

MEMORANDUM

SUBJECT: Data Set 212A

*file behind 592033-47*

File: 130.520

SACRAMENTO, February 23, 19 78

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Attached G.L. introduces the new 212A-L1A and 212A-L1/2A. The new 212A provides all the features of the older version and in addition provides Test Voltages on Pins 9 and 10 of the interface, Test Mode indication on either Pins 18 or 25 of the interface, Interface Control of Remote Digital loop via Pin 21 and Speed Control via Pin 23 or with the front H S button.

SIGNED J. R. SILFVAST

Subject: Data Set 212A

GL:78-02-009

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E.L. 5330

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other: Supplements E.L. 4800 (G.L. 76-11-182)  
Topical Index Code 1D8.1A2

to: Chief Engineers (copies included for General Plant Managers);  
Engineering, Plant and Marketing Data Specialists; Data  
Technical Support Personnel; and Data Set Product Managers

from: Director - Data and Special Services

synopsis: Introduces Data Set 212A-L1A which replaces Data Set 212A-L1. The new 212A data set features several new functions controlled through the customer interface, three new customer options and simplified testing procedures.

\* \* \*

Data Set 212A, which was introduced 4Q76 in E.L. 4800 (G.L. 76-11-182), is designed to provide full-duplex transmission and reception of serial binary data at speeds of 0-300 bps and 1200 bps. A new version of the data set, coded 212A-L1A and 212A-L1A/2A, will be available from Western Electric. With the introduction of the new data set, the 212A-L1 and 212A-L1/2 will be rated MD/NO. In addition to providing all features and options of the older data set, the new version provides additional customer interface circuits and options and provides simplified testing procedures. The new customer interface circuits and new customer options are discussed below:

1. Test Voltages - Plus and minus 14 vdc have been provided on pins 9 and 10 of the customer interface to facilitate data set testing.
2. Test Mode (TM) Indication and Make Busy/Analog Loop (CN) - A new customer option enables either pin 25 or pin 18 of the customer interface to control the CN circuit. When CN is optioned for pin 18, the TM circuit, which indicates that the data set is in a test mode state, can be optionally installed on pin 25. CN on pin 18 and TM on pin 25 would be used to implement an interface which would be compatible with the proposed International Organization for Standardization 25 pin interface.
3. Interface Controlled Remote Digital Loop (RL) - When this new customer option is activated, the RL test may be activated through pin 21 of the customer interface.

#### NOTICE

Not for use or disclosure outside the  
Bell System except under written agreement.

4. Speed Control - This new customer option enables high-speed or low-speed operation of an originating data set to be controlled through pin 23 of the customer interface or with the front panel HS button.

The operation of the Analog Loop front panel pushbutton has been redesigned to disable the Slave Timing option, if it is installed, and change the timing to Internal. This allows an analog loop test of the data set in the high-speed mode if the Slave option is installed. In addition, the operation of other interface circuits, when activated by the front panel pushbuttons, have been changed to facilitate testing of the data set. These changes are covered in detail in the attached memorandum.

With the Interface Controlled RL interface option or CN Assignment on pin 18 option installed, the 47D2 mounting is required for single data set installations and the new 40A3 Data Mounting announced in E.L. 5377 is required for multiple installations. EIA interface pins 18 and 21, which are not available at the connector on the 47D1 and 40A2 Data Mountings, are brought out to the connector on the 47D2 and 40A3 Data Mountings. If these pins are not used, the 47D1 and 40A2 Data Mountings may also be used for single and multiple installations respectively. Since the Data Set 212A-L1 does not provide any of these new options, it may be used in the 47D1, 47D2, 40A2 or 40A3 Data Mountings.

Price, ordering and availability information for the 212A-L1A is presented in Attachment A. Common Language codes and a revised customer option table are also given in Attachment A. More detailed technical information is contained in the accompanying memorandum.



Director - Data and Special Services

Attachments

JEM

I. ORDERING INFORMATION

The Western Electric Company has provided the following price availability, and order wording information for the Data Set 212A and related equipment.

