

## "COMM-STOR\*" II COMMUNICATIONS STORAGE UNIT TESTING AND TROUBLESHOOTING PROCEDURES

### 1. GENERAL

1.01 This section provides testing and troubleshooting procedures for the Comm-Stor II Communications Storage unit (hereafter referred to as the Comm-Stor II unit) manufactured by Sykes Datatronics, Incorporated. This information is contained in the attached reprint of practice SYKS 578-400-500, Issue 3, prepared by Sykes Datatronics.

1.02 This section is reissued to provide updated diagnostic procedures.

1.03 No special equipment is required for the procedures described herein. This section does not apply to the following units:

- (a) Comm-Stor II unit with 8A1/8B1 option
- (b) Comm-Stor II Station Message Detail Recording (SMDR) unit
- (c) Comm-Stor II Call Rating System (CRS) unit
- (d) Comm-Stor II Line Control Unit (LCU)

(e) Comm-Stor II Performance Analysis System (PAS) unit.

1.04 Test and troubleshooting procedures for the above units can be found in the following sections. (Check Divisional Index 578 for availability.)

SECTION	UNIT
578-400-501	8A1/8B1 Option
578-400-502	Comm-Stor II/SMDR
578-400-503	Comm-Stor II/LCU
578-400-505	Comm-Stor II/CRS
578-400-506	Comm-Stor II/PAS.

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Pursuant to Judge Greene's Order of August 5, 1983, beginning on January 1, 1984, AT&T will cease to use "Bell" and the Bell symbol, with the exceptions as set forth in that Order. Pursuant thereto, any reference to "BELL" and/or the BELL symbol in this document is hereby deleted and "expunged".

Comm-Stor\* II  
COMMUNICATIONS STORAGE UNIT (CSU)  
TEST AND TROUBLESHOOTING PROCEDURES

CONTENTS	PAGE	CONTENTS	PAGE
1. INTRODUCTION.....	2	3. Front View of the Comm-Stor II Unit.....	7
A. General.....	2	4. Base Board Pin Locations.....	39
B. Danger and Warnings.....	2		
2. PRELIMINARY CHECK.....	3	TABLES	
3. USER DIAGNOSTIC DESCRIPTION.....	3	A. Test Selections.....	6
A. General.....	3	B. Failure Interpretation.....	9
B. User Diagnostic Tests.....	3	C. LED Display.....	9
4. BASIC TROUBLESHOOTING PROCEDURE.....	4	D. RAM Size.....	11
5. USER DIAGNOSTIC PROCEDURE.....	5	E. Number of Drives/Standby Mode.....	12
A. General.....	5	F. Editor/Forms Options.....	12
B. Definition of Terms.....	5	G. Printer Port/Extended User Command Table.....	13
C. Start-Up Procedures.....	5	H. RAM Faults.....	14
D. Diagnostic Procedures.....	8	I. Configuration Memory Faults.....	14
6. COMMUNICATIONS CHECKOUT.....	28	J. ROM/Timer/Baud Rate Faults.....	15
7. LOCAL TERMINAL TESTS.....	28	K. Drive 1 Faults.....	15
8. CHECKLIST #1 — DIAGNOSTIC DOES NOT RUN.....	35	L. Drive 2 Faults.....	16
9. CHECKLIST #2 — OTHER DIFFICULTIES.....	35	M. Baud Rate Specification.....	16
		N. Terminal Receive/Transmit Faults.....	18
FIGURES		O. Terminal EIA Control Line Faults.....	18
1. Diagnostic Test Plug.....	4	P. Modem Receive/Transmit Faults.....	19
2. Rear View of the Comm-Stor II Unit.....	6	Q. Modem EIA Control Line Faults.....	19

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R. Printer Receive/Transmit Faults..... 20  
 S. Printer EIA Control Line Faults..... 21  
 T. Configuration Memory Faults..... 23  
 U. User Diagnostic Memory Test..... 24  
 V. Checksum Display..... 29  
 W. On-Line Check..... 30  
 X. Terminal Tests Error Analysis..... 33  
 Y. Checklist #1..... 36  
 Z. Checklist #2..... 40

**1. INTRODUCTION**

**A. General**

**1.01** This Section provides testing and troubleshooting procedures for the Comm-Stor II Communications Storage unit, hereafter referred to as the Comm-Stor II unit. No special equipment is required for the procedures described herein.

