

**48230 LOCAL AREA DATA SET**  
**MAINTENANCE AND TEST PROCEDURES**

**1. GENERAL**

**1.01** This section covers the 48230 Local Area Data Set manufactured by Codex Corporation.

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

**1.03** Maintenance and test procedures for the Local Area Data Set are contained in the attached reprint of the practice prepared by Codex Corporation.

**1.04** Descriptive information and installation and connection procedures are covered in Sections 592-035-100 and 592-035-200, respectively.

LOCAL AREA DATA SET  
(48230)

MAINTENANCE AND TEST PROCEDURES

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1.0 GENERAL

1.01 This section contains a list of controls and indicators on the Codex Local Area Data Set (LADS) together with their functions; an operating procedure consisting of power turn-on, operating instructions, and power turn-off; and a unit and system test procedure.

1.02 Installation procedures must be completed and checked before attempting to operate the LADS. Following initial power turn-on, the LADS will operate completely unattended.

2.0 CONTROLS AND FUNCTIONS

2.01 All controls and indicators are accessible from the front panel of the LADS. Access to the diagnostic test switches (all located on card A2) is obtained by lowering the hinged cover on the front panel (see Figure 2-1). The diagnostic indicators (LED's) also are located on card A2, and the POWER ON indicator (LED) is located on the power supply card. All indicators are visible through the front panel with the hinged cover shut. The function of each control and indicator is described in Table 2-1.