A. Data Sets

	<u>Order Wording</u>	<u>Price</u>	<u>Availability</u>	<u>Account Code</u>
(Qty)	Set, Data 212A-L1A	\$501.00	Limited Avail. Jan.'78 F/S - March '78	231-12
(Qty)	Set, Data 212A-L1A/2A	\$564.00	Limited Avail. Jan.'78 F/S - March '78	231-12
(Qty)	Mounting, Data 40A3	\$515.00	Limited Avail. Jan.'78 F/S - March '78	231-22
(Qty)	Mounting, Data 47D2	\$ 58.90	Limited Avail. Jan.'78 F/S - March '78	231-22

II. PLANT COST RESULTS

Installation and maintenance work units may be taken using Forms E-4433 and E-4423 as outlined in parts 302 and 424 of the Plant Cost Results Plan.

III. DATA MOUNTING COVER COMCODES

Front Cover, 47D2 D/M	842 304 800
Rear Cover, 47D2 D/M	840 806 988

IV. USOC CODES, COMMON LANGUAGE CODES, AND CUSTOMER OPTIONS

A. USOC Codes

The USOC codes for combined sending and receiving 0 to 300 bps and 1200 bps switched network services are given in the following table:

<u>USOC</u>	<u>Service</u>
D2A ++	- Individually housed Data Set 212A-L1/2 or 212A-L1A/2A with 565HK Telephone Set
D2B ++	- Station Arrangement of Data Sets 212A-L1/2 or 212A-L1A/2A without 565HK Telephone Set - for use with station arrangement USOC NCS
D2C ++	- Multiple Mounting Arrangement of Data Sets 212A-L1 or 212A-L1A
NCS00	- Station Arrangement for 2 to 5 stacked Data Sets
MDE00	- Common Equipment for Multiple Mounting Arrangements For up to 8 Data Sets
MDG00	For up to 16 Data Sets

B. Common Language Code

The Common Language Codes for the Data Set 212A are given below:

<u>Data Set</u>	<u>Code</u>
212A-L1A	2D12AACAAA
212A-L1A/2A	2D12AADAAA

C. Customer Option Table

The customer options for data services using Data Set 212A-type are given in the following table. This option table should replace the option table in E.L. 4800.

<u>Decision</u>	<u>Option</u>	<u>Option Designation</u>
A.	1. Factory supplied disconnect options.	Note 1
	2. Customer selected disconnect options.	Note 1
B.	3. Automatic Answer - YES.	ZH (Note 2)
	4. Automatic Answer - NO.	ZG
C.	5. Factory Supplies EIA Interface and ground options.	Note 3
	6. Customer selected EIA Interface and ground options.	Note 3
D.	7. Factory supplied dual mode, character formatted operation.	Note 4
	8. Customer selected modes of operation.	Note 4
E.	9. Interface Controlled Make Busy/Analog Loop - CN - IN	YE (Note 5)
	10. Interface Controlled Make Busy/Analog Loop - CN - OUT	YF*

Note 1: The following disconnect options marked by an asterisk (\*) are provided by decision A1 and are recommended for most systems. For decision A2 the customer may select the appropriate disconnect options.

<u>Option</u>	<u>Indication</u>
a. Send space disconnect	
1. IN	T*
2. OUT	U
b. Receive space disconnect	
1. IN	V*
2. OUT	Y

\*Factory furnished option.

<u>Option</u>	<u>Indication</u>
c. Loss of carrier disconnect	
1. IN	S*
2. OUT	R

Note 2: The telephone set supplied with Data Set 212A is not provided with keys to select automatic or manual answer. An installer option determines whether the automatic answer feature is functional or not.

Note 3: The following EIA Interface and ground options marked by an asterisk (\*) are provided by decision C5 and are recommended. For decision C6 the customer may select appropriate options.

<u>Option</u>	<u>Indication</u>
a. Data Set ready (CC) indication for analog loop	
1. ON	ZF*
2. OFF	ZE
b. Clear to send (CB) and carrier detector (CF) indications	
1. Common	A*
2. Separate	B
c. Signal ground to frame connection	
1. IN	Q*
2. OUT	P
d. Answer mode indication - CE	
1. ON	X
2. OFF	W*
e. Interface speed indication	
1. IN	YQ
2. OUT	YR*
f. Speed Control	
**1. Customer Interface	XJ
***2. HS button	XK*
g. Interface Controlled Remote Digital Loop	
**1. IN	XL
***2. OUT	XM*
h. CN and TM (Test Mode) Assignments	
***1. CN-pin 25, TM-Not Connected	XO*
**2. CN-pin 18, TM-Not Connected	XN
3. CN-pin 18, TM-pin 25	XR

\*\*Not available in D/S 212A-L1 or 212A-L1/2.

