06
-5.0 V	S06
+8.5 V	B11
+8.5 V	G11
+8.5 V	M11
+8.5 V	S11
+5.0 V	D03
+5.0 V	J03
+5.0 V	P03
+5.0 V	U03
Ground	D08
Ground	J08
Ground	P08
Ground	U08

Card Contact Assignments



LOOP CONTENTS

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System Attachment

The 3614 with the loop attachment feature communicates with the host system through an IBM 3601 Controller. It may be attached on either a local or remote loop. The remote loop attachment needs a mini-12 modem or FDX-6 (IBM World Trade Corporation only) feature installed in the 3614 and 3601. The FDX-6 feature adds two cards to the 3614 logic board, a send card at location U2, and a receive card at location U4. The mini-12 feature adds three cards to the logic board; the send card (U2), receive card (U4), and a wrap card at R5.

Note: System attachment is described in detail in *IBM 3600 Finance Communication System Configurator*, Order Number GA27-2762.

The message format, data format, and loop control is the same for both local and remote attachments.

Loop Operation

All devices on a loop operate under control of the 3601. Data and control information is transmitted around the loop in groups of 17 slots. Each terminal on the loop is assigned one or more of these slots. Communications between the 3601 and each terminal takes place in the slot(s) assigned to that terminal. Each terminal on the loop receives all the slots assigned to it, and retransmits the slots not assigned to it.

Terminal Address Operation

The Terminal Address (TA) keeps the 3614 in sync with the loop by recognizing the Frame Sync slot (one of the 17 slots transmitted on the loop) and responding to it with a Ready indicator and status. The TA recognizes the data slots assigned to it and removes data from, or places data on the loop during data exchange operations. More data slots may be assigned to the TA by the 3601 Controller. Base slot address selection and wiring are described on LOOP 880.

Most loop failures are transparent to the 3614 and are found and corrected by the TA and Controller. When failure correction does not work, the 3601 resets the TA and loop adapter hardware and then tries loop recovery.

The TA operates at 600, 1200, 2400, or 4800 bps on a local loop, and at 600 (FDX-6) or 1200 (mini-12) bits per second when the 3614 is located at a remote site.

Loop Adapter Operation

Data is moved between the loop adapter and TA during all 3614/3601 communications. Message formats are described on OPER 625-635.

The loop adapter basic status byte (see DIAG 405) maintains the loop status and signals the loop adapter when data is ready to be moved between it and the TA.

More information may be obtained from the following IBM publications:

- IBM 3600 Finance Communication System Operating Guide GA 26-2766
- IBM 3600 Finance Communication System Installation Manual SY 27-2365
- IBM 3600 Finance Communication System Installation Manual-Physical Planning GA 27-2766
- IBM 3601 Finance Communication Controller Maintenance Information SY 27-2360

An IBM 3614 attached to a 3600 loop communicates with Host through the 3601 loop controller as shown above. The 3601 handles all 3614 communication between it and the Central Processing Unit (CPU) through a 3704/3705 communications controller.

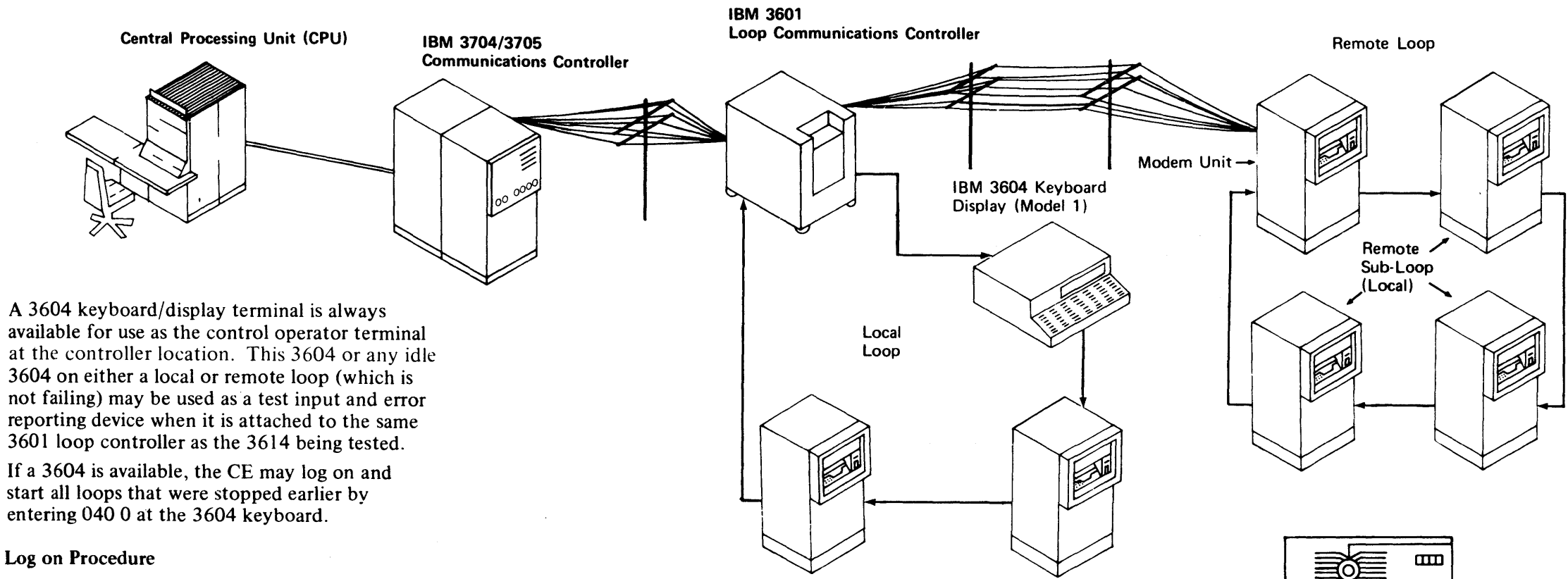
Each loop device contains a Terminal Address (TA) card. This card (in location S2 in the 3614) keeps the 3614 in-sync with the loop by recognizing the frame sync slot (one of 17 slots transmitted on the loop) and turning on the Ready indicator and loop adapter Basic Status Byte (BSB) bit 4. As long as the TA card continues to recognize the frame sync slots as they arrive, the Ready indicator will remain on.

When the 3601 senses that a loop is open, it goes into loop recovery mode. During recovery, the 3601 sends alternate valid and not valid frame sync characters on that loop. The result is a flashing Ready indicator on each device on that loop which is attached before the open point, and a Ready indicator which is off on each device on that loop which is attached after the open point (see indicator chart at right). The open point in the loop may be visually isolated by the CE or operator.

Many 3614 MAPs will ask the CE to ensure that the 3601 is flashing (trying to recover) the loop. If the Ready indicator on the device containing the modem on a remote loop (or the first device on a local loop) is flashing, the 3601 is in recovery mode. If the Ready indicator is off, it is more difficult to determine if the 3601 is trying to recover the loop or not.

If the Ready indicator on the modem device is off and the CE is at a remote branch which does not have an available 3604 keyboard/display terminal which may be used as the control operator 3604, he may have to telephone the control operator at the 3601 location to verify that the 3601 is flashing the loop or to ask her to start the loop for him.

Note: If a loop is failing (Ready off or flashing) any device attached to that loop will be disabled. In this condition a 3604 on another loop of the same 3601 must be used as the control operator terminal device.



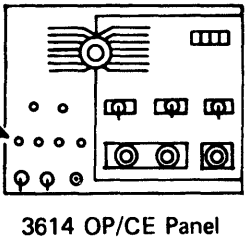
A 3604 keyboard/display terminal is always available for use as the control operator terminal at the controller location. This 3604 or any idle 3604 on either a local or remote loop (which is not failing) may be used as a test input and error reporting device when it is attached to the same 3601 loop controller as the 3614 being tested.

If a 3604 is available, the CE may log on and start all loops that were stopped earlier by entering 040 0 at the 3604 keyboard.

Log on Procedure

- Press the Cancel (CA) key three times. A display message of 90000 should appear.
Note: If 90000 is not displayed and the Check indicator on the 3604 lights, another 3604 is already logged on.
- Enter the control operator ID code at the 3604. If you do not know the control operator ID code, ask the control operator or bank supervisor.
Note: The control operator ID is not displayed.
- A 3604 display message of 91111 indicates a correct log on. If the screen remains blank, an erroneous code was entered; start over with Step 1 above.
- Start loop by entering 040 0, or if you are running Device Exercisers, see DIAG 415 and 420 for entry and error data.
- When testing is completed, log off by keying in 000 and pressing the Enter key.

For more details, see the *Operating Guide for the IBM Finance Communication System (GA 27-2776)*.



	DSBL Unit	Ready	Carrier Detect
Local Loop (or Remote Sub-loop)			
Loop Working Correctly	Off	On Continuous	—
Open Loop Before 3614	Off	Off	—
Open Loop After 3614	Off	Flashing	—
Remote Loop (Modem Unit)			
Loop Working Correctly	Off	On Continuous	On Continuous
Open Loop Before 3614	Off	Off	Off
Open Loop After 3614	Off	Flashing	On Continuous

1200 BPS INTEGRATED MODEM

The 1200 bps integrated modem is used as the communication link between the 3614 and the 3601 or the 3704/3705. At the transmitting site the modulation/de-modulation device converts data bits into signals suitable for transmission over voice-grade leased or switched lines. At the receiving site, the modem converts the transmitted data to data bits.

This feature requires 3 additional cards in the logic board, a transmit or send card in location U2, a receive card in location U4, and a wrap card in position R5 (loop).

This modem does not contain clocking circuits. Clocking is provided by the Terminal Address (TA) card. Installation procedures and adjustments for this feature are on LOOP 870.

Note: The transmit level adjustment must be done at initial installation and any time the transmit card in location U2 is changed.

Interface Lines

The interface lines connect the modem cards to the TA card.

Send Data: This line is keyed by the TA adapter when the 3614 has data to transmit to the 3601. When this line is active (+) the modulator puts a Mark frequency (1300 Hz) on the transmission line. When the line is not active (-) the modulator puts a space frequency (2100 Hz) on the transmission.

Data is transmitted serially by bit with the Mark frequency indicating a data bit and the Space frequency indicating a no data bit.

Receive Data: This line is active (+) when the modem detects a Mark frequency coming in over the transmission lines, and is not active (-) when it detects a Space frequency.

When the received signal level (Mark or Space) is below the threshold setting of the Carrier Detect circuitry, the Receive Data line is clamped at the positive level.

Request-To-Send (RTS): When ANDed with Data Set Ready, a carrier signal is set on the transmission lines.

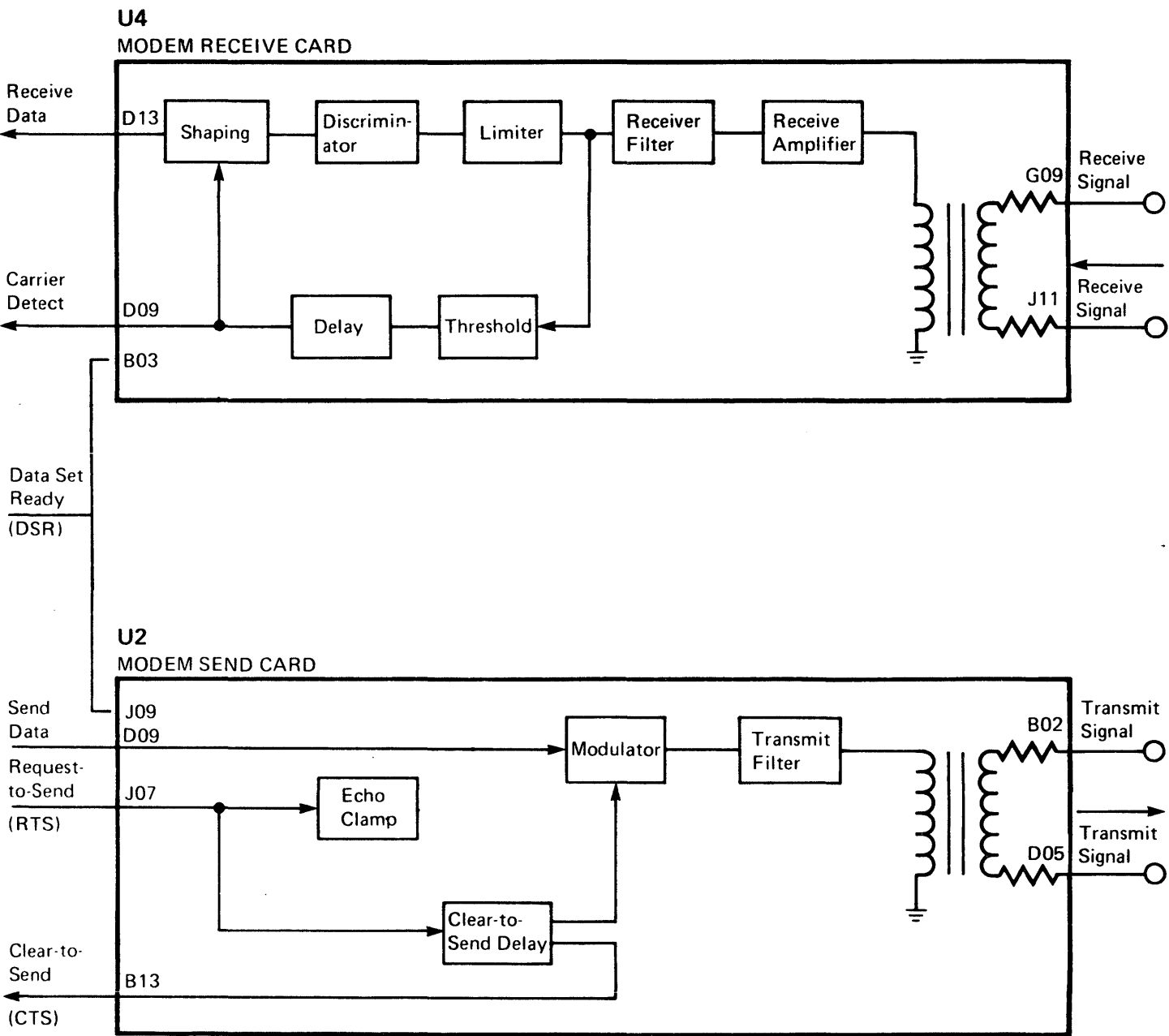
This line is always active (—) for LOOP machines.

Clear-To-Send (CTS): This line is always in active state (minus level) during loop operation.

Carrier Detect: When active (—) this line indicates that a carrier signal is on the Receive lines. It is active from 10 to 20 ms after carrier is detected on the line, and remains active until 5 to 15 ms after the carrier drops.

Data Set Ready (DSR): This line is activated by the modem to indicate that power is on and that the modem is ready for transmitting or receiving data. This modem circuit is not connected to the communication adapters.

Echo Clamp: This line is not used.



The 600 bps integrated modem is used as the communication link between the 3614 and the 3601. It is used only by World Trade Corporation (WTC) countries. At the transmitting site, data is converted to signals suitable for transmission over 2-wire, point-to-point, non-switched lines. At the receiving site, transmitted data is converted to data bits.

Data is transmitted serially by bit and character. The 3614 transmits at frequencies of 2,000 Hz and 2,400 Hz. The 2,000 Hz signal is the Mark frequency (indicating a data bit), and the 2,400 Hz signal is the Space frequency (indicating a no data bit).

The 3601 transmits at frequencies of 900 Hz (Mark) and 1,300 Hz (Space).

Clocking for the modem is provided by the 3601 loop.

Two additional cards are required for this feature: 1. A transmit or send card in location U2, and 2. A receive card in location U4. Installation procedures and adjustments are on LOOP 870.

Note: The transmit level adjustment must be done at initial installation and each time the transmit card in location U2 is changed.

Interface Lines

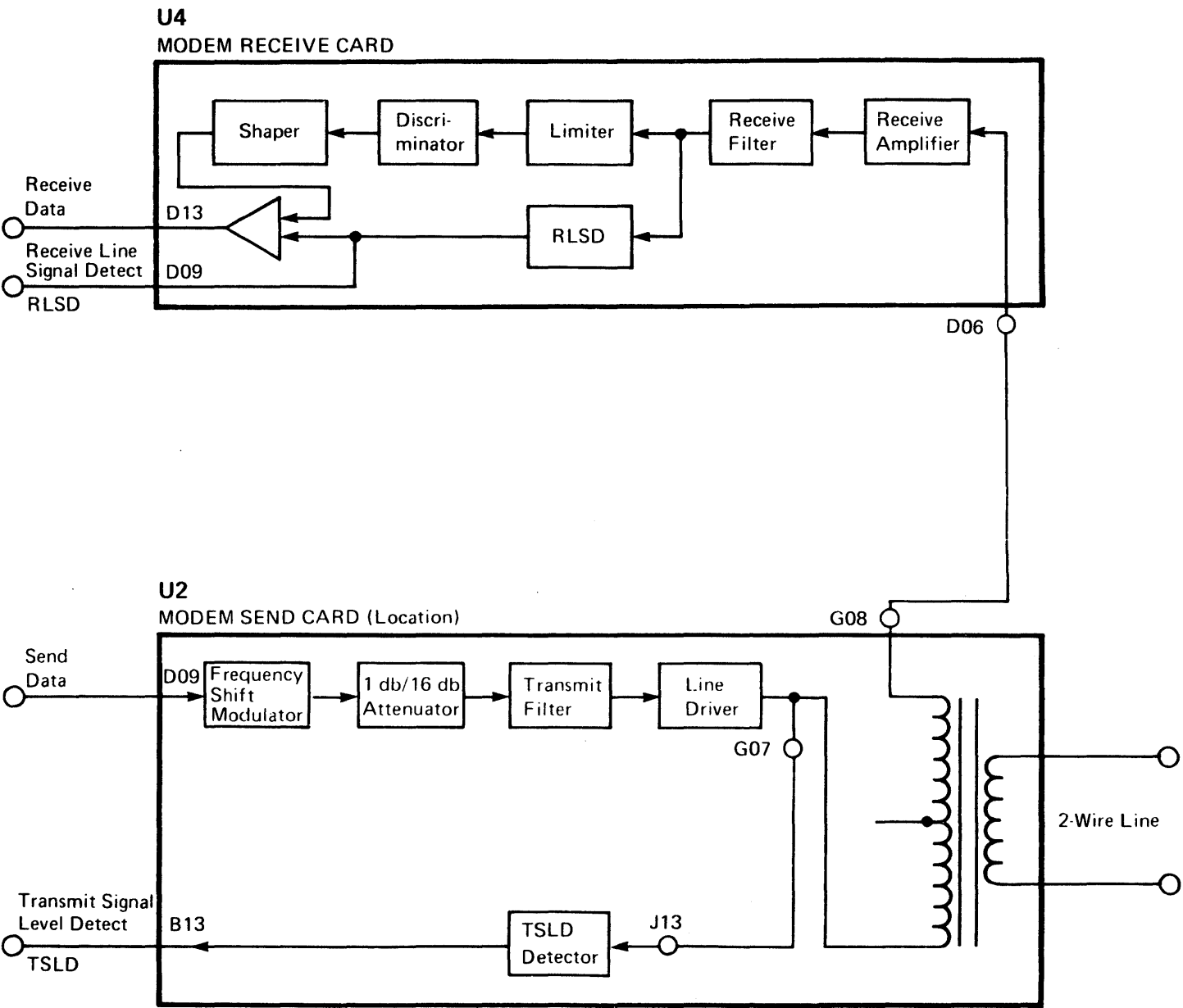
The interface lines connect the modem to the Terminal Adapter (TA) card.

Send Data: This line is keyed by the TA when the 3614 has data to transmit to the 3601. When this line is active (+) the modulator puts the Mark frequency on the transmission lines. When it is not active, it puts the Space frequency on the line.

Receive Data: This line is active (+) when the modem detects a Mark frequency coming in over the transmission lines and is not active (–) when a Space frequency is detected.

Receive Line Signal Detect (RLSD): When active (–), this line indicates that either a Mark or Space frequency has been detected by the modem. When the line is not active (+), the Receive Data line is clamped to its negative level.

Transmit Signal Level Detect (TSLD): When active (–), this line indicates that the modem is transmitting. TSLD does not depend on the Transmit Level Adjustment (see LOOP 870).



From		To Step (this page)
Page	Step	
START 41		10

ENTRY CONDITIONS

- A 3614 loop communications problem is suspected.
- This 3614 is attached to a 3601 on either:
 - a. A local loop or
 - b. A remote loop using an integrated modem on leased telephone lines.

Note: Whenever power is removed on a remote 3614 containing the modem for that bank branch, the entire loop is disabled until power is returned.

MAP STEPS

- 10 You are here because (select one):
- a. There are visual communication failure symptoms such as loss of Carrier Detect, or flashing or loss of the Ready indicator).
Go to —▶▶▶ LOOP 20-10
 - b. The 3614 Test failed with an error code of 'EE71' or 'EE72'.
Go to —▶▶▶ LOOP 150-10
 - c. Error log records indicate that communication failures occurred.
Go to —▶▶▶ LOOP 200-10
 - d. The 3614 operator reported a problem such as:

The 3614 stops with '12bb' in the display during an IPL operation.

Go to —▶▶▶ LOOP 100-10
 - e. The 3614 does not complete an IPL operation, or goes through the IPL sequence then stops with display = '14bb'.
Go to —▶▶▶ START 94

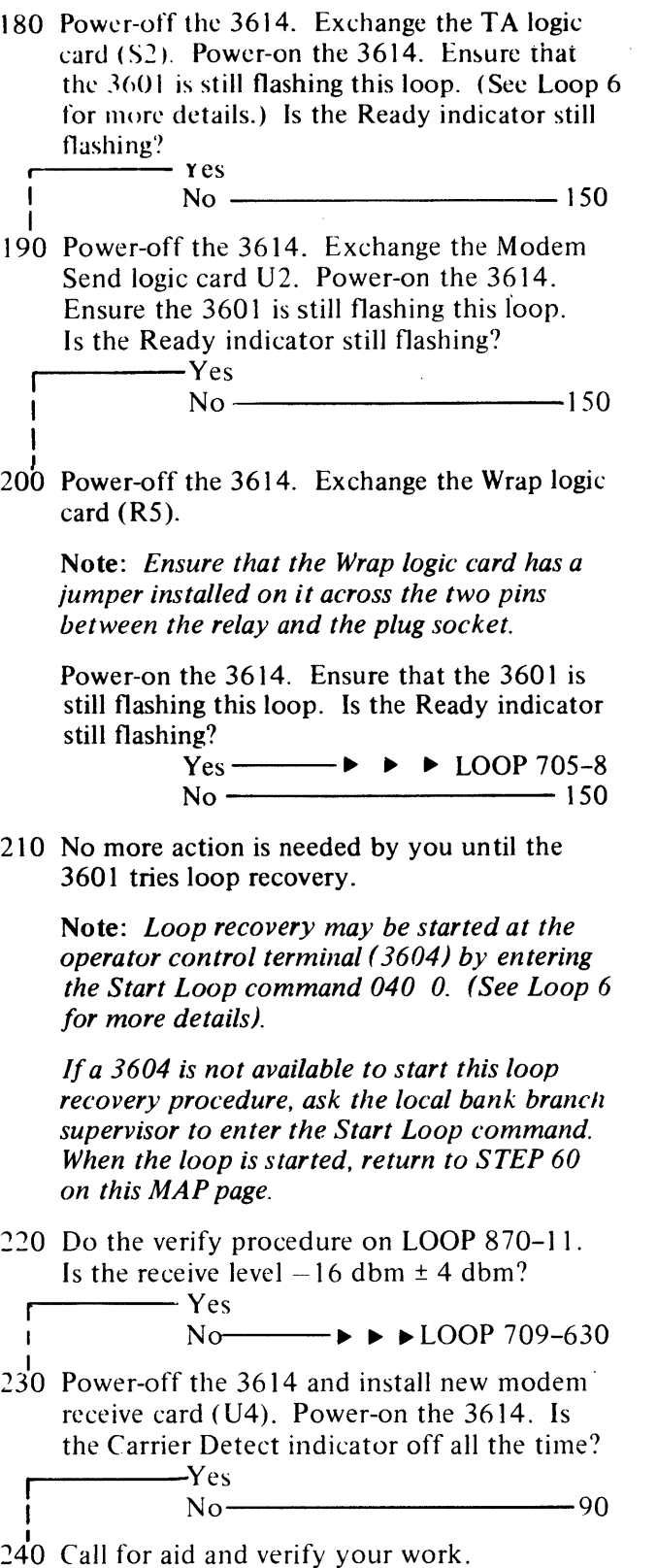
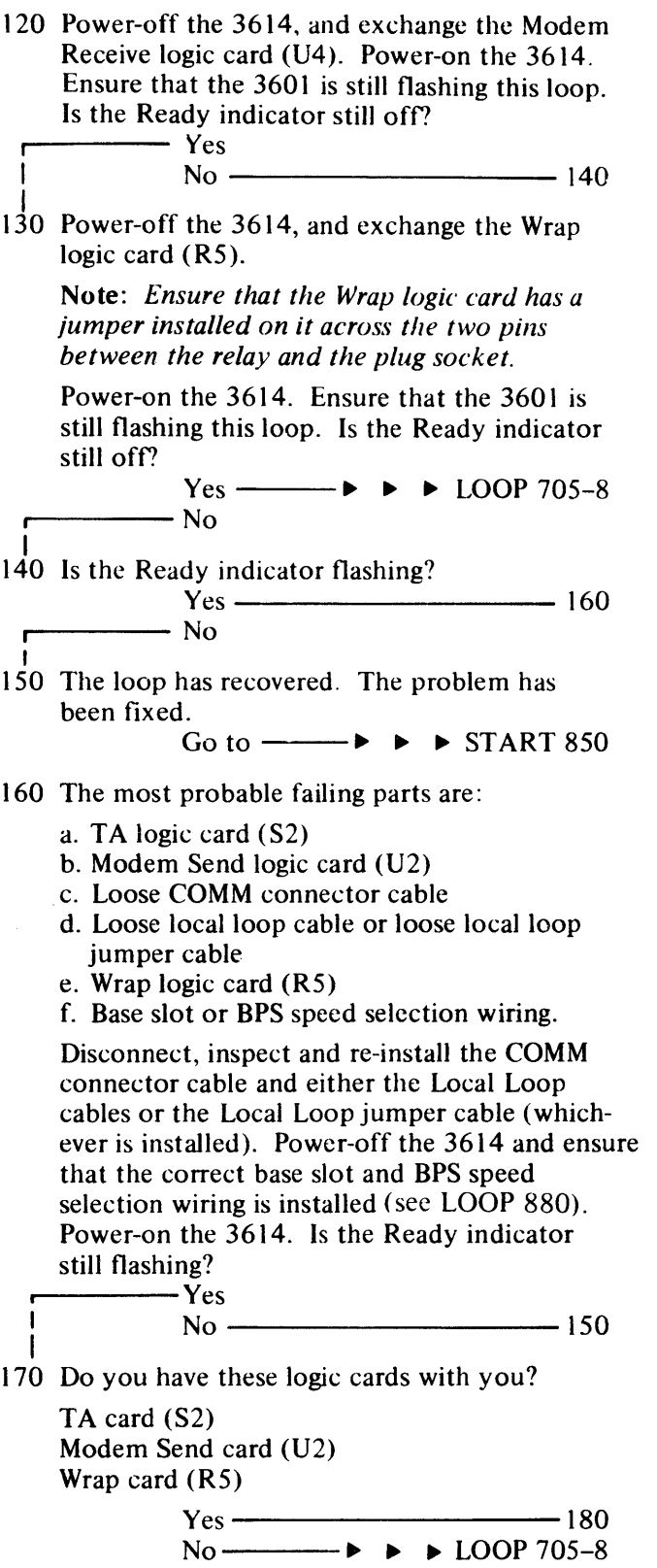
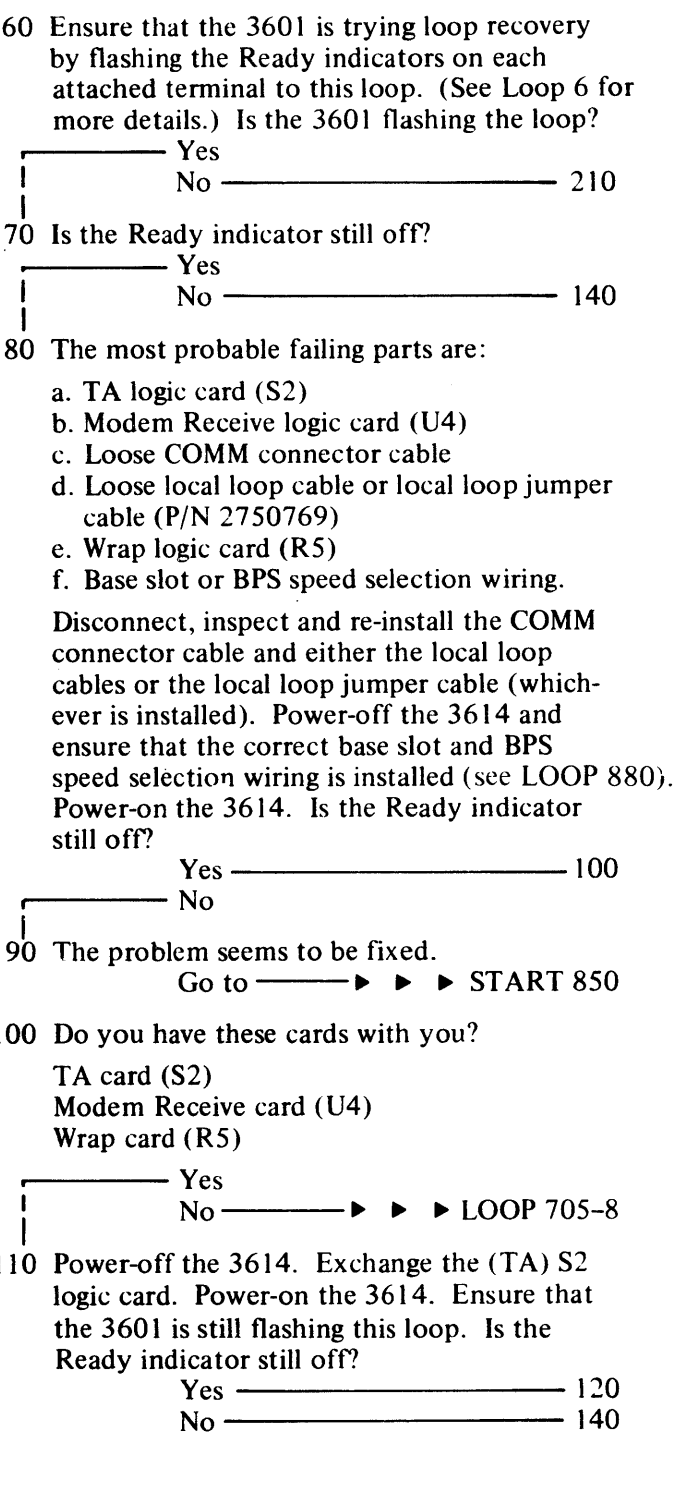
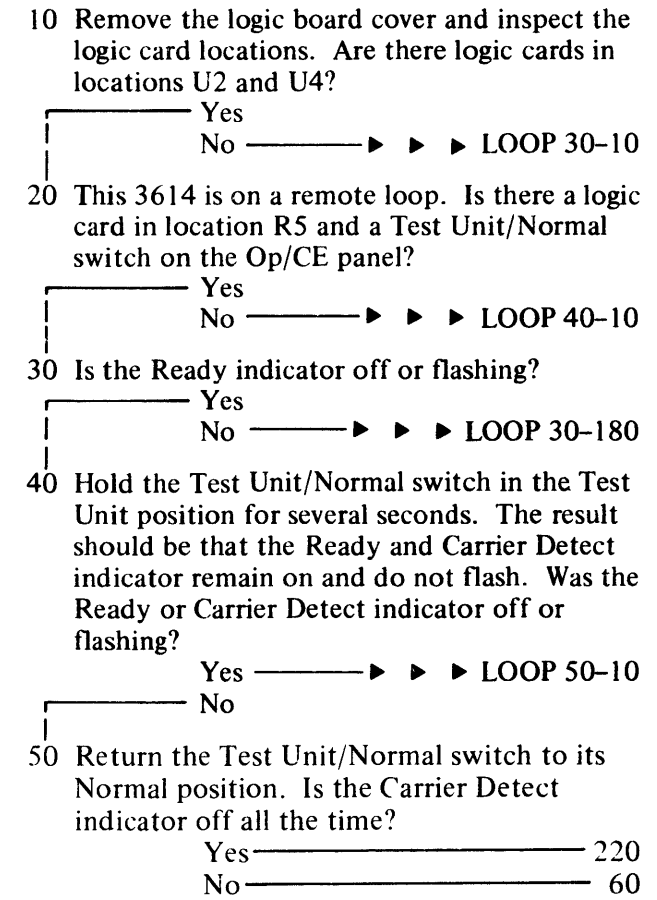
- f. During a customer transaction the 3614 receives patron account data, but is closed with a Transaction Cancelled Out of Service message after displaying Transaction In Progress message.
Go to —▶▶▶ LOOP 110-10
- g. The host program, System/370, or the communication controller has sensed and logged failures.
Go to —▶▶▶ LOOP 800-10
- h. The communication statistical counters indicate too many failures.
Go to —▶▶▶ LOOP 500-10
- i. The transaction status bytes indicate communication failures.
Go to —▶▶▶ LOOP 20-10
- j. The loop is failing and the 3600 or 3614 Operators Guide has isolated the 3614 as the failing device.
Go to —▶▶▶ LOOP 20-10
- k. Another symptom, operator reported or not, that fits none of the above failures.
Go to —▶▶▶ LOOP 20-10

From		To Step (this page)
Page	Step	
LOOP 10	10a, 10i, 10j, 10k	10
LOOP 100	190, 200	10
LOOP 150	200, 210	10
LOOP 210	90, 100	10
LOOP 220	40	10
LOOP 235	110, 120	10
LOOP 250	120, 130	10
LOOP 705	2	10
LOOP 800	190, 200	10

ENTRY CONDITIONS

- A communication problem has occurred.

MAP STEPS



JR0300	4791439	491723							
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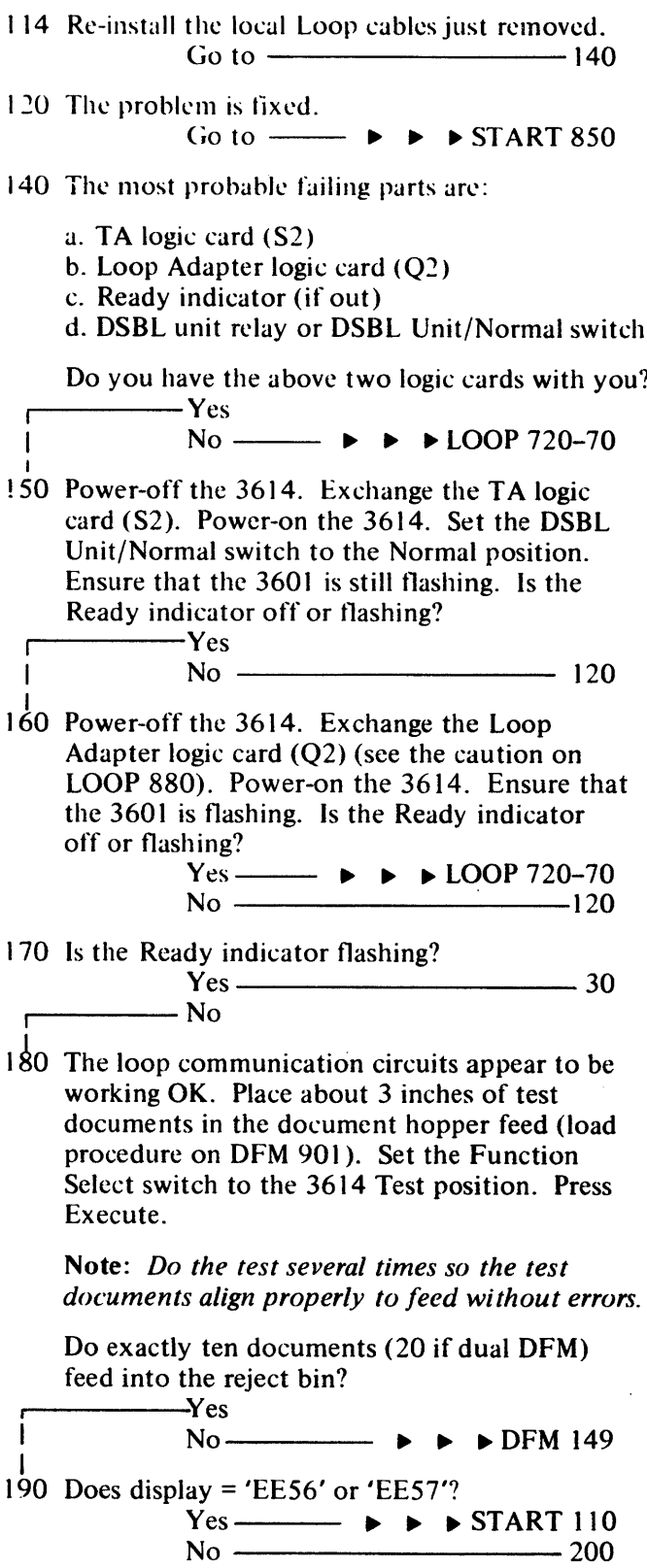
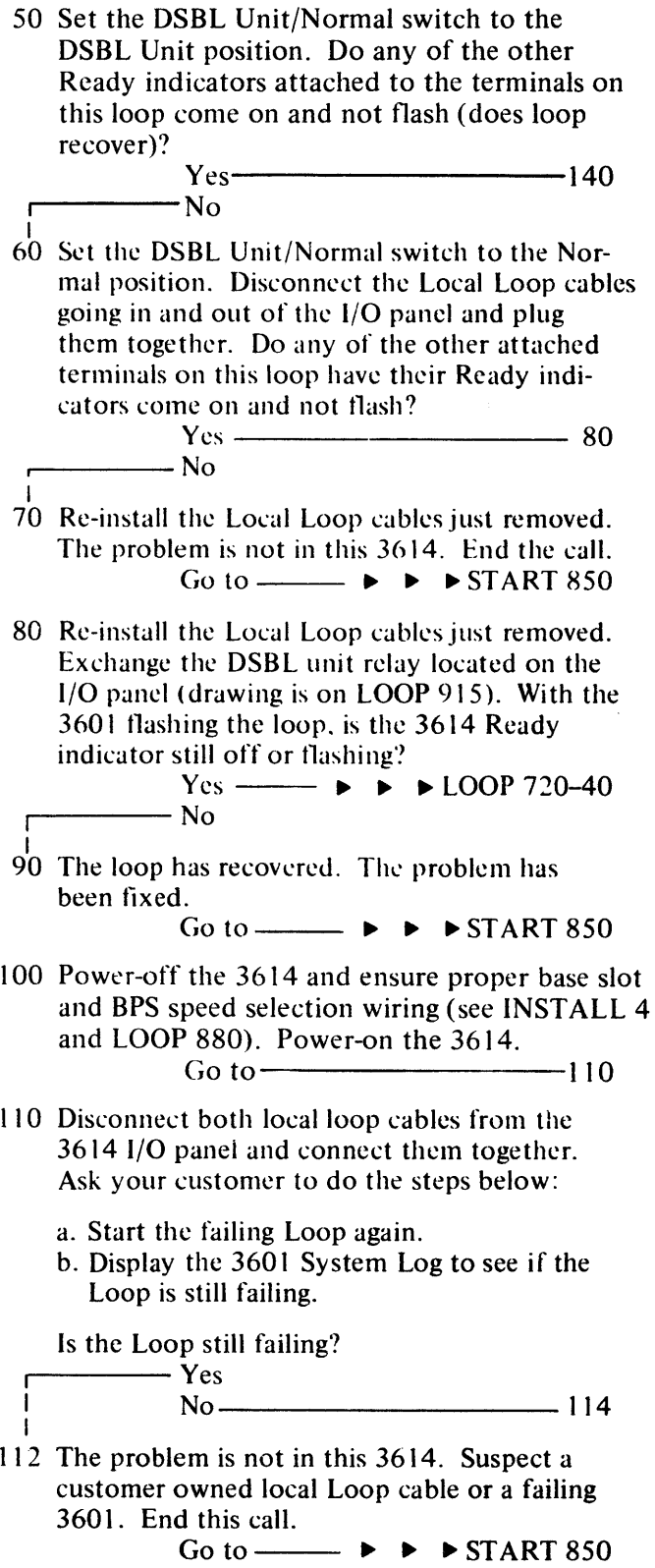
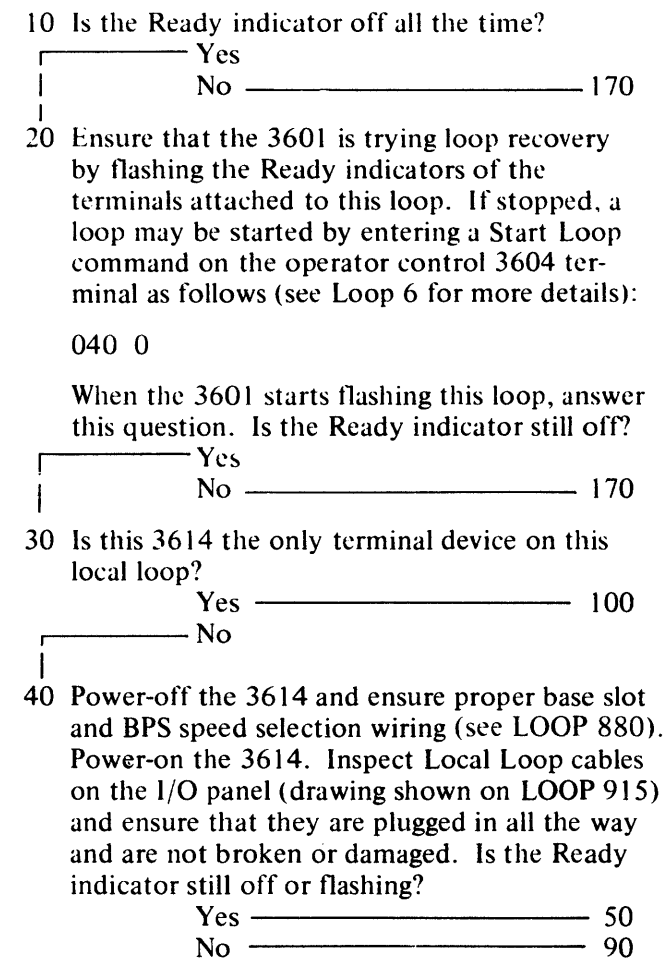
LOOP 30

From		To Step (this page)
Page	Step	
LOOP 20	10	10
LOOP 20	30	180
LOOP 40	90	180

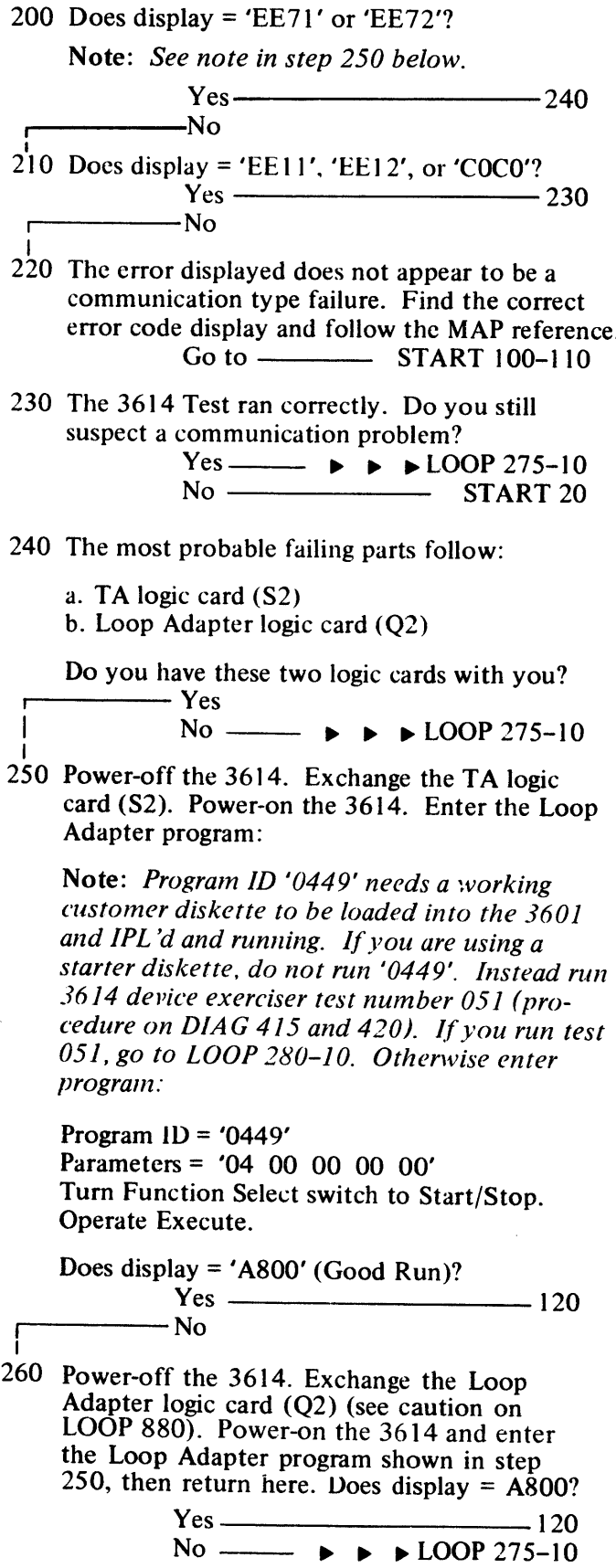
ENTRY CONDITIONS

- A loop communication problem has occurred.
- This 3614 is attached to a 3600 System local loop.