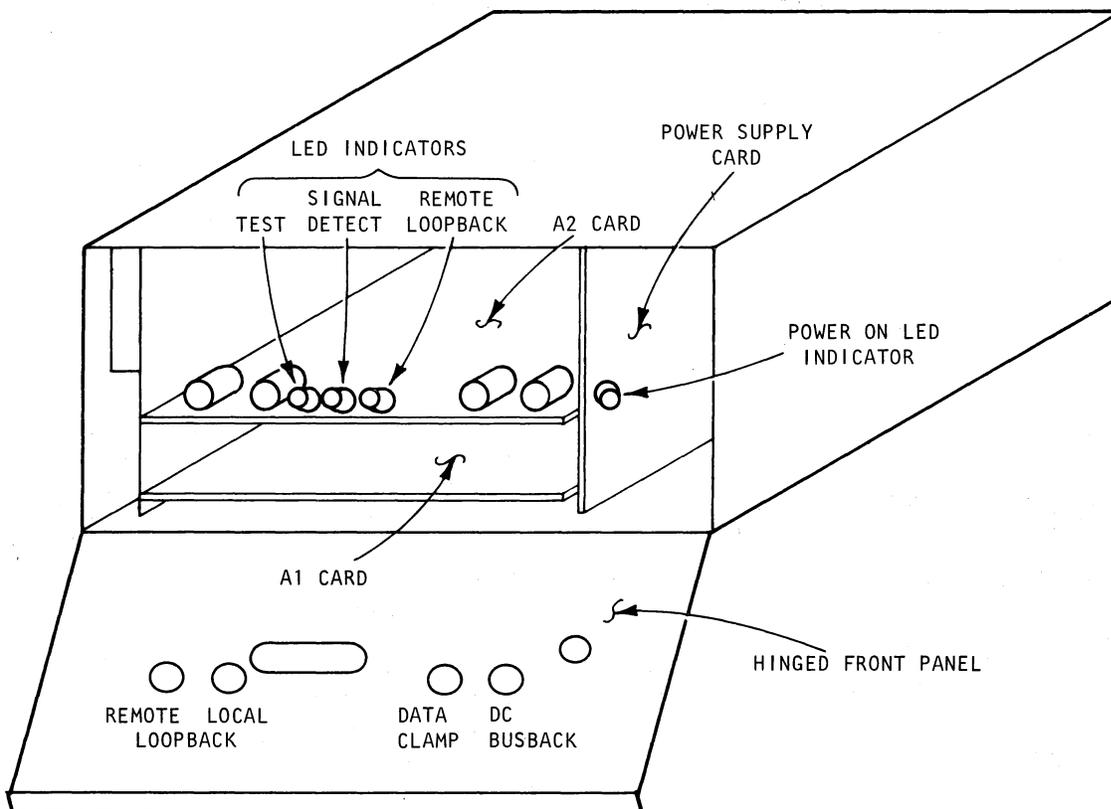


Figure 2-1. Control/Indicator Locations

TABLE 2-1. CONTROL AND INDICATOR FUNCTIONS

<u>Control/Indicator</u>	<u>Function</u>
REMOTE LOOPBACK switch	Alternate action pushbutton which provides dc busback at a remote site by transmitting the signal with an offset voltage. If the DATA CLAMP switch is also activated, a known data pattern will be transmitted, and the SIGNAL DETECT indicator will extinguish for 200 ms at the local LADS if an error is detected in the received data pattern.
LOCAL LOOPBACK switch	Alternate action pushbutton which loops the transmitter output back to the receiver input.

TABLE 2-1. CONTROL AND INDICATOR FUNCTIONS (Cont)

<u>Control/Indicator</u>	<u>Function</u>
DATA CLAMP switch	Alternate action pushbutton which clamps the transmit data to a known pattern and checks against receive data. SIGNAL DETECT indicator will go off for 200 ms if an error is detected. In conjunction with LOCAL LOOPBACK and REMOTE LOOPBACK switches, provides a check of the entire communications link.
DC BUSBACK switch	Alternate action pushbutton which connects the received data and clock back to the transmit data and clock. In conjunction with DATA CLAMP at the opposite end, provides a complete system test.
TEST lamp	Illuminates when the LADS is in any test configuration.
SIGNAL DETECT lamp	Illuminates when the LADS is receiving signals from the remote transmitter. Also used in test modes to indicate proper reception of test data sequence.
REMOTE LOOPBACK lamp	Indicates that a remote loopback command has been received from the remote LADS and that the local LADS has entered the dc busback mode.
POWER ON lamp	Indicates when power is on.

### 3.0 OPERATING PROCEDURE

3.01 With the unit power turned on, operating personnel are not exposed to voltages in excess of 30 volts on any card or accessible area of the dc power supply.

#### 3.02 POWER TURN-ON

To apply ac power to the dc power supply requires only the connection of the ac power cord to an acceptable ac source. If the local and remote data sets are in operation and passing data, the following indicator conditions will exist:

POWER ON:            On  
 TEST:                Off  
 SIGNAL DETECT:      On  
 REMOTE LOOPBACK:   Off

If the lamp indications given are not obtained following power turn-on and the

TEST lamp is lighted, one of the test switches is activated. Lower the front panel of the LADS and locate the test switch that is on (depressed). Press this switch to release the test function and extinguish the TEST lamp. If the correct lamp indications given are obtained after power turn-on, the LADS is operating normally.

#### 3.03 OPERATION

LADS operation is normally completely unattended other than the occasional monitoring of lamp indications.

#### 3.04 POWER TURN-OFF

To turn off ac power to the LADS, simply remove the ac power cord from the ac source. Ac power is removed from the regulated dc power supply and the POWER ON indicator is extinguished.

4.0 SYSTEM TEST AND FAULT ISOLATION PROCEDURE

WARNING

Removal of any card with power on may seriously damage unit. Disconnect ac power before removing any component.

CAUTION

LADS cards contain CMOS logic circuits. Follow proper static electricity control procedures to avoid damaging these circuits. These procedures must include the following handling cautions: Do not touch gold contact points; do not place the card on electrically conductive surfaces; handle cards by nonconducting edges only.

4.01 The test switches and indicators built into the 48230 LADS allow rapid checkout of the data terminals, LADS, and telephone lines. This checkout procedure can be used to verify normal system operation as well as to isolate faulty equipment in the event of failure. The results of the test steps immediately verify the operational performance of each unit in the system or provide a positive indication of equipment failure.

Note: The steps presented may be conducted from either the local or remote LADS.

Requirement: Ensure that the POWER ON indicator is illuminated and that all switches are in the off (out) position on both the local and remote site LADS.

4.02 The tests defined in the following paragraphs should be performed when the LADS are installed or when either the local or remote site units are suspected of performing in a defective manner. If the system tests good on both the Local Loopback Self-Test (paragraph 4.03) and the Remote Loopback Self-Test (paragraph 4.04), no further testing of the LADS is required. A positive indication from both of these tests will verify that both the local and remote site LADS and the telephone line between them are functioning properly.