\*\*\*Always provided in D/S 212A-L1 or 212A-L1/2.

Note 4: Decision D7 provides for the following factory supplied options marked by an asterisk (\*) for character formatted 1200 bps operations and 0 to 300 bps operation. Decision D8 requires customer selection of the appropriate options from the following choices:

<u>Option</u>	<u>Indication</u>
a. 1200 bps operation	
1. Asynchronous/start - stop	YG*
2. Synchronous	YH
b. Character Length (required for YG, not active for YH)	
1. 9 bit	YI
2. 10 bit	YJ*
c. Transmitter Timing	
1. Internal	YC*
2. External	YD
3. Slave	WI
d. Speed Mode	
1. High (1200 bps only permitted)	YO
2. Dual (1200 bps or 0 to 300 bps)	YP*
e. Receiver responds to digital loop	
1. IN	YK*
2. OUT	YL

Note 5: Customer interface control of the Make Busy/Analog Loop option is provided by decision E9 (Option YE). This choice is approximately equivalent to decision D8 (Option K) of the 103J Data Set. This interface control is only capable of providing a make busy condition if the Tip-Ring Make Busy Telco option F is installed or if Telco engineering provision is made for use of the third wire (sleeve) Make Busy contacts available from the data set.

V. TELCO OPTION TABLE

Telco engineering options for data service using Data Set 212A are given below:

<u>Option</u>	<u>Option Designation</u>
1. Tip-Ring Make Busy	
IN	F (Note 1)
OUT	E*

Note 1: Also install option ZX on 40A2 Data Mounting if used. The Tip-Ring Make Busy option is important for line hunting arrangements for terminate only lines. It should not be used for non-line hunting installations where the "Don't Answer" condition is a proper out-of-service indication. An alternate third wire (sleeve) Make Busy indication is available as relay contacts when the data set is used in single or multiple mountings.

TABLE OF CONTENTS

	<u>PAGE</u>
1.0 Description	2
1.1 Data Set 212A-L1A	2
1.2 New Options	3
1.3 New Testing Features	3
1.4 Physical Description	4
1.5 Data Station Arrangements	4
2:0 Working Limits and Maintenance	4
3.0 Drawings and Practices	5
Figures and Tables	

1.0 Description

1.1 Data Set 212A-L1A

Data Set 212A-L1A shown in Figures 11 and 12 replaces Data Set 212A-L1 which will be rated MD/NO when the new set is available. The new data set offers the following features not provided with the earlier data set.

- a. Plus and minus 14 volts have been provided on pins 9 and 10 of the EIA interface to facilitate data set testing.
- b. A new interface function, Remote Digital Loop (RL), has been added to the EIA interface, along with an option to disable its use. With this option installed, the RL circuitry may be controlled through the EIA interface in addition to the RL button on the front panel of the data set.
- c. A new interface function, Speed Select-Originate, (CH), has been added to the EIA interface, along with an option to select either the EIA interface pin 23 or the High Speed (HS) button on the front panel to control the data set speed.
- d. A new interface function, Test Mode (TM), has been added to the EIA interface, along with an option to disable its use. The TM circuit, when enabled, indicates that the data set is in a testing state by changing to a positive EIA-compatible voltage.
- e. A set of jumper-plug option straps have been added to allow the installation of the CN (Make Busy/Analog Loop) circuit on either pin 25 or pin 18 of the EIA interface. The pin 18 position would be used to implement an interface which would be compatible with the proposed International Organization For Standardization (ISO) 25-pin interface. When the CN function is installed on pin 18, the TM circuit can be optionally installed on pin 25, which is also necessary to be in compliance with the standard.
- f. The CH (Speed Select-Originate), RL (Remote Digital Loop), and the CN circuits are disabled when the front panel ST pushbutton is depressed. Speed control reverts to the front panel HS pushbutton, and the state of the RL and CN circuits is ignored.
- g. The TR (Terminal Ready) indication on the front panel of the data set will turn ON whenever the ST or DL pushbuttons are depressed, in addition to the case when the customer DTR circuit is ON. The indication will also be ON when the data set is remotely commanded to enter the digital loop mode. The TR indication of the older data set only indicated the state of the DTR (Data Terminal Ready) interface circuit.
- h. The Slave Timing option is overridden during an Analog Loop test in the high-speed mode if it is installed. The Timing option is then forced to the Internal state.