MAP STEPS



LOOP 30

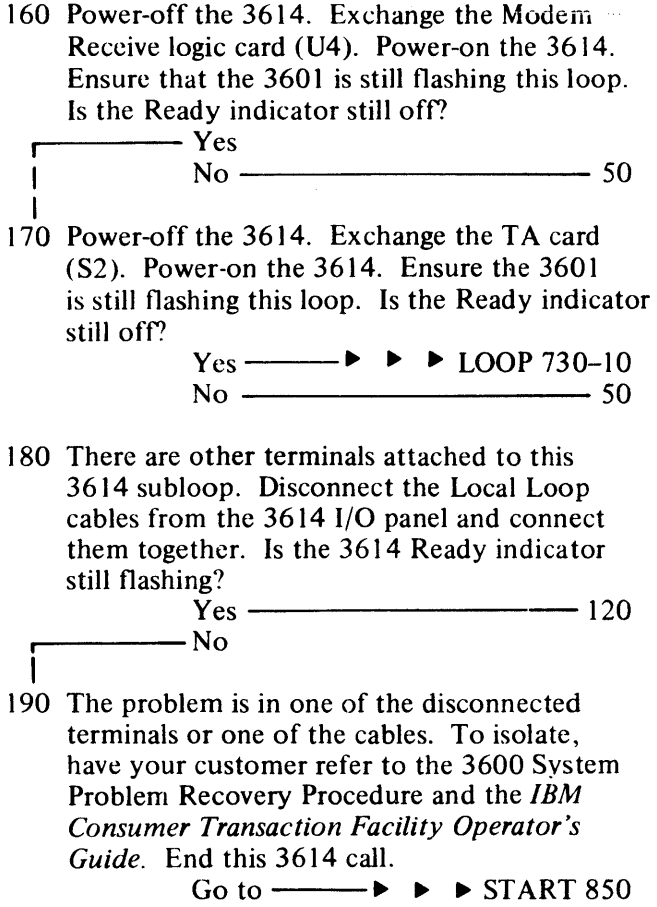
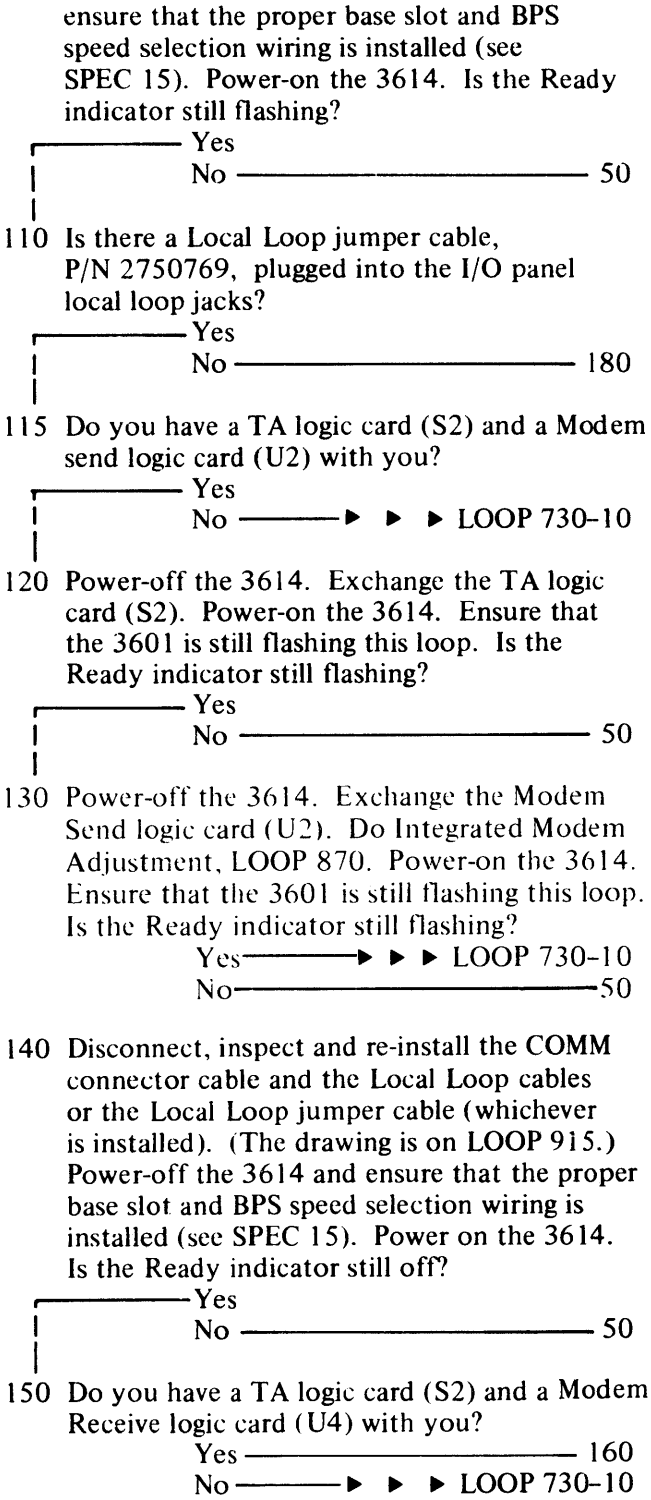
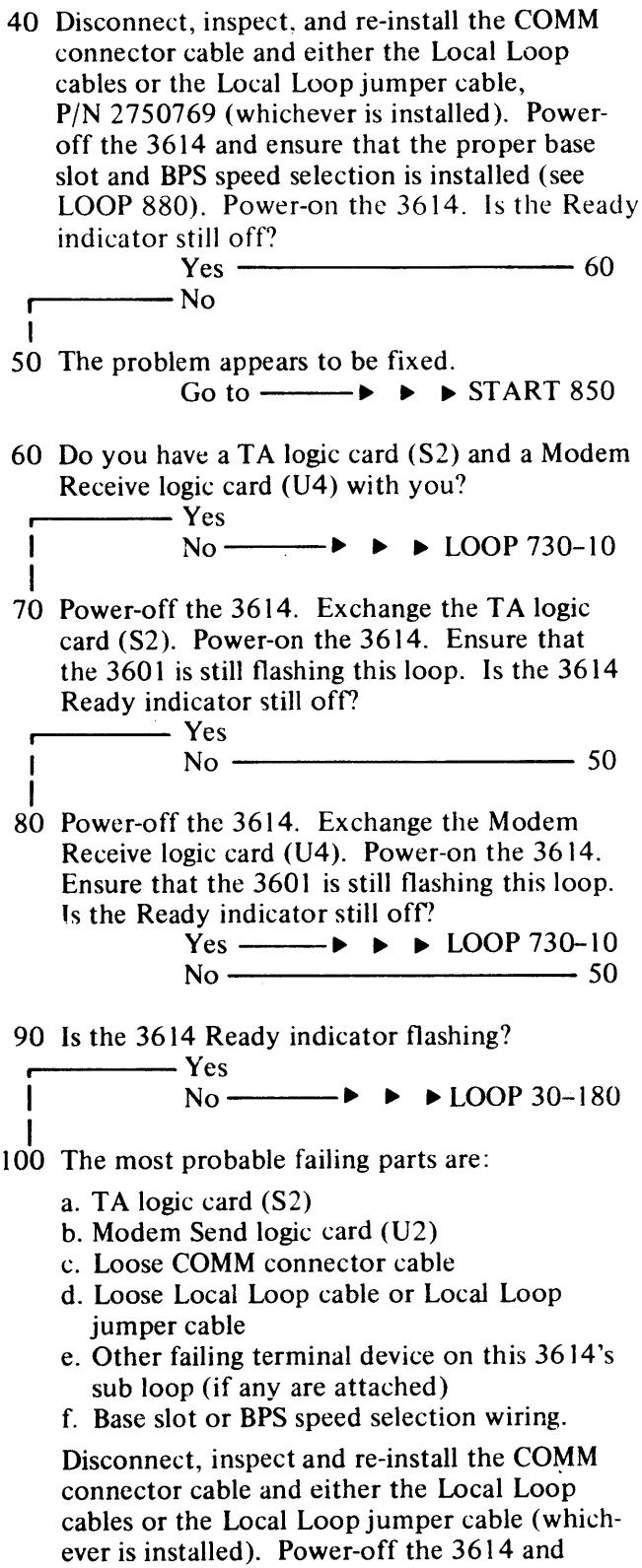
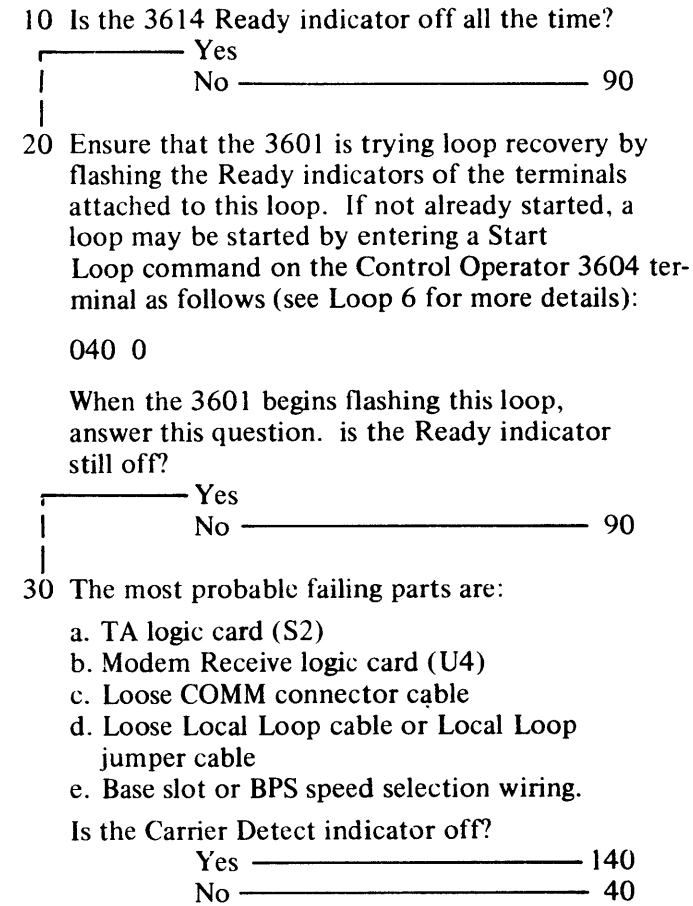


From		To Step (this page)
Page	Step	
LOOP 20	20	10

ENTRY CONDITIONS

- A loop communications problem has occurred.
- This 3614 is attached to a 3600 System Remote Loop with 600 bps Modems (IBM World Trade Corporation only).

MAP STEPS



JR0400	4791440	491723						
Seq.2 of 2	Part No. ()	17 Feb 78						

From		To Step (this page)
Page	Step	
LOOP 20	40	10

ENTRY CONDITIONS

- A loop communication problem has occurred.
- This 3614 is attached to a 3600 System remote loop on 1200 bps Modems.
- The Wrap Function (Test Unit) fails.

MAP STEPS

- 10 The most probable failing parts are:
- a. TA logic card (S2)
 - b. Modem Receive logic card (U4)
 - c. Modem Send logic card (U2)
 - d. Wrap logic card (R5)
 - e. Loose COMM connector cable
 - f. Loose Local Loop cables or Loose Local Loop jumper cable
 - g. Other terminal device on the 3614 subloop.
 - h. Base slot or BPS speed selection wiring.
- Disconnect, inspect, and re-install the COMM connector cable and either the Local Loop cables or the Local Loop jumper cable, whichever is installed (I/O panel drawing on LOOP 915). Power-off the 3614 and ensure that the proper base slot and BPS speed selection wiring is installed (see LOOP 880). Power-on the 3614.
- Hold the Test Unit/Normal switch in the Test Unit position for several seconds. Is the Ready indicator off or flashing?
- Yes _____ 30
- No _____
- 20 The problem seems to be fixed.
- Go to ► ► ► START 850
- 30 Did the Ready indicator come on at all?
- Yes _____ 110
- No _____ 40

- 40 Is there a jumper cable, P/N 2750769, plugged into the local Loop jacks on the I/O panel (drawing is on LOOP 915)?
- Yes _____ 80
- No _____
- 50 Disconnect the Local Loop cables from the I/O panel and install the Local Loop jumper cable, P/N 2750769, into the Local Loop jacks. Hold the Test Unit/Normal switch in the Test Unit position. Is the Ready indicator off or flashing?
- Yes _____ 70
- No _____
- 60 The problem is in one of the disconnected terminals or in one of their cables. Ask your customer to see the IBM 3614 Consumer Transaction Facility Operator's Guide (GA 26-1624) to isolate. End this 3614 call.
- Go to ► ► ► START 850
- 70 Remove the jumper cable and connect the Local Loop cables just removed. The problem is in this 3614.
- Go To _____ 160
- 80 Exchange the Ready and Carrier Detect indicators. Hold the Test Unit/Normal switch in the Test Unit position. Does the Ready indicator come on?
- Yes _____
- No _____ 110
- 90 If a failing indicator (LED) is in the 3614, exchange it with a new one.
- Go to _____ 20
- 100 Exchange the Ready indicator (LED). Hold the Test Unit/Normal switch in the Test Unit position. Does the Ready indicator come on?
- Yes _____ 90
- No _____
- 110 Power-on the 3614 if needed. Do you have a TA logic card (S2), Modem Send logic card (U2), Modem Receive logic card (U4), and Wrap logic card (R5) with you?
- Yes _____ 120
- No ► ► ► LOOP 705-8

- 120 Power-off the 3614. Exchange the TA logic card (S2). Power-on the 3614. Hold the Test Unit/Normal switch in the Test Unit position. Is the Ready indicator off or flashing?
- Yes _____
- No _____ 20
- 130 Power-off the 3614. Exchange the Modem Receive logic card (U4). Power-on the 3614. Hold the Test Unit/Normal switch in the Test Unit position. Is the Ready indicator off or flashing?
- Yes _____
- No _____ 20
- 140 Power-off the 3614. Exchange the Modem Send logic card (U2). Power-on the 3614. Do Integrated Modem Adjustment, LOOP 870. Hold the Test Unit/Normal switch in the Test Unit position. Is the Ready indicator off or flashing?
- Yes _____
- No _____ 20
- 150 Power-off the 3614. Exchange the Wrap logic card (R5).
- Note: Ensure that the Wrap logic card has a jumper installed on it across the two pins between the relay and the plug socket.
- Power-on the 3614. Hold the Test Unit/Normal switch in the Test Unit position. Is the Ready indicator off or flashing?
- Yes ► ► ► LOOP 705-8
- No _____ 20
- 160 Power-off the 3614. Set the CE meter on the R x 1 scale. Place the minus (-) lead on frame ground and with the plus (+) lead probe the following logic board pins and observe the associated indicator:
- H1D11 - Ready
- H1E11 - Carrier Detect
- If you cannot see either indicator light, check meter leads for correct polarity: (-) lead to ground, (+) lead to logic board pins. If correct, exchange the batteries in CE meter.

- Note: CE meter batteries must be in good condition for this test.
- Do both indicators light up during this test method?
- Yes _____ 110
- No _____
- 170 Do you have a spare indicator (LED) with you?
- Yes _____ 100
- No _____ 80

From		To Step (this page)
Page	Step	
LOOP 10	10c, 10d	10
LOOP 110	50, 60, 70	10
START 41		10
START 94		
START 95		
START 97		
START 101	Many	10

ENTRY CONDITIONS

- The 3614 failed to complete an IPL.
- The usual IPL failure symptom is one of those below:
 - a. The 3614 stops with '12bb', '120x', '1210', '1220', or '1230' in the display (with hang reset jumper installed).
 - b. The 3614 display goes from '12bb' to '1200' or higher, then resets to '0000' and repeats the Bring-up test and IPL repeatedly trying to recover (with no hang reset jumper installed).
 - c. The 3614 display goes from '12bb' to '1200', '1201', 'FFxx', etc. Then stops with a '14bb' displ
 - d. An IPL failure message prints at the host end.

MAP STEPS

- 10 Is the Ready indicator on and not flashing?
Yes _____ 40
No _____
- 20 Is the Ready indicator flashing on and off?
Yes _____ 190
No _____
- 30 The Ready indicator is off.
Go to _____ 190
- 40 Enter any non-valid Key B as follows:
 - Turn the Function Select switch to Enter Key B.
 - Turn Data Entry switches to any value '01' 'FF'.
 - Press the Execute pushbutton 9 times.
 - Press Reset.

CAUTION
Do not try to IPL from a 3601 which was brought up with a starter diskette. Load the customer's application diskette into the 3601 for this procedure.

- The 3614 runs normal bringup tests, then tries to IPL from the host system. The IPL should end with a '14bb' in the display because of the non-valid Key B. The IPL sequence you may expect is: (see START 94 sequence chart)
- '12bb' -- The 3614 requests an IPL from the host.
 - '1200' -- The 3614 receives the first record.
 - '12xx' -- The IPL continues until invalid key detected.
 - 'FFxx' -- "Flushing" IPL data.
 - '14bb' -- Did not IPL invalid key "B".

- Did the sequence of displays = '12bb', '1200', '1201', 'FFxx', etc., then stop at '14bb'?
- Yes _____
No _____ 80
- 50 The 3614 is able to communicate in both directions. The IPL function seems to work OK.
Go to _____ 70

- 70 Turn the Function Select switch to Clear Key B and operate Execute. Ask the operator to enter the correct key and try an IPL.

Note: Back door being closed must be simulated by pulling out the back door interlock switch. When the switch is placed in the door-open position or the door is opened, the 3614 closes (the open/closed sign goes closed) and sends an exception status message to the host system.

- Was the IPL correct and did the 3614 Open indicator come on?
Yes _____ ▶ ▶ ▶ START 850
No _____ 150
- 80 Did the display end with '12bb'?
Yes _____ 200
No _____
- 120 Did the display ever = '1200'?
Yes _____ 250
No _____ 130

- 130 Look up the error code display on START 100 and 101 and follow the MAP reference.
- 140 Repeat the procedure starting in step referenced.
Go to _____ 40
- 150 Was the IPL display sequence '12bb', '1201', '1202', '1203', etc., and then 'bbbb' with the 3614 failing to open for transaction?
Yes _____
No _____ 210
- 160 The 3614 communication circuits work properly. Suspect a short-circuit or failing Security Enclosure switch, Interlock switch or associated wiring. Refer to SPEC 510 and try to isolate a problem in the point-to-point wiring. Did you find the problem?
Yes _____
No _____ ▶ ▶ ▶ START 94
- 170 Repair or exchange the failing component or wire.
Go to _____ ▶ ▶ ▶ START 850
- 190 Do you have spare 3614 loop communication cards with you?
Yes _____ ▶ ▶ ▶ LOOP 20-10
No _____ ▶ ▶ ▶ LOOP 705-5
- 200 Do you have a TA logic card (S2) with you?
Yes _____ ▶ ▶ ▶ LOOP 20-10
No _____ ▶ ▶ ▶ LOOP 275-10
- 210 Did the display progress through '12bb', '1201', '1202', 'FFxx', etc., then stop with '14bb'?
Yes _____
No _____ 200
- 220 The 3614 has detected a back-up key (Key B) out of sync. Either the 3614 teller is entering a wrong key, or the teller's key is not matching the host program's key. Ask your customer to verify that both the teller key being entered and the host key being used are identical. Are the two keys identical?
Yes _____ 240
No _____
- 230 This is a customer responsibility. Have them correct the key problem. Terminate this call.
Go to _____ ▶ ▶ ▶ START 850

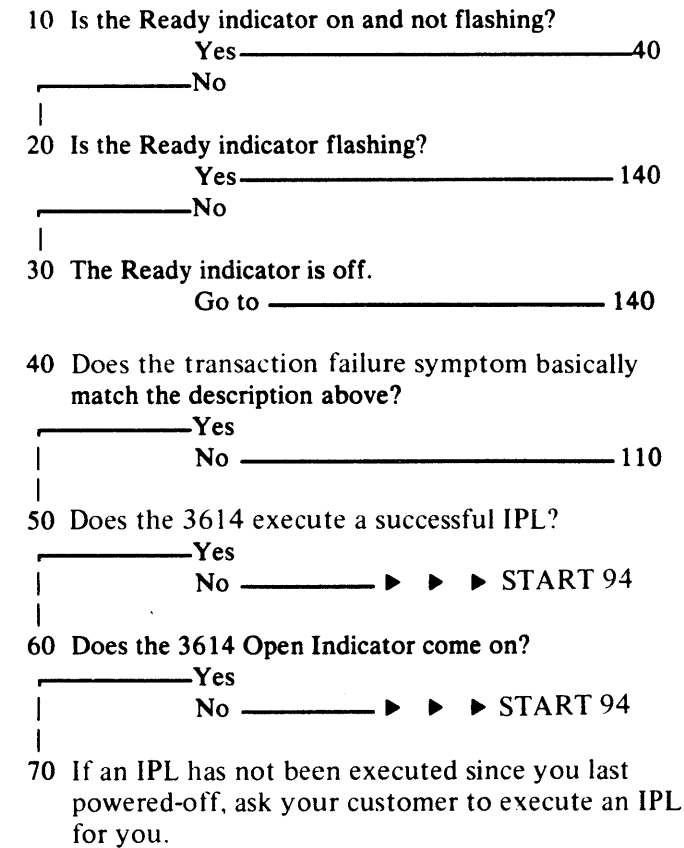
- 240 There may be a key entry problem with the switches on the CE/Op panel. Verify the Function Select and Data Entry switch operation as outlined on CTRLR 540 then return here. Switches work OK?
Yes _____ 200
No _____ 170
- 250 Did one of the following occur?
 - 3614 IPL routine sequences from '12bb' to '12xx', then reset back to '0000' and start over again?
 - Display stop with '1210', '1220', or '1230'?
 - Display stop with '12bb' or '12xx'?
Yes _____
No _____ 300
- 260 Exchange the cards in positions D2 and H2 if installed, with new cards. Power-on and try a customer IPL. Did exchanging the cards fix a problem?
Yes _____ 290
No _____
- 270 Ask your customer to verify that the keys entered into the 3614 match the Keys generated in the Host Program. Do all the Keys match?
Yes _____
No _____ ▶ ▶ ▶ START 850-10
- 280 Problem could be a bad EC Record installed in the Host Program during an EC update, or some other Host Program error. Ask your Programming Support CE to determine the problem.
- 290 Determine which of the cards was causing the failure by exchanging half of the cards with old ones until the failing card is isolated. Each time, try a customer IPL until the failing card is found. Return the other cards to your branch office.
Go to _____ ▶ ▶ ▶ START 850-10
- 300 Did display stop with a '17xx'?
Yes _____
No _____ 140
- 310 Install a new card in B2 position. Power-on and try a customer IPL. Did the new card fix the problem?
Yes _____ START 850
No _____ 260

From		To Step (this page)
Page	Step	
LOOP 10	10f	10

ENTRY CONDITIONS

- The 3614 failed during a transaction.
- The usual symptom is the transaction runs through the point when the bank's customer enters a dollar amount and presses the OK key. A transaction In Progress message may have flashed on the display, but the 3614 flashed an Out of Service — Transaction Cancelled message on the display, returned the patrons card, and the 3614 changed to closed status. There may be a communication problem.

MAP STEPS



Note: The customer must enter a valid Key A and Key B. The back door must be closed or the back door Interlock switch must be pulled out.

Does the 3614 execute a successful IPL (does the Open indicator come on)?



- 80 Do the following:
- a. Set the Function Select switch to Enter Address.
 - b. Set the Data Switches to '3B'.
 - c. Operate Execute once (display = '3Bbb').
 - d. Set the Data switches to 'A9'.
 - e. Operate Execute once (display = '3BA9').
 - f. Set the Function Select switch to Display Data.
 - g. Operate Execute once (display = 'bbxx').

The second byte in the display ('xx') represents the customer option byte, which determines the communication time-out the customer wants. Time-out is measured in quarter seconds (0.25 seconds).

Example:

xx = '28' = decimal 40 x 0.25 seconds = 10 seconds

The time-out value must be high enough to allow a transaction message to be sent and a response to be received. A time-out value less than '28', for example, may cause transactions to fail (though the IPL is correct because the time-out option is not used during IPL) on loops with relatively slow communication line speeds.

Does the timeout option seem to be too small?
Yes _____ 100
No _____ 150

100 Inform your customer that his host program is sending a time-out value that is too small. End the call.
Go to _____ ▶ ▶ ▶ START 850

110 Does the test transaction run OK?
Yes _____ 130
No _____ 120

120 Search for another symptom.
Go to _____ ▶ ▶ ▶ START 40

130 Communication circuits seem OK?
Go to _____ 120

140 Do you have spare 3614 loop communication logic cards with you?
Yes _____ ▶ ▶ ▶ LOOP 20-10
No _____ ▶ ▶ ▶ LOOP 705-5

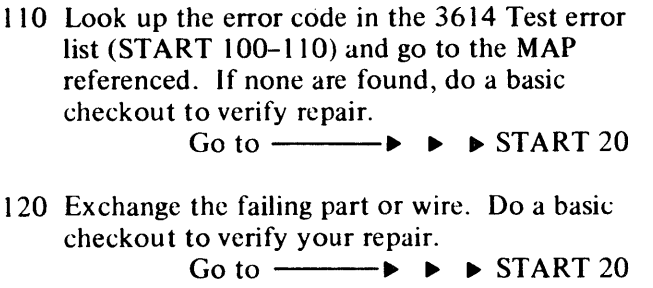
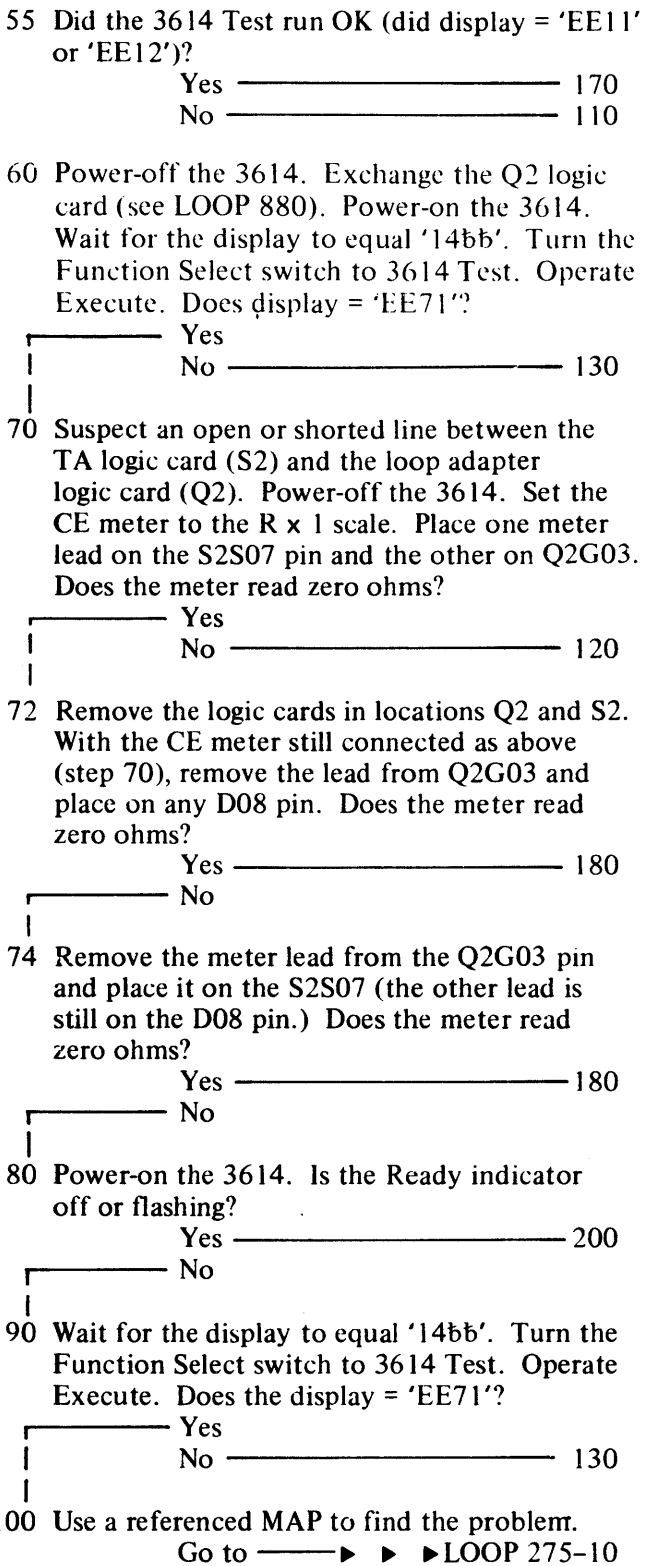
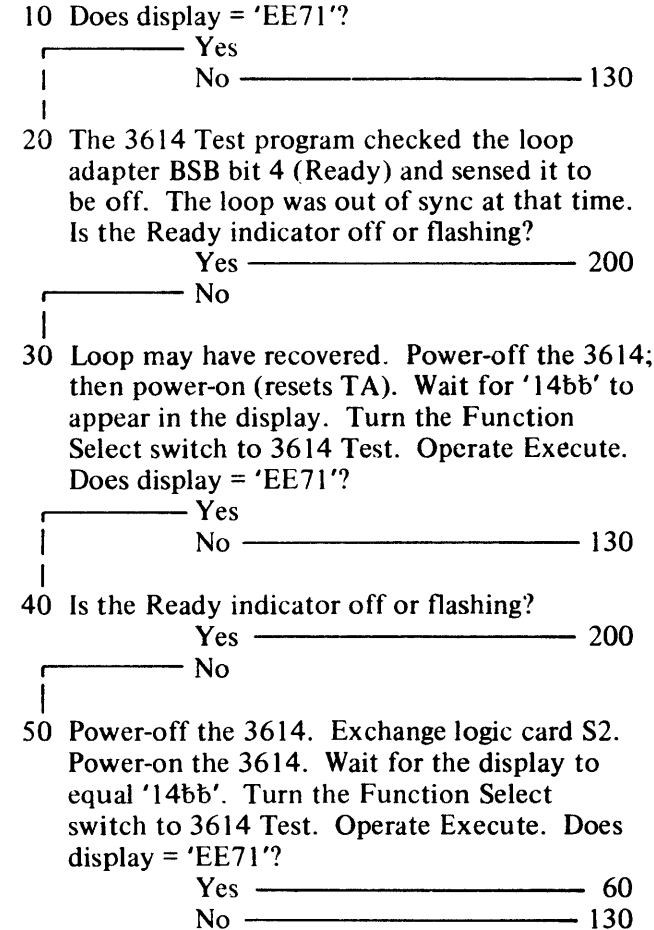
150 Do you have a TA logic card (S2) and loop adapter logic card (Q2) with you?
Yes _____ ▶ ▶ ▶ LOOP 20-10
No _____ ▶ ▶ ▶ LOOP 275-10

From		To Step (this page)
Page	Step	
LOOP 10	10	10
START 110	10	10

ENTRY CONDITIONS

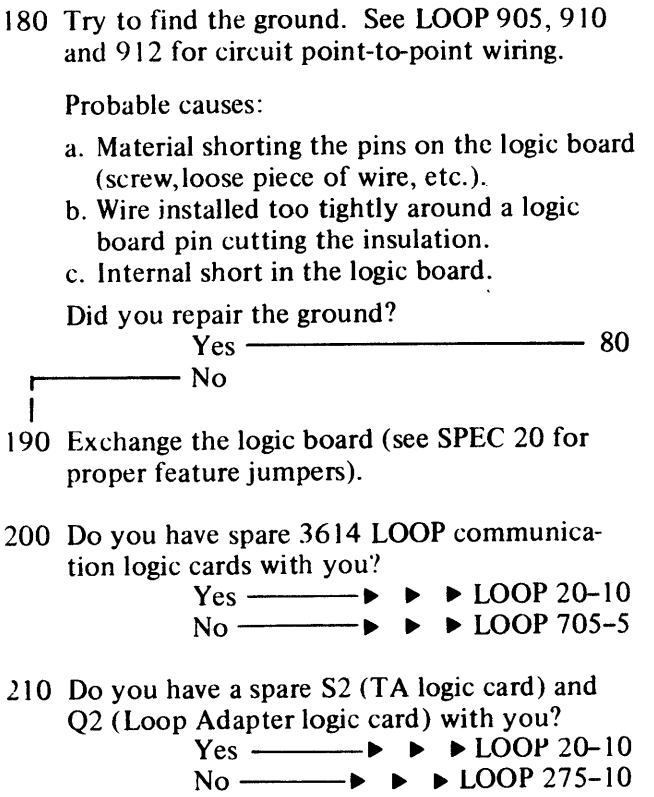
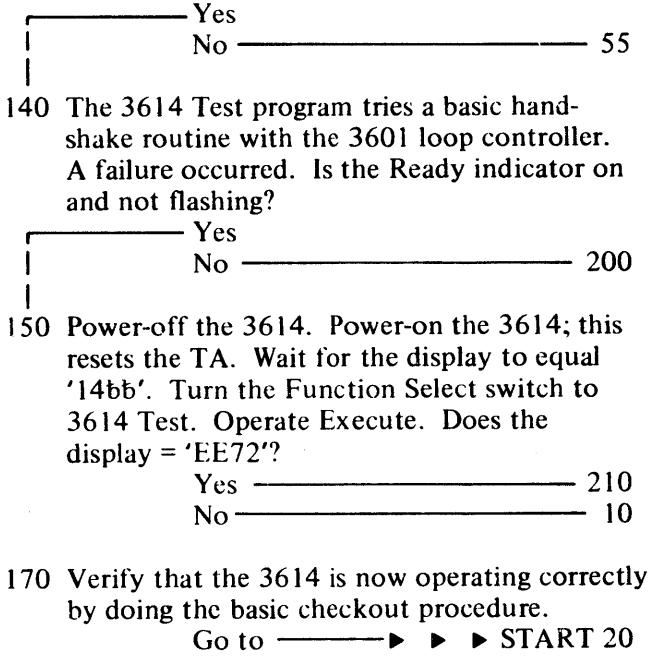
- The 3614 Test indicated one of the displays below:
 - a. 'EE71' - Loop Sync error
 - b. 'EE72' - Handshake test error
- A TA/Loop adapter communication hardware problem is suspected.

MAP STEPS



130 Does the display = 'EE72'?

CAUTION
The 3614 test will fail with an 'EE72' if the 3601 has a starter diskette running as the system diskette. If a starter diskette is loaded, ignore the error code and have the 3601 loaded by using the customer's application diskette, then run the 3614 test again. If you are on an installation or if a customer diskette is not available, verify that the 3614 Device Exerciser Test 051 runs correctly (procedure and error data are on DIAG 415 and 420), instead of relying on the 3614 test procedure. If Device Exerciser Test 051 fails, follow the MAP on LOOP 280. If test 051 runs, go to START 850.



JR0600	4791442	491723						
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You are here because log analysis indicates that error log records were stored in NVM as a result of communications hardware errors. Find the MAP pointed to by the applicable error code and follow it.

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6	MAP Reference
Error Code	Transaction Count	Error Count	Descriptor 1	Descriptor 2	Descriptor 3	
'71'	XX	XX	00	Message Length	Bytes Not Sent	LOOP 210-10
'72'	XX	XX	BSB	Message Length	Bytes Not Sent	LOOP 210-70
'74'	XX	XX	00	BSB	00	LOOP 210-20
'75'	XX	XX	00	Msg Length Byte or '00' If IPL	Number of Bytes Received	LOOP 220-10
'76'	XX	XX	01 02	00 BSB	00 First Byte	LOOP 220-20
'77'	XX	XX	00	Not Valid or Out of Sequence Command	00	LOOP 220-30
'78'	XX	XX	00	BSB	00	LOOP 210-80
'79'	XX	XX	01 02 03 05 06 08	BSB	XX XX XX XX Actual Data XX	LOOP 235-10
'7B'	XX	XX	00	Expected Data	Received Data	LOOP 250-10
'7D'	XX	XX	00	Subclass Received	00	LOOP 250-90

Bytes 1 through 6 = Error Log
BSB = Basic Status Byte

From		To Step (this page)
Page	Step	
LOOP 200	'71 '	10
LOOP 200	'74 '	20
LOOP 200	'72 '	70
LOOP 200	'78 '	80
START 106		10
START 108		10

ENTRY CONDITIONS

- Loop communications error.

MAP STEPS

10 An early End Op command was received by the 3614 while executing a Write operation. Not all of the transmitted message was received by the 3601. The transaction (if any) was canceled, the patron's card was returned, and the 3614 was closed.

Error log record definition follows:

Byte 1 — Error Code = '71 '
Byte 2 — Transaction Count = 'xx '
Byte 3 — Error Count = 'xx '
Byte 4 = '00 '
Byte 5 — Message Length = 'xx '
Byte 6 — Bytes not sent = 'xx '

Possible failing units are:

3601 loop hardware.
A TA logic card.
A loop adapter logic card.
An open printed circuit on the logic board.
Go to _____ 100

20 A recoverable loop communications error occurred. A reset condition occurred in the 3614 loop hardware while reading. Two types of resets can cause this condition:

- a. A Power-on-Reset (POR) from 3614 hardware circuits.
- b. A TA Reset command from the 3601 loop controller.

The 3614 communications adapter takes the following action:

If writing, sends the entire transaction message again.
If reading, ignores the entire message.

If idle, (not communicating), ignores the Reset command.

Error log record definition follows:

Byte 1 — Error Code = '74 '
Byte 2 — Transaction Count = 'xx '
Byte 3 — Error Count = 'xx '
Byte 4 = '00 '
Byte 5 — Basic Status Byte = 'xx '
Byte 6 = '00 '

Is Byte 5 (BSB) bit 2 on?

Yes _____
No _____ 60

30 The TA Reset command caused an error log entry. Is byte 5 bit 4 on?

Yes _____ 50
No _____

40 The 3614 Ready line failed and caused the reset.
Go to _____ 90

50 Failure was probably caused by one of the following:

- a. A 3614 Power-on Reset (POR).
- b. Another failing terminal on the loop.
- c. A noisy communication line.

When loop diagnostic ID '0449' is run correctly, the end result is a TA Reset which does not cause a logged record. In this case it is not an error. End of call.

Go to _____ ▶ ▶ ▶ START 850

60 The reset condition was probably the result of a reset from the 3614 while the loop adapter was communicating with the 3601. Try another symptom.

Go to _____ ▶ ▶ ▶ START 100

90 Do you have spare 3614 loop communication logic cards with you?

Yes _____ ▶ ▶ ▶ LOOP 20-10
No _____ ▶ ▶ ▶ LOOP 705-5

100 Do you have a spare S2 (TA logic card) and Q2 (Loop Adapter logic card) with you?

Yes _____ ▶ ▶ ▶ LOOP 20-10
No _____ ▶ ▶ ▶ LOOP 275-10

70 The 3614 could not recover from a loop communications error and this caused the 3614 to close. A timeout occurred while trying to send one of the following messages to the host:

- a. Transaction Request message
- b. Transaction Status message
- c. Command Status message

This failure is not logged during the timeout of:

- a. An IPL request message
- b. Other exception status messages such as Opened Service Door, Closed Service Door, etc.

Error log record definition follows:

Byte 1 — Error Code = '72 '
Byte 2 — Transaction Count = 'xx '
Byte 3 — Error Count = 'xx '
Byte 4 — Basic Status Byte (BSB) = 'xx '
Byte 5 — Message Length = 'xx '
Byte 6 — Bytes not sent = 'xx '

Possible causes of this failure are:

- a. The TA logic card (S2)
- b. The loop adapter logic card (Q2)
- c. The modem logic card (U2 or U4)
- d. The host program is down or failing
Go to _____ 100

80 A timeout occurred while waiting for the Suppress or TA Reset line to become inactive before sending a message to the host.