If problems have occurred and have seemingly been resolved but an alternate test is desired for verification, the DC Busback Mode Test (paragraph 4.06) may be performed.

4.03 LOCAL LOOPBACK SELF-TEST

This test will determine whether the local site LADS is operable or not. All test switches and LED indicators are mounted on the A2 (upper level) card of the LADS. See Figure 4-1 for a schematic diagram of this test.

LOCAL LOOPBACK SELF-TEST

<u>Step</u>	<u>Action</u>	<u>Verification</u>
1	Lower the front panel.	
2	Locate the switches and indicators.	
3	Depress the LOCAL LOOPBACK switch.	
4	Depress the DATA CLAMP switch.	
5		Both switches should be in their test (in and latched) position.
6		The TEST lamp and SIGNAL DETECT lamp should be on.

<u>Step</u>	<u>Action</u>	<u>Verification</u>
	If the two test lamps remain on, the unit tests good.	
	If the SIGNAL DETECT lamp flashes, errors are being received in the data stream. This means that the unit is defective and should be replaced.	
7	Operate the LOCAL LOOPBACK and DATA CLAMP switches.	Both switches should be in their normal (out) operation position.  The TEST lamp should be off.
8	End of test.	

#### 4.04 REMOTE LOOPBACK SELF-TEST

This test will determine whether the remote site LADS and the connecting telephone line are operable or not. A positive indication from this test means that both are good. A negative indication means that either the remote site LADS, or the connecting phone line, or both are defective.

If a positive indication results after a positive local loopback test, system test and fault isolation for the LADS is complete. If a negative indication occurs, proceed to the test cited in paragraph 4.05. If problems still exist, see paragraph 4.07, Interfacing Cabling and DTE. See Figure 4-2 for a schematic diagram of this test.

REMOTE LOOPBACK SELF-TEST		
<u>Step</u>	<u>Action</u>	<u>Verification</u>
1	Depress the REMOTE LOOPBACK switch.	
2	Depress the DATA CLAMP switch.	
3		Both switches should be in their test (in and latched) position.
4		The TEST lamp and SIGNAL DETECT lamp should be on.
	If the two test lamps remain on, the system tests good.	
	If the SIGNAL DETECT lamp flashes, errors are being received in the data stream. This means that either the remote unit or the interconnecting telephone line, or both are defective.	
5	Operate the REMOTE LOOPBACK and DATA CLAMP switches.	Both switches should be in their normal (out) operation position. The TEST lamp should be off.
6	End of test.	