## 1.2 New Options

Table 2 is a listing of installer options for Data Set 212A-L1A.

The name of the YE/YF option (previously "CN Circuit") was changed to "Interface Controlled Make Busy/Analog Loop - CN" to be more descriptive about the purpose of the option. The selection of this option determines whether or not the CN circuit (which can be on either pin 18 or pin 25) can be used to control the Make Busy/Analog Loop function. When the YF (OUT) selection is made, the Make Busy/Analog Loop function can only be controlled by the front panel AL pushbutton.

The new option, "CN and TM Assignments", allows the user to configure the interface to be compatible with the ISO standard (Analog Loop controlled by pin 18 and Test Mode indication on pin 25) or to be compatible with data set interfaces that use the CN function on pin 25. When the CN function is assigned to pin 25 (option XO), the TM function is not available. It is possible to assign the CN function to pin 18 and remove the TM circuit from pin 25 by choosing option XN. Note that if Analog Loop control through the EIA interface is required, option YE (discussed above) must be installed.

The new Speed Control option enables either the EIA interface (Option XJ) or the HS button (Option XK) to control the operating speed of the originating station. With the Speed Control-Interface option installed, an externally applied positive voltage on pin 23 of the EIA interface will cause the data set to operate at 1200 bps. With no voltage or a negative voltage applied to this pin, the data set is conditioned to operate at 0-300 bps.

The new Remote Digital Loop option enables the RL circuitry to be controlled through the EIA Interface as well as the RDL button on the front panel of the data set. With the RL option (Option XL) installed, an externally applied positive voltage on pin 21 will cause the same response as depressing the RDL button on the front panel of the data set. The RL EIA circuit is a fail-safe-off circuit, so disconnecting the input will cause an OFF condition.

## 1.3 New Testing Features

When the ST (Self Test) front panel pushbutton is depressed on Data Set 212A-L1A, the CN (Make Busy/Analog Loop), RL (Remote Digital Loop), and CH (Speed Mode Selector) circuits are disconnected from the interface and prevented from having any effect on the test state. The CN circuit is disabled whether it is optioned for pin 25 or pin 18 of the interface connector. Speed control of the originate data set is automatically transferred to the front panel HS pushbutton. Care must therefore be exercised when using ST to set the HS button to the desired speed. It is not possible to change the speed mode of the data set once it is in the data mode; the preferred operating procedure when using ST is to depress the ST pushbutton and set the HS pushbutton before the data set is transferred into the data mode.

The TM (Test Mode) circuit, when installed, changes to a positive (ON) state whenever the data set is in Analog Loop, Self Test, Digital Loop, Remote Digital Loop, or any combination of these.

The TR (Terminal Ready) indication on the front panel of the data set has been changed so that it is ON whenever the ST or DL pushbuttons are depressed, and when the data set is put in the digital loop mode remotely. The indication is also ON in all other modes when the CD (Data Terminal Ready) circuit on the EIA interface is ON. This indication is provided in the test mode to alert the user that the data set is internally forcing the CD circuit to the ON state.

The functioning of the AL (Analog Loop) front panel pushbutton has been changed so as to disable the Slave Timing option, if it is installed, and set the timing to Internal. This allows an analog loop test of the data set in the high-speed mode if the Slave option is installed.

#### 1.4 Physical Description

The physical arrangement of Data Set 212A-L1A has not changed with respect to the older data set. The 47D1 Data Mounting can be used with Data Set 212A-L1A if options XL, XN, and XR are not installed. If any of these options are installed, the 47D2 Data Mounting must be used for the single data set installation. If these options are not installed, the 40A2 or 40A3 Multiple Data Mountings can be used with Data Set 212A-L1A. If any of these options are installed, the 40A3 mounting must be used. Since the Data Set 212A-L1 does not provide any of these options, it can be used in either the 47D2 or the 40A3 mountings. The new list code designations for ordering Data Set 212A type are set forth below:

Data Set 212A-L1A	Data set circuit pack (replaces 212A-L1)
Data Set 212A-L1A/2A	Data set circuit pack with single set housing (replaces 212A-L1/2)

#### 1.5 Data Station Arrangements

The data station arrangements for the 212A-L1A data set are the same as those given in E.L. 4800 (G.L. 76-11-182) for single data sets and E.L. 4799 (G.L. 76-11-270) for multiple arrangements.