Error log record definition follows:

Byte 1 — Error Code = '78 '
Byte 2 — Transaction Count = 'xx '
Byte 3 — Error Count = 'xx '
Byte 4 = '00 '
Byte 5 — Basic Status Byte (BSB) = 'xx '
Byte 6 = '00 '

The 3614 was Closed and status bit (bit 0 byte 3) was set to on. Possible causes of this failure are:

- a. A Loop failure
- b. A 3601 failure
- c. A defective TA logic card (S2)
- d. A defective loop adapter logic card (Q2)

Go to _____ 100

JR0700	4791443	491723						
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From		To Step (this page)
Page	Step	
START 106	75	10
START 106	76	20
START 106	77	30
LOOP 200	75	10
LOOP 200	76	20
LOOP 200	77	30

ENTRY CONDITIONS

- The 3614 recovered from a loop communication error.

MAP STEPS

10 Error log record definition follows:

Byte 1 – Error Code = '75'
Byte 2 – Transaction Count = xx
Byte 3 – Error Count = xx
Byte 4 = '00'
Byte 5 – Message Length Byte or '00' if IPL
Byte 6 – Number of Bytes

An early or late End Op command was received from the 3601 while the 3614 was receiving a message.

If an IPL was tried from the host program, the bytes received did not equal 256.

Other messages can cause the count in byte 6 to be less than byte 5 for Early End Op (not enough bytes received) or the count in byte 6 to be more than byte 5 for Late End Op (too many bytes sent).

Note: It is possible for byte 6 to contain a negative number (the byte counter is too small for the highest count). It may occur during a Late End Op error.

To recover, the 3614 tries to send an unintelligible-message exception status to the 3601. If it cannot, the 3614 times out, returns the patrons card, and closes.

Possible causes of this failure are:

- a. The 3601 ends transmission after 16 consecutive loop failures.
 - b. Line problems (noise, etc.).
 - c. A failing TA logic card (S2).
 - d. A failing loop adapter logic card (Q2) defective.
 - e. A failing modem send logic card (U2) or modem receive logic card (U4).
- Go to _____ 40

20 Error log record definition follows:

Byte 1 – Error Code = '76'
Byte 2 – Transaction Count = 'xx'
Byte 3 – Error Count = 'xx'
Byte 4 = Error Number
Byte 5 – '00' or BSB
Byte 6 – '00' or First Byte Received

Error Number '01'

Overrun – The 3614 is receiving input so quick that it cannot handle the data. The message being received is ignored and an exception message to the host is tried. Error log bytes 5 and 6 = '00'.

Error Number '02'

Not expected Data Received – The 3614 received data it did not expect without first receiving a Write Select command (put into Read mode). The 3614 tries recovery as in error '01' above. Error log byte 5 contains Basic Status byte and byte 6 contains the first byte of the not expected data received.

Possible causes of this failure are:

- a. Loop failures.
 - b. A 3601 hardware failure.
 - c. A failing TA logic card (S2).
 - d. A failing loop adapter logic card (Q2).
 - e. A failing Modem Send (U2) or Modem Receive logic card (U4).
- Go to _____ 40

30 Error log record definition follows:

Byte 1 – Error Code = '77'
Byte 2 – Transaction Count = 'xx'
Byte 3 – Error Count = 'xx'
Byte 4 = '00'
Byte 5 – Not valid or Out of Sequence Command
Byte 6 = '00'

A not valid or Out of Sequence command was received from the 3601. The 3614 was not able to respond to the command. An exception message was sent to the 3601.

Possible causes of this failure are:

- a. 3601 hardware failed.
 - b. A failing TA logic card (S2).
 - c. A failing loop adapter logic card (Q2).
 - d. A failing modem send logic card (U2) or modem receive logic card (U4).
- Go to _____ 40

40 Do you have a spare S2 (TA) and Q2 (Loop Adapter) logic card with you?

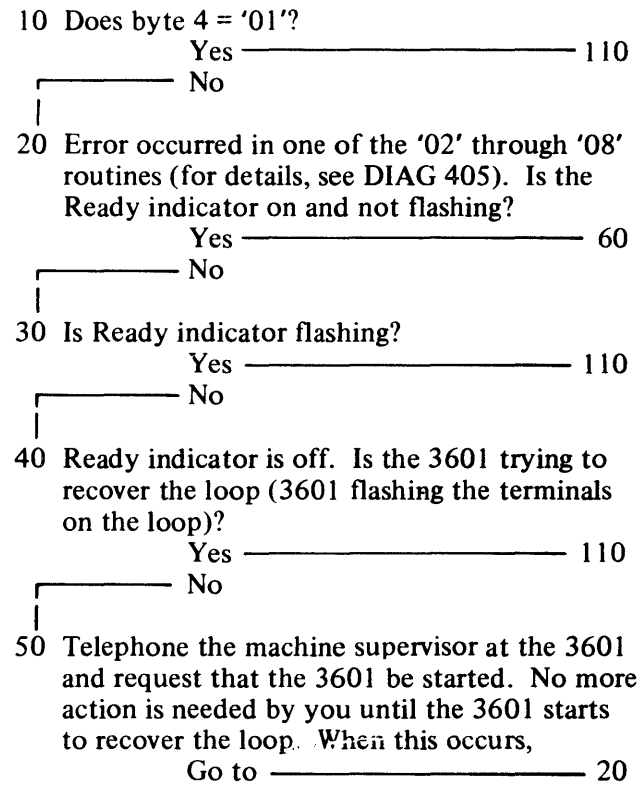
Yes _____>>> LOOP 20-10
No _____>>> LOOP 275-10

From		To Step (this page)
Page	Step	
START 107	Many	10
LOOP 200	'79'	10

ENTRY CONDITIONS

- Program ID '0449' failed.
- A loop communication problem is suspected.
- Error log record definition follows:
Byte 1 – Error Code = '79'
Byte 2 – Transaction Count = xx
Byte 3 – Error Count = xx
Byte 4 = Error number
Byte 5 = BSB
Byte 6 = Received Data (applies only to error number 6).

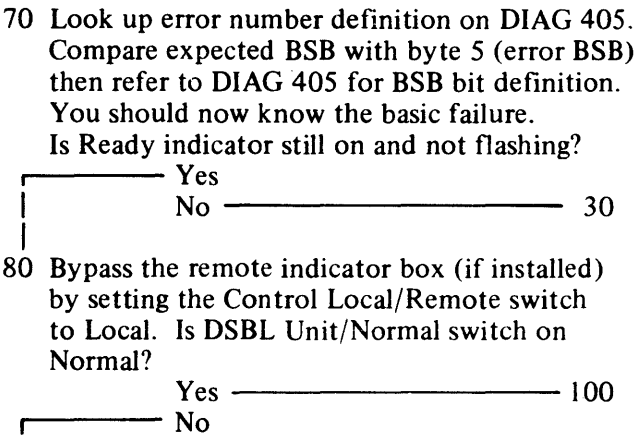
MAP STEPS



60 Program ID '0449' failed. Error log record definition follows:

Byte 1 – Error Code = '79'
Byte 2 – Transaction Count = 'xx'
Byte 3 – Error Count = 'xx'
Byte 4 = Error '02' – '08'
Byte 5 = Error BSB
Byte 6 = Received Data byte

Error number and BSB definitions are shown on DIAG 405. Command data (Routine '06') or BSB (all other routines) were other than expected.
Go to ————— 70

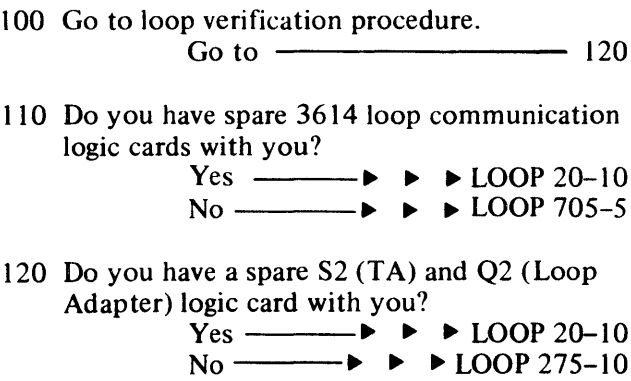


90 See caution below before starting this step. Set DSBL Unit/Normal switch to the Normal position.

Enter Loop Adapter Program:
Program ID = '0449'
Parameters = '04 00 00 00 00'

CAUTION
Do not try to loop this program ID. It may cause the communications loop to be stopped by the 3601.

Turn Function Select switch to Start/Stop. Operate Execute. A good run will make the Ready and Logic Run indicators turn off, for a short time, then displays 'A800'. Was the test run correctly (does display = 'A800')?
Yes ————— ▶ ▶ ▶ START 850
No ————— 100



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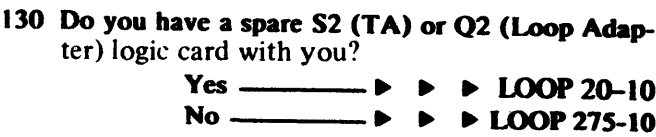
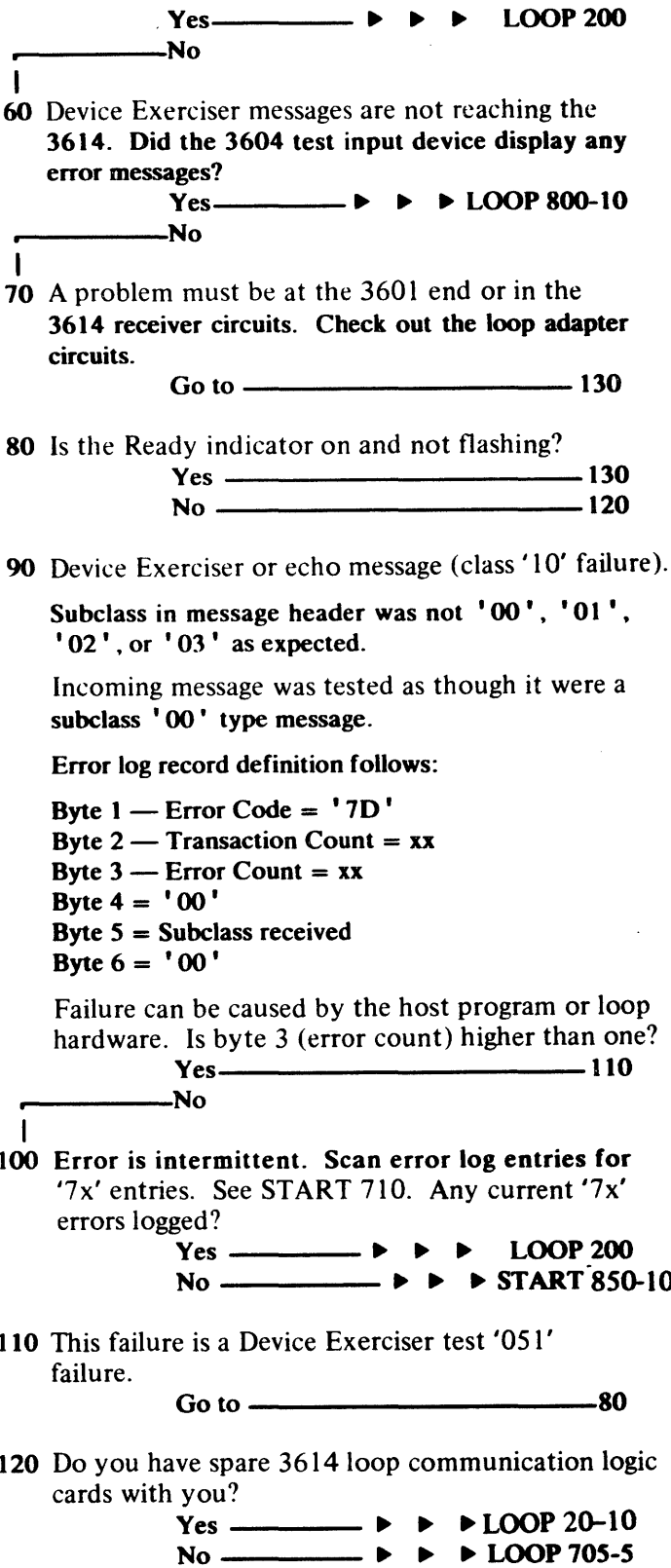
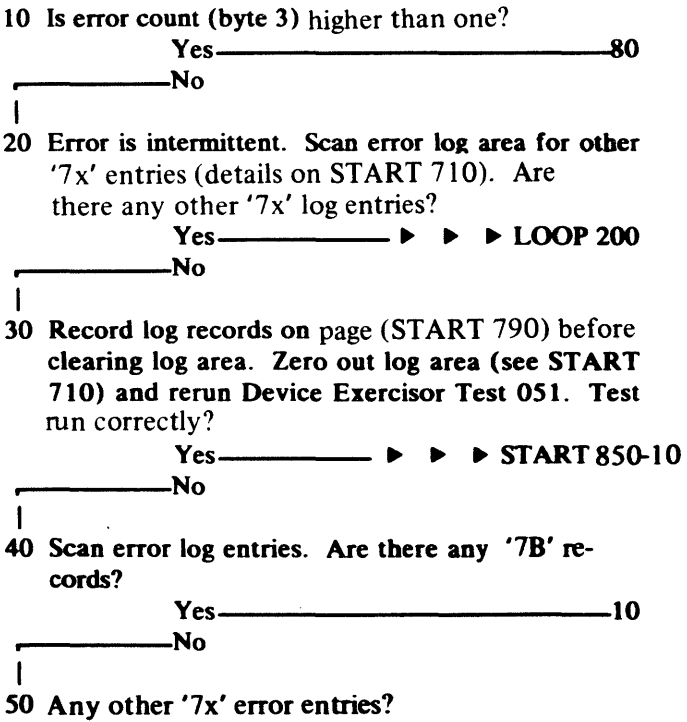
From		To Step (this page)
Page	Step	
LOOP 200		10
LOOP 200		90
START 107		10
START 107		90

ENTRY CONDITIONS

- Device Exerciser Test 051 failed.
- Error log record definition follows (not all errors cause a log):
 - Byte 1 — Error Code = '7B'
 - Byte 2 — Transaction Count = 'xx'
 - Byte 3 — Error Count = 'xx'
 - Byte 4 = '00'
 - Byte 5 = Expected Data
 - Byte 6 = Received Data

Test details are on DIAG 415 and DIAG 420.

MAP STEPS



From		To Step (this page)
Page	Step	
LOOP 30	230, 240, 260	10
LOOP 100	200	10
LOOP 110	150	10
LOOP 150	100, 210	10
LOOP 210	100	10
LOOP 220	40	10
LOOP 235	120	10
LOOP 250	130	10
LOOP 276	140, 220, 240, 270	10
LOOP 500	60	10
LOOP 705	66	10
LOOP 800	200	10

ENTRY CONDITIONS

- A communication failure between the 3614 and the 3601 loop controller.
- A failure of program ID '0449' logs an error record ('79' error code).
- Program ID '0449' runs automatically during the 3614 Test procedure or from the Op/CE Panel (see DIAG 405).
- Test failures may be caused by:
 - a. Line problems on this loop
 - b. A failing TA logic card (S2)
 - c. A failing loop adapter logic card (Q2)
 - d. Failing modems (U2 or U4)
 - e. Loose communications cables
 - f. Wrong speed or base slot wiring
 - g. A 3601 failure
 - h. Another device failing on this loop
 - i. 3601 IPL'd using a starter diskette

MAP STEPS

- 10 Ensure that the DSBL Unit/Normal switch is on Normal. Is the ready indicator off or flashing?

Yes	_____	20
No	_____	40

- ```

20 Is the ready light off?
 Yes -----> > > LOOP 705-5
 No -----> 30
30 The ready light is flashing.
 Go to -----> > > LOOP 705-5

```

- ```

40 Enter Loop Adapter program:
    Program ID = '0449'
    Parameters = '04 00 00 00 00'

```

CAUTION

Do not try to loop this program ID. It may cause the communications loop to be stopped by the 3601.

Note: A good run will cause the ready and Logic Run indicators to go off, then display = 'A800'. Entire test may take up to 15 seconds to complete if error conditions are sensed.

Turn the Function Select switch to Start/Stop.
Operate Execute.

Does display = 'A800'?

CAUTION

Loop Adapter program ID '0449' will not run normally unless the 3601 has been brought up (IPL'd) using the customer's application diskette and is up and running. If a starter diskette was used to IPL the 3601, have the 3601 brought back up using the customer's application diskette than continue this step. If you are on an installation or if a customer application diskette is not available, verify that the 3614 Device Exerciser test 051 runs correctly (procedure and error data are on DIAG 415 and 420), instead of trying to run test '0449'. If Device Exerciser Test 051 fails, follow the MAP on LOOP 280. If test 051 runs, go to START 850.

- ```

50 Repeat test by pressing Execute. Does
 Display = 'A800'?
 Yes -----> LOOP 280-10
 No -----> 60
60 Does display = 'AC01'?
 Yes -----> 120
 No -----> 70

```

- ```

70 Does display = 'AC02' through 'AC08'?
    Yes _____ 130
    No  _____
    |
80 Does display = '0449', '04AA', or '04FF' for
    more than 20 seconds?
    Yes _____ 110
    No  _____
    |
90 A display occurred which was not expected.
    Go to step 40, enter program ID and parameters
    again and run test again. If you return to this
    step, see START 100-110 pages and try to
    locate a display that matches the one you are
    getting. Did you find one?
    Yes _____
    No  _____ ► ► ► START 20
    |
100 Follow the reference MAP on the START 100-
    110 page.

110 The 3614 seems to be busy. Go to step 40.
    Enter the entire program ID and parameters
    once more, and run test again. If you return
    to this step, go to START 20 and do a basic
    checkout of the 3614.

```

- 120 Is the ready indicator off or flashing? 20
- Yes _____
- No _____
- 130 Power-off the 3614. Do the following procedure:
- a. Exchange the TA logic card (S2) if you have one on site, or remove, inspect card and logic board for dirty or bent pins, and return S2 logic card to logic board.
 - b. Remove loop adapter logic card (Q2). Verify that the proper base slot is wired on the module side of the logic card (see SPEC 15). Inspect card and logic board for dirty or bent pins, and return the Q2 card to the logic board.
 - c. *Remove modem logic cards (U2 and U4) if installed. Inspect card and board for dirty or bent pins and return cards (U2 and U4) to the logic board.
 - d. **Remove wrap logic card (R5) if installed. Inspect card and board for dirty or bent pins. Ensure that the relay is properly attached to the logic card.

Note: Ensure that the Wrap logic card has a jumper installed on it across the two pins between the relay and the plug socket.

Return R5 card to logic board.

- c. Verify that the proper bps speed-selection jumper wire is installed on the logic board. See LOOP 880 for pin assignments.

* Remote 3614s only.

**** 1200 bps remote 3614 only.**

Power-on the 3614.

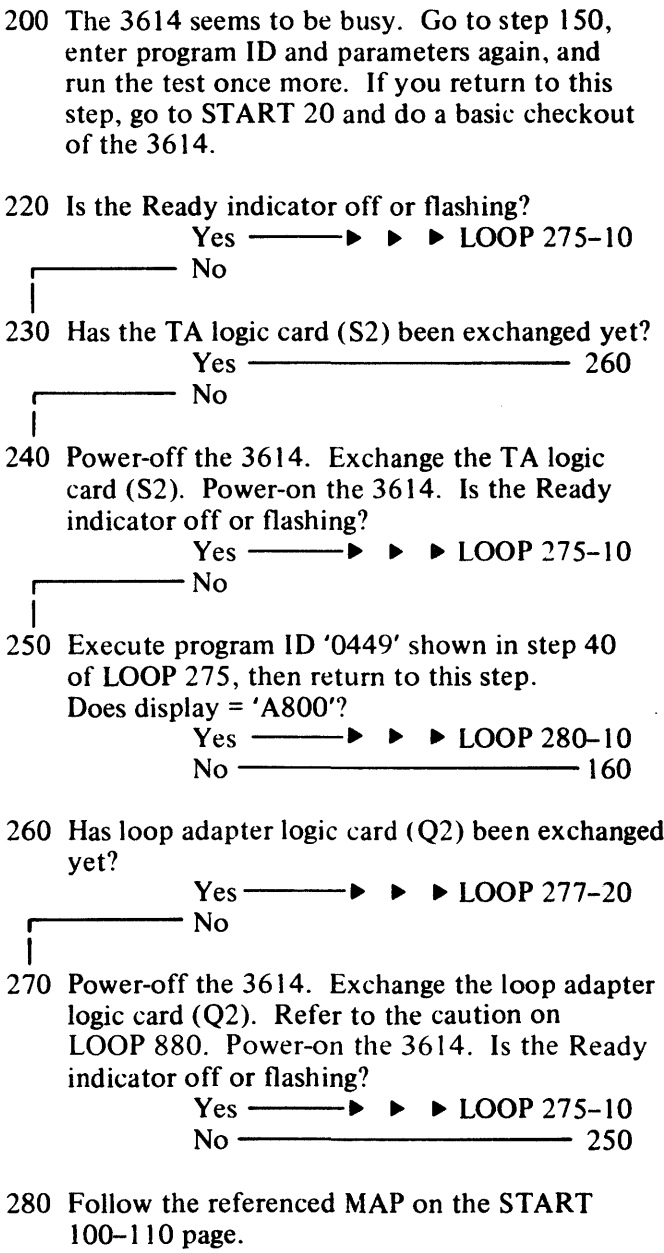
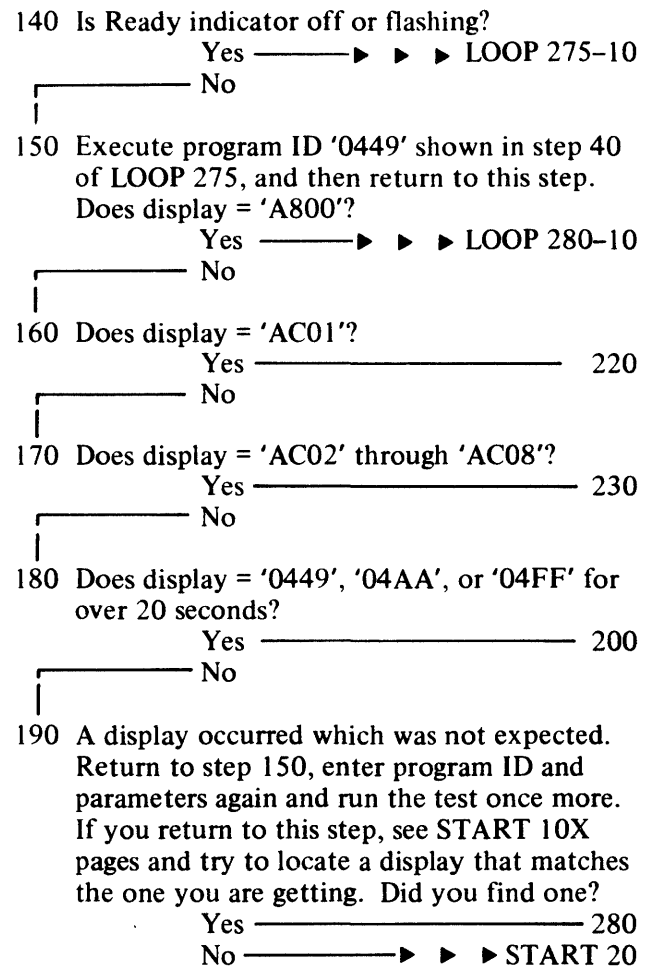
Go to —▶ ▶ ▶ LOOP 276-140

From		To Step (this page)
Page	Step	
LOOP 275	130	140

ENTRY CONDITIONS

- This MAP is continued from LOOP 275.

MAP STEPS

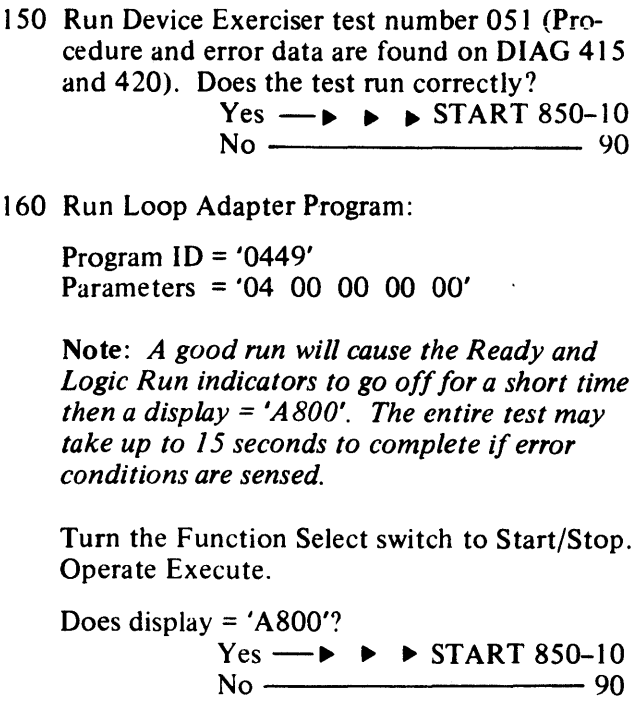
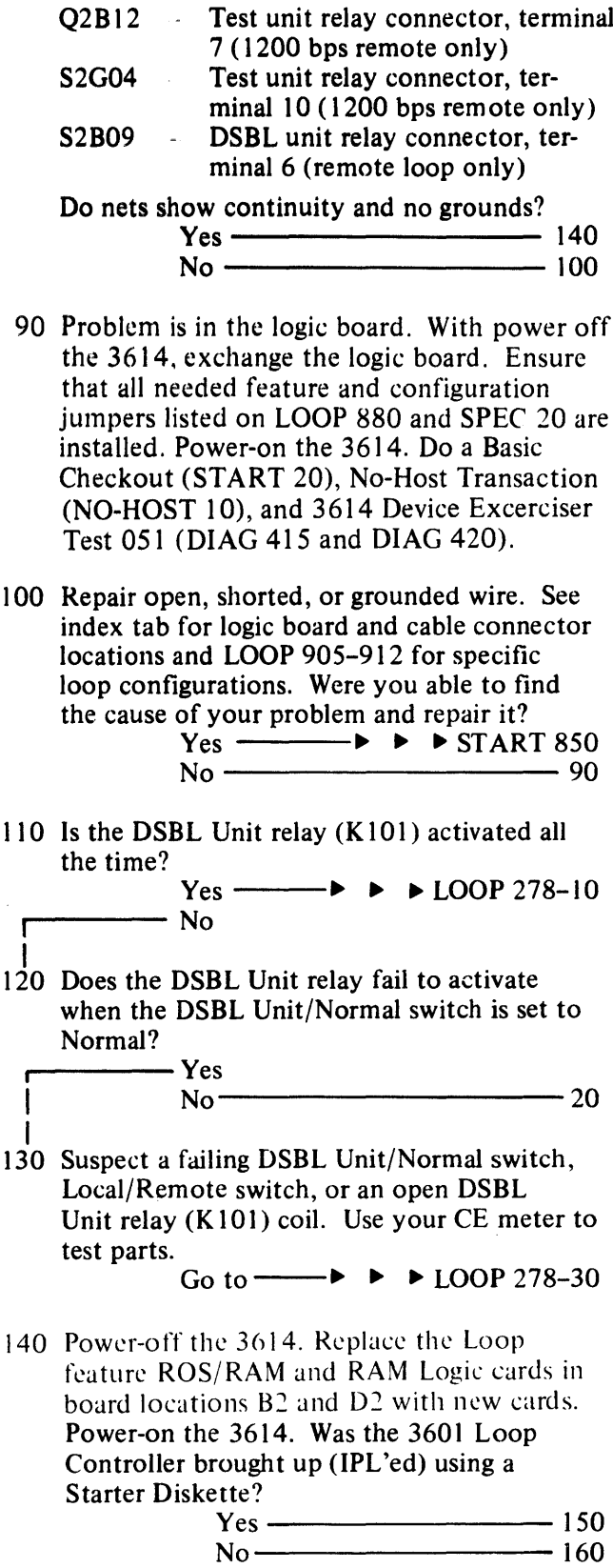
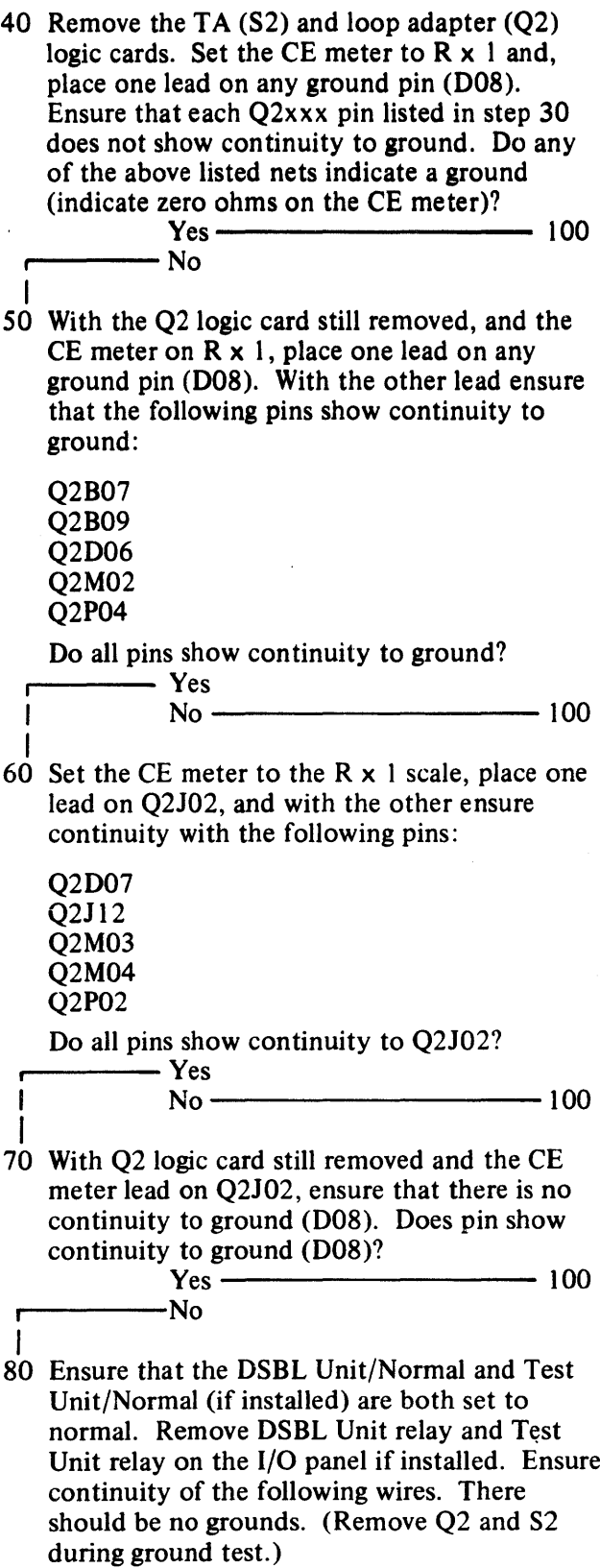
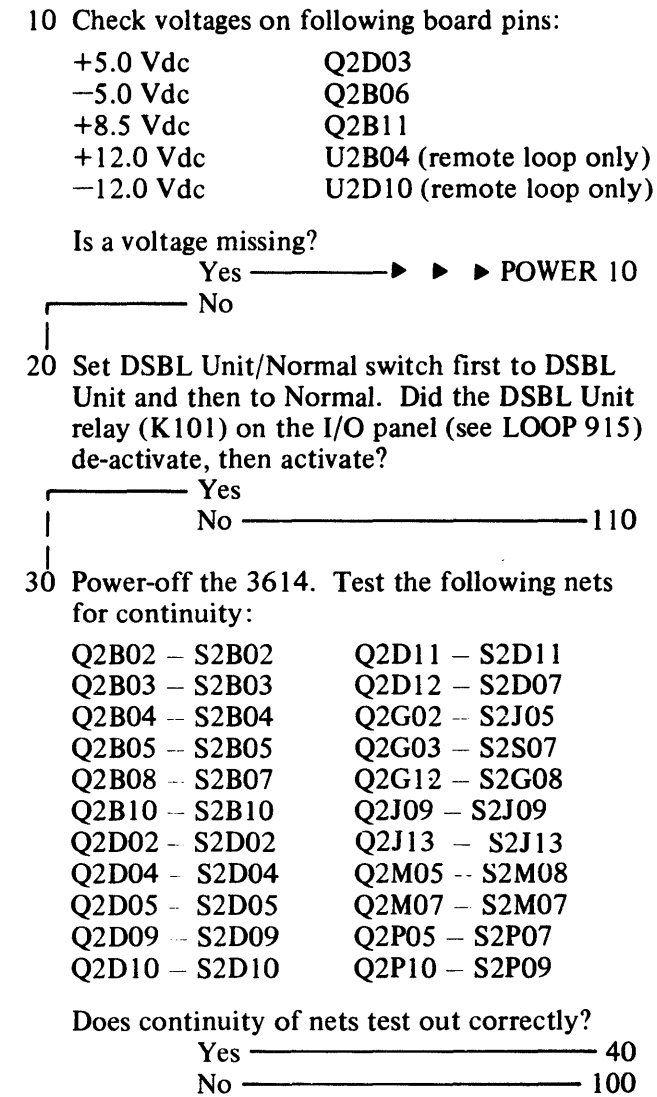


From		To Step (this page)
Page	Step	
LOOP 276	260	20
LOOP 280	120	20

ENTRY CONDITIONS

- The Ready indicator is on and not flashing.
- The TA logic card (S2) and loop adapter logic card (Q2) have been exchanged.
- The 3614 is failing.

MAP STEPS



From		To Step (this page)
Page	Step	
LOOP 277	110	10
LOOP 277	130	30

ENTRY CONDITIONS

- Problem in DSBL unit relay (K101) area.

MAP STEPS

- 10 The DSBL unit relay (K101) is activated all the time. Power-off the 3614 and test for a shorted DSBL Unit/Normal switch or a ground between the switch and the relay. See one of the following pages for relay or switch wiring:

Local Loop Configuration ——— LOOP 905
1200 bps remote Loop ——— LOOP 910
600 bps remote Loop ——— LOOP 912

Did you find a problem?
Yes —————
No ————— 50
- 20 Repair or exchange the failing wire or part. Verify that the DSBL Unit/Normal switch can de-activate the DSBL unit relay (K101) when set to the DSBL unit position, then activate the DSBL unit relay when it is set to the Normal position.
Go to —————▶▶▶ START 850
- 30 The DSBL Unit relay (K101) fails to activate. Set the DSBL Unit/Normal switch to the DSBL unit position. Does the DSBL unit light come on?
Yes ————— 70
No —————
- 40 Suspect an open DSBL Unit/Normal switch, open Control Local/Remote switch, failing LED, or open wire from:

K101-1 to DSBL Unit/Normal switch.
K101-4 to TB2-2 (See PWR 905).
DSBL Unit/Normal switch to Control Local/Remote switch.

- Power-off the 3614. See one of the following pages and look for the problem:
Local Loop configuration ——— LOOP 905
1200 bps remote loop ——— LOOP 910
600 bps remote loop ——— LOOP 912

Did you find a problem?
Yes ————— 20
No —————
- 50 Exchange the DSBL unit relay (K101). Power-on the 3614 and set the DSBL Unit/Normal switch first to the DSBL Unit position, then to the Normal position. Did the DSBL unit relay (K101) de-activate, then activate.
Yes —————▶▶▶ START 850
No —————
- 60 Request technical aid.
- 70 Power-off the 3614. Set the CE meter to the R x 1 scale. Test the continuity of the circuit as follows:

K101-1 to DSBL Unit/Normal switch Normal Position.
K101-4 to TB2-2 (See POWER 905)

See one of the following pages for relay or switch reference:

Local Loop configuration ——— LOOP 905
1200 bps remote loop ——— LOOP 910
600 bps remote loop ——— LOOP 912

Did you find a problem?
Yes ————— 20
No —————
- 80 Ensure that the DSBL Unit/Normal switch is not open on the Normal side. Does the switch test properly?
Yes ————— 50
No ————— 20

From		To Step (this page)
Page	Step	
LOOP 275	40, 50	10
LOOP 276	150, 250	10
LOOP 150	130	10

ENTRY CONDITIONS

- This MAP is referenced as the 3614 communication verification procedure.
- Program ID '0449' ran correctly, or you are on an installation and have not run '0449' yet.

MAP STEPS

10 If the 3614 senses a failure, a '7B' or '7D' error log entry is made in NVM. If the 3601 loop controller senses an error, a message is displayed on the 3604 being used as test input device.

Execute the 3614 Loop Device Exerciser Test 051 at least 10 times. The device exerciser run procedure, input messages, and error messages are located on DIAG 415 and DIAG 420. Did the exerciser run correctly?

Yes ————— 130

No —————

20 Is the Ready indicator off or flashing?

Yes —————>>> LOOP 705-5

No —————

30 Power-off the 3614. Do the following procedure:

a. Exchange the TA logic card (S2) if you have one on site. If not, remove, inspect card and board for dirty or bent pins, and return the S2 card to the logic board.

b. Remove loop adapter logic card (Q2). Verify that the proper base slot is wired on the module side of the card (see SPEC 15). Inspect card and board for dirty or bent pins, and return the Q2 card to the logic board.

- c. Remove modem logic cards (U2 and U4) if this is a remote 3614. Inspect card and board for dirty or bent pins and return the U2 and U4 cards to the logic board.
- d. Remove the wrap logic card (R5) if this is a 1200 bps remote 3614. Inspect card and board for dirty or bent pins.

Note: Ensure that the Wrap card has a jumper installed on it across the two pins between the relay and the plug socket.

Ensure that the relay is properly attached to the logic card, then return the R5 card to the logic board.

- e. Verify that the proper bps speed selection jumper wire is installed on the logic board. See SPEC 15 for pin assignments.

Power-on the 3614.
Go to ————— 40

40 Is the Ready indicator off or flashing?

Yes —————>>> LOOP 705-5

No —————

50 Run 3614 Loop Device Exerciser Test 051 (DIAG 415-420). Did the test run OK?

Yes —————>>> START 850

No —————

60 Has the TA logic card (S2) been exchanged?

Yes ————— 90

No —————

70 Power-off the 3614. Exchange the TA logic card (S2). Power-on the 3614. Is the ready indicator off or flashing?

Yes —————>>> LOOP 705-5

No —————

80 Run 3614 Loop Device Exerciser Test 051 (DIAG 415-420). Did the test run OK?

Yes —————>>> START 850

No —————

90 Has the loop adapter logic card (Q2) been exchanged?

Yes ————— 120

No ————— 100

100 Power-off the 3614. Exchange the loop adapter logic card (Q2). See caution on LOOP 880. Power-on the 3614. Is the Ready indicator off or flashing?

Yes —————>>> LOOP 705-5

No —————

110 Run 3614 Loop Device Exerciser Test 051 (DIAG 415-420). Did the test run OK?

Yes —————>>> START 850

No —————

120 Verify that your test entries are correct and again run 3614 Loop Device Exerciser Test 051 (DIAG 415-420). Did the test run OK?

Yes —————>>> START 850

No —————>>> LOOP 277-20

130 The 3614 to the 3601 loop communication circuits have been verified. Was the first symptom an IPL problem (loops with display = '12bb' etc)?

Yes ————— 150

No —————

140 Was the first problem an online transaction failure (front display panel flashed a Transaction In Progress message then flashed a Transaction Canceled - Out of Service message and the 3614 Closed)?

Yes ————— 160

No ————— 230

150 Ask the bank operator to enter a valid key B and try an IPL from the host. Did the 3614 complete an IPL correctly?

Yes ————— 230

No ————— 180

160 Ask the bank operator to enter a valid key B and try an IPL. After the IPL, have the operator try a Dummy transaction. Did the IPL work correctly?

Yes —————

No ————— 180

170 Did the dummy transaction work correctly?

Yes ————— 230

No ————— 180

180 The 3614 diagnostics run with the 3601 loop controller, but customer activities do not. Ask the bank supervisor at the host CPU to verify the operation of the customer's host application program. One symptom of a host program problem is all terminals fail. Is the host program up and running?

Yes ————— 210

No —————

190 Ask the bank supervisor at 3601 loop controller to see if the 3601 is trying limited customer applications while running in a stand-alone mode (while the host program is not operating). Is the 3601 trying stand-alone operation?

Yes —————

No ————— 220

200 Probable failure with the customer APB program in the 3601 loop controller. Inform your customer of what you found.

Go to —————>>> START 850

210 Probable failure with the customer APB program in the 3601 loop controller or a problem in the CPU host program. Inform the customer of what you found.

Go to —————>>> START 850

220 No more action is needed at this time.

Go to —————>>> START 850

230 Communication circuits seem to be working correctly.

Go to —————>>> START 850

JR1100	4791447	491723						
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From		To Step (this page)
Page	Step	
LOOP 10	10h	10

ENTRY CONDITIONS

- Statistical counters log loop failures as follows:
 - Loss of Ready occurrences.
 - Number of TA Resets received.Neither condition is recognized unless the 3614 and 3601 are trying to communicate.
- The statistical Log Record C description follows:
 - Byte 1 – Trials Counter
 - Byte 3 – Errors Counter
 - Byte 4 – Errors per 255 TrialsTrials = Transactions tried as indicated by correct card reads.
- NVM addresses of loop statistical counter bytes are:
 - Ready Losses –
 - Byte 1 – '4B'
 - Byte 3 – '4D'
 - Byte 4 – '4E'
 - TA Resets –
 - Byte 5 – '4F'
 - Byte 6 – '50'
- See START 730 and 750 for more information.

MAP STEPS

- 10 Is the statistical counter counting the numbers of Ready occurrences lost?
- Yes _____ 50
- No _____ 20

- 20 It is counting TA Resets.
- Note: A reset condition can occur two ways:*
- a. Power on Reset from 3614 hardware brings up a TA Reset line.*
 - b. If there is a TA Reset from the 3601 loop controller. In this case the 3614 takes the following action:*
 - If writing, sends entire message again.*
 - If reading, ignores entire message.*
 - If idle, ignores the Reset.*

- Is the error count higher than 5% of the trials count?
- Yes _____ 60
- No _____
- 30 Error counts are small enough to ignore at this time. Scan the error log. Are there any '7x' error codes? (See START 710.) Any current '7x' error entries?
- Yes _____ ► ► ► LOOP 200
- No _____ ► ► ► START 850
- 50 Is the error count higher than 5% of the trials count?
- Yes _____
- No _____ 30
- 60 Run diagnostics to verify that the 3614 is not causing many of these loop failures.
- Go to _____ ► ► ► LOOP 275-10

From		To Step (this page)
Page	Step	
START 30		2
LOOP 20	100,130,170,200	8
LOOP 50	110,150	8
LOOP 100	190	5
LOOP 110	140	5
LOOP 150	200	5
LOOP 210	90	5
LOOP 235	110	5
LOOP 250	120	5
LOOP 275	20,30	5
LOOP 280	20,40,70,100	5
LOOP 706	160	5
LOOP 708	360	5
LOOP 800	190	5
CTLR 570	130	5

ENTRY CONDITIONS

- One of two conditions has occurred:
 - The Ready indicator is off or flashing.
 - Loop adapter basic status byte, bit 4 (ready) was off when sensed by program ID '0449'.