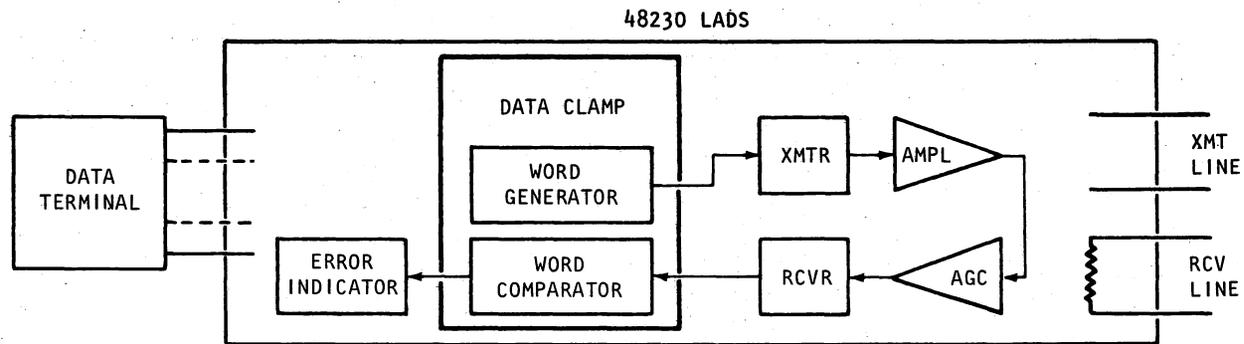


Figure 4-1. Local Site LADS in Local Loopback/Data Clamp Mode Test

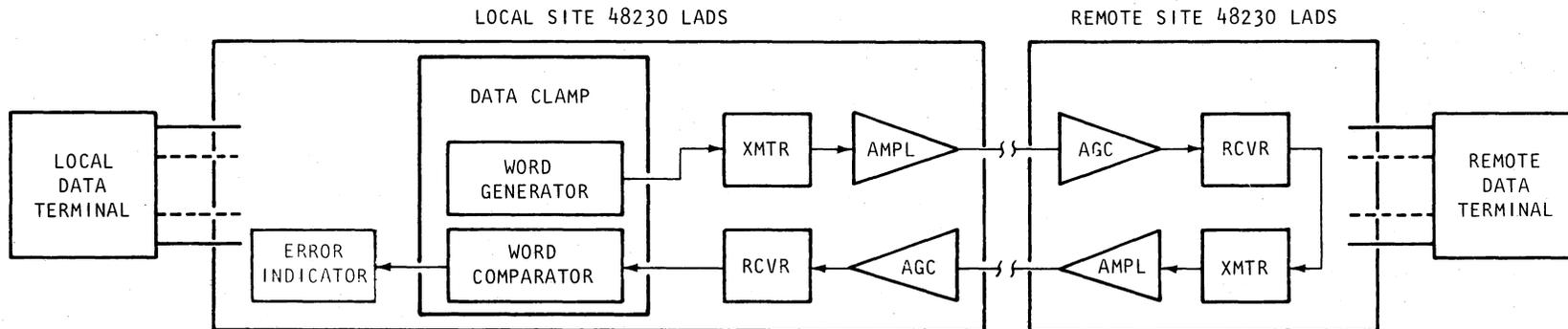


Figure 4-2. Local Site LADS in Remote Loopback/Data Clamp Mode Test

#### 4.05 REMOTE SITE LOCAL LOOPBACK TEST

This test is required only if the system fails the Remote Loopback test. A positive response to this test after failure of the Remote Loopback test indicates that the remote site LADS is functioning properly but the interconnecting telephone line is faulty. Failure of this test indicates that the remote site LADS is defective and should be replaced.

Requirement: An operator must be present at the remote site to perform this test on the remote site unit.

The operator at the remote site unit shall:

- a. Perform the Local Loopback Self-Test (see paragraph 4.03).
- b. If the LADS tested passes this test, the interconnecting telephone line is suspect of being faulty.

c. If the LADS tested fails this test, it should be replaced.

d. After it has been replaced, the Local Loopback and Remote Loopback tests should be conducted again to verify system operability.

#### 4.06 DC BUSBACK TEST

This test provides a system check that is similar to the Remote Loopback test but two operators are required to perform it. See Figure 4-3 for a schematic diagram of this test.

Requirement: An operator must be present at both the local and remote site LADS installation.

Note: All steps apply to both operators unless otherwise specified.

<u>Step</u>	<u>Action</u>	DC BUSBACK TEST	<u>Verification</u>
1	Lower front panel.		
2	Locate all switches and indicators.		
3			All four switches should be in their normal operation (out) position.
4			The POWER ON light should be illuminated.
5	Local Site operator - Depress DC BUSBACK switch.		Switch should be latched in its test (in) position. TEST light should be on.
6	Remote Site operator - Depress DATA CLAMP switch.		Switch should be latched in its test (in) position. TEST light should be on. SIGNAL DETECT light should be on.

Remote Site operator -

If SIGNAL DETECT light remains on, system tests good.

If SIGNAL DETECT light flashes, errors are being received in the data stream. This means that either the local or remote site