#### 2.0 Working Limits and Maintenance

Data Set 212A-L1A is designed to the same working limits and maintenance requirements as Data Set 212A-L1. The temperature range is 40°F to 120°F with maximum relative humidity of 95 percent at 84°F or 34 percent at 120°F. The data set is not designed for operation during conditions that cause condensation. The power supply transformers require a source of 105 to 129 volts rms at 57 to 63 Hz. Maximum power drain per data set is 9W, which includes the power transformer losses.

3.6 Drawings and Practices

Circuits for Data Set 212A-L1A are shown in SD (or CD) 1D268-02, Issue 1. The applicable Bell System Practices are 592-034-100, Issue 2, 592-034-200, Issue 2, and 592-034-500, Issue 2. The expected date of availability of these documents is 1Q78.

Table 1

EIA Connector Pin Assignments

<u>PIN</u>	<u>EIA DESIGNATION</u>	<u>DESCRIPTION</u>
1	-	No Connection (NC)
2	BA	Send Data
3	BB	Receive Data
4	-	NC
5	CB	Clear To Send
6	CC	Data Set Ready
7	AB	Signal Ground
8	CF	Carrier On
9	-	+P
10	-	-P
11	-	NC
12	CI	Speed Indication
13	-	NC
14	-	NC
15	DB	Transmit Clock
16	-	NC
17	DD	Receive Clock
18	(CN)	Make Busy/Analog Loop (optional pin)
19	-	NC
20	CD	Data Terminal Ready
21	(RL)	Remote Digital Loop
22	CE	Ring Indicator
23	(CH)	Speed Select-Originate
24	DA	External Transmit Clock
25	CN (or TM)	Make Busy/Analog Loop or Test Mode

Note: Designations in parentheses indicate new interface circuits available on 212AR-L1A Data Set.