MAP STEPS

- 2 Do you have spare 3614 loop communication logic cards with you?
Yes → LOOP 20-10
No →
- 5 Is the 3614 Ready indicator off or flashing?
Yes →
No → LOOP 710-690
- 7 Are there logic cards in logic board location U2 and U4 (remote loop)?
Yes →
No → LOOP 720-5
- 8 Is the Ready indicator off?
Yes → 9
No → 40

- 9 Place about 3 inches (7,6 cm) of IBM test documents in the bill feed hopper(s) (see DFM 901 for loading procedure). Set the Function Select switch to 3614 Test and operate Execute.

Note: You may need to run the 3614 Test several times before the bills line up and feed properly.

Does the 3614 feed ten documents (20 if dual DFM) without error displays of 'EE56' or 'EE57'?

Yes →
No → 69

- 10 Does display = 'EE72' ?
Yes → 14
No →

- 12 Does display = 'EE71' ?
Yes → 15
No → 62

- 13 Error is not a loop communication error. Return to basic checkout procedure.
Go to → START 20

- 14 A Ready signal is sensed by the program, but the Ready light does not come on. The Ready indicator may be faulty or there may be a loose or broken wire to the LED (behind Op/CE panel).
Go to → 50

- 15 Does this 3614 have a Test Unit/Normal switch on the Op/CE panel?

Yes →
No → 17

- 16 *Note: When holding the Test Unit/Normal switch in the Test Unit position for several seconds, the Ready and Carrier Detect indicators should come on and stay on.*

Hold the Test Unit/Normal switch in the Test Unit position. Are the 3614 Ready indicator or the Carrier Detect indicators off or flashing?
Yes → LOOP 706-105
No → 17

- 17 Start the failing loop (details on LOOP 6) or, request the bank supervisor at the 3601 to start loop recovery. Loop recovery sends alternate valid and not valid frame characters on the loop to isolate the failing machine. The Ready indicator on each attached terminal flash on and off, allowing visual location of this loop failure.
NOTE: When the question is asked in the MAPs, "Is the Ready indicator off or flashing?", ensure that the 3601 loop controller is trying loop recovery.

Is the 3601 trying loop recovery?
Yes → 40
No →

- 20 No more action is required on your part until loop recovery is started.
Go to → START 850

- 30 *Note: When holding the Test Unit/Normal switch in the Test Unit position for several seconds, the Ready and Carrier Detect indicators should come on and stay on.*

Hold the Test Unit/Normal switch in the Test Unit position. Are the 3614 Ready indicator or the Carrier Detect indicators off or flashing?
Yes → LOOP 706-105
No → LOOP 709-620

- 40 Before continuing, power-off the 3614 and do the following procedure:
- Remove the TA logic card (S2) and exchange it if you have a card on site. If not, inspect the card and board for dirty or bent pins and return the S2 card to the logic board.
 - Remove loop adapter logic card (Q2). Verify that the proper base slot is wired on the card (see INSTALL 4 and LOOP 880), inspect the card and the board for dirty and bent pins, and return the Q2 card to the logic board.
 - Remove modem logic cards (U2 and U4), inspect cards and board for dirty and bent pins, and return the U2 and U4 cards to the logic board.
 - Remove wrap logic card R5 (1200 bps only). Inspect the card and board for dirty or bent pins and ensure that the relay on the card is properly attached.

Note: Ensure that the Wrap logic card has a jumper installed on it across the two pins between the relay and the plug socket.

Return the R5 card to the logic board.

- Ensure that one of the proper bps speed selection jumper is installed on the logic board as follows:

S2J11 – S2G09 (1200 bps)
S2J10 – S2G09 (600 bps)- World Trade Corporation (WTC)

Power-on the 3614. Ensure that the 3601 loop controller is still flashing. Is the Ready indicator off or flashing?

Yes →
No → LOOP 710-690

- 50 Does this 3614 have a Test Unit/Normal switch on the Op/CE panel?

Yes →
No → LOOP 730-10

- 60 Is a jumper cable (P/N 2750769) installed in the local loop jacks on the I/O panel (see LOOP 915)?
Yes → 68
No → LOOP 706-70

- 62 Did display = 'EE11', 'EE12', or 'C0C0' ?
Yes →
No → 13

- 64 Is the Ready indicator still off?
Yes → 14
No →

- 66 The loop problem may be intermittent. Is the Ready indicator flashing?
Yes → 5
No → LOOP 275-10

- 68 This is a 1200 bps loop with no local loop terminals attached. Verify that the jumper cable (P/N 2750769) plugged into the local loop jacks on the I/O panel is tight. Is the ready indicator off?
Yes → 30
No → LOOP 707-235

- 69 Find the error code and follow referenced MAP.
Go to → START 100

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LOOP 705	60	70
LOOP 705	30	105
LOOP 707	195, 220, 300	160
LOOP 707	237, 240	105
LOOP 707	197	84
LOOP 709	610	105
LOOP 708	530	105
CTLR 570	160	105

ENTRY CONDITIONS

- This MAP is continued from LOOP 705.

MAP STEPS

- 70 Ensure that the local loop cables are plugged in tightly. Is the Ready indicator off;
- Yes _____
No _____ 178
- 80 Hold the Test Unit/Normal switch in the Test Unit position for several seconds (the Ready and Carrier Detect indicators should both come on and stay on). Is the 3614 Ready indicator or the Carrier Detect indicator off or flashing?
- Yes _____
No _____>>> LOOP 709-620
- 83 Exchange the failing relay just installed on the I/O panel (see LOOP 915). Hold Test Unit/Normal switch in the Test Unit position for several seconds. Is the 3614 Ready indicator or the Carrier Detect indicator off or flashing?
- Yes _____ 85
No _____
- 84 Exchange the failing relay just installed into the DSBL relay socket with a new one. Ensure that the loop can recover (Ready indicator is on and not flashing) and then;
Go to _____>>> START 850
- 85 Remove the local loop cables at the I/O panel and install the local loop jumper cable (P/N 2750769) into the I/O panel jacks. Hold the Test Unit/Normal switch in the Test

- Unit position. Is the 3614 Ready indicator or the Carrier Detect indicator off or flashing?
- Yes _____ 105
No _____
- 90 The problem is in one of the locally attached devices or one of the cables. Do you want to continue to isolate the problem?
- Yes _____
No _____>>> START 850
- 100 Remove the local loop jumper (P/N 2750769) and install the local loop cables in the I/O panel local loop jacks. With Test Unit/Normal switch in the Test Unit position, does one of the locally attached terminal Ready indicators on this sub loop come on and not flash?
- Yes _____>>> LOOP 708-485
No _____ 110
- 105 *When holding the Test Unit/Normal switch in the Test Unit position for several seconds, the Ready and Carrier Detect indicators should come on and stay on. Hold the Test Unit/Normal switch in the Test Unit position. Is the Ready indicator on?*
- Yes _____>>> LOOP 711-850
No _____
- 106 Exchange the test unit and DSBL unit relays on the I/O panel (LOOP 915). Hold the Test Unit/Normal switch in the Test Unit position for several seconds. Is the 3614 Ready indicator or the Carrier Detect indicator off or flashing?
- Yes _____ 140
No _____ 84
- 110 See LOOP 950 and the customer's loop description sheet; determine the first device on this subloop. Pull out the local loop cables in that device and connect them together. Hold the Test Unit/Normal switch in the Test Unit position. Is the 3614 Ready indicator off or flashing?
- Yes _____
No _____>>> LOOP 707-255
- 120 Return the local loop cables that were just removed. Disconnect the local loop cables in the 3614 and plug in jumper cable (P/N 2750769) into the I/O panel jacks. Hold the Test Unit/Normal switch in the Test Unit position. Is the

- 3614 Ready indicator or the Carrier Detect indicator off or flashing?
- Yes _____ 140
No _____
- 130 The local loop cable between the 3614 and the first terminal on the local loop is failing. Inform your customer that this cable is his responsibility.
Go to _____>>> START 850
- 140 Prepare the general logic probe for signal probing (see section tab for procedure). Remove the communication cable from the COMM connector on the I/O panel. Hold the Test Unit/Normal switch in the Test Unit position. Probe +Local Loop RCVR Output at S2P04. Are the Up and Down lights both on?
- Yes _____>>> LOOP 709-670
No _____
- 143 Probe S2M03 while holding the Test Unit/Normal switch in the Test Unit position. Are the Up and Down lights both on?
- Yes _____ 150
No _____
- 145 Probe S2P02 while holding the Test Unit/Normal switch in the Test Unit position. Are the Up and Down lights both on?
- Yes _____ 170
No _____
- 147 Install the COMM connector cable removed earlier. Power-off the 3614. Repair the connection between S2P02 and S2M03. Does this fix the problem?
- Yes _____>>> START 850
No _____
- 150 With the power off the 3614, continuity test the following nets (see LOOP 910 for wiring diagram). Also ensure that there are no grounds on these connections with the TA logic card (S2) removed.
- Note: You will be measuring through the local loop jumper cable P/N 2750769.
- S2M05 - S2P06
S2M04 - S2P05
Do the nets test out properly?
- Yes _____ 162
No _____>>> LOOP 708-370

- 160 Repair or exchange the failing part or wire, re-install the communication cable into the COMM connector removed earlier, verify your fix by ensuring that the loop can recover (Ready indicator is On and not flashing) and that the test unit function works properly.
Go to _____>>> LOOP 705-5
- 162 With the S2 logic card removed, determine that the following pins are not shorted together (not indicating continuity, zero ohms):
S2M04 to S2M05
S2P05 to S2P06
Replug S2 after test. Are either two of the pins shorted together?
- Yes _____
No _____ 170
- 164 Find the cause for the short (see LOOP 910 for wiring diagram). Suspect a shorted local loop cable, local loop jumper cable (P/N 2750769), a failing device on the sub-loop, or a short on the logic board. Did you find the problem?
- Yes _____>>> LOOP 708-370
No _____ 170
- 170 Install the communication cable removed earlier into the COMM connector. Power-on the 3614. Observe the test unit relay on the I/O panel (see LOOP 915 for panel drawing). Does the test unit relay activate when the Test Unit/Normal switch is set in the Test Unit position?
- Yes _____>>> LOOP 707-197
No _____ 175
- 175 Exchange the test unit relay (if you don't have one, exchange the test unit and DSBL unit relays). Set the Test Unit/Normal switch in the Test Unit position. Does the new test unit relay activate properly?
- Yes _____
No _____>>> LOOP 707-180
- 177 Exchange the failing relay if installed in another position in the machine, then;
Go to _____>>> START 850
- 178 The Ready indicator is flashing. Hold the Test Unit/Normal switch in the Test Unit position. Is the 3614 Ready indicator or the Carrier Detect indicator off or flashing?
- Yes _____ 85
No _____>>> LOOP 709-620

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LOOP 705	68	235
LOOP 706	110	255
LOOP 706	170	197
LOOP 706	175	180
LOOP 708	550	260

Note: Ensure that the Wrap logic card has a jumper installed on it across the two pins between the relay and the plug socket.

Power-on the 3614. Hold the Test Unit/Normal switch in the Test Unit position for several seconds. Do the Ready and Carrier Detect indicators come on and stay on?

Yes
No ————— 205

202 The problem has been fixed. Ensure that the loop can recover (the Ready indicator is on and not flashing), then end the call.
Go to ————— ▶ ▶ ▶ START 850

205 Prepare the general logic probe for signal probing (see section tab for procedure). Hold the Test Unit/Normal switch in the Test Unit position and probe S2G04. Is the line active (Down light on)?

Yes
No ————— 220

210 Power-off the 3614 and exchange the TA logic card (S2). Power-on the 3614 and verify that the loop can recover (Ready indicator is on and not flashing) and that the test unit function works properly. Did you fix the problem?

Yes ————— ▶ ▶ ▶ START 850
No ————— ▶ ▶ ▶ LOOP 709-620

220 Continue holding the Test Unit/Normal switch in the Test Unit position and probe the failing line through the board connector, cables, and test unit relay (K102) to dc common. Did you find the problem?

Yes ————— ▶ ▶ ▶ LOOP 706-160
No ————— ▶ ▶ ▶ LOOP 708-460

235 Is the Ready light on and not flashing (loop recovered)?

Yes
No ————— 240

237 Hold the Test Unit/Normal switch in the Test Unit position. Is the Ready indicator or the Carrier Detect indicator off or flashing?

Yes ————— ▶ ▶ ▶ LOOP 706-105
No ————— ▶ ▶ ▶ START 850

240 The Ready indicator is flashing. Hold the Test Unit/Normal switch in the Test Unit position for several seconds (the Ready and Carrier Detect indicators should both come on and stay on). Is the Ready indicator or the Carrier Detect indicator off or flashing?

Yes ————— ▶ ▶ ▶ LOOP 706-105
No ————— ▶ ▶ ▶ LOOP 709-620

255 The disconnected terminal is causing the loop failure. Leave the terminal offline until it can be fixed. Verify that the loop has recovered.
Go to ————— ▶ ▶ ▶ START 850

260 Hold the Test Unit/Normal switch in the Test Unit position and probe —Ready at Q2G03. Is the line active (Down light on)?

Yes ————— 280
No

270 Repair the open circuit between S2S07 and Q2G03. Verify the fix by ensuring that the loop can recover and that the test unit function works properly. Does the loop recover and the test unit function work OK?

Yes ————— ▶ ▶ ▶ START 850
No ————— ▶ ▶ ▶ LOOP 708-560

280 The Ready line is active but the Ready light does not come on. Power-off the 3614. Test for continuity (see LOOP 910 for wiring diagram) of the following nets. Ensure that there are no grounds (remove Q2 card and Ready LED before testing for grounds).

H1D11 - Q2J06
H1D11 - ready LED (on Op/CE panel)

Is the test correct (no open, grounds, or shorts)?

Yes ————— 320
No ————— 330

290 See caution below before starting this step. Power-off the 3614 and exchange the loop adapter logic card (Q2).

CAUTION
No base slot should be assigned to more than one terminal on the same loop. Also, if the loop adapter card (Q2) is exchanged, the new card must be wired to the proper base slot.

Power-on the 3614 and ensure that the loop can recover (the Ready indicator is on and not

flashing) and the test unit works correctly. Does the loop recover and does test unit work correctly?

Yes ————— ▶ ▶ ▶ START 850
No ————— ▶ ▶ ▶ LOOP 711-900

300 Power-off the 3614. Set the CE meter to R x 1. Remove the test unit relay on the I/O panel (LOOP 915 for drawing). Continuity test and ensure that no grounds or shorts are on the following nets (see LOOP 910 for wiring figure):

a. Test unit relay terminal Number 1 —Test Unit/Normal switch. Test unit position.
b. Test Unit/Normal switch operating point TB2-11 (dc Common). Re-install the test unit relay. Set Test Unit/Normal switch to Test Unit position and test between the test unit and operating points of the switch.

Re-install the test unit relay. Did you find the problem?

Yes ————— ▶ ▶ ▶ LOOP 706-160
No

310 Exchange the test unit relay (K102). Power-on the 3614 and verify the repair by ensuring that the loop can recover and that the test unit function works. Does the loop recover and the test unit work properly?

Yes ————— ▶ ▶ ▶ START 850
No ————— ▶ ▶ ▶ LOOP 711-900

320 Check the voltage side of the ready LED (see LOOP 910 for wiring diagram). Does the continuity test correctly?

Yes ————— 350
No

330 Repair or exchange the open wire. Verify the repair by ensuring that the loop can recover and that the test unit function works properly. Can the loop recover (the Ready indicator is on and not flashing) and does the test unit function work correctly?

Yes ————— ▶ ▶ ▶ LOOP 708-360
No

350 Power-off the 3614 and exchange the Ready LED. Hold the Test Unit/Normal switch in the Test Unit position. Is the Ready indicator or the Carrier Detect indicator off or flashing?

Yes ————— 290
No ————— ▶ ▶ ▶ START 850

ENTRY CONDITIONS

- The MAP is continued from LOOP 706.

MAP STEPS

180 See LOOP 910 for wiring diagram. Test for +5.0 Vdc at terminal 4 of the test unit relay on the I/O panel. Does the voltage test OK?

Yes ————— 300
No

185 Test for +5.0 Vdc on S2J03 on the logic board. Is there +5.0 Vdc on S2J03?

Yes
No ————— ▶ ▶ ▶ PWR 10

190 See PWR 905 for the TB2 location. Is +5.0 Vdc present on TB2-2?

Yes
No ————— ▶ ▶ ▶ PWR 10

195 See LOOP 910 and find the cause of the open wire between K102-4 and TB2-2. Did you find the problem?

Yes ————— ▶ ▶ ▶ LOOP 706-160
No ————— 300

197 Exchange the test unit and DSBL unit relays on the I/O panel. Hold the Test Unit/Normal switch in the Test Unit position for several seconds. Is the 3614 Ready indicator or Carrier Detect indicator off or flashing?

Yes
No ————— ▶ ▶ ▶ LOOP 706-84

200 The test unit relay activates properly, but the proper test signal is not wrapped correctly. Power-off the 3614 and exchange the wrap logic card (R5).

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LOOP 706	100	485
LOOP 706	150	370
LOOP 706	164	370
LOOP 707	220	460
LOOP 707	270	560
LOOP 707	330	360
LOOP 709	622	570
LOOP 709	650	560
LOOP 710	750, 760	550

ENTRY CONDITIONS

- This MAP is continued from LOOP 707.

MAP STEPS

360 Wrap circuits (test unit function) are working correctly.
Go to —▶▶▶ LOOP 705-5

370 Install the communication cable removed earlier into the COMM connector. See LOOP 910, and try to find the problem from:
a. The TA logic card (S2) to the logic board connector.
b. The board connector to the local loop jacks.
c. The local loop jacks through the local loop cable jumper (P/N 2750769).

Did you find a problem?
Yes —▶▶▶ START 850
No —▶▶▶ LOOP 711-900

380 Exchange or repair the faulty part or wire (nets are shown on LOOP 910 and 911). Verify that the loop can recover. Can the loop recover?
Yes —▶▶▶ START 850
No —▶▶▶ LOOP 711-900

390 Verify your fix by ensuring that the loop can recover and that the test unit function works properly. Did you fix the problem?
Yes —▶▶▶ START 850
No —▶▶▶ LOOP 711-900

400 Continue holding the Test Unit/Normal switch in the Test Unit position and probe the failing line through the logic board connector, cables,

test unit relay (K102) to dc common (see LOOP 910 for wiring). Did you find a problem?
Yes —▶▶▶ 380
No —▶▶▶ 460

410 Hold the Test Unit/Normal switch in the Test Unit position and probe Test Unit RL at Q2B12. Is the line active (Down light on)?
Yes —▶▶▶ 400
No —▶▶▶ 400

420 Hold the Test Unit/Normal switch in the Test Unit position and probe Wrap No. 3 at R5B13. Is the line active (Down light on)?
Yes —▶▶▶ 400
No —▶▶▶ 400

430 See caution below before starting this step. Power-off the 3614 if not done in an earlier step, and exchange the loop adapter logic card (Q2).

CAUTION
No base slot should be assigned to more than one terminal on the same loop. Also, if the loop adapter logic card (Q2) is exchanged, the new card must be wired to the proper base slot.

Power-on the 3614. Did you fix your problem?
Yes —▶▶▶ 390
No —▶▶▶ 440

440 Power-off the 3614 and exchange the wrap logic card (R5).

Note: Ensure that the Wrap card has a jumper installed on it across the two pins between the relay and the plug socket.

Power-on the 3614. Did you fix your problem?
Yes —▶▶▶ 390
No —▶▶▶ LOOP 711-900

450 These MAPs have failed. Call for technical aid, then:
Go to —▶▶▶ START 800

460 Have you exchanged the TA logic (S2) card?
Yes —▶▶▶ 480
No —▶▶▶ 470

470 Power-off the 3614 and exchange the TA (S2) logic card. Power-on the 3614. Did you fix the problem?
Yes —▶▶▶ 390
No —▶▶▶ 410

480 Have you exchanged the loop adapter logic card (Q2)?
Yes —▶▶▶ 420
No —▶▶▶ 482

482 See caution below before starting this step. Power-off the 3614 and exchange the loop adapter logic card (Q2).

CAUTION
No base slot should be assigned to more than one terminal on the same loop. Also, if the loop adapter card (Q2) is exchanged, the new card must be wired to the proper base slot.
Power-on the 3614. Did you fix your problem?
Yes —▶▶▶ 390
No —▶▶▶ 420

485 See LOOP 950 and the customer's loop. description sheet. Determine which is the last terminal on this subloop. Hold the Test Unit/Normal switch in the Test Unit position in this 3614 and observe the Ready indicator on the last local loop terminal. Does this terminal Ready indicator come on and not flash?
Yes —▶▶▶ 520
No —▶▶▶ 490

490 Determine which is the last terminal on the 3614 local loop with the Ready indicator on and not flashing when the 3614 Test Unit/Normal switch is in the Test Unit position. The Test Unit signal is being lost in or between that device and the next one on the loop. Remove the local loop cables on the last device with the Ready indicator on and not flashing, and connect the local loop cables together. Hold the Test Unit/Normal switch in the Test Unit position. Is the 3614 Ready indicator or the Carrier Detect indicator off or flashing?
Yes —▶▶▶ 545
No —▶▶▶ 500

500 Return the local loop cables just removed to their normal positions. Go to the next device on the loop (Ready indicator should be off when the test unit function is run in the 3614) and remove the local loop cables. Connect them together. Hold the 3614 Test Unit/Normal switch in the Test Unit position. Is the 3614 Ready indicator or the Carrier Detect indicator off or flashing?
Yes —▶▶▶ 510
No —▶▶▶ 545

510 There is a problem with the local loop cable between the two devices just tested. Inform your customer that these cables are his responsibility.
Go to —▶▶▶ START 850

520 The problem is between the last device on the 3614 local loop and the 3614. Remove the local loop cables from this terminal and connect them together. Hold the 3614 Test Unit/Normal switch in the Test Unit position. Is the 3614 Ready indicator or the Carrier Detect indicator off or flashing?
Yes —▶▶▶ 490
No —▶▶▶ 530

530 Return the local loop cables removed earlier into the last device on the 3614 local loop. Remove the local loop cables from the local loop jacks on the I/O panel (see LOOP 915 for drawing) and install local loop cable jumper (P/N 2750769). Hold the Test Unit/Normal switch in the Test Unit position. Is the 3614 Ready indicator or the Carrier Detect indicator off or flashing?
Yes —▶▶▶ LOOP 706-105
No —▶▶▶ 540

540 Probable failing local loop cable between the last device on the 3614 local loop and the 3614. Inform your customer that this cable is his responsibility.

Go to —▶▶▶ START 850

545 The disconnected terminal is causing the loop failure. Leave it off the loop until it can be fixed.
Go to —▶▶▶ START 850

550 Re-install the communication cable into the COMM connector if not done previously. The wrap (test unit) circuits work correctly. While holding the Test Unit/Normal switch in the Test Unit position, probe Ready at S2S07. Is the line active (Down light on)?
Yes —▶▶▶ LOOP 707-260
No —▶▶▶ 560

560 Power-off the 3614 and exchange the TA (S2) logic card. Power-on the 3614. Does the loop recover and the test unit function work correctly?
Yes —▶▶▶ START 850
No —▶▶▶ LOOP 711-900

570 Ensure that the Test Unit/Normal switch is in the Normal position. The test unit relay should not be activated. Is the test unit relay (K102) activated?
Yes —▶▶▶ LOOP 709-595
No —▶▶▶ LOOP 709-575

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LOOP 705	30	620
LOOP 706	140	670
LOOP 706	80, 178	620
LOOP 707	210, 240	620
LOOP 708	570 Y	595
LOOP 708	570 N	575
LOOP 710	762	665
LOOP 710	765	650
LOOP 710	766	610
LOOP 710	768	622
LOOP 710	769 N	590
LOOP 710	740, 769 Y	655
LOOP 710	690	621

ENTRY CONDITIONS

- This MAP is continued from LOOP 708.

MAP STEPS

575 Ensure that the DSBL Unit/Normal switch is in the Normal position. The DSBL unit relay should be activated. Is DSBL Unit relay (K101) activated?

Yes ————— 600

No ————— 600

580 Remove both relays (K101 and K102). Probe the failing point(s) in step 622 on LOOP 709. Is a line still active (Down light on).

Yes ————— 605

No ————— 605

585 See LOOP 910 and follow the wire back to the problem. Suspect a grounded or shorted switch, failing R5, Q2, or S2 logic card, or a shorted or grounded wire/cable.

Note: To isolate a short or ground, try removing cards or other parts one at a time while watching response.

Did you find the problem?

Yes ————— 655

No ————— 655

590 Request technical aid, then;

Go to ————— ▶ ▶ ▶ START 800

595 Suspect a shorted Test Unit/Normal switch or a grounded wire going to the activated coil of the test unit relay (K102). See LOOP 910 and

try to find the problem. Did you find the problem?

Yes ————— 655

No ————— 590

600 Suspect an open DSBL Unit/Normal or Control Local/Remote switch or an open wire from K101-4 to TB2-2. See LOOP 910 and try to find the problem. Did you find the problem?

Yes ————— 655

No ————— 590

605 Suspect a shorted relay. Exchange the relay associated with the problem (see LOOP 910 for wiring diagram). Did you find the problem?

Yes ————— 655

No ————— 590

610 With Test Unit/Normal switch in the Test Unit position, is the Ready indicator off all the time?

Yes ————— ▶ ▶ ▶ LOOP 706-105

No ————— 612

612 The Test Unit switch and associated circuits work correctly. With the Test Unit/Normal switch in the Normal position, is the Ready indicator off or flashing (ensure that the 3601 is flashing the loop)?

Yes ————— 622

No ————— ▶ ▶ ▶ START 850

620 With the Test Unit/Normal and the DSBL Unit/Normal switches in the Normal position. Does the Ready indicator stay on (loop recover)?

Yes ————— 622

No ————— 622

621 With the Test Unit/Normal switch in the Test Unit position, do the Ready and Carrier Detect indicators come on and not flash?

Yes ————— ▶ ▶ ▶ START 850-10

No ————— ▶ ▶ ▶ LOOP 710-767

622 Prepare the general logic probe for analytical probing (see section tab for procedure). With both Disable Unit/Normal and Test Unit/Normal switches in Normal position, probe the following points (connect probe ground lead to any D08 pin):

S2B09	Q2B12
S2G04	R5B13

All the above points should be not active (Up light on). Are any lines active (Down light on)?

Yes ————— ▶ ▶ ▶ LOOP 708-570

No ————— 625

625 Is the Ready indicator flashing?

Yes ————— 660

No ————— 630

630 Remove the connector cable from the COMM connector on the I/O panel. With power off the 3614, test the following nets for continuity (remove modem logic cards U2 and U4), and ensure that there are no grounds or shorts on or between nets. (See LOOP 910.)

U2B02 -- pin B of COMM connector

U2D05 -- pin A of COMM connector

U4G09 -- pin C of COMM connector

U4J11 -- pin D of COMM connector

Replace the U2 and U4 (modem) logic cards and communication cable (removed earlier). Did you find the problem?

Yes ————— 655

No ————— 635

635 Power-on the 3614 and hold Test Unit/Normal switch in the Test Unit position. Is the Ready or Carrier Detect indicator off or flashing?

Yes ————— 640

No ————— 637

637 A first test of the 3614 communication circuits show them to be working correctly. Ask your customer to call the telephone company and have them test for an open or shorted line. The problem is outside the 3614 COMM connector. If a proper test by the telephone company fails to find a problem, continue testing the 3614 as follows:

Go to ————— 640

640 Power-off the 3614. Ensure that the proper bps rate is selected for this device. There should be a jumper between board pins S2J11 (1200 bps) and S2G09 (-Clock). The net should not be grounded (remove S2 card during ground test). Did the net test out correctly?

Yes ————— ▶ ▶ ▶ LOOP 711-910

No ————— 650

650 Repair the open or grounded net. Ensure that no other bps rates were wired to Clock in error. After repair, return the S2 card to the logic board. Power-on the 3614 and verify that the loop can recover. Did the loop recover?

Yes ————— ▶ ▶ ▶ START 850-10

No ————— ▶ ▶ ▶ LOOP 708-560

655 Repair or exchange the failing part or wire, and verify your fix by ensuring that the loop

can recover (Ready indicator is on and not flashing) and that the test unit function works correctly.

Go to ————— ▶ ▶ ▶ START 850-10

660 Remove the communication cable from the COMM connector on the I/O panel. With power off, test continuity of the following nets and insure that no grounds exist and the wires are not shorted together (use the R x 100 meter scale when testing for shorts). No nets should be grounded (U2 and U4 logic cards must be removed during ground test):(See LOOP 910.)

U2D05 -- pin A of COMM connector

U2B02 -- pin B of COMM connector

U4G09 -- pin C of COMM connector

U4J11 -- pin D of COMM connector

Return the U2 and U4 modem cards and the communication cable to their correct places after the test. Did you find the problem?

Yes ————— 655

No ————— ▶ ▶ ▶ LOOP 710-762

665 A first test of the 3614 communication circuits show that they may be working correctly. Ask your customer to have the telephone company test for open or shorted communication lines. Does a test by the telephone company show the lines to be working correctly?

Yes ————— 667

No ————— 666

666 Until telephone lines test correctly or are repaired, no more action is needed of you. End this call.

Go to ————— ▶ ▶ ▶ START 850-10

667 Continue testing as follows:

Go to ————— ▶ ▶ ▶ LOOP 710-765

670 Hold the Test Unit/Normal switch in the Test Unit position. Probe +Receiver output at U2D09. Are the Up and Down lights both on?

Yes ————— ▶ ▶ ▶ LOOP 710-700

No ————— 680

680 Repair the open jumper between S2P04 and U2D09, or remove, inspect and re-install the loose modem send logic card (U2). Plug the communication cable into the COMM connector. Verify that the loop can recover, and that the test unit function works properly. Does the loop recover and does the test unit work properly?

Yes ————— ▶ ▶ ▶ LOOP 710-690

No ————— ▶ ▶ ▶ LOOP 710-700

From		To Step (this page)
Page	Step	
LOOP 709	621	767
LOOP 709	660	762
LOOP 709	667	765
LOOP 709	670, 680 N	700
LOOP 709	680 Y	690
LOOP 711	920	770
LOOP 732	360	770
LOOP 705	5.40	690

• This MAP is continued from LOOP 709.

MAP STEPS

690 The loop has recovered. Does this 3614 have a Test Unit/Normal switch?
Yes ———▶▶▶ LOOP 709-621
No ———▶▶▶ START 850-10

700 With the communication cable removed from the COMM connector, probe +Receive line at U4D13. Hold the Test Unit/Normal switch in the Test Unit position. Are the Up and Down lights both on?
Yes ————— 750
No

710 Power-off the 3614. Exchange the modem send logic card (U2). Power-on the 3614. Hold the Test Unit/Normal switch in the Test Unit position. Is the 3614 Ready indicator or the Carrier Detect indicator off or flashing?
Yes ————— 725
No

720 Power-off the 3614. Exchange the modem receive logic card (U4). Power-on the 3614. Hold the Test Unit/Normal switch in the Test Unit position. Is the 3614 Ready indicator or the Carrier Detect indicator off or flashing?
Yes ————— 730
No

725 Let go of the Test Unit/Normal switch. Return the communication cable removed earlier into the COMM connector. With the 3601 loop controller trying loop recovery, is the 3614 Ready indicator or the Carrier Detect indicator still off or flashing?
Yes ———▶▶▶ LOOP 711-900
No ———▶▶▶ START 850

730 Power-off the 3614. Exchange the wrap logic card (R5).
Note: *Ensure that the Wrap card has a jumper installed on it across the two pins between the relay and the plug socket.*
Power-on the 3614. Hold the Test Unit/Normal switch in the Test Unit Position. Is the 3614 Ready indicator or the Carrier Detect indicator off or flashing?
Yes ————— 725
No ————— 725

740 Power-off the 3614. Continuity test the following nets (see wrap circuits on LOOP 910). Ensure that no nets are grounded (R5, U2, U4 cards must be removed during ground test):
U2B03 R5D09 U2B05 R5B05
U2D07 R5D10 U4G02 R5B10
U4G05 R5D05 U4G09 R5D07
R5B13 T2G10 R5B13 F6D04
F6D04 K102-13 (N/O) on I/O panel
Return the cards to the logic board when finished with the test. Did you find the problem?
Yes ———▶▶▶ LOOP 709-655
No ———▶▶▶ LOOP 711-830

750 Hold the Test Unit/Normal switch in the Test Unit position and probe the +Receive line at S2M02. Are the Up and Down lights both on?
Yes ———▶▶▶ LOOP 708-550
No

760 Repair the open jumper between S2M02 and U4D13. Return the communication cable in the COMM connector. Verify that the loop can recover and that the test unit function works correctly. Did the loop recover and the test unit function work correctly?
Yes ———▶▶▶ START 850-10
No ———▶▶▶ LOOP 708-550

762 Power-on the 3614 and hold the Test Unit/Normal switch in the Test Unit position. Is the Ready indicator or Carrier Detect indicator off or flashing?
Yes ————— 765
No ———▶▶▶ LOOP 709-665

765 Power-off the 3614, and if not done previously, be sure that the proper bps rate is selected for this device. There should be a jumper between S2J11 (1200 bps) and S2G09 (--Clock). No

ground should occur on this net (S2 card must be removed during ground test). Net tests properly?
Yes ———▶▶▶ LOOP 711-920
No ———▶▶▶ LOOP 709-650

766 With loop in recovery mode (the Ready indicator is on and not flashing), hold the Test Unit/Normal switch in the test unit position. Does the Ready indicator flash?
Yes ————— 767
No ———▶▶▶ LOOP 709-610

767 The wrap relay on the R5 logic card is probably failing to activate. With the Test Unit/Normal switch in the Test Unit position, probe R5B13. Is the line active (Down light on)?
Yes ————— 769
No ————— 769

768 Power-off the 3614 and exchange the wrap logic card (R5).
Note: *Ensure that the Wrap card has a jumper installed on it across the two pins between the relay and the plug socket.*
Power-on the 3614. Verify that the loop can recover and that the test unit function works properly. Did you fix the problem?
Yes ———▶▶▶ START 850-10
No ———▶▶▶ LOOP 709-622

769 See the wiring diagram on LOOP 910 and trace the line from R5B13 back to source. Did you find the problem?
Yes ———▶▶▶ LOOP 709-655
No ———▶▶▶ LOOP 709-590

770 The problem may be farther down the Loop from the 3614, but before continuing, continuity test the following nets:

S2B12	S2S07	}	TA
S2G03	S2P10		
S2G05	S2J06		
S2J04	S2M09		
S2P02	S2M03	}	Modem Send To Modem Receive
U2B10	U4J04		
U2D11	U4D05		
U2J09	U4B03	}	Modem Send Nets
U2B03	U2D05		
U2B07	U2D06		
U2G02	U2G03		
U2G05	U2G07		
U2G10	U2G12		

U4D11 – URD12	}	Modem Receive Nets	
U4G08 U4G10			
U4J06 U4J07			
U4J12 U4J13			
*U4B09 U4D07	}	600 bps Integrated Modem (WTC) Only	
*U4B13 U4D03			
*U4D07 U4D08			
R5B02 U4J04			
T2G10 R5B13	}	600 bps Integrated Modem (WTC) Only	
*U2B04 U2G04			
U2B08 U2B09			
†U2B12 U2D03			
U2B13 T2B03			
U2D02 U2D07			
*U2D10 U2J10			
U2G07 U2J13			
U2G08 U4D06	}		
*U4B04 U4G04			
U4B07 U4B08			
*U4D10 U4J10			
†U4G12 U4G13	}	600 bps Integrated Modem (WTC) Only	
D6E02 E6B04			
D6E04 E6A04			

† Printed circuit.
Did you find the problem?
Yes ———▶▶▶ LOOP 711-950
No

780 Set the CE meter to R x 1 and place one meter lead on any D08 (ground) pin. With the other lead ensure that none of the nets listed in step 770 are grounded except where an asterisk (*) is shown.

Note: *The R5, Q2, U2, U4, and T2 cards must be removed during the ground test. Ensure that you return the cards at the end of the ground test.*

Did you find the problem?
Yes ————— 790
No ———▶▶▶ LOOP 711-930

790 Try to find the ground. You may want to look at LOOP 910 and 911 for logic board wiring. Where you able to find the problem?
Yes ———▶▶▶ LOOP 711-950
No ————— 710

From		To Step (this page)
Page	Step	
LOOP 706	105	850
LOOP 707	290, 310	900
LOOP 708	380, 390, 440	900
LOOP 708	560	900
LOOP 709	640	910
LOOP 710	725	900
LOOP 710	740	830
LOOP 710	765	920
LOOP 710	770, 790	950
LOOP 710	780	930
LOOP 732	360	800

ENTRY CONDITIONS

- This MAP is continued from LOOP 710.

MAP STEPS

800 The problem may be on the Loop before the 3614. Before continuing, continuity test the nets listed in step 770 on LOOP 710. Did you find a problem?

Yes _____ 950

No

810 Set the CE meter to R x 1 and place one meter lead on any D08 (ground) pin. With the other lead ensure that none of the nets listed in step 770 are grounded except where an asterisk (*) is shown.

Note: The R5, Q2, S2, U2, U4, and T2 cards must be removed during ground test. Ensure that you return the cards at the end of the ground test.

Did you find the problem?

Yes

No _____ 940

820 Try to find the ground or short. See LOOP 910 and 911 for logic board wiring. Were you able to find the problem?

Yes _____ 950

No _____ 940

830 The failure is probably in the modem board wiring. Power-off the 3614 and test the nets listed in step 770 (LOOP 710) for continuity.

Did you find the problem?

Yes _____ 950

No _____ 840

840 Set the CE meter to R x 1 and place one meter lead on any D08 (ground) pin. With the other lead, ensure that none of the nets listed in step 770 are grounded, except where an asterisk (*) is shown.

Note: The R5, Q2, S2, U2, U4 and T2 cards must be removed during the ground test. Ensure that you return the cards at the end of the ground test.

Did you find the problem?

Yes _____ 820

No _____ 940

850 The carrier detect LED or circuit may be failing. Power-off the 3614. Test the following nets (see LOOP 910 for wiring diagram) for continuity. Ensure that the nets do not have grounds.

Note: Remove the U4 and T2 cards during the ground test.

U4D09 - T2B02

T2D06 Carrier Detect LED (plate)

TB2-2 Carrier Detect LED (cathode)

Do the nets test correctly?

Yes

No _____ 950

870 Exchange the Carrier Detect LED. Did you fix the problem?

Yes _____ ▶ ▶ ▶ START 850

No

880 Power-off the 3614 and exchange the T2 logic card (analog). Power-on the 3614. Did you fix the problem?

Yes _____ ▶ ▶ ▶ START 850

No

890 Power-off the 3614 and exchange the U4 logic card (modem receive). Power-on the 3614.

Did you fix the problem?

Yes _____ ▶ ▶ ▶ START 850

No _____ 800

900 Do the cable checkout procedures on LOOP 850, exchange any failing IBM-supplied cables you find, then continue this step.

Note: Local loop cables are your customer's responsibility.

The problem does not seem to be in the 3614. However, if a proper test of all the cables, communication lines, and other devices on

this loop fails to find a problem, exchange the following Field Replaceable Units (FRUs) in the order listed (if not done before):

- U2 logic card (modem send). Do transmit level adjustment (see LOOP 870).
- U4 logic card (modem receive).
- S2 logic card (Terminal Address).
- Q2 logic card (Loop adapter). See caution on LOOP 880.
- R5 logic card (Wrap) (See note below).

Verify your repair by doing a Basic Bringup (START 70), No-Host Transaction (NO-HOST 10), and 3614 Device Exerciser 051 (DIAG 415-420) tests.

910 This step exchanges the following logic cards:

TA	S2
Modem Receive	U4
Modem Send	U2 (see note on SPEC 10)
Wrap	R5 (see note below)
Loop Adapter	Q2 (see caution on LOOP 880)

Follow this procedure:

- Power-off the 3614.
- Replace cards (two or three at a time each time through this procedure).
- Power-on the 3614.
- If the loop recovers (Ready indicator is on and not flashing), execute program ID '0449'.

Program ID = '0449'

Parameters = '04 00 00 00 00'

Turn the Function Select switch to Start/Stop. Operate Execute.

Note: Program ID '0449' will not run correctly if a Starter diskette was used to bring-up (IPL) the 3601. If a Starter diskette must be used (no Customer Application diskette available) run 3614 Loop Device Exerciser 051 as shown on DIAG 415 and 420 instead of Program ID '0449'.

If the Ready indicator comes on and does not flash, and Program ID '0449' display equals 'A800', the problem has been fixed. If not, repeat the above procedure until all listed FRUs have been exchanged. Have all of the above FRUs been exchanged without fixing the problem?

Yes _____ 800

No _____ ▶ ▶ ▶ START 850

920 Do step 910 above, then return to this step.

Did you fix the problem?

Yes _____ ▶ ▶ ▶ START 850

No _____ ▶ ▶ ▶ LOOP 710-770

930 This 3614 tests out correctly. Problem may be in outgoing circuits. Suspect a communication cable, line, or other loop device.

Go to _____ 900

940 This 3614 tests out correctly. Problem may be in incoming circuits. Suspect a communication cable, line, or other loop device.

Go to _____ 900

950 Repair or replace the failing part or wire. Verify your fix by ensuring that the loop can recover (Ready indicator is on and not flashing) and that the Test Unit function works correctly.