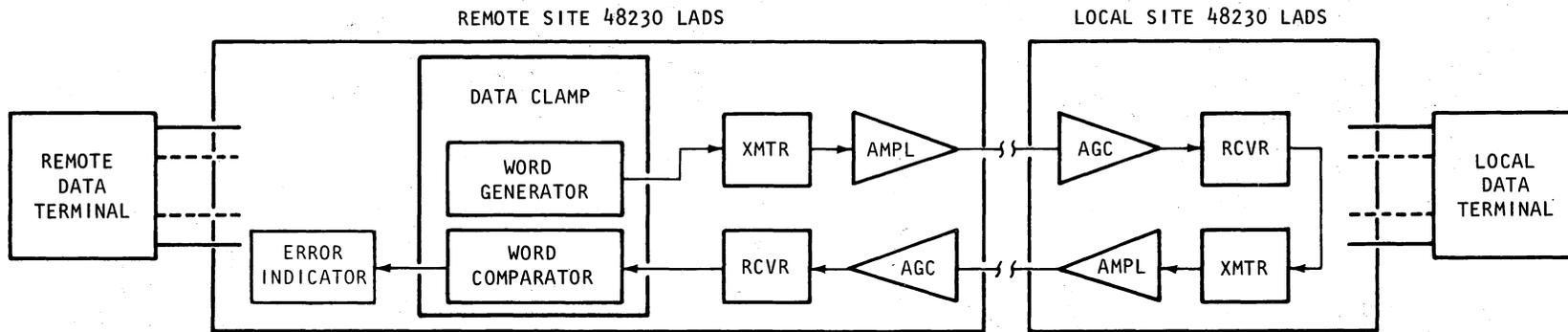


Figure 4-3. Local Site LADS in DC Busback Mode with Remote Site LADS in Data Clamp Mode

<u>Step</u>	<u>Action</u>	<u>Verification</u>
	LADS or the interconnecting telephone line is defective.	
7	Local Site operator - Press DC BUS-BACK switch.	Switch should be in its normal operation (out) position. TEST light should be off.
8	Remote Site operator - Press DATA CLAMP switch.	Switch should be in its normal operation (out) position. TEST light should be off.
9	Close front panel.	
10	End of test.	

#### 4.07 INTERFACE CABLING AND DATA TERMINAL EQUIPMENT (DTE) TESTS

If the DTE, data communications equipment (DCE), or central processing unit (CPU) connected to the LADS has a test mode wherein it can recognize its own looped-back data stream, it can be used in conjunction with the LADS to test the interface cabling between itself and either the local or remote site LADS. If it does not have this capability, an appropriate data test set must be connected to the interface cabling to test this portion of the system.

Any or all of the tests cited in paragraphs 4.03, 4.04, 4.05, or 4.06 may be

performed using the DTE, DCE, CPU, or data test set as the test data source. Thus, the following must be considered:

a. The DTE, DCE, CPU, or test set is providing the test data signal. Therefore, do not depress the DATA CLAMP switch on the LADS when conducting these tests.

b. If errors are being observed in the data stream, recognize that the interface cables to the LADS and the test data signal generator itself are additional possible sources for these errors.

Schematic diagrams of these tests are depicted in Figures 4-4, 4-5, and 4-6.