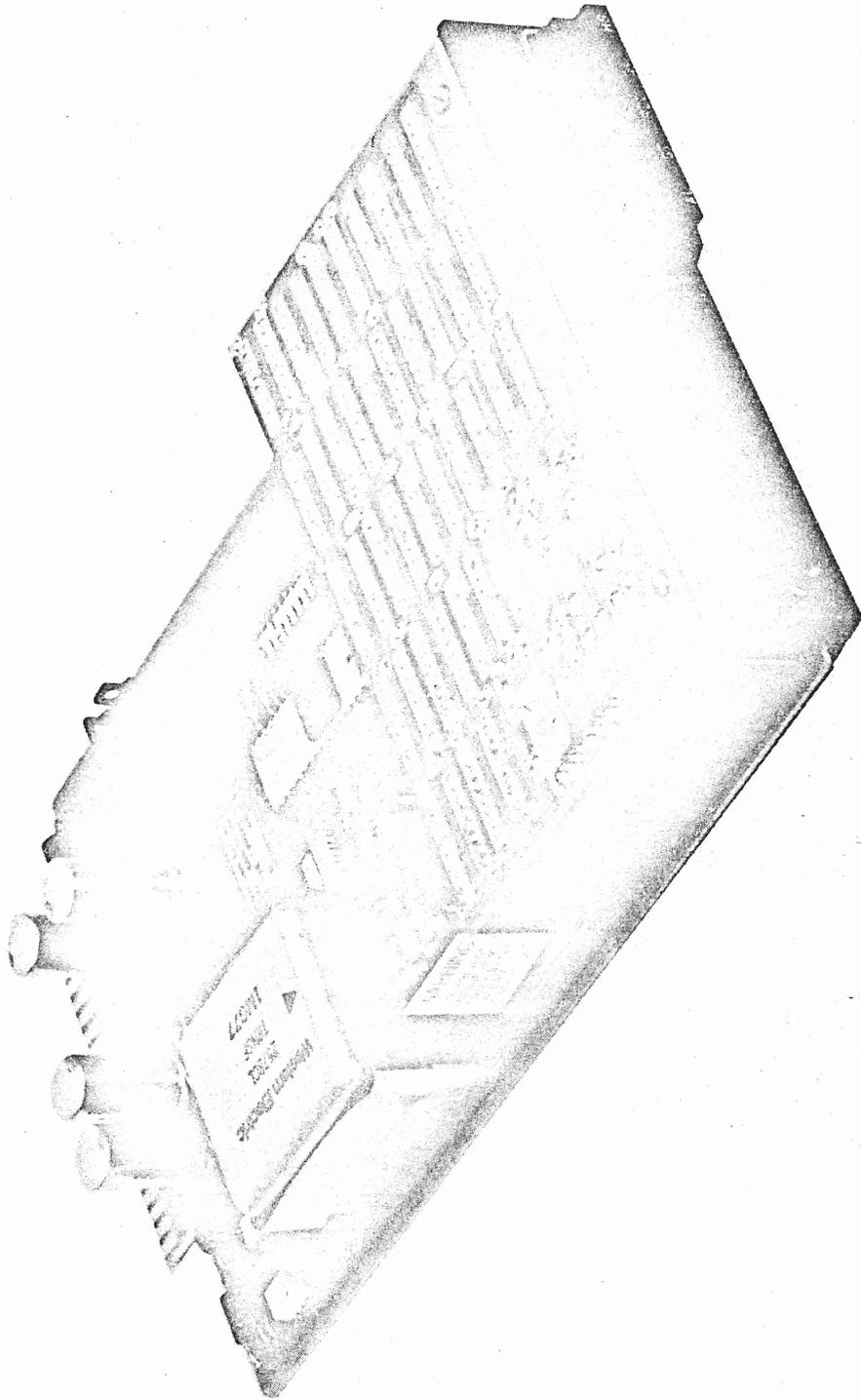


FIGURE 1 - DATA SET 212A-L1A

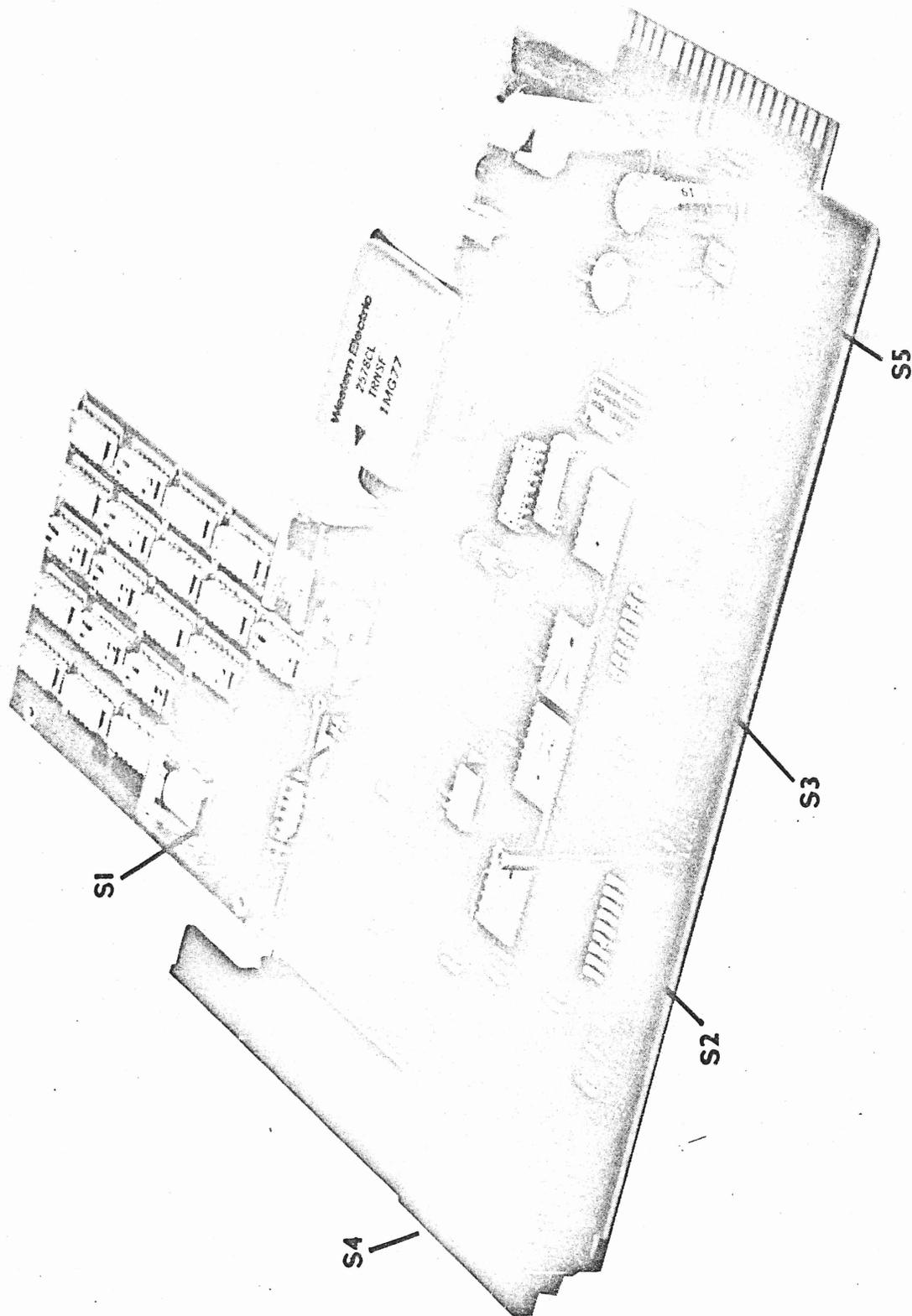


FIGURE 2 - DATA SET 212A-11A WITH UPPER BOARD REMOVED TO SHOW OPTION SWITCH SWITCH LOCATIONS

FEATURE	CHOICE	DESCRIPTION
CC Indication For Analog Loop	On	CC Circuit On During AL Test
	Off	CC Circuit Off During AL Test
Speed Control	Interface	CH Circuit Controls Speed
	HS Button	HS Button Controls Speed
Interface Controlled Make Busy/Analog Loop	In	AL/Make Busy Controlled By CN Circuit Or AL Button
	Out	AL/Make Busy Controlled Only By AL Button, CN Internally Held Off
Transmitter Timing	Internal	1200BPS Transmitter Driven By Internal Clock
	External	1200BPS Transmitter Driven By DA Circuit
	Slave	1200BPS Transmitter Driven By Receive Clock (DD)
1200 BPS Operation	Asynchronous/Start-Stop	Character-Oriented Operation In The High-Speed Mode
	Synchronous	Bit-Synchronous Operation In The High-Speed Mode
Character Length	9 Bit	Character Format Is 9 Bit For 1200BPS Asynchronous/Start-Stop Operation
	10 Bit	Character Format Is 10 Bit For 1200BPS Asynchronous/Start-Stop Operation
Receiver Responds To Digital Loop	In	Digital Loop Can Be Remotely Activated In The High-Speed Mode
	Out	No Response To Remote Request For A Digital Loop
Interface Controlled Remote Digital Loop	In	RL Circuit Enabled To Activate Remote Digital Loop