Go to _____ ▶ ▶ ▶ START 850

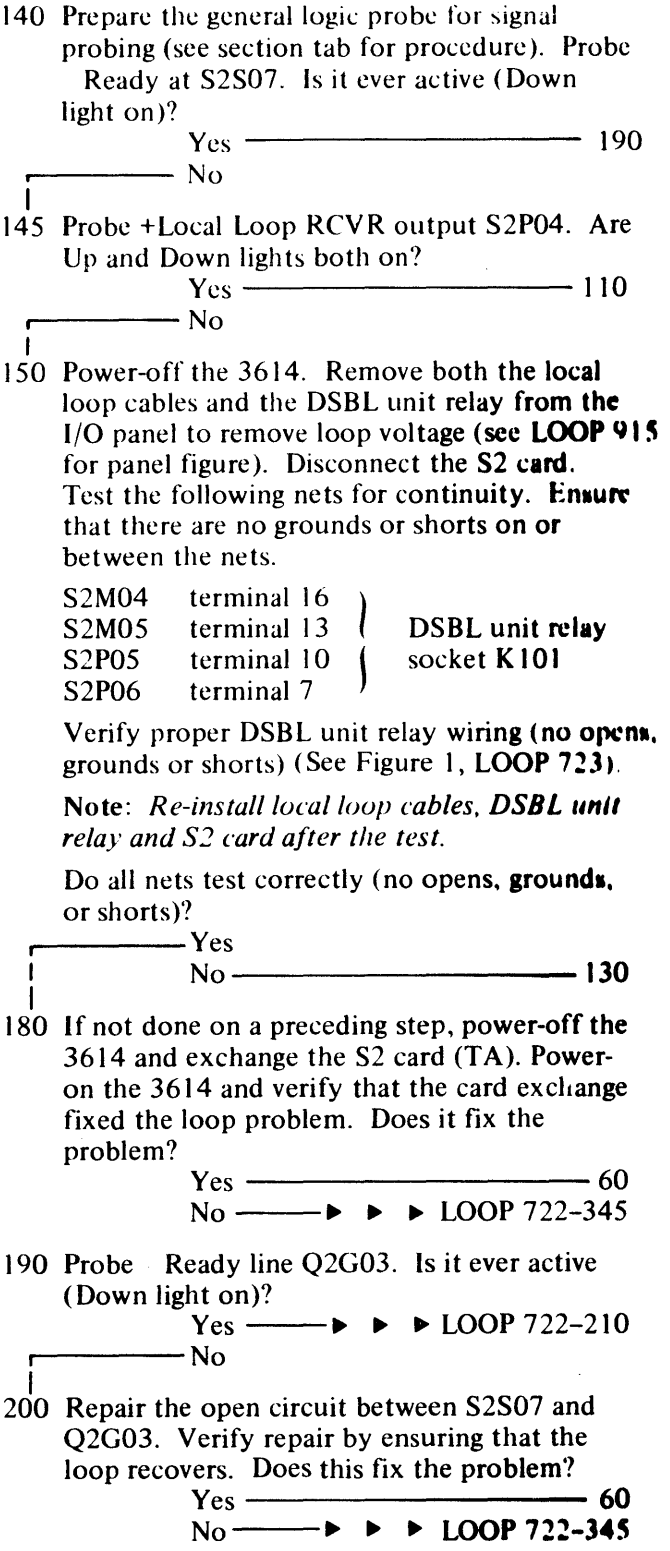
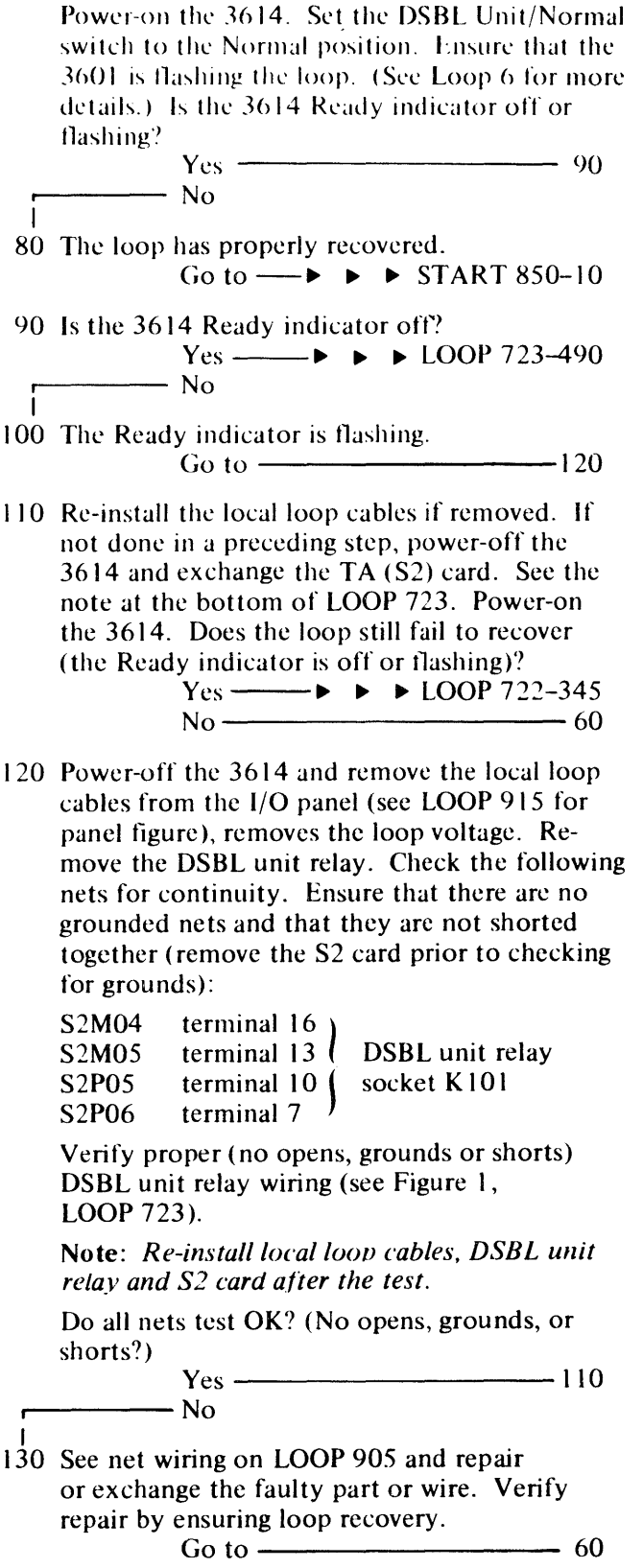
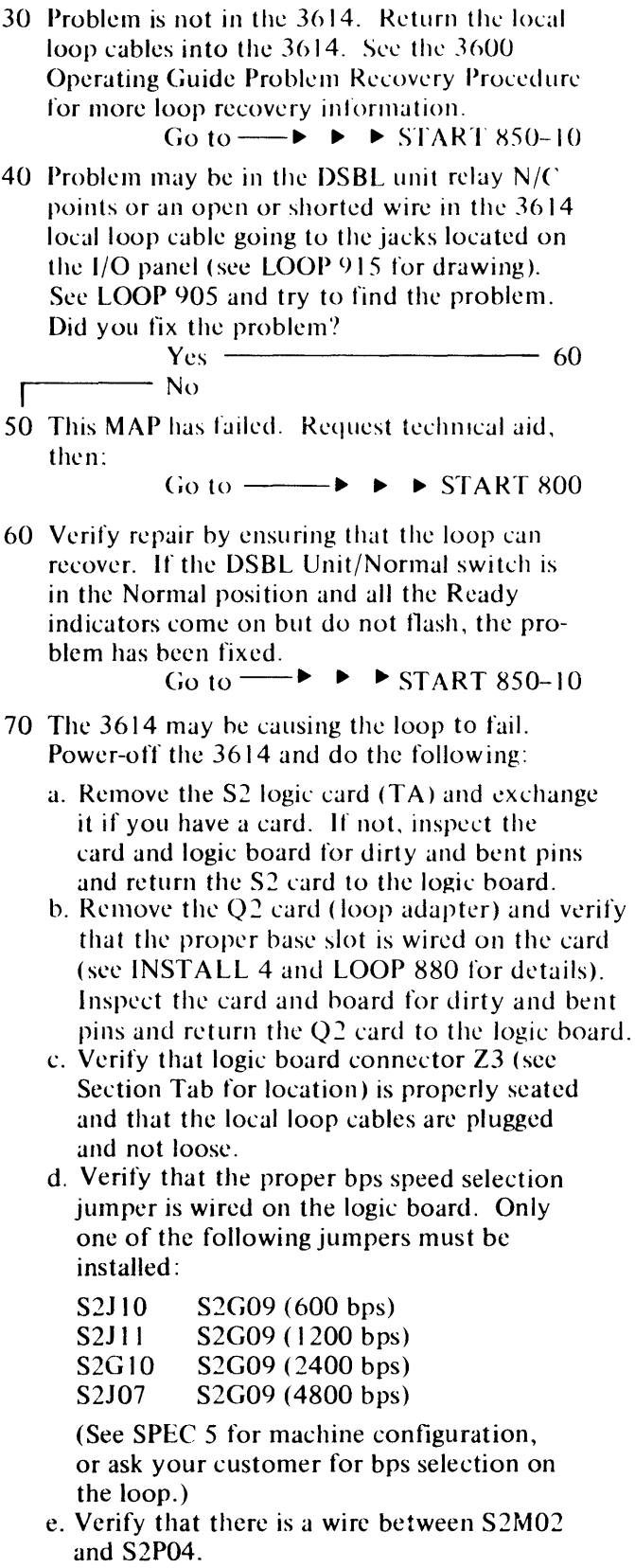
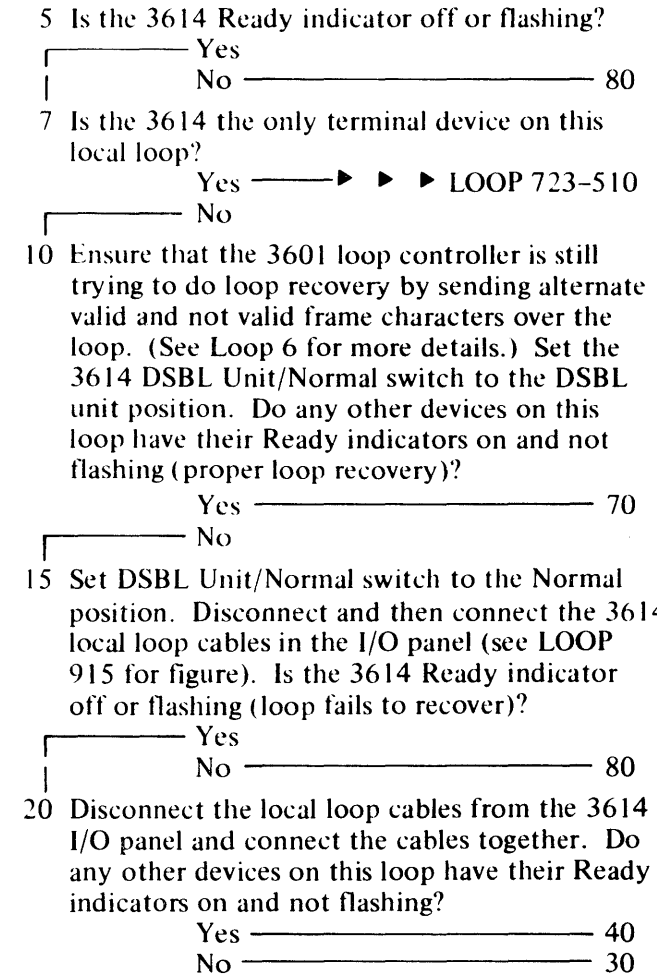
Note: Ensure that the Wrap card has a jumper installed on it across the two pins between the relay and the plug socket.

From		To Step (this page)
Page	Step	
LOOP 30	80	40
LOOP 30	140, 160	70
LOOP 705	7	5
LOOP 722	242, 347	10
LOOP 723	490	140
LOOP 723	510	70

ENTRY CONDITIONS

- A loop communication problem has occurred.
- The 3614 is attached to a local loop.
- The Ready indicator is either off or flashing, or the loop adapter basic status byte, bit 4 (ready) was off when sensed by program ID '0449'.

MAP STEPS



JR1600	4791452	491723						
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From		To Step (this page)
Page	Step	
LOOP 720	110, 180, 200	345
LOOP 720	190	210
LOOP 723	480	250

ENTRY CONDITIONS

- This MAP is continued from LOOP 720.

MAP STEPS

- 210 The Ready line goes active but the Ready indicator does not light. Power-off the 3614. Test the following net for continuity. Ensure that the net is not grounded (remove Q2 logic card during the ground test):
Q2J06 – Ready LED on Op/CE panel.
Does the net test OK?
Yes —————>>> LOOP 723-350
No —————>>> LOOP 723-350
- 220 Did the DSBL Unit indicator come on earlier when the DSBL Unit/Normal switch was in the DSBL Unit position?
Yes —————>>> LOOP 723-390
No —————>>> LOOP 723-390
- 230 Test for continuity between TB2-2 and the +5 Vdc side of the Ready indicator (see LOOP 905 for wiring figure). Is there continuity?
Yes —————>>> LOOP 723-350
No —————>>> LOOP 723-350
- 240 Exchange the failing Ready indicator on the Op/CE panel. Power-on the 3614 and ensure that the 3601 is flashing the loop (trying recovery). Is the Ready indicator off?
Yes —————>>> 247
No —————>>> 242
- 242 Is the Ready indicator flashing?
Yes —————>>> LOOP 720-10
No —————>>> 245
- 245 The loop has properly recovered.
Go to —————>>> START 850-10

- 247 Power-off the 3614 and exchange the loop adapter logic card (Q2). Ensure that you plug the proper base slot on the new Q2 card (see LOOP 880 for details). Power-on the 3614 and verify that the 3601 is flashing the loop. Does the Ready indicator come on?
Yes —————>>> 242
No —————>>> 250
- 250 Power-off the 3614. If not done earlier, ensure that the proper bps rate jumper is wired on the logic board. Only one of the following wires should be present:
S2J10 (600 bps) – S2G09 (– Clock)
S2J11 (1200 bps) – S2G09 (– Clock)
S2G10 (2400 bps) – S2G09 (– Clock)
S2J07 (4800 bps) – S2G09 (– Clock)
Is the proper jumper installed?
Yes —————>>> 300
No —————>>> 260
- 260 Repair the open circuit or remove the wrong bps rate jumper and install the proper jumper. Power-on the 3614. Does the loop recover (3614 Ready indicator is on and not flashing)?
Yes —————>>> START 850-10
No —————>>> 270
- 270 Power-off the 3614, then test the following nets for continuity:
Q2M10 – Q2S02
Q2P07 – Q2M12
S2B12 – S2S07
S2G03 – S2P10
S2G05 – S2J06
S2J04 – S2M09
S2M02 – S2P04
S2P02 – S2M03
S2B09 – H6D04
Do the nets test correctly?
Yes —————>>> LOOP 723-350
No —————>>> LOOP 723-350
- 275 Set the CE meter to R x 1. After the Q2, S2, and J2 cards are removed, place one meter lead on the D08 (ground) pin. With the other lead, ensure that there are no grounds on the net pins listed in the left column of step 270. Do the nets test correctly (none are grounded)?
Yes —————>>> 280
No —————>>> 290

- 280 With one lead on any D08 (ground) pin, verify that the following pins are grounded:
Q2B07
Q2B09
Q2D06
Q2M02
Q2P04
Are all pins grounded?
Yes —————>>> LOOP 723-350
No —————>>> LOOP 723-350
- 285 Move one lead to Q2J02 and ensure that it is not grounded (Q2 card removed), but shows continuity to the following pins:
Q2J12
Q2M03
Q2M04
Q2P02
Do all pins show continuity but no ground?
Yes —————>>> 310
No —————>>> LOOP 723-350
- 290 Try to find the ground (see LOOP 905 for wiring diagram). Were you able to find the ground problem and repair it?
Yes —————>>> LOOP 723-360
No —————>>> LOOP 723-460
- 300 If not done earlier, remove the S2 card. Ensure that no grounds exist on the S2G09 pin on the logic board. Does the net test properly?
Yes —————>>> 270
No —————>>> 290
- 310 The problem could be a failing logic card or DSBL unit relay. Have both the Q2 and S2 cards and DSBL unit relay been exchanged?
Yes —————>>> 340
No —————>>> 320
- 320 (See caution below before starting this step). Power-off the 3614 and exchange those cards not yet exchanged one-at-a time, then exchange the DSBL unit relay.
CAUTION
No base slot should be assigned to more than one terminal on the same loop. Also, if the loop adapter card (Q2) is exchanged, the new card must be jumpered to the proper base slot.

- After each exchange, power-on the 3614 and verify that the Ready indicator comes on without flashing (Proper loop recovery). Does exchanging the parts fix the problem?
Yes —————>>> START 850-10
No —————>>> 340
- 330 Problem is not in the 3614. See the 3600 Operating Guide Problem Recovery Procedure for more loop recovery information.
Go to —————>>> START 850-10
- 340 Set the DSBL Unit/Normal switch to the DSBL Unit position. Ensure that the 3601 tries loop recovery. Can the rest of the loop (excluding the 3614) recover?
Yes —————>>> LOOP 723-460
No —————>>> 330
- 345 Observe the DSBL unit relay on the I/O Panel and set the DSBL Unit/Normal switch to DSBL Unit, then to Normal. Does the DSBL unit relay deactivate, then activate again?
Yes —————>>> 250
No —————>>> 347
- 347 Exchange the DSBL unit relay, then repeat step 345. Does the DSBL unit relay deactivate, then activate again?
Yes —————>>> LOOP 720-10
No —————>>> LOOP 723-370

From		To Step (this page)
Page	Step	
LOOP 722	347	370
LOOP 722	210,230,270,280,285	350
LOOP 722	290 Y	360
LOOP 722	290 N, 340	460
LOOP 722	220	390
LOOP 720	7	510
LOOP 720	90	490

ENTRY CONDITIONS

This MAP is continued from LOOP 720.

MAP STEPS

- 50 See net wiring on LOOP 905 and repair or exchange the failing part or wire.
Go to _____ 360
- 60 Verify repair by ensuring that the loop can recover. If the DSBL Unit/Normal switch is in the Normal position and all the Ready indicators come on but do not flash, the problem has been fixed.
Go to —▶▶▶ START 850-10
- 70 Set the DSBL Unit/Normal switch first to DSBL Unit position, then to Normal position. Does the DSBL unit relay K101 on the I/O panel (see LOOP 915 for panel drawing) deactivate and then activate (Control Local/Remote switch must be in local)?
Yes _____ 480
No _____
- 80 Does the DSBL Unit indicator come on when the DSBL Unit/Normal switch is in the DSBL unit position?
Yes _____ 410
No _____
- 90 Is there +5.0 Vdc on TB2-2 in the Power Supply (see PWR 905 for TB drawing)?
Yes _____ 400
No —▶▶▶ PWR 10

- 400 See wiring diagram on LOOP 905 and try to find open or shorted wire, failing DSBL Unit indicator, a faulty DSBL Unit/Normal or Control Local/Remote switch, or a bad K101 relay. Did you find a problem?
Yes _____ 350
No _____ 460
- 410 Is there +5.0 Vdc on the DSBL Unit relay socket, terminal 4 (K101)?
Yes _____ 430
No _____
- 420 See wiring diagram on LOOP 905 and try to find an open or shorted wire, or a faulty relay K101. Did you find a problem?
Yes _____ 350
No _____ 460
- 430 With the DSBL Unit/Normal switch in the Normal position, does dc common (TB2-11) go to the DSBL unit relay socket, terminal 1 (K101)?
Yes _____ 450
No _____
- 440 See wiring diagram on LOOP 905 and try to find an open or shorted wire, a faulty DSBL Unit/Normal or Control Local/Remote switch, or a faulty K101 relay. Did you find a problem?
Yes _____ 350
No _____ 460
- 450 Exchange the DSBL unit relay (K101). With power-on, ensure that the DSBL unit relay de-activates and then activates when the DSBL Unit/Normal switch is set to the DSBL unit position and then to the normal position. Did you fix the problem?
Yes _____ 360
No _____
- 460 Power-off the 3614 and exchange the logic board. Ensure all feature and configuration jumpers are properly installed on the new board (see LOOP 880 and SPEC 20 for jumper list). Power-on the 3614 and do the 3614 Basic Checkout (START 20), No-Host Transaction (NO-HOST 10) and Loop Checkout (LOOP 275 and LOOP 280 in that order). Did exchanging the board fix your problem?
Yes —▶▶▶ START 20
No _____ 470

- 470 These MAPs have failed. Request technical aid, then;
Go to —▶▶▶ START 800
- 480 Power-off the 3614 and exchange the DSBL unit relay K101. Power-on the 3614 and verify that K101 caused the loop problem. Does this fix the problem?
Yes _____ 360
No —▶▶▶ LOOP 722-250
- 490 Observe the DSBL unit relay on the I/O Panel and set the DSBL Unit/Normal switch to DSBL Unit, then to Normal. Does the DSBL unit relay deactivate, then activate again?
Yes —▶▶▶ LOOP 720-140
No _____
- 500 Replace the DSBL unit relay, then repeat Step 490. Does the DSBL unit relay deactivate then activate up again?
Yes _____ 360
No _____ 380
- 510 Remove both local loop cables from the 3614 I/O Panel and connect them together. Ask the customer to start the failing loop, then display the system log to see if that same loop is still failing. Is the loop still failing? (Reconnect cables after test to 3614.)
Yes _____
No —▶▶▶ LOOP 720-70
- 520 The problem is not in this 3614. Suspect a customer-owned local loop cable or a failing 3601. Terminate this call.
Go to —▶▶▶ START 850-10

Note: If you must go to the parts office, pick up the following logic cards:
S2 card (TA)
Q2 card (loop adapter)
If you exchange a card, and it does not fix the problem, ensure that you return the old card to the machine and return the new card to the parts office.

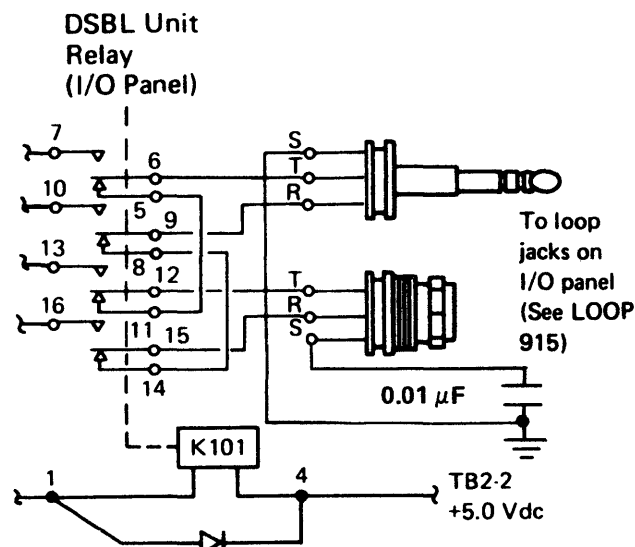


Figure 1. DSBL Unit Relay Wiring

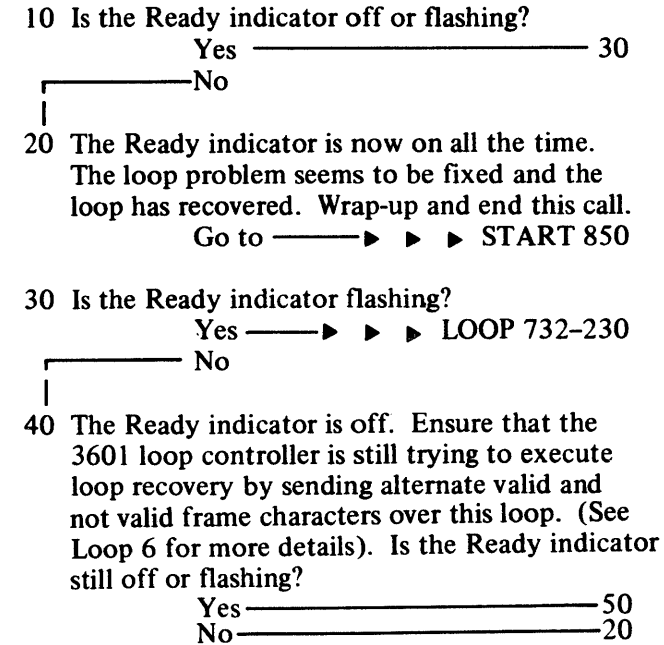
4	JR1700 Seq. 2 of 2	4791453 Part No. ()	491723 17 Feb 78						
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From		To Step (this page)
Page	Step	
LOOP 40	Many	10
LOOP 705	50	10
LOOP 732	270, 350	20
LOOP 732	280	150
LOOP 732	290, 320	220
LOOP 732	310	170
LOOP 734	390, 430, 450	170
LOOP 734	400	20
LOOP 734	410	190
LOOP 734	410	40
LOOP 734	440	10
LOOP 734	460	180
LOOP 734	470, 480	65

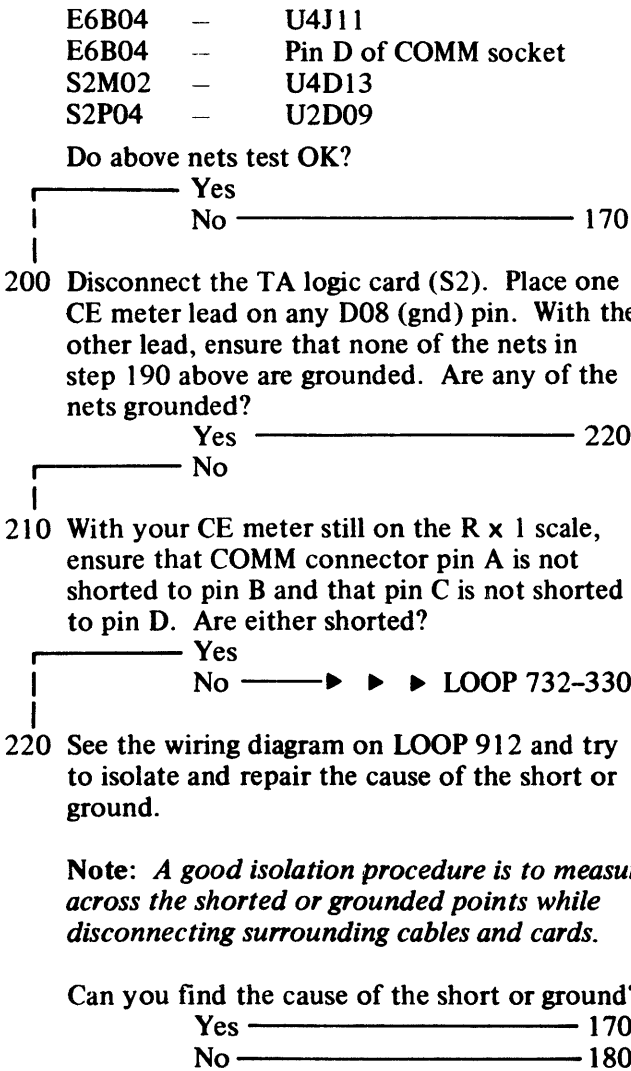
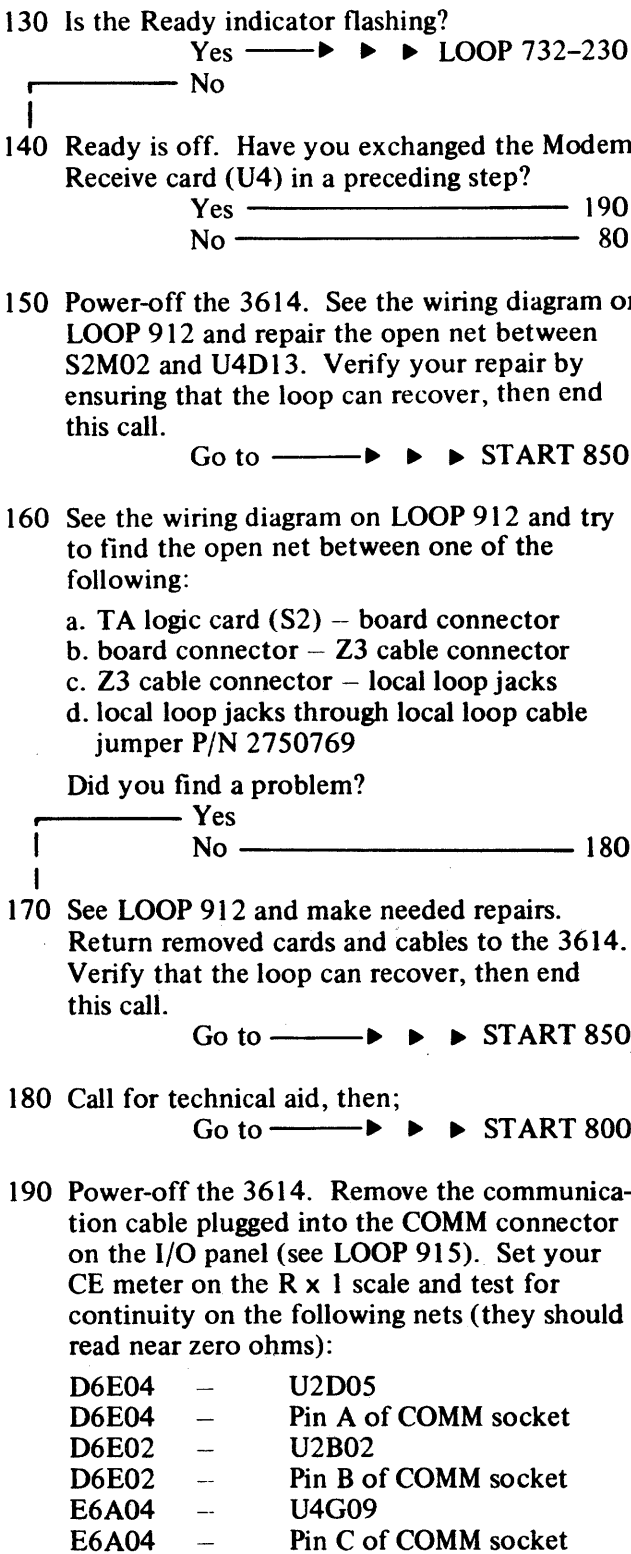
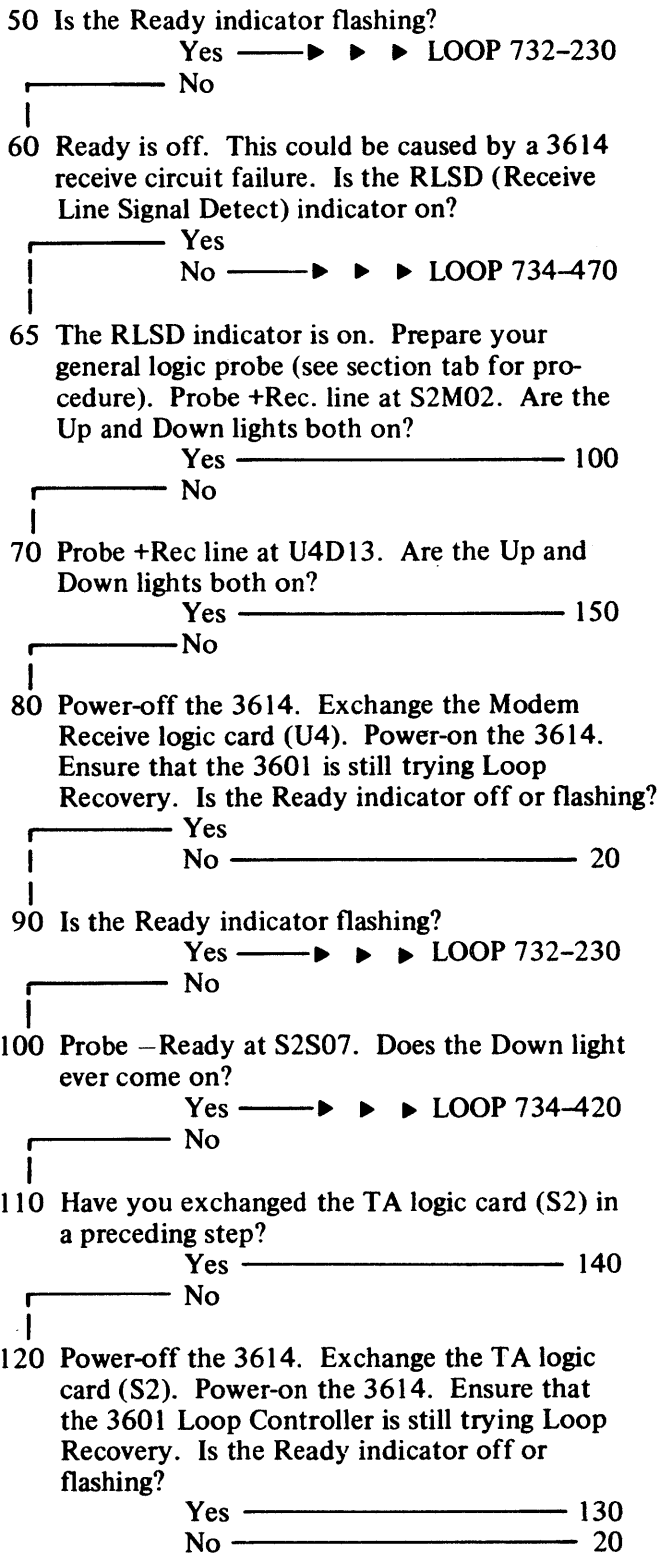
ENTRY CONDITIONS

- A loop communication problem has occurred. The Ready indicator is off or flashing.
- This 3614 is attached to a 3600 Remote Loop through a 600 bps rate integrated modem (WTC only).

MAP STEPS



JR1800	4791454	491723						
Seq. 1 of 2	Part No. ()	17 Feb 78						

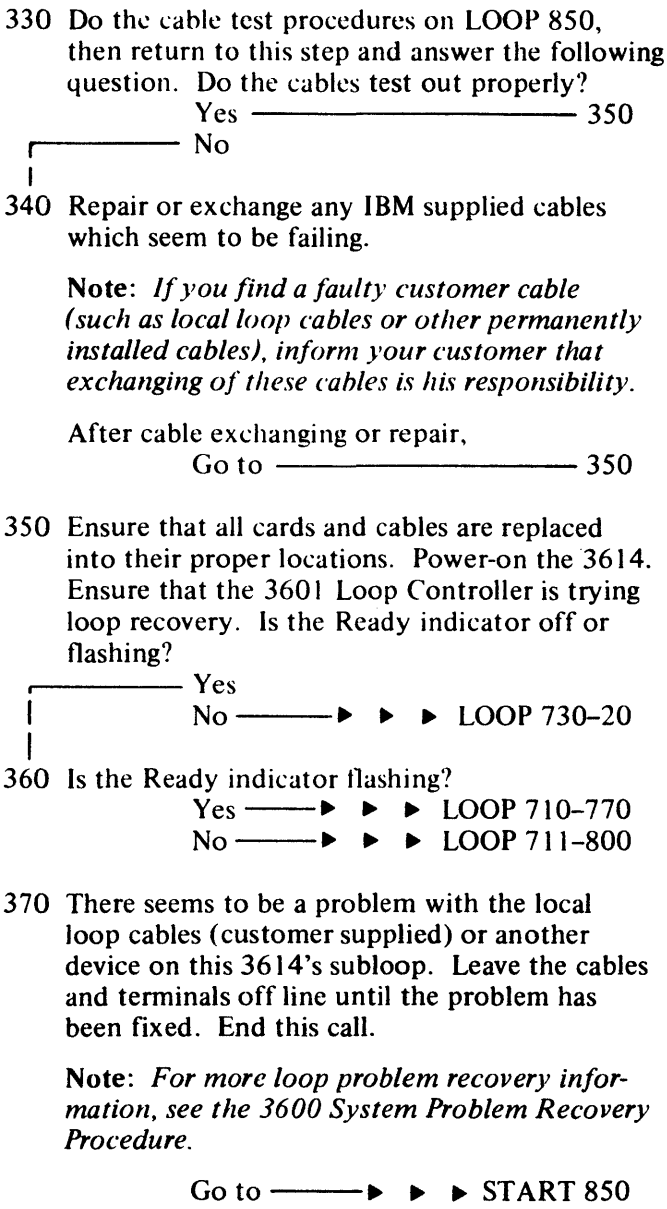
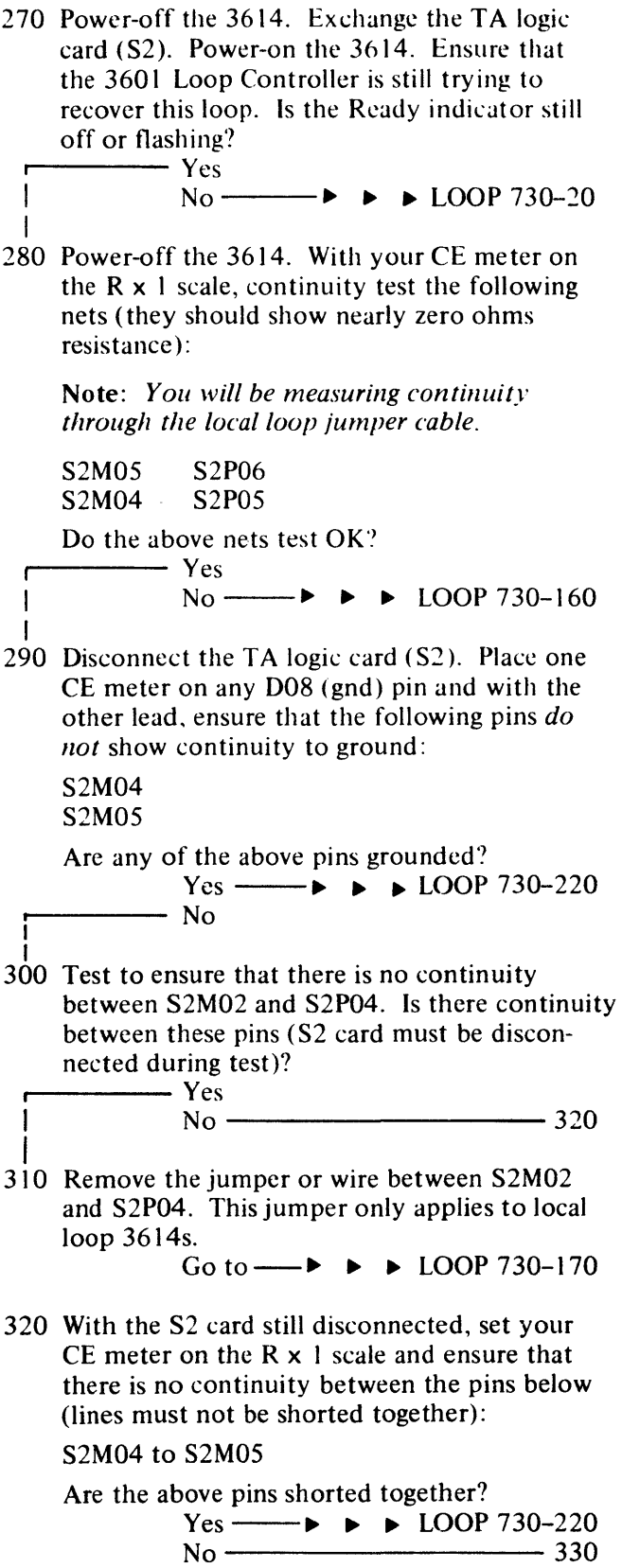
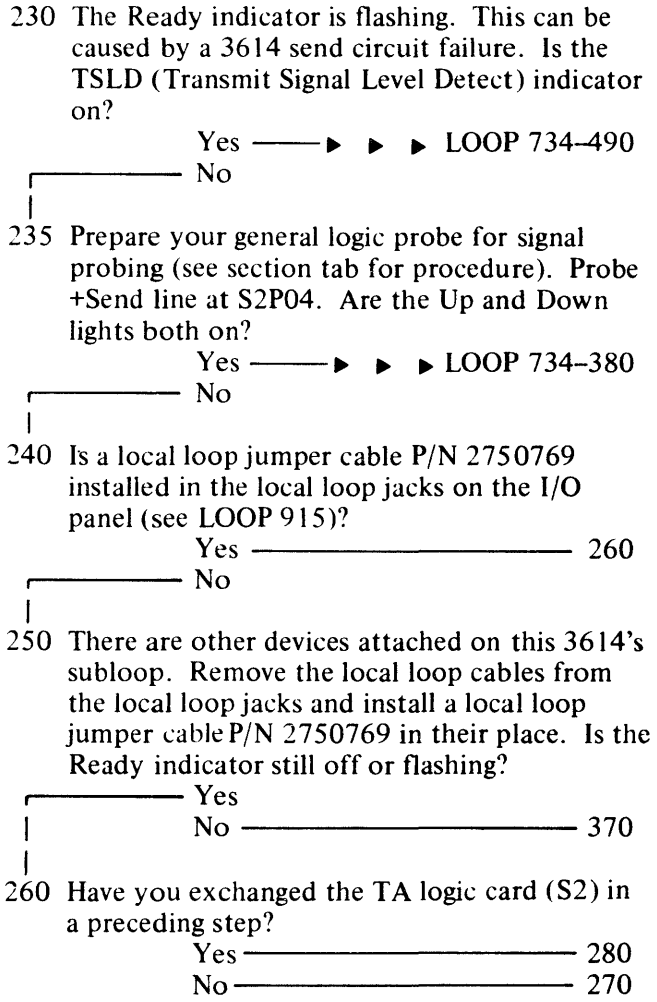


From		To Step (this page)
Page	Step	
LOOP 730	30, 50, 90, 130	230
LOOP 730	210	330
LOOP 734	490, 500	235

ENTRY CONDITIONS

- This MAP is continued from LOOP 730.