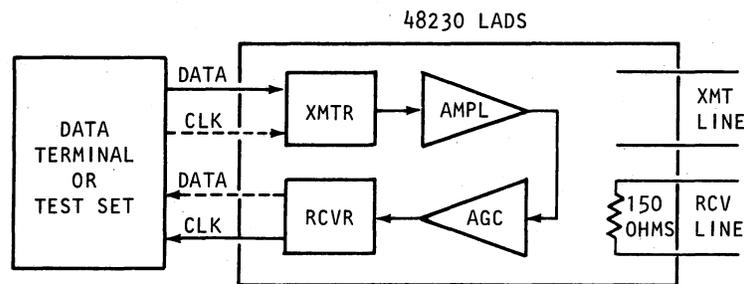


Figure 4-4. Local Site LADS in Local Loopback Mode

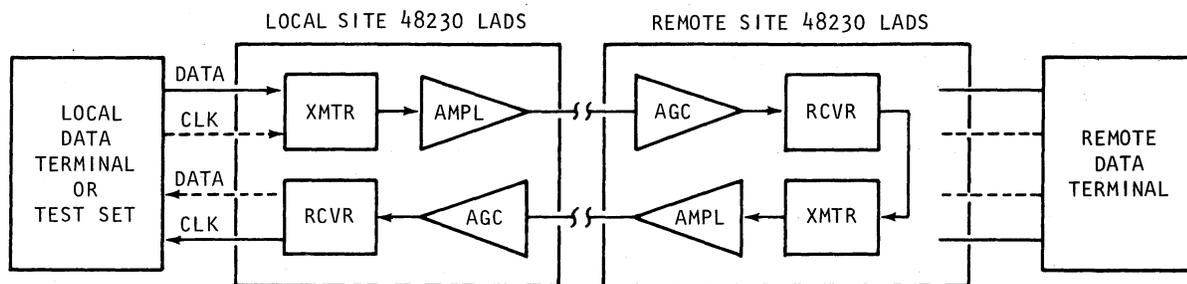


Figure 4-5. Local Site LADS in Remote Loopback Mode

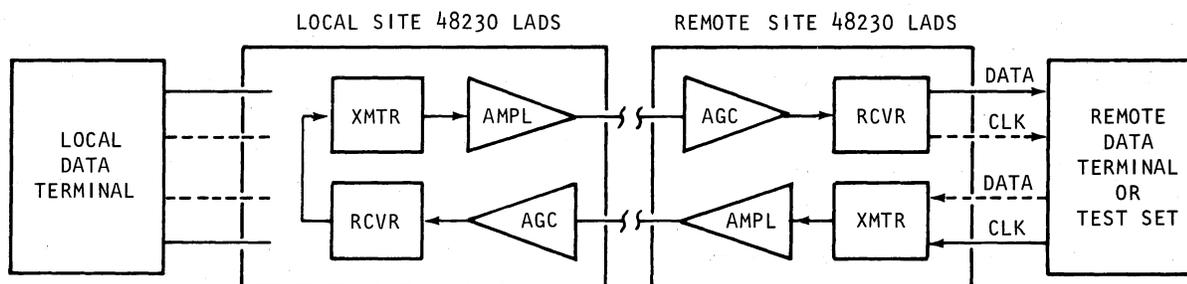


Figure 4-6. Local Site LADS in DC Busback Mode

#### 4.08 LOCAL LOOPBACK TEST WITH 914 DATA TEST SET

a. In this test, a local loopback error run is performed. The error run checks the data set transmitter and receiver and the customer interface. Test data is generated by a data test set (DTS) and looped back from the data set transmitter output to the receiver input through an internal attenuator. The received data is compared to the original data by the DTS. Data errors are indicated by the DTS counter.

b. The following test equipment is required:

- One 914C DTS or
- One 914B DTS and one 903-type DTS.

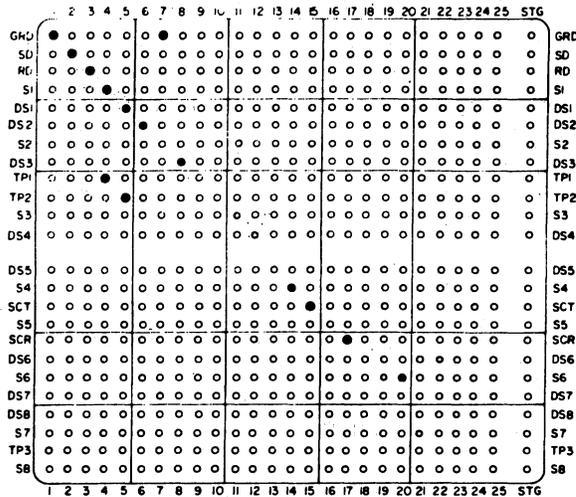
c. Perform the test as follows:

1. Connect and condition test equipment as shown in Figures 4-4 and 4-7.
2. Apply power to data set and then to test equipment.
3. Depress LOCAL LOOPBACK switch on data set.

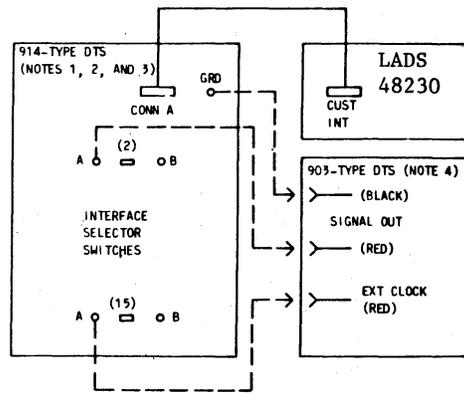
Requirement: Test lamp lights.

d. On 914-type DTS, set S1 to ON. (If 903-type DTS is used, momentarily depress START button.)

Requirement: DS1, DS2, and DS3 are lighted.