	Out	RL Circuit Not Connected To Interface
Loss Of Carrier Disconnect	In	Call Is Dropped If Loss Of Carrier Occurs
	Out	Loss Of Carrier Does Not Drop Call
Receive Space Disconnect	In	Call Is Dropped If Steady Space Is Received
	Out	Space Signal Has No Effect On Data Set
CB And CF Indications	Common	CB Circuit Is Turned Off Whenever CF Circuit Goes Off
	Separate	CB Circuit Is Not Affected By CF Circuit
Send Space Disconnect	In	Steady Space Transmitted Before Disconnecting
	Out	No Space Transmitted Before Disconnecting
Automatic Answer	In	Unattended Answer If CD Circuit Is On
	Out	No Response To Ringing Indication
Answer Mode Indication—CE	On	Circuit CE Remains On After Call Is Answered
	Off	Circuit CE Turns Off After Call Is Answered
Speed Mode	High	Data Can Cross Interface Only In The High-Speed Mode
	Dual	Data Can Cross Interface In Both Speed Modes
Interface Speed Indication	In	Circuit CI Indicates Speed Mode
	Out	Circuit CI Disconnected From Interface
CN And TM Assignments	CN25, TM NC	CN On Pin 25, TM Not Connected
	CN18, TM NC	CN On Pin 18, TM Not Connected
	CN18, TM25	CN On Pin 18, TM On Pin 25
Signal Ground To Frame Ground Connection	In	Protective Ground And Signal Ground Tied Together
	Out	No Connection Between Protective Ground And Signal Ground

Figure 3 – Data Set 212A Customer Options