MAP STEPS



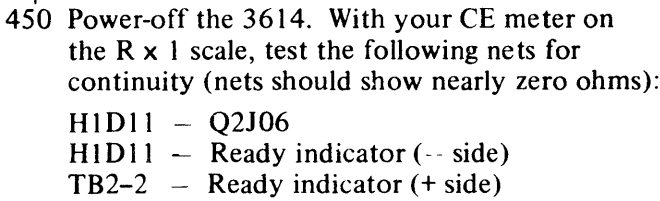
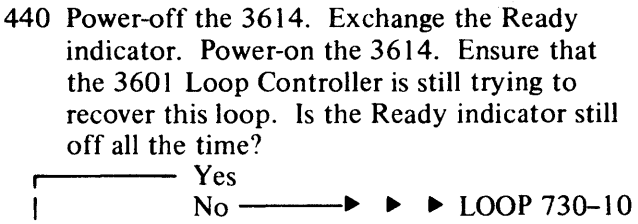
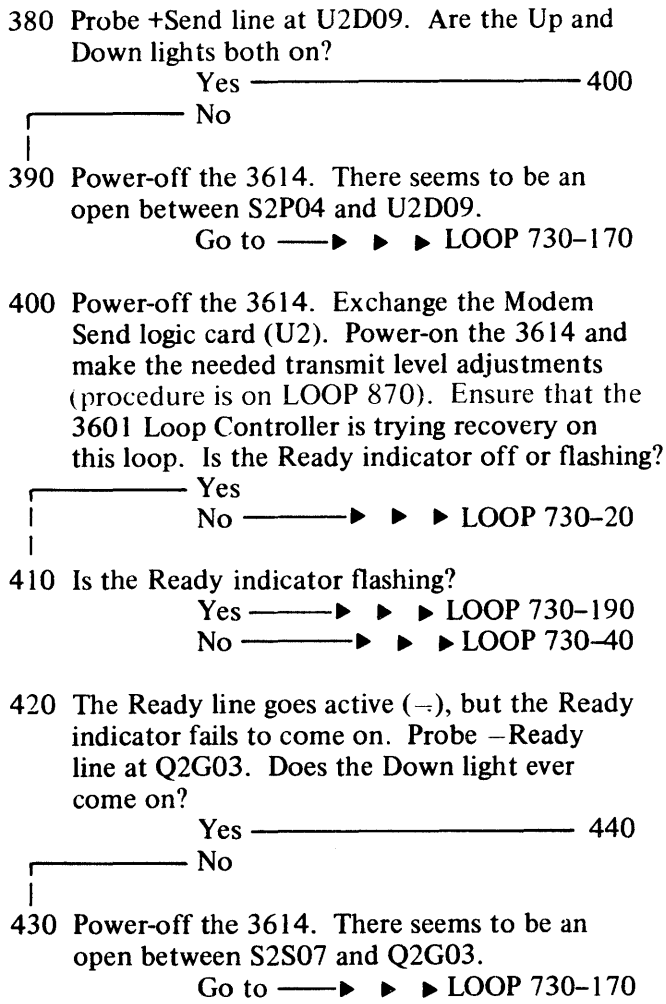
JR1800	4791454	491723						
Seq. 2 of 2	Part No. ()	17 Feb 78						

From		To Step (this page)
Page	Step	
LOOP 730	100	420
LOOP 730	60	470
LOOP 732	230	380
LOOP 732	230	490

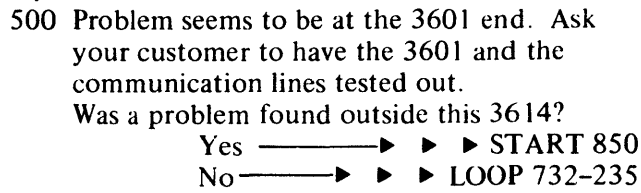
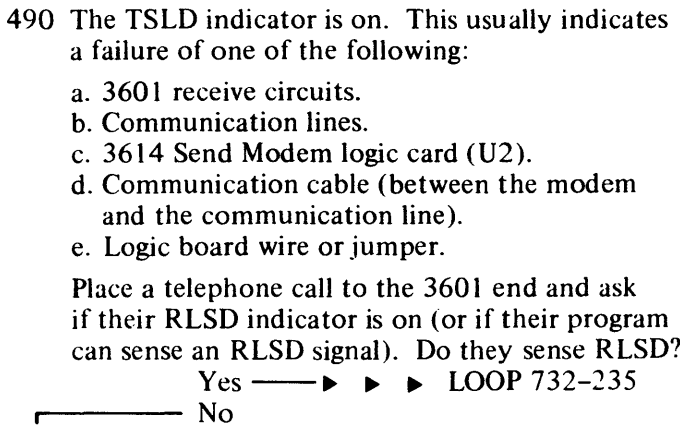
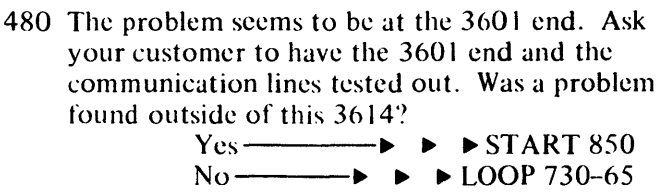
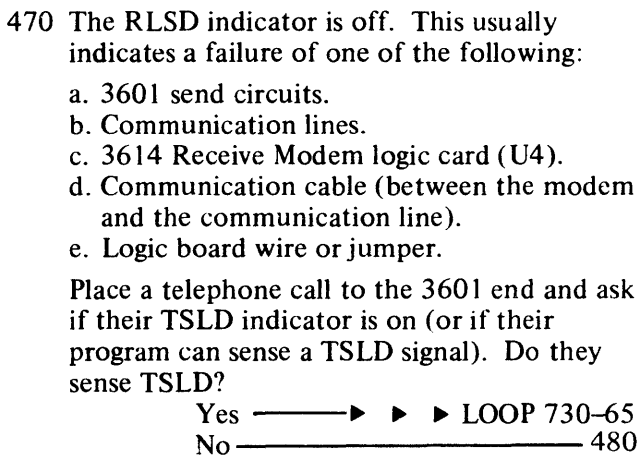
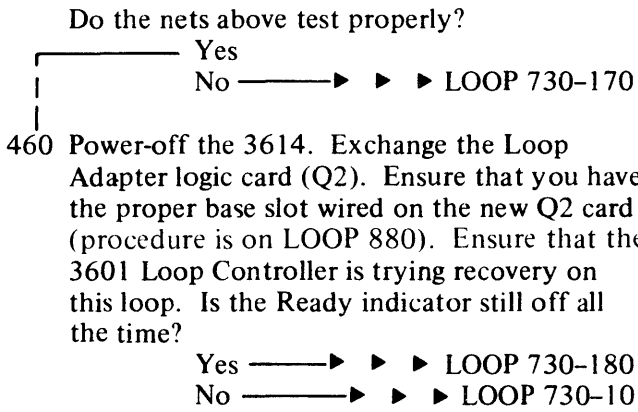
ENTRY CONDITIONS

- This MAP is continued from LOOP 730 and LOOP 732.

MAP STEPS



Note: See PWR 901-905 for TB drawing to LOOP 912 for above wiring diagram.



From		To Step (this page)
Page	Step	
START 30		10

50 Request technical aid, then;
Go to —————▶ ▶ ▶ START 800

60 Exchange the failing part or wire. Verify that the DSBL unit circuits function properly.
Did this fix the problem?
Yes —————▶ ▶ ▶ START 850
No ————— 50

ENTRY CONDITIONS

- DSBL Unit indicator remains on, though the DSBL Unit/Normal switch is in the Normal position.
- The probable failing unit is:
 - a. DSBL Unit/Normal switch.
 - b. Q2 logic card (loop adapter).

MAP STEPS

10 Power-off the 3614 and test the DSBL Unit/Normal switch to verify that it is not shorted or otherwise failing. Does it test out properly?
Yes
No ————— 60

20 Exchange the Q2 logic card (loop adapter). Power-on the 3614. Ensure that the DSBL Unit/Normal switch is in the Normal position. Is the DSBL Unit indicator on?
Yes
No —————▶ ▶ ▶ START 850

30 Power-off the 3614 and return the old Q2 card (loop adapter) to the machine. See one of the following pages and follow the DSBL Unit indicator and the DSBL Unit/Normal switch wiring. Check for continuity and ensure that there are no grounds.
Local loop LOOP 905
Remote 1200 bps LOOP 910
Remote 600 bps LOOP 912
Did you find a problem?
Yes ————— 60
No ————— 50

3614

JR1900	4791455	491723							
Seq. 2 of 2	Part No. ()	17 Feb 78							

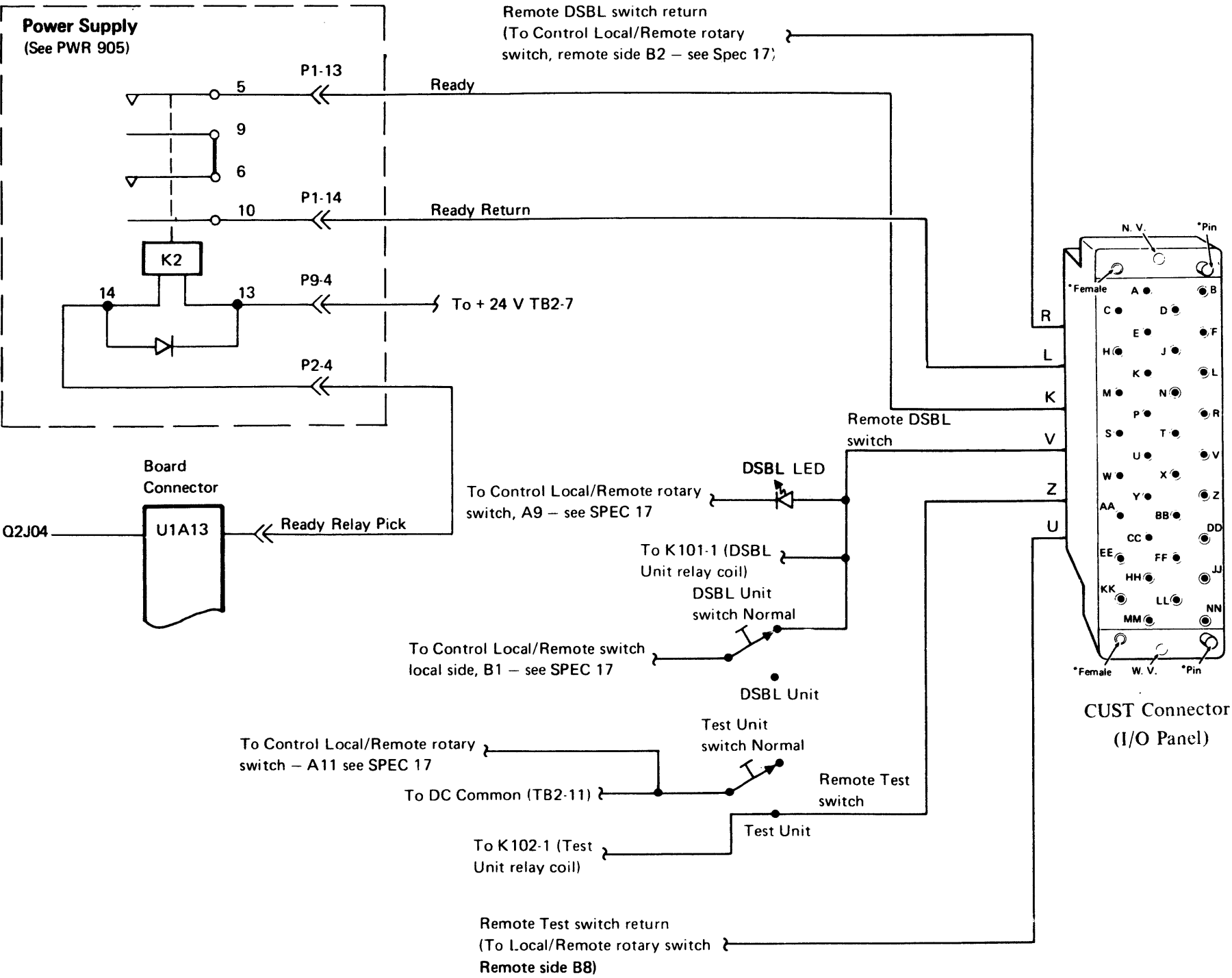
Problem with customer control and remote indicator box in the communications area.

- 10 See wiring at right and follow (point to point) the failing line. Repair or exchange the failing wire or part.

Note: If the failure is determined to be in the customer remote box, end this call and inform the customer.

WARNING

Wires to the I/O panel connector have red tags attached. The tags mean that due to connected equipment, other than normal voltages may be present at any time.
VOLTAGES CAN BE HAZARDOUS.

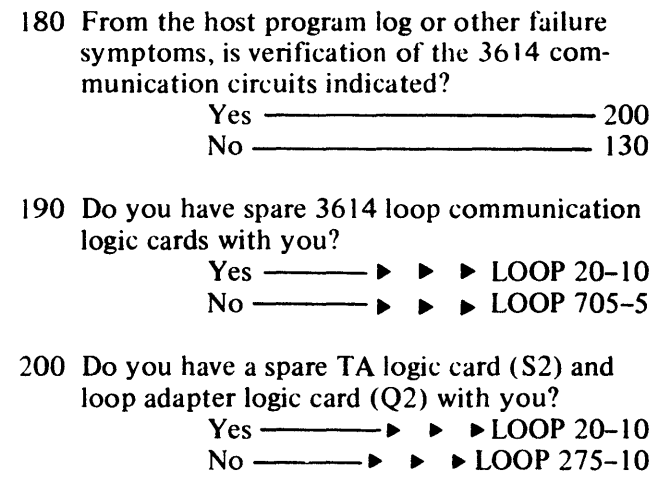
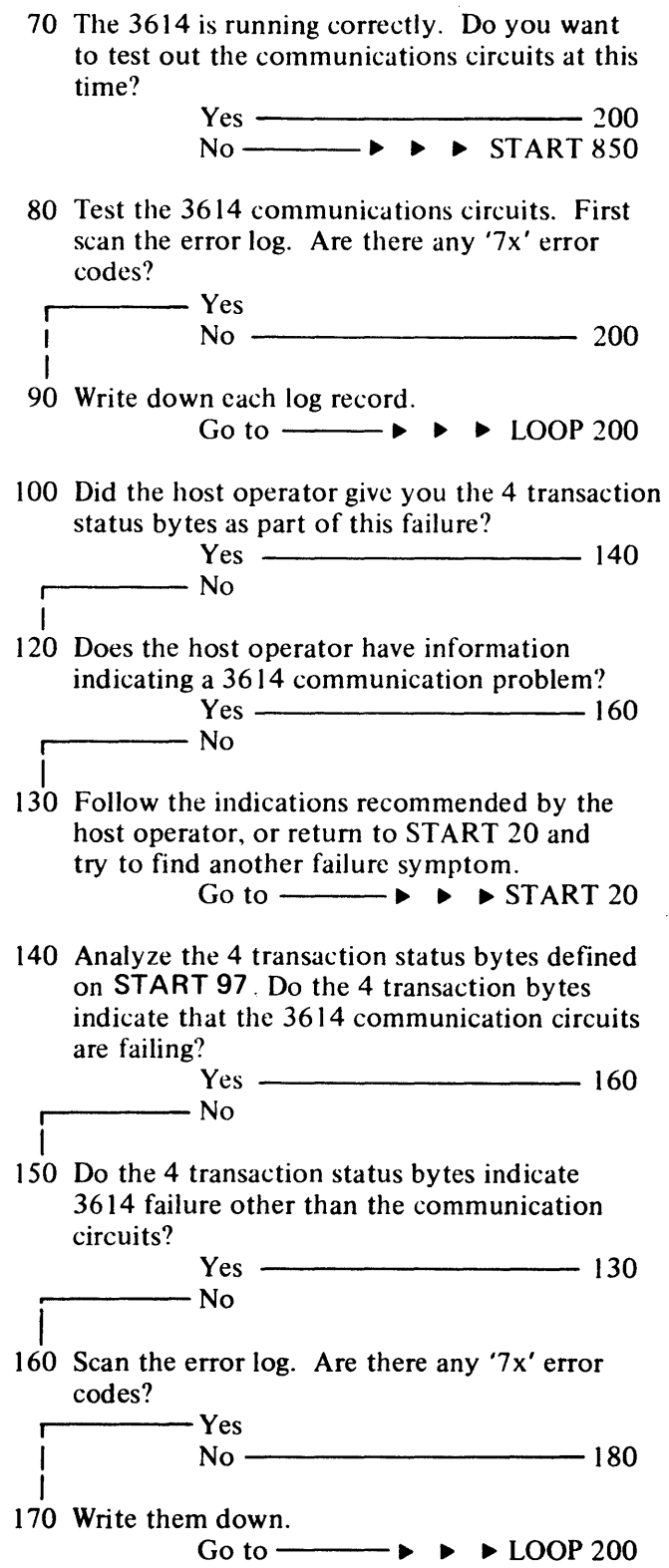
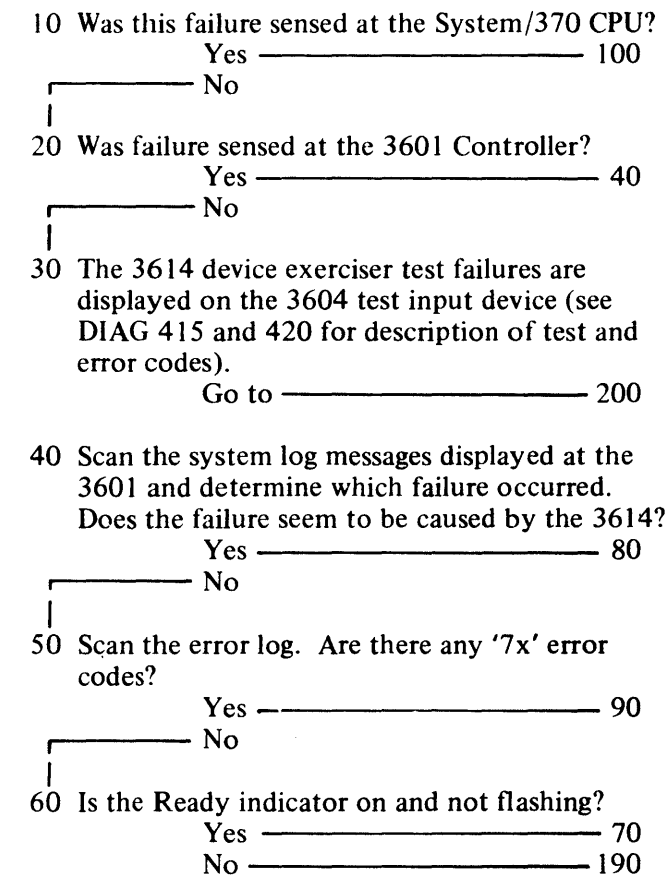


From		To Step (this page)
Page	Step	
LOOP 10	10	10
LOOP 250	60	10

ENTRY CONDITIONS

- The 3614 failures have been sensed and logged by one of the following:
 - a. The host application program at the System/370 location.
 - b. The 3601 Controller.
 - c. The 3604 test input device while trying to run device exerciser test on the 3614.

MAP STEPS

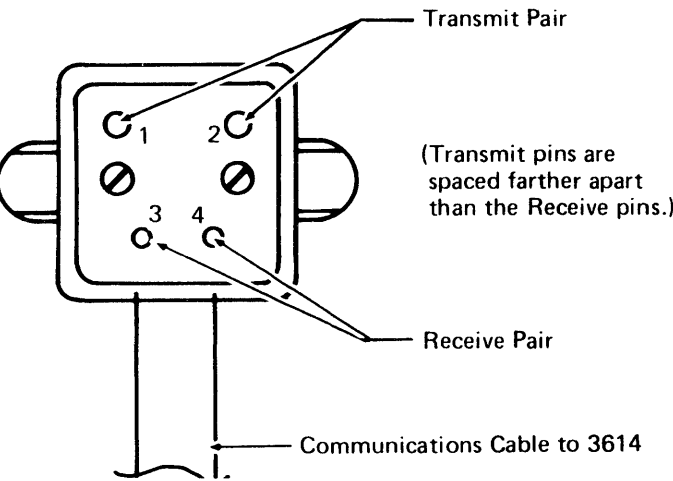
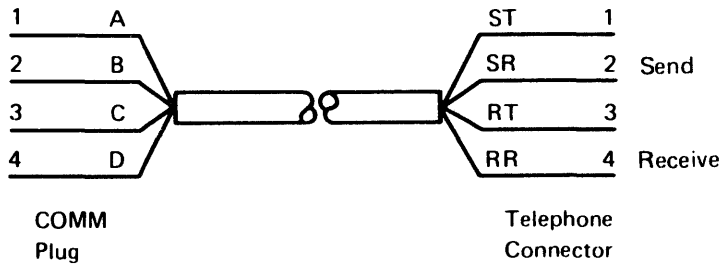


PROCEDURE A

(See Figure A)

- 1. Power off the 3614.
- 2. Disconnect both ends of cable shown in Figure A.
- 3. With CE meter on the R x 1 scale, test each wire in the cable for continuity.
- 4. Remove R5, U2, and U4 logic cards. Connect one end of cable into the COMM connector on the I/O Panel. Ensure that none of the wires (1-4) are grounded by placing one meter lead on any D08 pin, and touching each cable wire with the other lead at the disconnected telephone connector end.
- 5. Ensure that none of the wires are shorted to any other wire by testing continuity between each wire and all other in the cable (there should be no continuity).
- 6. Repair or exchange cable if failing. If cable tests good, replace cable and all cards removed during test.
- 7. Power-on the 3614 and return to the MAP that sent you here.

Figure A



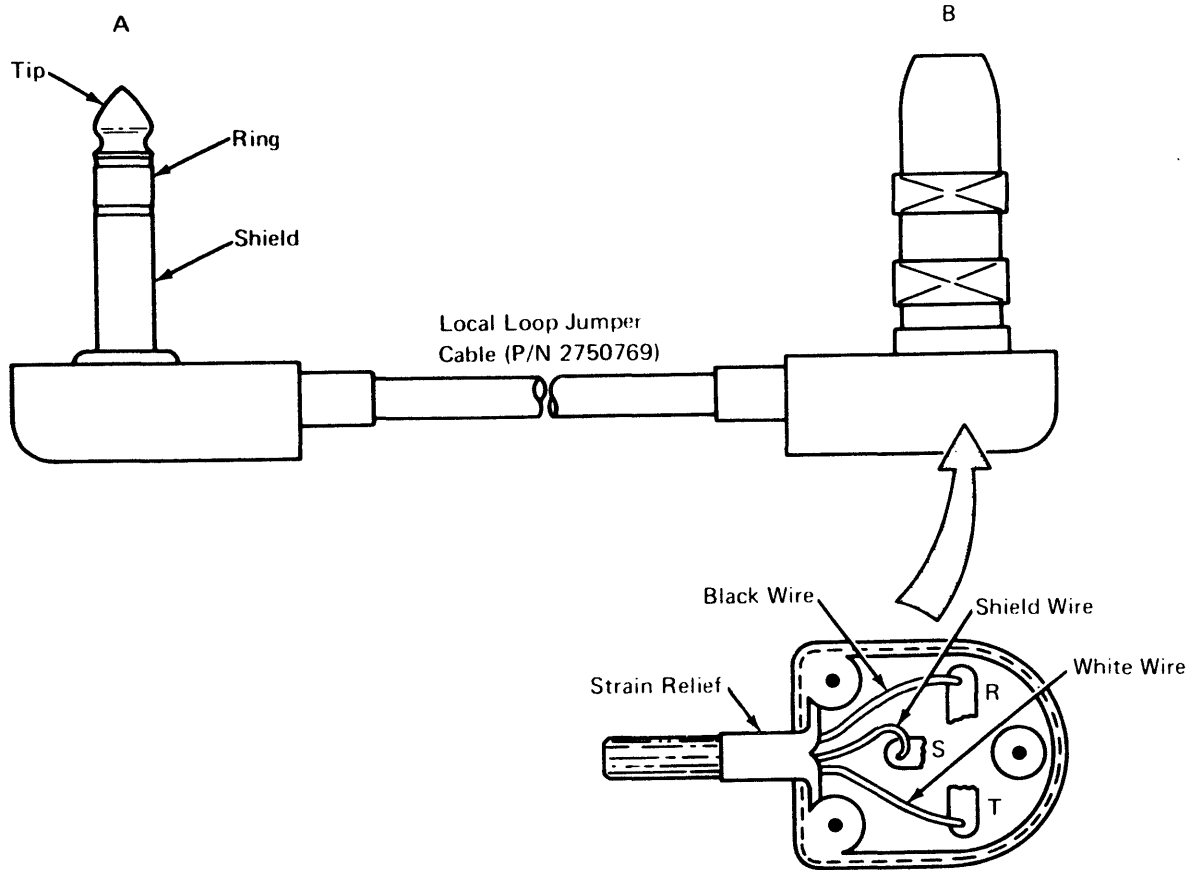
3614	JR2100 Seq. 2 of 2	4791457 Part No. ()	491723 17 Feb 78						
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PROCEDURE B

(See Figure B)

- 1. Remove both ends of local loop jumper cable (P/N 2750769).
 - 2. Remove back cover of B end of the cable to show wires as shown in figure B.
 - 3. With CE meter on the R x 1 scale, test for continuity as follows using Figure B.
- | From A End of Cable | To B End of Cable |
|---------------------|-------------------|
| Tip | T |
| Ring | R |
| Shield | S |
- 4. Place one CE meter lead on the shield (A end) and with the other lead, verify that there is no continuity to either the tip or ring (cable grounded).
 - 5. Place one CE meter on the tip and with the other meter lead verify that there is no continuity to the ring (cable shorted).
 - 6. Replace back cover of the B end of the cable and install cable into machine(s) if it tests properly. Repair or exchange the cable if failing. Return to the map that sent you here.

Figure B



INTEGRATED MODEM ADJUSTMENT

This adjustment applies to 600 and 1200 bps integrated modems. It should be done at initial installation for both bps speeds, as well as anytime that the 1200 bps modem send card (U2) is replaced. If the 600 bps modem send card (U2 in WTC only) is replaced, the same jumpers should be selected on the new card as existed on the old card. In this latter case, no further adjustment is necessary. Refer to right for diagrams to help you make adjustments.

1. Use the DB meter, and set the ON switch to ON.
2. Momentarily press the BATT TEST switch down. Meter should read in the GOOD range.
3. Set the 2W-4W TRANS/REC switch to 2W-4W TRANS.
4. Set the WRAP switch in the down position (not in WRAP).
5. Set the BRDG/600/324 switch as follows:
 - a. To BRDG if communication lines are attached to the 3614.
 - b. To 600 if communication lines are not attached to the 3614.
6. Turn the ADD TO RDG switch to 0 (always take your readings as near to the middle of the scale as is possible by utilizing the ADD TO RDG switch).
7. Jumper the modem output lines (U2B02 and U2D05) to the LINE jacks.
8. Adjust the transmit level as follows: (WTC adjust to P.T.T. specifications)
1200 bps integrated modem - adjust the potentiometer on the U2 card (modem send) until the meter reads between -2 and 0 on the scale.

Note: On loop machines, Request-to-Send is wired on and the modem is always transmitting.

9. 600 bps Integrated Modem (WTC Loop only):
 - a. Remove the communication cable from the 3614 I/O panel.
 - b. Put db meter lead on U2B02 and U2D05.
 - c. Set the meter to 600.
 - d. Install jumper (P/N 816645) as shown in drawing for 600 bps Transmit Card to obtain a proper PTT reading on the meter.

Note: 600 bps integrated modem has Request-to-Send ON all the time. If the transmit signal level detect (TSLD) is on, the modem is transmitting.

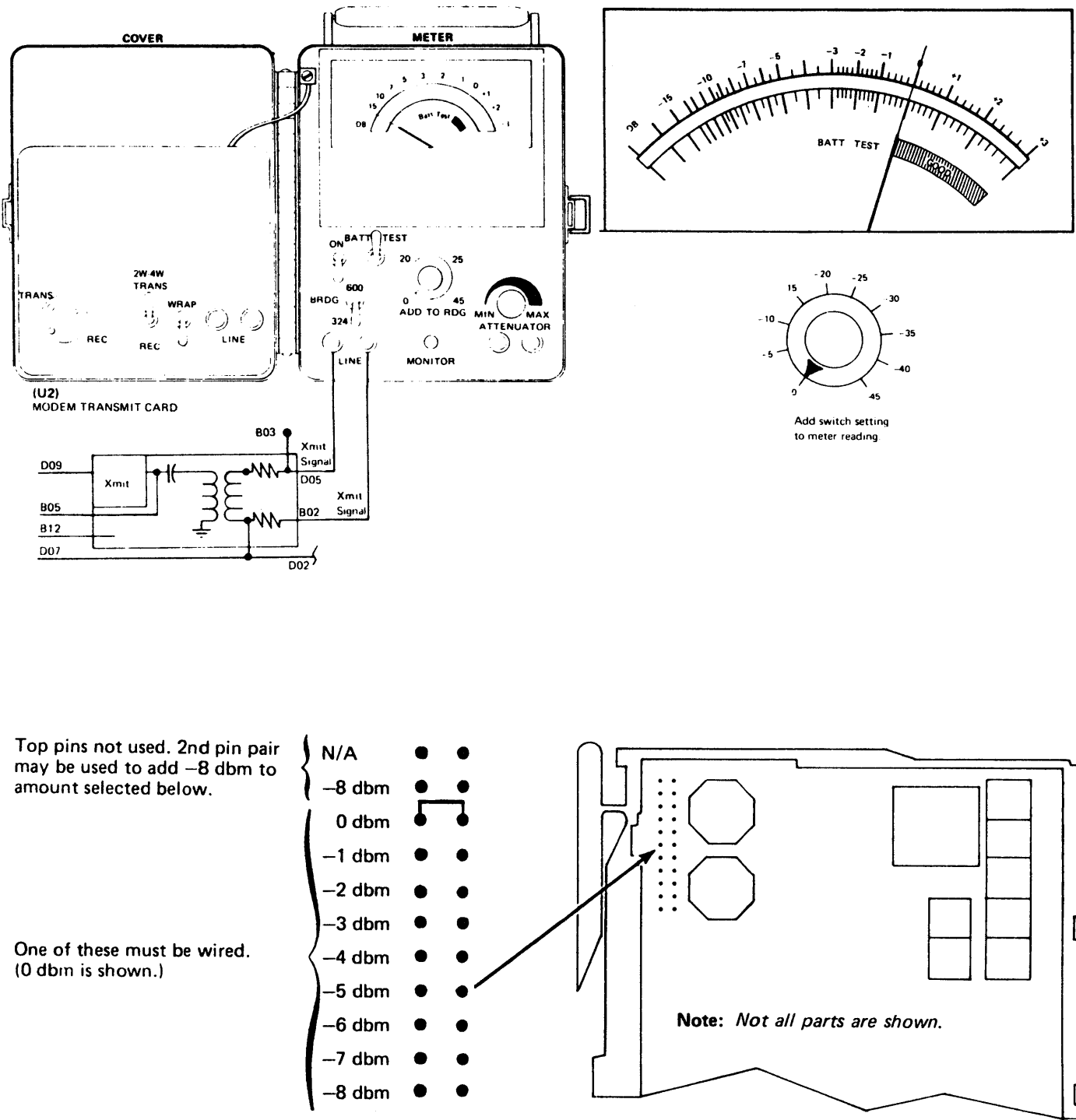
10. You have now set the transmit level adjustment to the correct setting. If for some reason you continue to have communication problems, it may be caused by transmission of a signal which is too high or too low a level for the Receive modem at either end to function properly. This will require the assistance of at least one other CE to check the receive level.

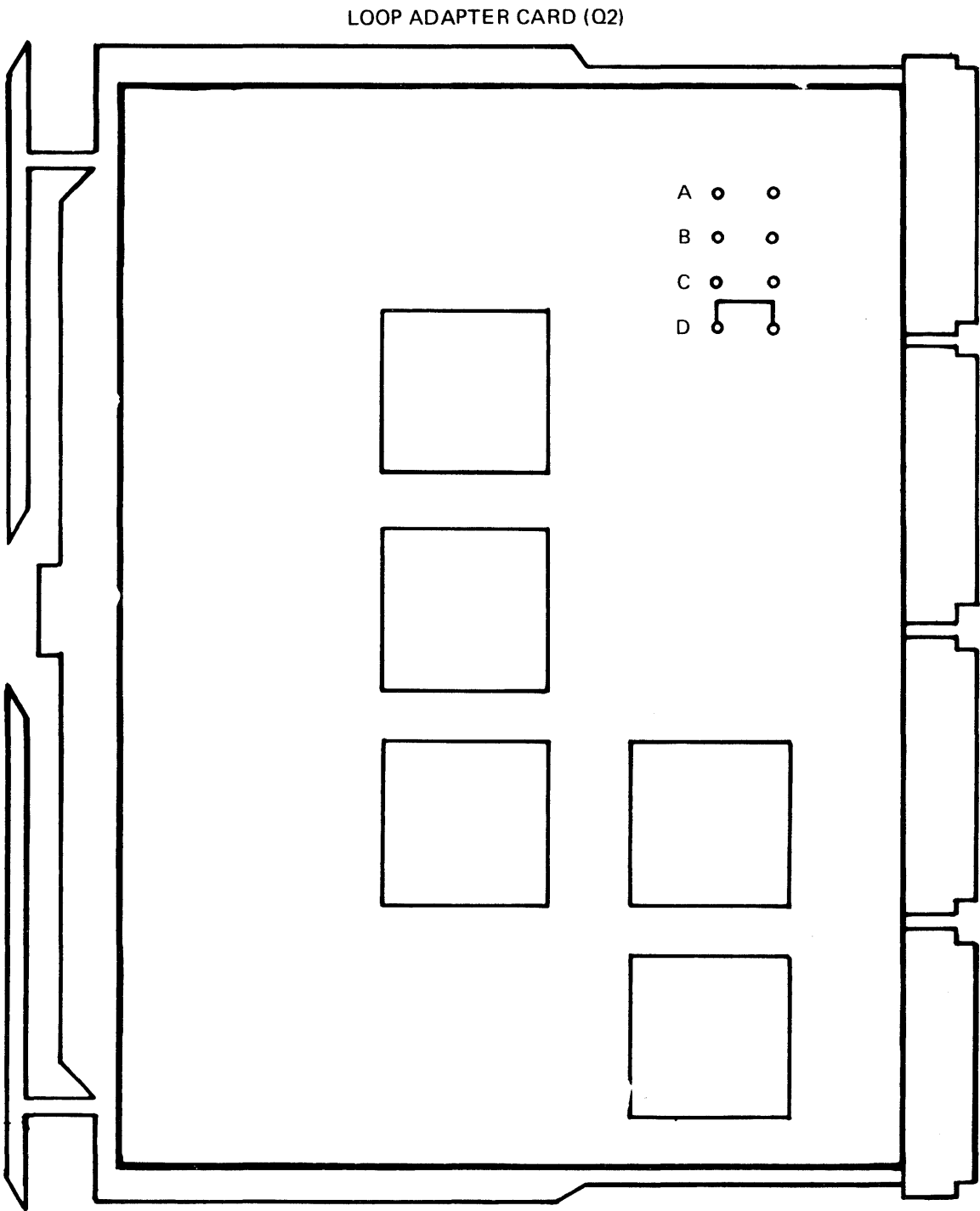
1200 bps Integrated Modem:

- a. Remote loop
 - 1) All devices in the loop must first set their transmit level at 0 to -2 dbm (U.S. and Canada, see step 8).
 - 2) On a 3614, put db meter leads on U4G09 and U4J11. (On 360 X, check MLM for receive pair pins.)
 - 3) Switch meter to Bridge.
 - 4) Meter should read between -12 and -22 dbm (U.S. and Canada).
 - 5) If a receive level between -12 and -22 dbm cannot be obtained, have the customer contact the common carrier for correction.
- b. 600 bps Integrated Modem Remote Loop:
 - 1) Both devices must first set their transmit levels to the proper PTT level.
 - 2) Do steps 9a to 9d at the 3614.
 - 3) Disconnect the communication cable from the 3614 I/O panel.
 - 4) Set db meter to 600.
 - 5) Connect db meter leads to A and B pins of the communication cable.
 - 6) Meter reading should show the PTT line loss specification below the transmit level.
 - 7) To measure receive level at the 370X, connect communication cable to 3614 and measure disconnected communication cable at 370X.
 - 8) If a receive level within the PTT line loss specification cannot be obtained, have the customer contact the common carrier for correction.

11. If the 3614 is on a loop, the following turn around delay must be wired:

Jumper	U2G10 to U2G12
and	U2G07 to U2G05





BASE SLOT JUMPER SELECTION

Desired Base Slot	Install Jumper in Row			
	A	B	C	D
1		X		
2	X			
3	X	X		
4				X
5		X		X
6	X			X
7	X	X		X
8			X	
9		X	X	
10	X		X	
11	X	X	X	
12			X	X
13		X	X	X
14	X		X	X
15	X	X	X	X
16				

Base Slot Wiring

Loop attached 3614s must be assigned a base slot which corresponds to that assigned by the customers application program (see branch configurator on SPEC 5 for your customer's base slot assignment before continuing).

3614 base slots are assigned by plugging hardwired jumpers, assembly P/N 2731801 (or optional P/N 814342 and housing P/N 815923), on the loop adapter card in location Q2.

The diagram shows an example of the wiring required to assign base slot 4. If base slot 3 were desired, jumpers would be required in position A and B with no jumpers in positions C and D.

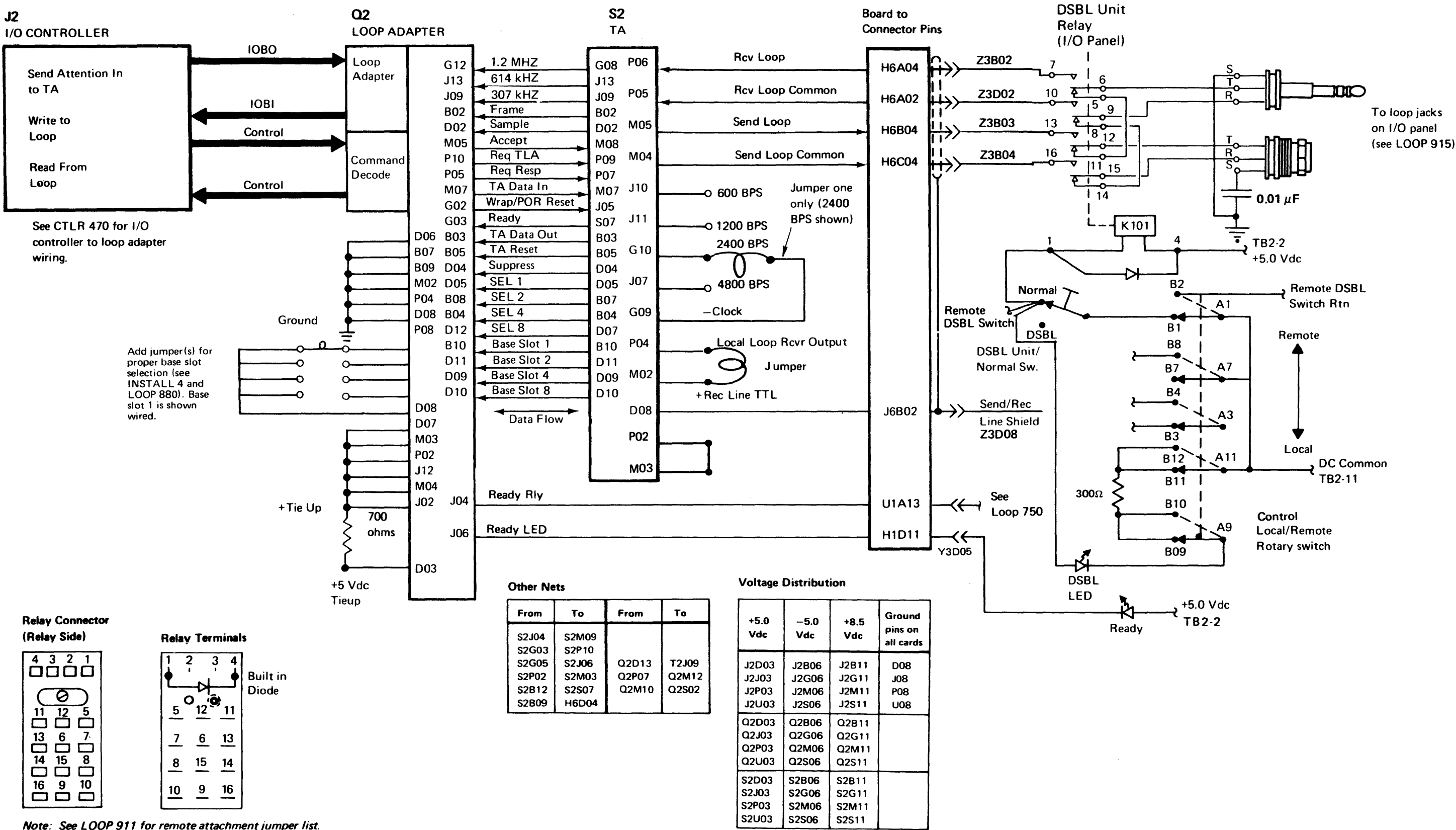
If no jumpers are plugged, the 3614 will be assigned the last base slot (slot 16). Use the chart at the left to select the proper wiring required.

Caution: No base slot should be assigned to more than one terminal on the same loop. In addition, if the Q2 card (loop adapter) is replaced, a jumper must be placed from the new card to the proper base slot.

Speed Selection Wiring

A wire-wrapped jumper must be added to the logic board as follows:

Configuration	Speed	Jumper
Local Loop	4800	S2G09 – S2J07
	2400	S2G09 – S2G10
	1200	S2G09 – S2J11
	600	S2G09 – S2J10
1200 bps Integrated Modem	1200	S2G09 – S2J11
600 bps Integrated Modem	600 (WTC only)	S2G09 – S2J10



Note: See LOOP 911 for remote attachment jumper list.



Voltage Distribution

+5.0 Vdc	R5D03 J2D03 J2J03 J2P03 J2U03	−5.0 Vdc	R5B06 J2B06 J2G06 J2M06 J2S06	+8.5 Vdc	R5B11 J2B11 J2G11 J2M11 J2S11	+12.0 Vdc	R5B04 U2B04 U4B04 (600 Bps) U2G04 (600 Bps) U4G04
	Q2D03 Q2J03 Q2P03 Q2U03 S2D03		Q2B06 Q2G06 Q2M06 Q2S06 S2B06		Q2B11 Q2G11 Q2M11 Q2S11 S2B11	−12.0 Vdc	U2D10 U4D10 (600 Bps) U2J10 (600 Bps) U4J10
	S2J03 S2P03 S2U03 U2D03 U2J03		S2G06 S2M06 S2S06 U2B06 U2G06		S2G11 S2M11 S2S11 U2B11 U2G11	Ground pins on all cards	D08 J08 P08 U08
	U4D03 U4J03		U4B06 U4G06		U4B11 U4G11		

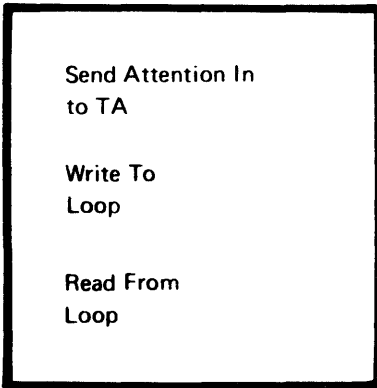
Note: The Jumpers listed may be yellow wires on the logic board or in some cases printed circuits where their presence does not affect operations of other configurations. For example, some 600 bps FDX-6 jumpers may be present on a 3614 containing 1200 bps mini-12 modem.