914-TYPE DTS MATRIX



NOTES:

1. SET SWITCHES ON 914-TYPE DTS AS FOLLOWS:

SWITCH	SETTING
INTERFACE SELECTOR A	ALL DEPRESSED (NOTE 5)
INTERFACE MODE	VOLTAGE
VERTICAL MONITOR	9
TEST SET MODE	SER (914C)
	RCV SER (914B)
	BIT ERRORS
COUNTER FUNCTION	OFF
RANGE	DCV-30
POLARITY	NOR
SAMPLE WIDTH	.5*5
TRIGGER-TP1	+ / OPEN
TRIGGER-TP2	+ / OPEN
START (914C)	A OR B
RCV BIT RATE (914C)	EXT+
RCV WORD LENGTH (914C)	511*
TRANSMIT BIT RATE (914C)	EXT+
TRANSMIT WORD LENGTH (914C)	511*
SIG LEV (914C)	±4V
BIT RATE (914B)	EXT+
WORD LENGTH (914B)	63
SIGNAL LEVEL (914B)	±4V
S1	OFF
S4	OFF
S6	ON
Word Sync	AUTO

\*Use 63 for 914B/903

2. INSERT RED PROGRAMMING PINS IN 914-TYPE DTS MATRIX IN POSITIONS INDICATED.

3. 914-TYPE DTS SWITCHES AND INDICATOR LAMPS CORRESPOND TO THE FOLLOWING INTERFACE LEADS:

SWITCH	LAMP	LEAD	EIA
S1	DS1	REQUEST TO SEND (RS)	CA
	DS2	CLEAR TO SEND (CS)	CB
	DS3	DATA SET READY (DSR)	CC
S4	S6	RECEIVED LINE SIGNAL DETECTOR (CD)	CF
		NEW SYNC (NS)	
		DATA TERMINAL READY (DTR)	CD

4. 903-TYPE DTS IS REQUIRED WITH 914B DTS. SET SWITCHES ON 903-TYPE DTS AS FOLLOWS:

SWITCH	SETTING
BIT RATE	EXT CLOCK
TRIGGER	+ (POSITIVE)
RANDOM-DOT	RANDOM

5. IF 914B DTS IS USED, PULL OUT INTERFACE SELECTOR SWITCHES A(2) AND A(15).

Figure 4-7. Local and Remote Loopback Test Setup

e. Set FUNCTION to OFF.

f. Depress RESET and allow counter to operate for five minutes.

Requirement: No errors indicated.

g. Remove all test equipment and restore data set to pretest condition.

#### 4.09 REMOTE LOOPBACK TEST WITH 914 DATA TEST SET

a. The Remote Loopback test checks the transmitter and receiver of both data sets and the facilities connecting the data sets. The customer interface at the far-end data set is not checked. Test data is generated by a DTS and transmitted by the near-end data set. This data is looped back from the receiver output to the transmitter input of the far-end data set and retransmitted. The data is received by the near-end data set and compared to the original data by the DTS. Data errors are indicated by the DTS counter.

b. The following test equipment is required:

One 914C DTS or  
One 914B DTS and one 903-type DTS.

c. Perform the test as follows:

1. Connect and condition test equipment as shown in Figures 4-5 and 4-7, except on 914-type DTS set COUNTER to BLOCK ERRORS.

2WL for 914C.  
16WL for 914B/903.

2. Apply power to data set and then to test equipment.

3. Depress the REMOTE LOOPBACK switch on the local data set.

d. On 914-type DTS, set S1 to ON. (If 903-type DTS is used, momentarily depress START button.)

Requirement: DS1, DS2, and DS3 are lighted.

e. Depress RESET and allow counter to operate for the following periods of time:

12 minutes for 2400 bps operation.  
6 minutes for 4800 bps operation.  
3 minutes for 9600 bps operation.

Record total errors indicated.

Requirement: Total errors are less than 18.

f. Set S1 to OFF.

g. Remove all test equipment and restore data set to pretest condition.

#### 5.0 MAINTENANCE

5.01 The LADS should provide totally maintenance free service with the exception of an occasional cleaning to remove whatever dust that may have settled on top of the unit. If the 48230 Local Area Data Set malfunctions:

- a. Remove ac power.
- b. Disconnect all interconnecting cables.
- c. Place the LADS in its original shipping carton.
- d. Return it to Codex Corporation, 15 Riverdale Avenue, Newton, MA 02195 for repair.