Jumpers (see note)

Line	From	To
Jumper	U4J04	R5R02
Jumper	T2G10	H5B13
Jumper	Q2P07	Q2M12
Jumper	Q2M10	Q2S02
Ready Relay	Q2J04	U1A13
Jumper	S2B12	S2S07
Jumper	S2G03	S2P10
Jumper	S2G05	S2J06
Jumper	S2J04	S2M09
Jumper	S2P02	S2M03
+ Echo Clamp	U2D11	U4D05
+ Data Set Ready Wrap Unclamp	U2J09 U2B10	U4B03 U4J04
Jumper	U2B07	U2D06
Jumper	U2B03	U2D05
Jumper	U2G02	U2G03
Jumper	U2G10	U2G12
Jumper	U2G05	U2G07
Jumper (1200bps mini-12 only)	U2J07	U2J08
Jumper	U2B12	U2D03
Jumper	U4J06	U4J07
Jumper	U4J12	U4J13
Jumper Receive Sensitivity *	U4G08	U4G10
+5.0 Vdc	U4D11	U4D12
− Carrier Det LED	U4B13	U4D03
	U4D09	T2B02
−Xmit Clamp	U4B09	U4D07
Jumper	U4D07	U4D08
Jumper (600 bps FDX-6 modem attach- ment only)	U2B08 U2B12 U2B13 U2D02 U2G07 U2G08 U4B07 U4G12	U2B09 U2D03 T2B03 U2D07 U2J13 U4D06 U4B08 U4G13
(2 wire)	D6E02	E6B04
(2 wire)	D6E04	E6A04

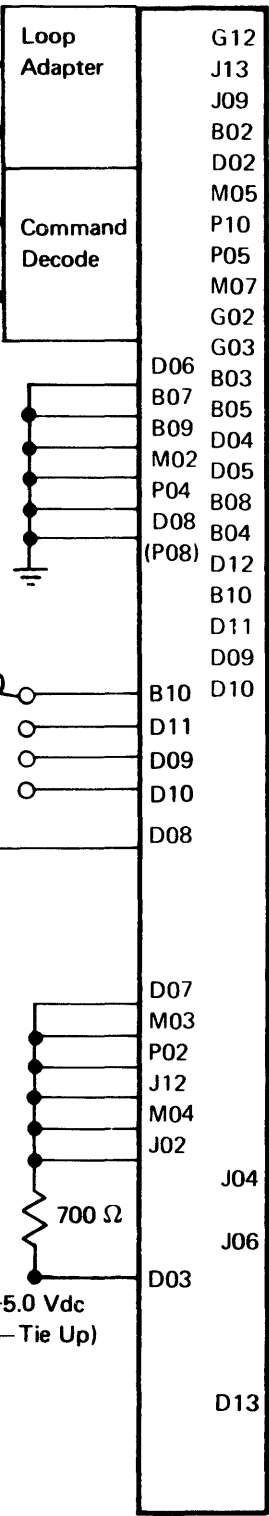
*Must be installed for WTC only.

J2
I/O CONTROLLER

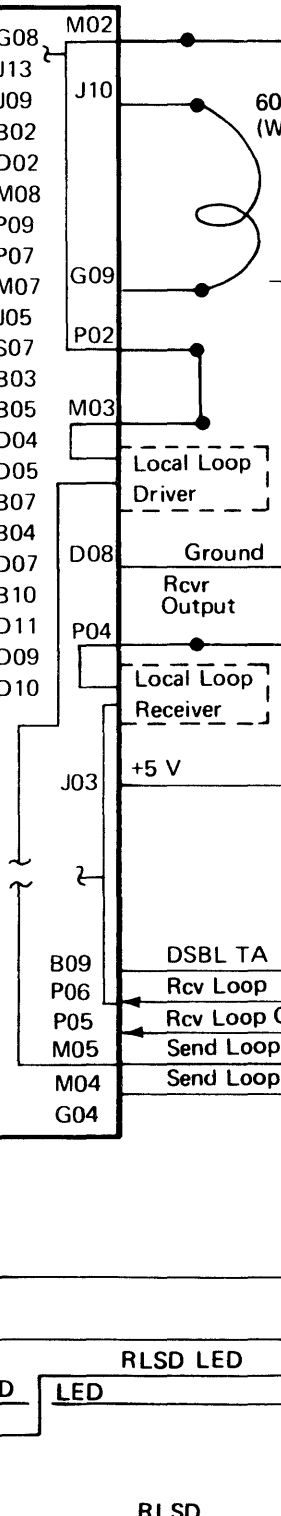


See CTLR 470 for I/O controller to loop adapter wiring.

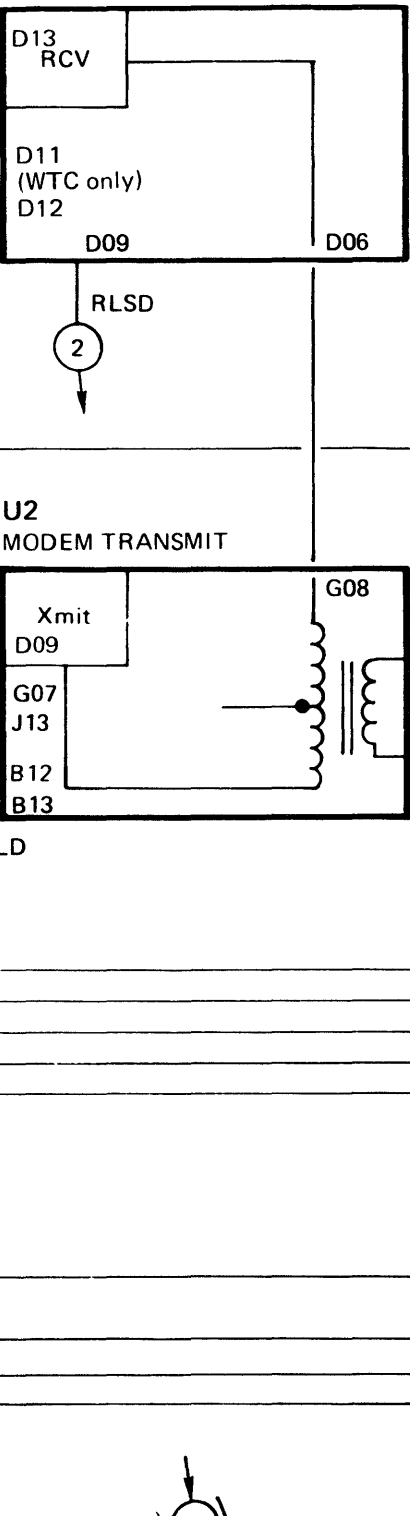
Q2
LOOP ADAPTER



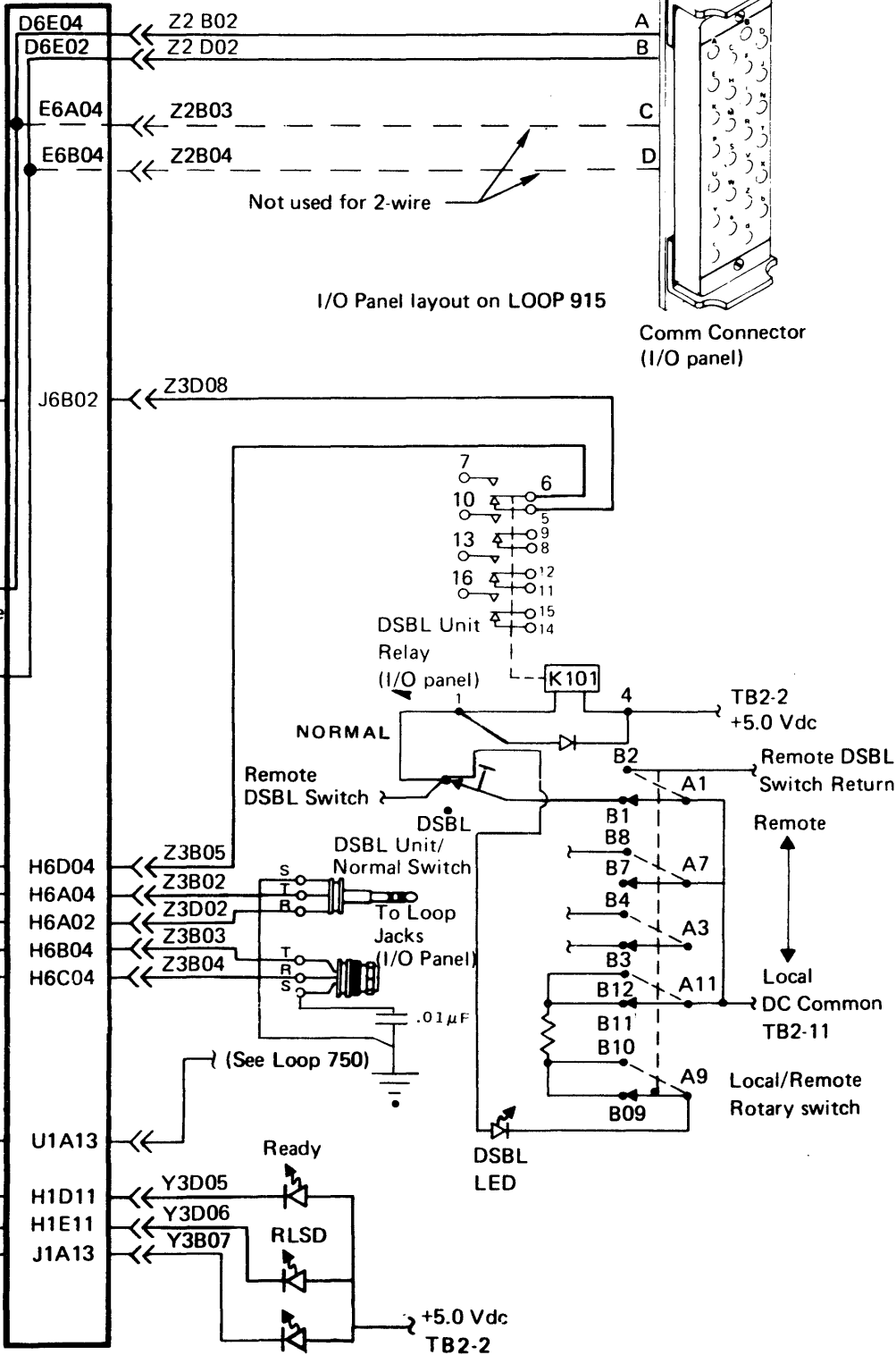
S2
TA



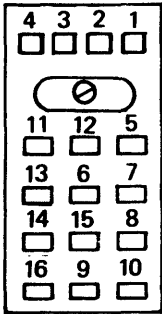
U4
MODEM RECEIVE



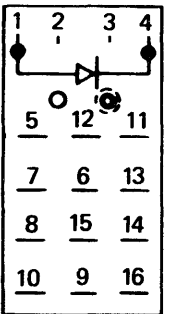
Board to
Connector Pins



Relay Connector
(Relay Side)



Relay Terminals



Built in Diode

Note: See LOOP 911 for remote attachment jumper list.

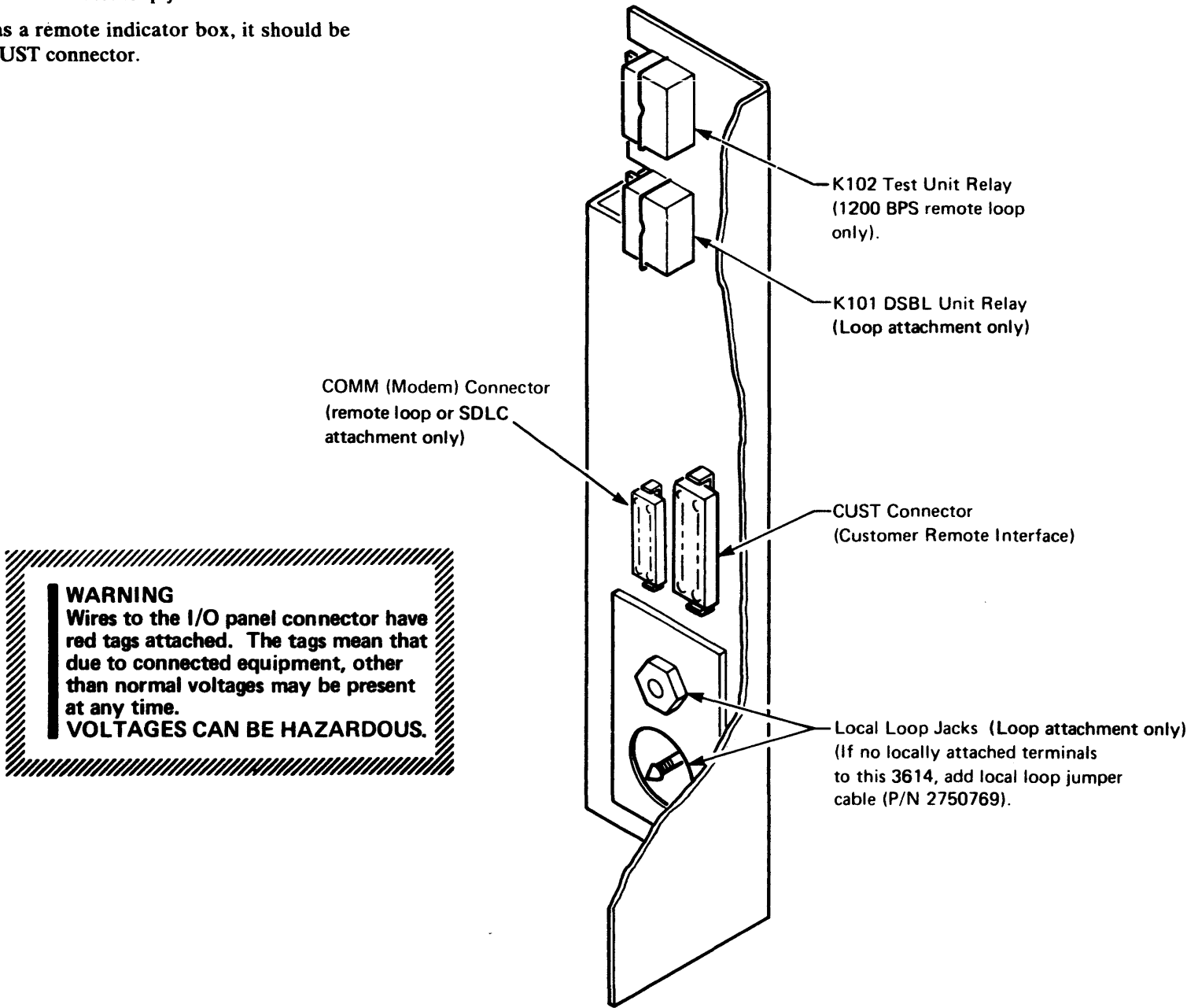
I/O PANEL

The I/O Panel assembly is located at the lower rear of the 3614 below the Op/CE panel (see LOC 10).

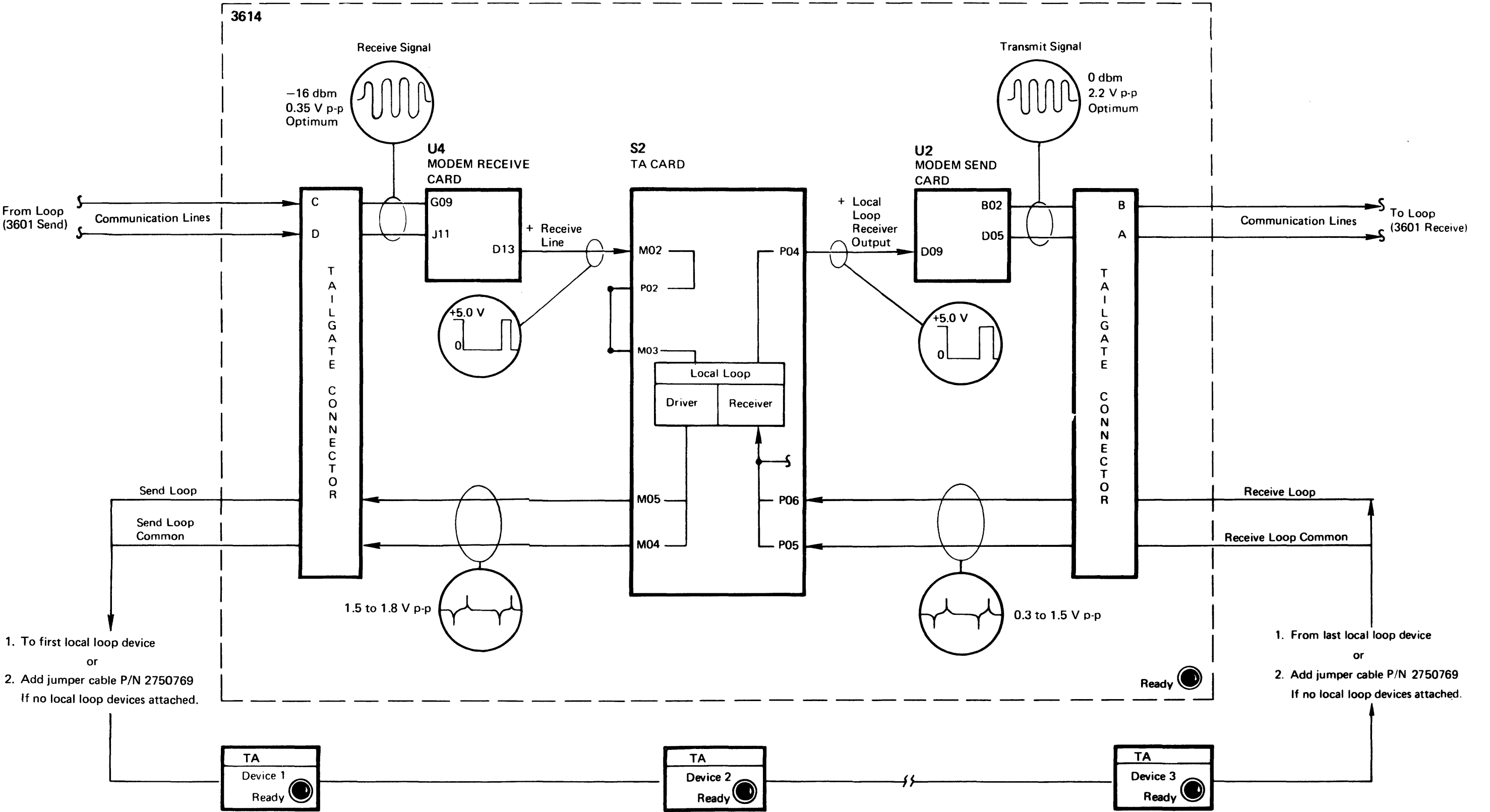
If the 3614 is at a remote location, a cable should be installed in the COMM connector.

If the 3614 is at a local location, a male and female cable should be plugged into the local loop jacks.

If the customer has a remote indicator box, it should be plugged into the CUST connector.



WARNING
Wires to the I/O panel connector have red tags attached. The tags mean that due to connected equipment, other than normal voltages may be present at any time.
VOLTAGES CAN BE HAZARDOUS.

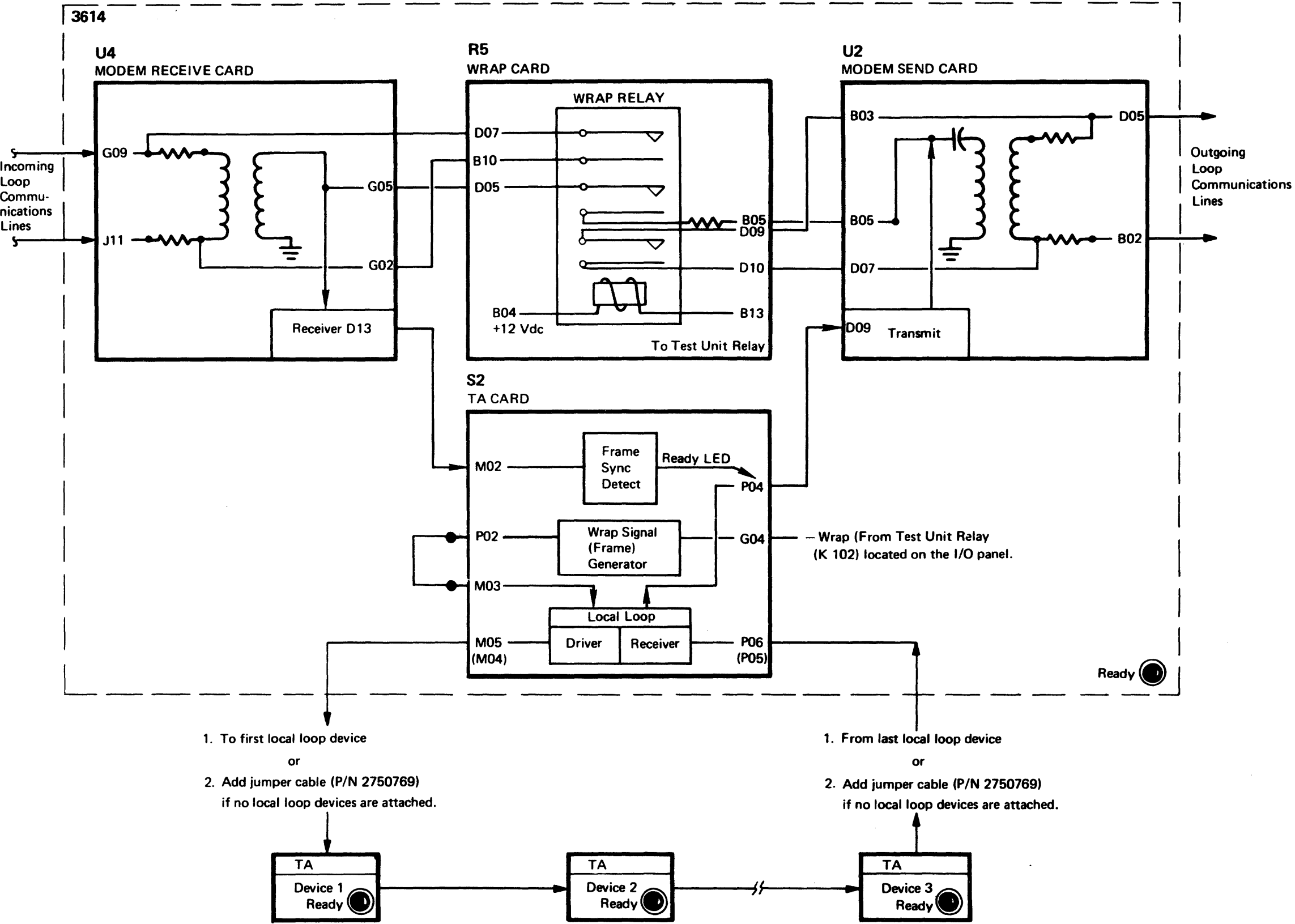


Wrap Test Circuit Operation

When executing the Wrap test, the communications circuitry signal sequence is as follows:

- 1. Set the Test Unit/Normal switch to Test Unit which causes the Test Unit relay to pick.
- 2. The test unit relay picks the wrap relay on the R5 card and starts the wrap signal generator.
- 3. The wrap signal travels through the local loop, TA, modem send card, wrap relay, modem receive card, back to the TA, and turns on the Ready indicator.

During the Wrap operation, the incoming and outgoing loop communications lines are shorted together through a resistor network.



Feature Description	Feature Number	Mode of Communication Attachment	Associated Cards	Associated Indicators and Switches	DELETE	Wires if Installed as Noted Below	ADD	Wires if Not Installed as Noted Below
Model 1 and 2	N/A	All	N/A	N/A			Ground Ground Ground Ground Ground Ground Ground Ground	L2J10 to L2J08 N2B02 to M1E11 N2D10 to M1E11 N2P10 to N2P08 N2D05 to N2D08 T4D12 to T4D08 T4D07 to T4J08 T4B09 to T4D08
3614 without deposit feature.	N/A	All	N A	N/A			Ground Ground	TB7-2 to TB7-3 N2G05 to M2J08 N2D09 to M2D08
3614 with deposit feature.	3322	All	N A	N/A	Ground Ground	N2G05 to M2J08 N2D09 to M2D08 TB7-2 to TB7-3		
Model 11 and 12	N/A	All	N A	Denomination Select Switch	Ground Ground Ground Ground Ground Ground Ground Ground	L2J10 to L2J08 N2B02 to M1E11 N2D10 to M1E11 N2P10 to N2P08 N2D05 to N2D08 T4D12 to T4D08 T4D07 to T4J08 T4B09 to T4D08		
3614 with Depository-Printer	RPQ MG3746	All	V4	N/A			Ground	L2B05 to L2D08

3614 CONFIGURATION BYTES

The 3614 configuration bytes are stored in Non-Volatile Memory (NVM) addresses '0046', '0047', and '005F'. Configuration data is entered from the Op/CE Panel. Entry procedures are described on START 8. Entry data for this 3614 are on INSTALL 4. All 3 bytes can be shown by displaying log as follows: (See caution.)

CAUTION: The 3614 configuration bytes entered into NVM must match those generated in the Host program for this 3614 for correct operation. It is your customer's responsibility to ensure that his program is generated to match the hardware configuration of this 3614

DISPLAY CONFIGURATION BYTES

- Set the Function Select switch to Display Log.
- Set the Data Entry switches to 'B2'.
- Operate Execute once (Display = 'xxyy'). Record the 1st two configuration bytes.
- Set the Function Select switch to Enter Address.
- Set the Data Entry switches to '00'; operate Execute once.
- Set the data entry switches to '5F'; operate Execute once.
- Set the Function Select switch to Display Data.
- Operate Execute once; display = 'bbzz', record zz (3rd configuration byte).

Note 1: Configuration bytes are entered into NVM using the Function Select, Data Entry, and Execute switches. The 3614 will not recognize that a change has occurred until a manual or Power-on Reset (POR) initiates the Bring-up tests and writes the NVM into storage.

The meaning of each bit in the first and third bytes is described below. The second byte (Station ID) is assigned by the customer (bank). See configuration byte 2.

CONFIGURATION BYTE 1

Value	Bit	Meaning
8	0	Unassigned.
4	1	Off - No modem or modem without wrap feature. On - Modem with wrap feature is installed.
2	2	Ignored by the 3614 code. The 3614 does not support switched lines.

CONFIGURATION BYTE 1 (Continued)

Value	Bit	Meaning
1	3	Off - Non-NRZI and no leading pads (see Note 2). On - NRZI and leading pads (see Note 2).
8	4	Off - Normal (high) speed data rate (see Note 4). On - Low speed data rate (see Note 4).
4	5	Off - Controlled Request-To-Send (RTS); 2-wire only or EIA adapter. On - Permanent RTS; 4-wire only.
2	6	Unassigned.
1	7	Off - Normal DFM speed (see Note 3). On - Slow DFM speed (see Note 3 - France only).

CONFIGURATION BYTE 2

This byte is hex address for SDLC machines and '00' for loop machines. The Station ID (byte 2) is the same as the cluster address specified in the customer's 3704/3705 Network Control Program (NCP) at NCP Generation time.

Consult with customer to obtain cluster address for configuration byte 2 bit assignments.

CONFIGURATION BYTE 3

Value	Bit	Meaning
8	0	Off - Configuration data not entered. On - Configuration data entered.
4	1	Unassigned.
2	2	Unassigned.
1	3	Off - Lobby model. On - Through-the-Wall (TTW) model.
8	4	Off - No printer attached. On - Printer feature attached.
4	5	Off - No depository attached. On - Depository feature attached.
2	6	Must be off.
1	7	Off - Single Document Feed Mechanism. On - Dual Document Feed Mechanism.

Note 2: Specify NRZI encoding when

- The SDLC communication feature with clocking (No. 6301) is used or
- The SDLC communication feature without clocking (No. 6302) is used and NRZI encoding is recommended for the attaching modem.

Specific modem requirements for commonly used modems in USA and Canada are listed in the IBM Data Communication Handbook. For other countries, the IBM Sales Manual M2700 Pages and the IBM Signal Converter Handbook contain recommendations for each IBM modem and PTT mandatory facility. Your IBM SE or Sales Representative will assist you in determining the required specification.

The primary station (3704/5) port and the 3614(s) connected to that port must be consistent in their specification of NRZI parameter controlling the transmission encoding.

Note 3: DFM speed is difficult to observe optically. The following procedure is suggested for timing the DFM feed rate (a watch with a second hand is required).

Measure DFM feed rate at three bills per second (normal rate):

1. Load all standard test documents in DFM.
2. Enter the transaction power program '0222'.
Program ID = '0222'
Parameters = '00 00 00 00 00'
Function Select switch to Start/Stop
Operate Execute
Transaction power should come up.
3. Enter the feed documents program '0226'
Program ID = '0226'
Parameters = '00 00 00 14 00'
Function Select switch to Start/Stop
Using a watch/clock with a second hand, prepare to measure the DFM feed rate. The documents will feed from station 2 on a dual DFM. The rate is measured from the time the Execute switch is operated until the last document is fed. Operate Execute. Observe the elapsed time (about 7-9 seconds).
4. Remove documents from the Escrow unit. Count the documents. There should be 20 documents.

If the elapsed time was about 7-9 seconds and there were 20 documents, DFM is running at its proper speed.

Measure DFM feed rate at two bills per second (slow option rate selected):

1. Load all standard test documents in DFM.
2. Enter the transaction power program '0222'.
Program ID = '0222'
Parameters = '00 00 00 00 00'
Function Select switch to Start/Stop
Operate Execute
Transaction power should come up.
3. Enter the feed documents program '0226'
Program ID = '0226'
Parameters = '00 00 00 14 00'
Function Select switch to Start/Stop
Using a watch/clock with a second hand, prepare to measure the DFM feed rate. The documents will feed from station 2 on a dual DFM. The rate is measured from the time the Execute switch is operated until the last document is fed. Operate Execute. Observe the elapsed time (about 11-13 seconds).
4. Remove documents from the Escrow unit. Count the documents. There should be 20 documents.

If the elapsed time was about 11-13 seconds and there were 20 documents, DFM is running at the selected option (slow) speed.

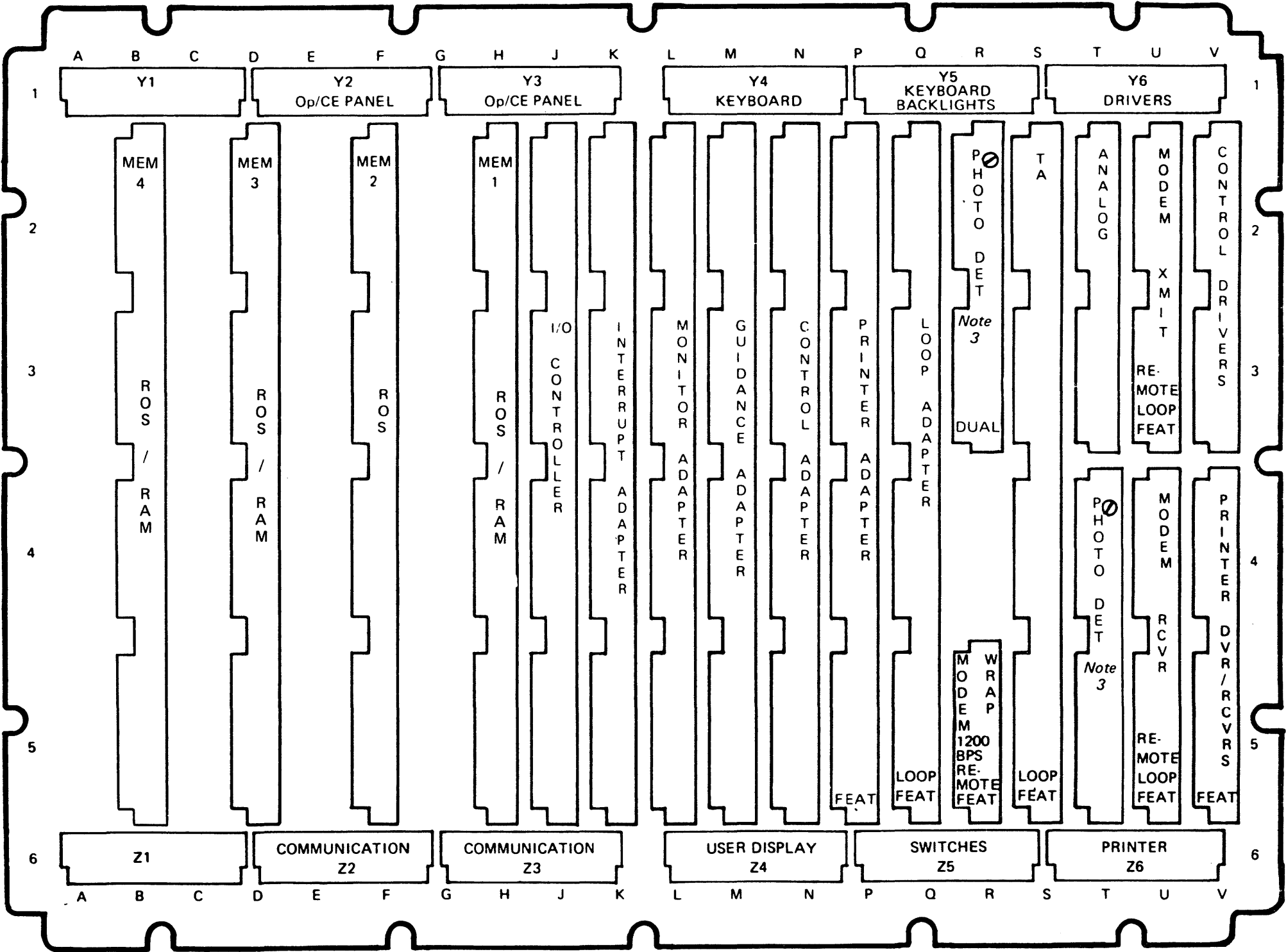
Note 4: Some external data sets have a capability for normal (high) speed data rate or half (low) speed data rate.

However, the 3614 is unable to change to these data rates at this time; therefore, this bit is "off".

BOARD (Card Side)

LOC	Name	Part No.
B2	MEM	2751448
D2	MEM	4160883
F2	MEM	4160882
H2	MEM	4160881
J2	I/O Controller	8523384
K2	Interrupt Adapter	4161200
L2	Monitor Adapter	4161595
M2	Guidance Adapter	2751194
N2	Control Adapter	1707772
P2	Printer Adapter	2750945
Q2	Loop Adapter	1706953
R2	Photo Detect Mod (11, 12)	Note 4
R5	Modem Wrap	5862864
S2	TA	Note 5
T2	Analog	1706977
T4	Photo Detect	Note 4
U2	Modem XMIT, 1200 Baud	Note 1
U2	Modem XMIT, 600 Baud	5864159
U4	Modem RCVR, 1200 Baud	Note 2
U4	Modem RCVR, 600 Baud	5864160
V2	Control Drivers	4161227
V4	Printer DVR/RCVRS	4160950
—	Board	4520589
Printer	Print Magnet Drivers(M/D)	4160535
Power Supply	POWI	8527190

- Notes:
1. Modem XMIT (1200 Baud) card 5863763, 5864374, or 5864353 may be used in location U2.
 2. Modem RCVR (1200 Baud) card 5862859 or card 5864331 may be used in location U4.
 3. Doubt-document feed sense circuit must be adjusted when these cards are exchanged or installed new. See DFM 980.
 4. Use Card P/N 4520309 except for those currencies that require P/N 4520318 as shown on DFM 982.
 5. For TA, use Card P/N 1744806 or 4404240.

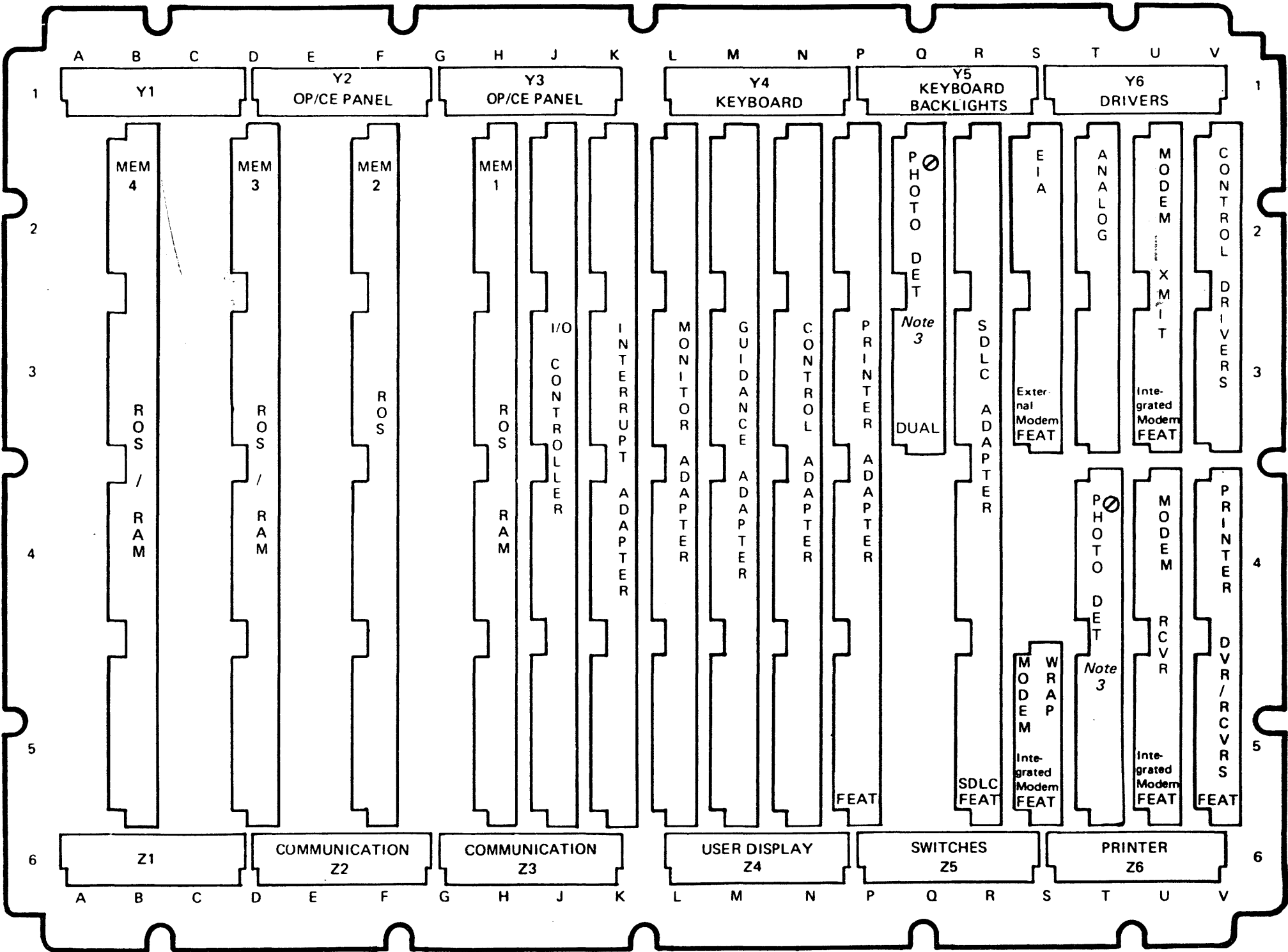


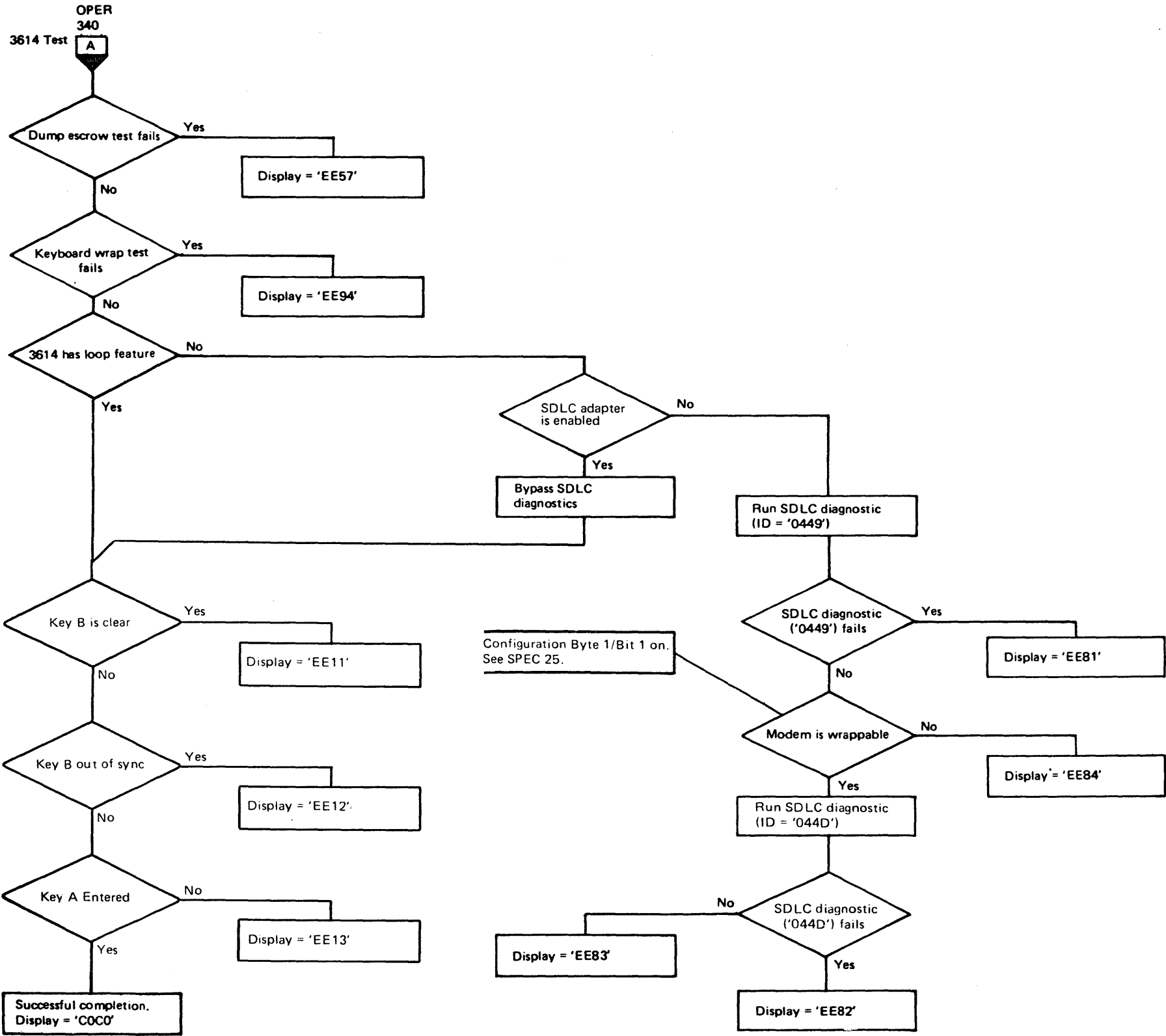
LOC	Name	Part No.
B2	MEM	2751447
D2	MEM	4160885
F2	MEM	4160882
H2	MEM	4160881
J2	I/O Controller	8523384
K2	Interrupt Adapter	4161200
L2	Monitor Adapter	4161595
M2	Guidance Adapter	2751194
N2	Control Adapter	1707772
P2	Printer Adapter	2750945
Q2	Photo Detect Mod (11.12)	Note 4
R2	SDLC Adapter, with Clocking	8526485
R2	SDLC Adapter, without Clocking	8523016
S2	EIA	8523023
S5	Modem Wrap	5862864
T2	Analog	1706977
T4	Photo Detect	Note 4
U2	Modem XMIT	Note 1
U4	Modem RCVR	Note 2
V2	Control Drivers	4161227
V4	Printer DVR/RCVRS	4160950
—	Board	4520590
Printer	Print Magnet Drivers(M/D)	4160535
Power Supply	POWI	8527190

Notes:

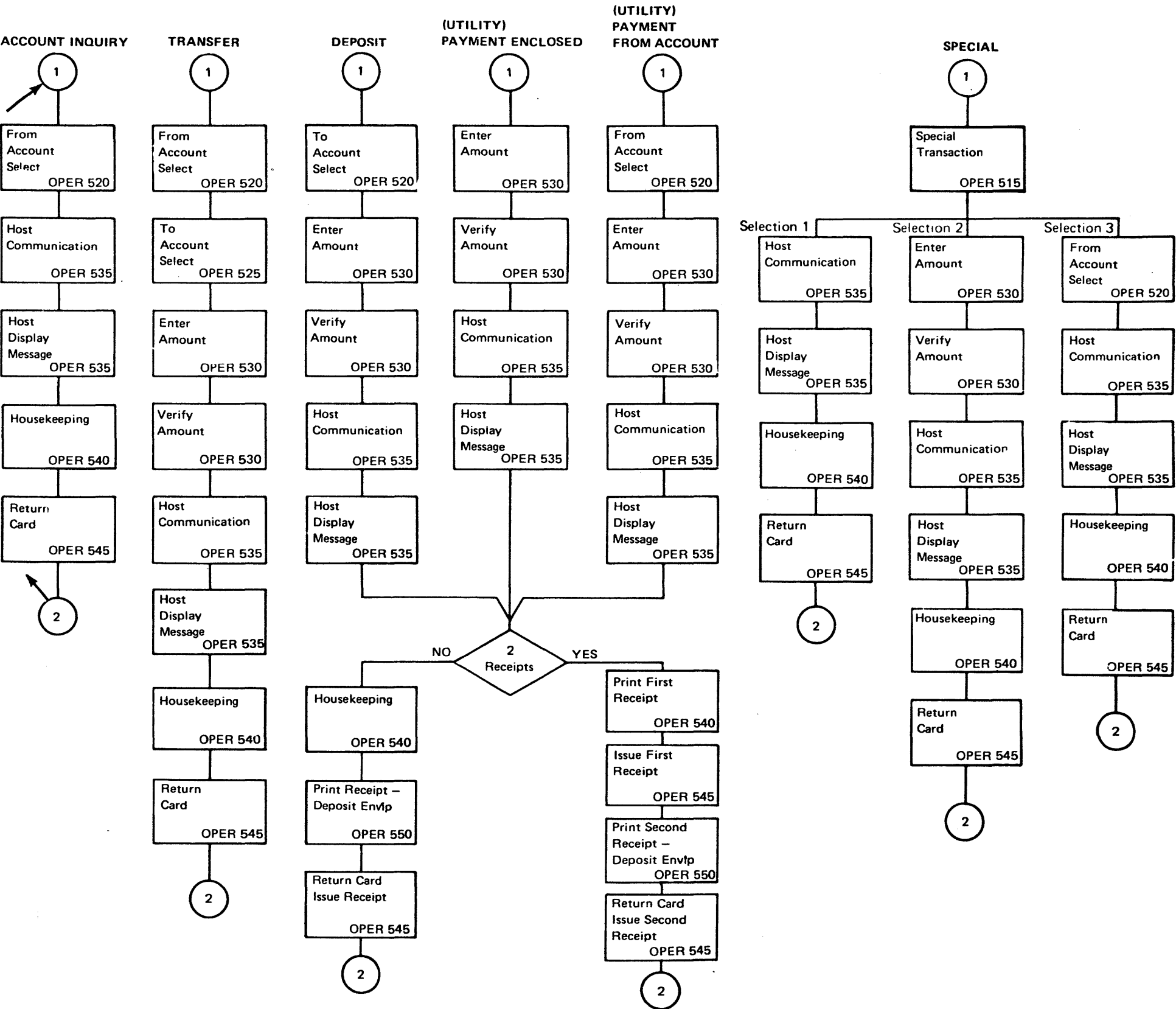
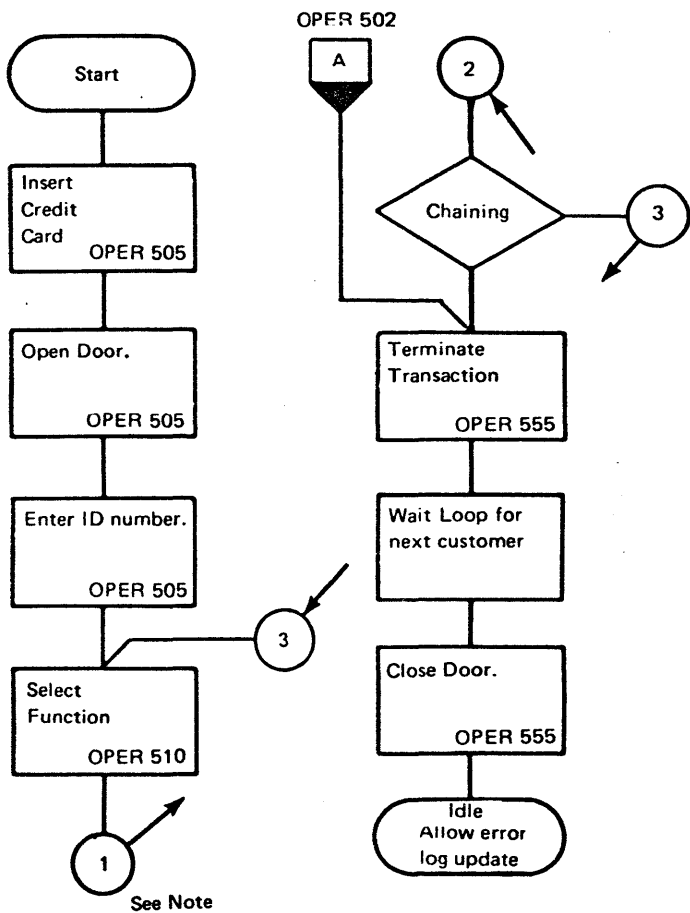
1. Modem XMIT card 5863763, 5864353, or 5864374 may be used in location U2.
2. Modem RCVR card 5862859 or card 5864331 may be used in location U4.
3. Double-document feed sense circuit must be adjusted when these cards are exchanged or installed new. See DFM 980.
4. Use Card P/N 4520309 except for those currencies that require P/N 4520318 as shown on DFM 982.

BOARD (Card Side)

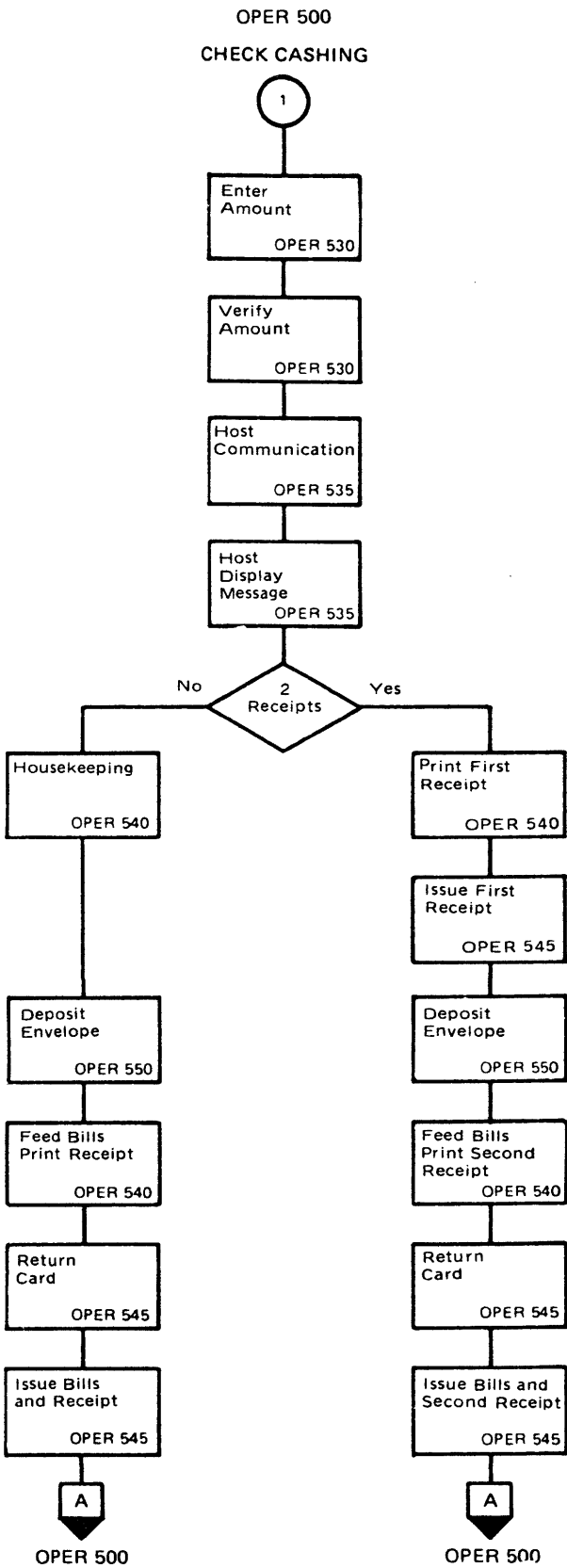
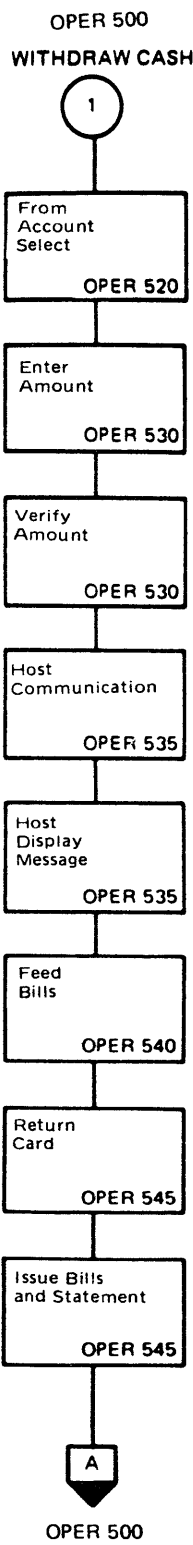




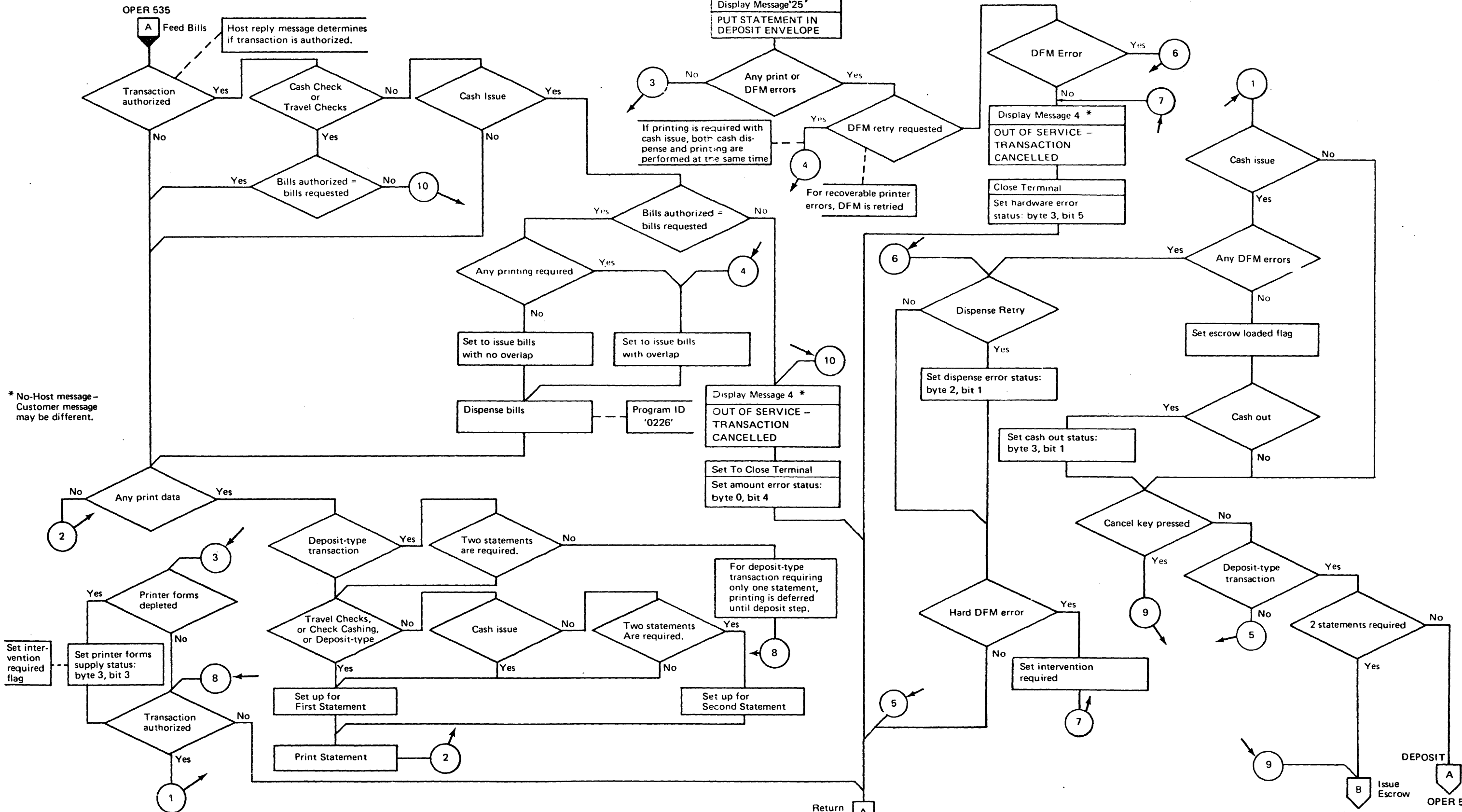
TRANSACTION OVERVIEW



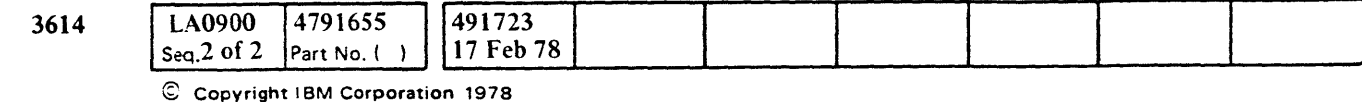
Note: Refer to OPER 502 for Withdraw Cash or Check Cashing overview.

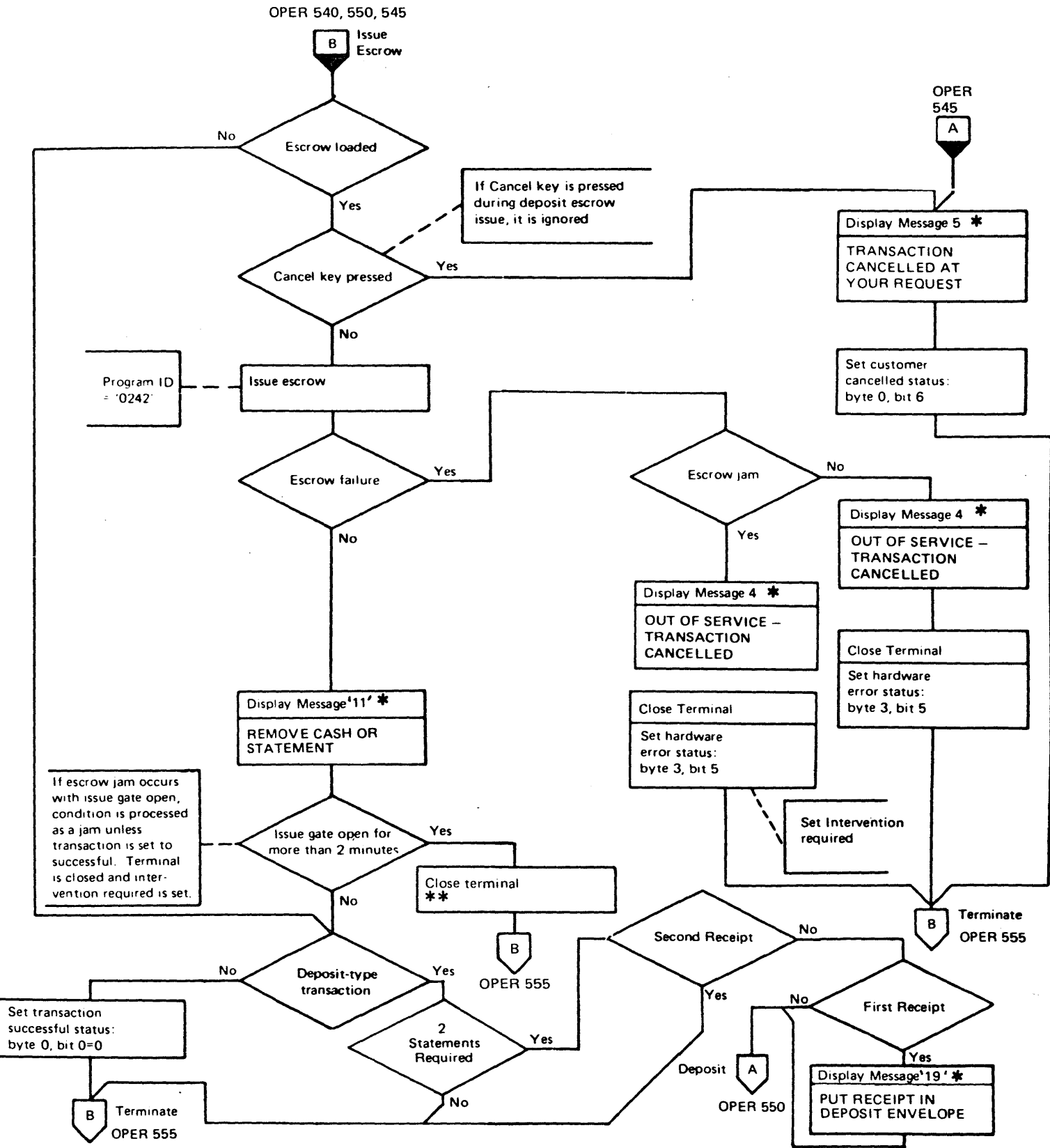


Note: Withdraw Cash or Check Cashing must be the last transaction in a chained group of transactions.



* No-Host message - Customer message may be different.





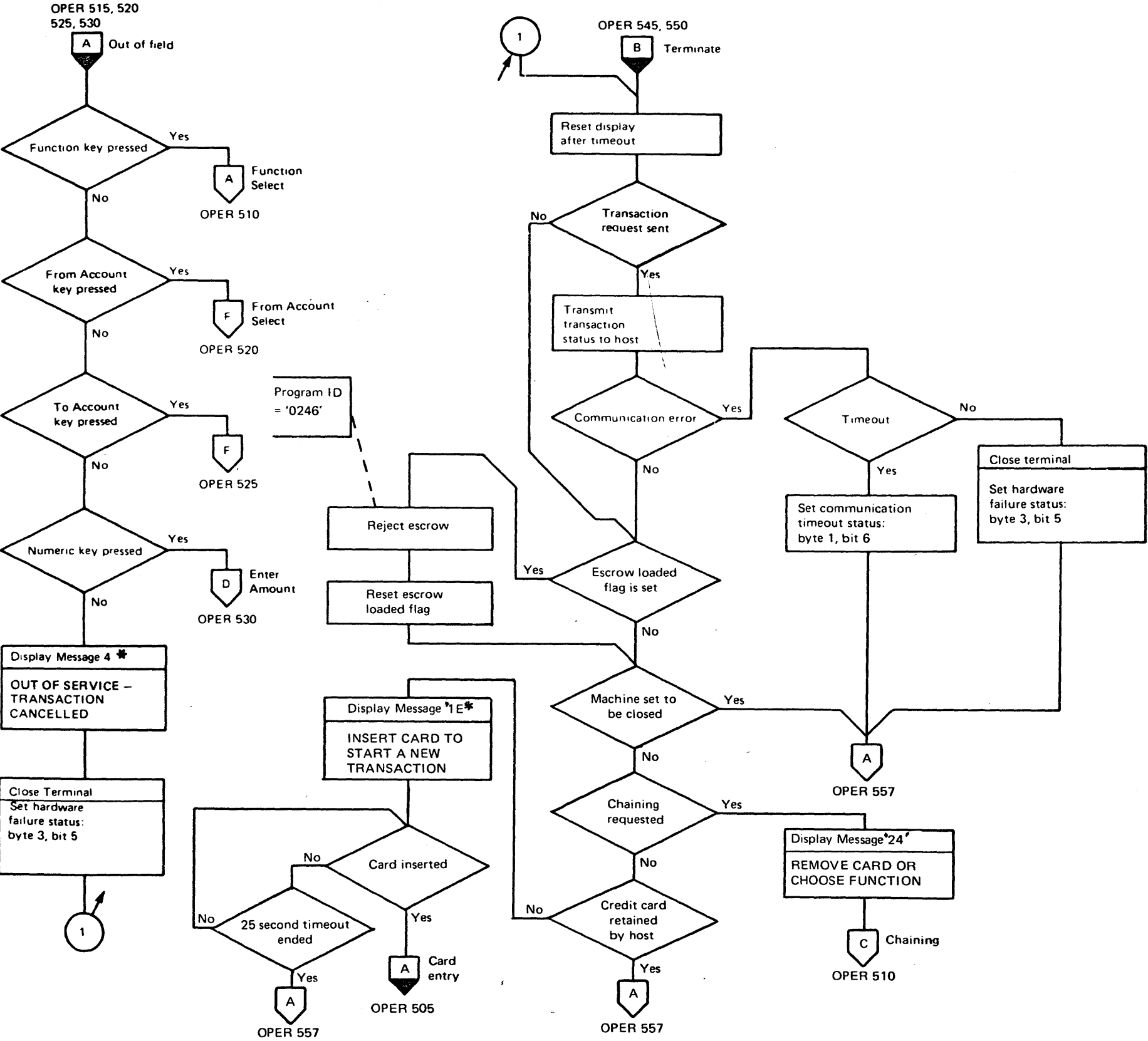
* No-Host message — Customer message may be different.
** This path does not close terminal, but does preclose routine.

DEPOSIT OPER 550

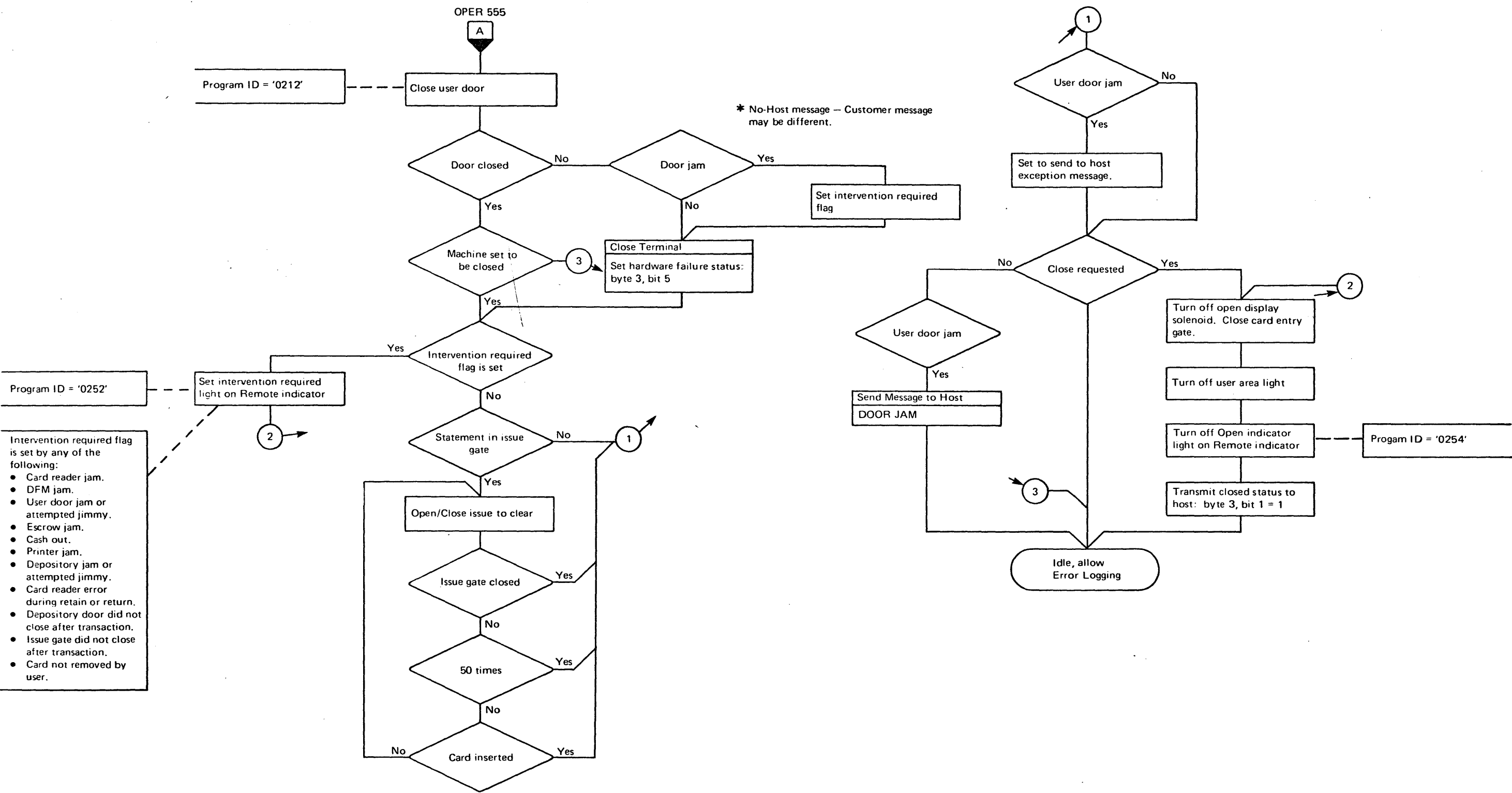


TERMINATE TRANSACTION, CLOSE DOOR

TERMINATE TRANSACTION, CLOSE DOOR OPER 555

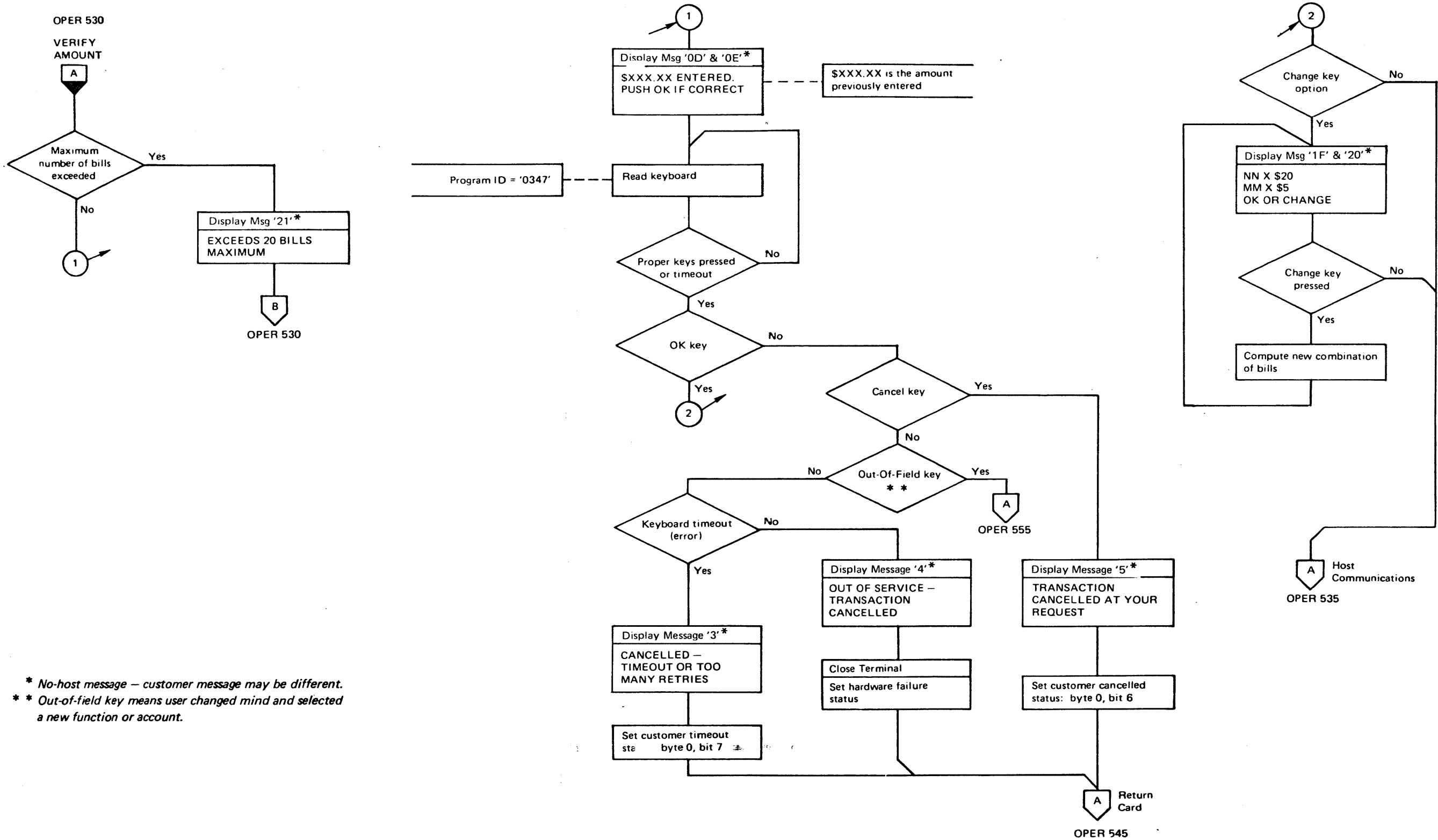


* No-Host message – Customer message may be different.



VERIFY AMOUNT

VERIFY AMOUNT OPER 560



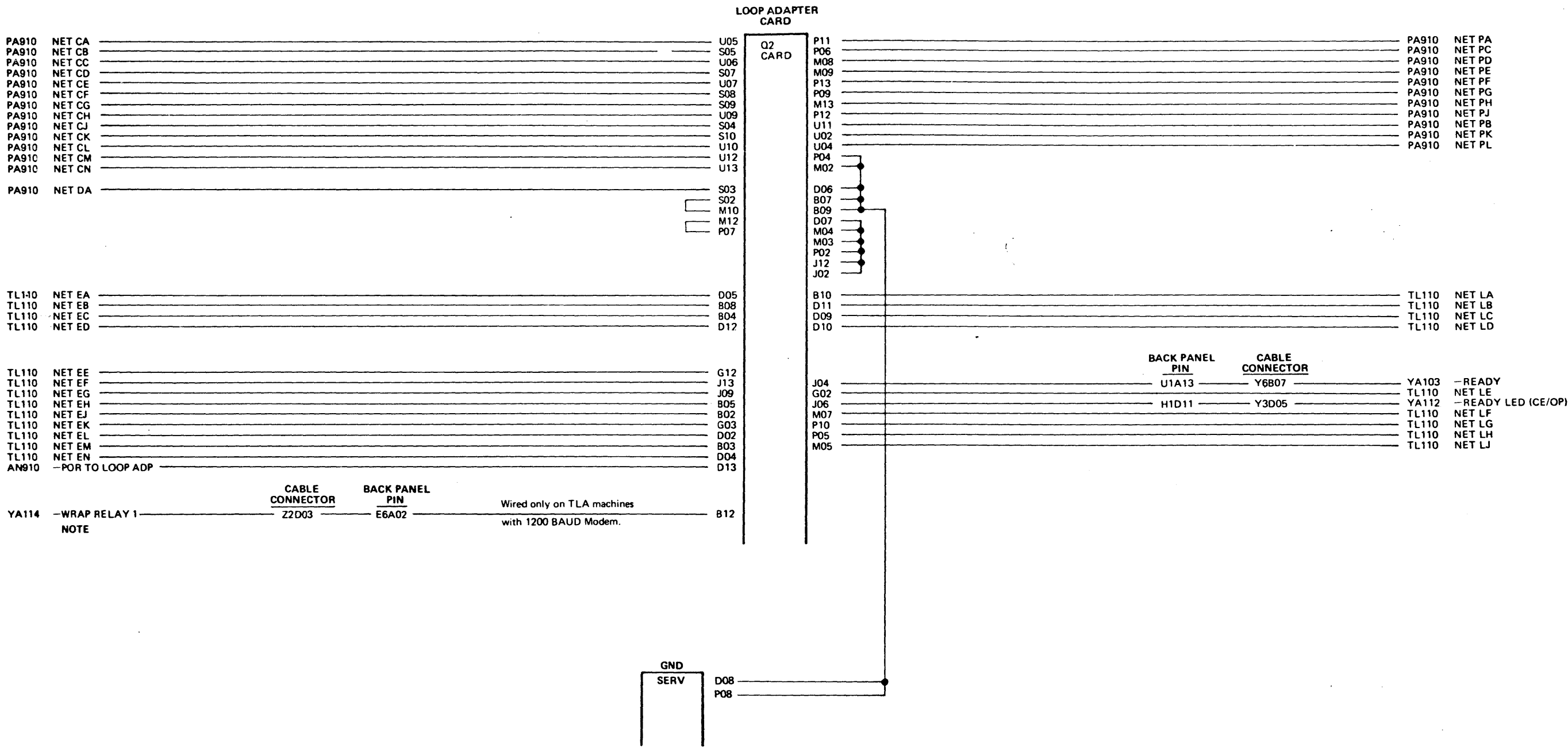
* No-host message - customer message may be different.
* * Out-of-field key means user changed mind and selected a new function or account.

LOOP ADAPTER

LOOP ADAPTER

WD 40

LA910



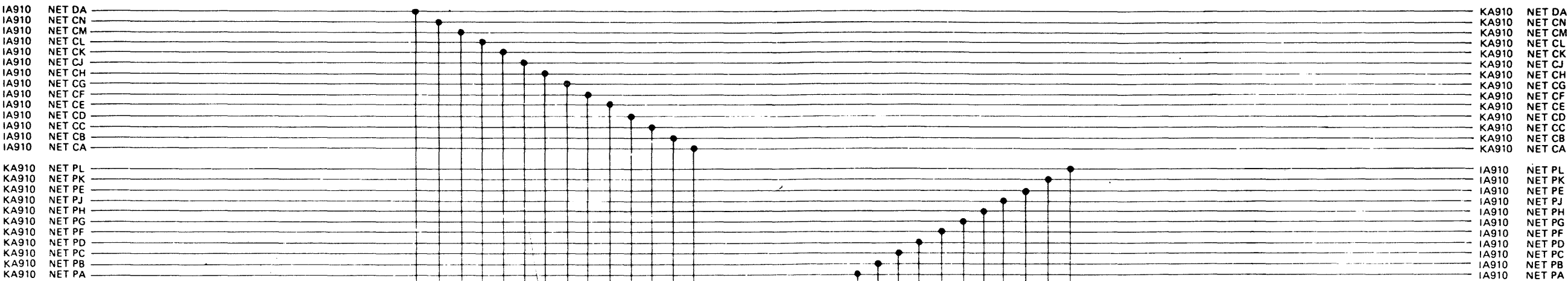
LA910

LA910

LOOP ADAPTER

WD 40

MA910



CABLE CONNECTOR		BACK PANEL PIN	
YA111	+DATA SW 0	Y2D09	F1B11
YA111	+DATA SW 1	Y2B10	F1C13
YA111	+DATA SW 2	Y2D10	F1C11
YA111	+DATA SW 3	Y2D11	F1D11
YA111	+DATA SW 4	Y2B12	F1E13
YA111	+DATA SW 5	Y2D12	F1E11
YA111	+DATA SW 6	Y2B13	G1A13
YA111	+DATA SW 7	Y2D13	G1A11
YA111	+FUNCTION SW 0	Y3B02	H1A13
YA111	+FUNCTION SW 1	Y3D02	H1A11
YA111	+FUNCTION SW 2	Y3B03	H1B13
YA111	+FUNCTION SW 3	Y3B04	H1C13
YA111	-EXECUTE SW	Y3B08	J1B13
YA104	+6 V BATTERY	Z5D03	Q6A02
YA104	-4 V BATTERY	Z5B11	R6D04
YA104	-POR (NVM)	Z5B04	Q6B04
IA910	-10 MS CLOCK A		
IA910	-10 MS CLOCK B		
YA111	DENOM SW	Y3B06	H1E13
+SENSE 1-0			D02
1-1			B03
1-2			D04
1-3			D05
1-4			B05
1-5			D10
1-6			B10
1-7			G09
2-0			J11
2-1			J12
2-2			G12
2-3			J13
2-4			G13
2-5			P02
2-6			M03
2-7			P04
-GATE FUNNEL			P10

BACK PANEL PIN	CABLE CONNECTOR	
E1E11	Y2D07	YA111 + BLANK LEFT
E1E13	Y2B07	YA111 + BLANK RIGHT
F1B13	Y2B09	YA111 - COPY LEFT
F1A13	Y2B08	YA111 - COPY RIGHT
D09	D1E13	YA111 + AD BUS 0 PWD
B09	D1E11	YA111 + AD BUS 1 PWD
D07	E1A13	YA111 + AD BUS 2 PWD
B07	E1B13	YA111 + AD BUS 3 PWD
B02	E1B11	YA111 + AD BUS 4 PWD
B08	E1C13	YA111 + AD BUS 5 PWD
D06	E1C11	YA111 + AD BUS 6 PWD
B04	E1D11	YA111 + AD BUS 7 PWD

Note: I/O pin L2P10 must be wired to ground.
Sense 1 and Sense 2 I/O pins are individually
wired to ground for particular features when
installed. For specific feature, see SPEC 21.

SDLC MESSAGE TYPES

Two types of messages are transmitted from the 3614 to the host system:

Transaction Request
Status

Two types of messages are transmitted from the host to the 3614:

Transaction Reply
Command

TRANSACTION REQUEST

Format of a Transaction Request Message:

Line Control	Net Control	Message	Line Control
F, A, C,	TH, RH	L, N, C, SC, VAR, PC, FAS, FS, TAS, FS, SPT, AMT, MX, FS, CD	BC, F

- F = Flag Character (1 byte) always '7E'.

A = 3614 Address (1 byte)

C = Control Field (1 byte) content determined by program.

TH = Transmission Header (6 bytes) contains origin and destination of addresses and sequence numbers.

RH = Request/Response Header (3 bytes) specifies the type of network control command or data.

L = Message Length (1 byte) indicates number of bytes in message field.

N = Transaction Number (1 byte) contains the transaction sequence number.

C = Message Class (1 byte) '01' for transaction request message.

SC = Message Subclass (1 byte):

'00' = Incomplete Transaction

'01' = Cash Request

'02' = Account Inquiry

'03' = Deposit

'04' = Funds Transfer

'05' = Loan/Bill Payment

'06' = Special Transaction

'07' = Incomplete Transaction deposit flap jammed.

'08' = Loan bill payment by funds transfer.

'09' = Check Cashing

'0A' = Travelers Checks

VAR = Cash Counter (1 byte) indicates number of bills dispensed. It is also used for transaction number.

PC = Customer ID Number (8 bytes) 16 hexadecimal digits. The hex digits correspond to the key number pressed, plus pad digits (digit specified by financial institution). (For example, Key 3=hex 3, Key 5=hex 5.)

Note: The PC and VAR fields are encoded.

FAS = From Account Select (1 to 3 bytes):

'21' = From Checking

'22' = From Savings

'23' = From Credit Card

'24' = From Special (may contain up to 3 numeric modifiers).

FS = Field Separator (1 byte) always 'FE'.

TAS = To Account Select (0 to 3 bytes) field not used for Cash Request Messages:
- '31' = To Checking

'32' = To Savings

'33' = To Credit Card

'34' = To Special (may contain up to 3 numeric modifiers)

FS = Field Separator (1 byte) always 'FE'.

SPT = Special Transaction Number Field (1 byte). Present only for special transaction request messages.

AMT = Keyboard Data (up to 10 bytes) indicates keyboard entries:

'F0' = Key 0

'F1' = Key 1

'F2' = Key 2

'F3' = Key 3

'F4' = Key 4

'F5' = Key 5

'F6' = Key 6

'F7' = Key 7

'F8' = Key 8

'F9' = Key 9

'4B' = Key (decimal) or 000 (triple zero)

MX = Change Key (1 byte) for Dual-Denomination machines. Contains the number of times (binary) Change key was pressed. Contains zero for Single-Denomination machines.

FS = Field Separator (1 byte) always 'FE'.

CD = Card Data (up to 22 bytes) contains data read from customer's account card. Data is packed two digits per byte. EOC, SOC, and LRC characters are not included:

0000 = Character 0

0001 = Character 1

0010 = Character 2

0011 = Character 3

0100 = Character 4

0101 = Character 5

0110 = Character 6

0111 = Character 7

1000 = Character 8

1001 = Character 9

BC = Block Check Character (1 byte)

F = Flag Character (1 byte) always '7E'.

STATUS, C = '15'
Format for a Status message:

Line Control	Net Control	Message	Line Control
F, A, C	TH, RH	L, N, C, SC, N, RES, L-8, CNTR, STATUS, INDX, LD, DATA	FCS, F

Line control and net control characters are defined in Transaction Request message (see COMM 600).

- L = Message Length (1 byte) indicates number of bytes in message field.
- N = Transaction Number (1 byte) contains the transaction sequence number.
- C = Message Class (1 byte) '15' for status message.
- SC = Message Subclass (1 byte):
 '01' = Transaction Complete
 '02' = Command Status (see Note 1)
 '03' = Exception Status
 '04' = Initialization Response
 '08' = Recovery Request (see Note 2)
- N = Transaction Number (1 byte) same as N above.
- RES = Cash Counter No. 1 (1 byte) Model 11 & 12 only.
- L-8 = Length of message beyond enciphered field.
- CNTR = Cash Counter (1 byte) indicates number of bills dispensed. (Cash Counter No. 1 for Model 1 & 2; Cash Counter No. 2 for Model 11 & 12.) & 12.)

- STATUS = Status information (4 bytes), normally '00 00 00 00'. Individual bits are defined on COMM 348.
- INDX = Displacement (1 byte) from byte 0 of the Customized Option Data of first byte to be read or changed.
- LD = Number (1 byte) of bytes to be read or changed.
- DATA = Option data requested or changed.

Note 1: *Request or Change Data commands contain a data field of 0-30 bytes of option data. Inquiry Maintenance Data command does not use the INDX or LD fields and has maintenance data bytes 4 to 111 instead.*

Note 2: *Recovery Request Status field has last status, not current status. INDX, LD, and DATA are not sent. In their place, the transaction number of the last successful transaction and the current value of the transaction counter are sent.*