**1.02** This section has been reissued to provide updated diagnostic procedures.

**1.03** This section does not apply to the following units:

- (a) Comm-Stor II unit with 8A1/8B1 option
- (b) Comm-Stor II/SMDR unit
- (c) Comm-Stor II/CRS unit
- (d) Comm-Stor II/LCU unit
- (e) Comm-Stor II/PAS unit

**1.04** Test and troubleshooting procedures for the above units can be found in the following Sections:

UNIT	SECTION
8A1/8B1 Option	578-400-501
Comm-Stor II/SMDR	578-400-502
Comm-Stor II/CRS	578-400-505
Comm-Stor II/LCU	578-400-503
Comm-Stor II/PAS	578-400-506

**1.05** An operational checkout should be performed after installation or on trouble calls. It may be a brief checkout to make sure the unit is operable, or a complete checkout to exercise all features and options. Since off-line checkout procedures do not check the interface or send and receive capabilities, an on-line checkout is also required to completely test the Comm-Stor II unit. However, if the terminal, printer, and/or data set are customer provided equipment, perform the diagnostic tests only.

**1.06** With the Comm-Stor II unit properly interfaced to the system where it will be used, conduct a complete checkout of send and receive capabilities, taking into account all option and feature variables. Check all operational modes in sending to or receiving from another station in the system (Part 6).

**1.07** Use the local checkout during installation if a complete checkout has been performed prior to installation (Part 7). Continue with a complete checkout, if needed, to check all features and options.

**1.08** On maintenance or trouble calls at a location, perform diagnostic tests on the specified trouble area. Perform a complete series of diagnostic tests after an extensive repair.

**1.09** If the indicated response is not obtained in any test procedure, repeat the test to make sure that the procedure has been performed correctly. If the results are still unsatisfactory, replace the module indicated as the possible cause.

**1.10** As a further aid to troubleshooting, refer to Section 578-400-400, *Comm-Stor II Unit Wiring Diagrams*. For help in identifying components, refer to Section 578-400-700, *Disassembly/Reassembly Procedures*.

**1.11** The terms *baud* and *baud rate* as used throughout this practice refer to data transmission and are considered equivalent to "bits per second."

**B. Danger and Warnings**

**1.12**

*Danger: Power off the unit and remove all EIA cables from the rear panel ports of the Comm-*

*Stor II unit before removing or replacing any module or component.*

**Warning 1:** *To avoid possible internal damage to circuitry, wear a static discharge strap (TP346392) connected to ground to allow static discharge before handling circuit boards or components for removal or replacement. Avoid touching circuit lands or components as much as possible.*

**Warning 2:** *Put the replaced board in an anti-static bag immediately after removal from unit. Never handle the board outside the bag without being properly grounded.*

**Warning 3:** *Handle all diskettes with care:*

*Never touch the exposed diskette surface. Handle the diskette only near the label.*

*Do not write on the diskette cover; write only on the label. If possible, write on the label before placing it on the diskette.*

*Do not attempt to clean a dirty or dusty diskette; such a diskette should be discarded.*

*Keep the diskette away from potentially magnetic materials (e.g. paper clips, etc.) or magnetic sources (e.g. unshielded power supplies, CRT monitors, etc.).*

*Do not bend the diskette.*

*Do not expose the diskette to extremes of heat or cold.*

*Keep the diskette in its protective cover when not in use.*

*Store diskettes vertically in boxes when not in use.*

## **2. PRELIMINARY CHECK**

**2.01** Before powering on any equipment, check to be sure the unit is connected to a properly grounded AC outlet. Also check the seating of all circuit boards and cable connectors.

**2.02** If there are operational difficulties with a Comm-Stor II unit, peripheral devices

such as the terminal, data set, and printer should be checked, depending on the area of difficulty.

**2.03** Also, check the Comm-Stor II unit's variable configuration data. All configuration parameters should be checked and changed as required. Refer to Section 578-400-200, *Comm-Stor II Unit Installation Procedures*.

**2.04** If difficulties are encountered with data transfers on and off a diskette, other diskettes should be tried and a check should be made of diskette handling procedures (paragraph 1.12).

## **3. USER DIAGNOSTIC DESCRIPTION**

### **A. General**

**3.01** The User Diagnostic kit (Part #1030A5191) consists of a Diagnostic diskette and a three-port EIA test plug (Fig. 1).

**3.02** The Diagnostic diskette contains a prerecorded set of procedures for testing the Comm-Stor II unit. Each test is automatically loaded from the diskette into the memory of the Comm-Stor II unit upon request.

**3.03** The test plug has two switches numbered "1" and "2", for simulating peripheral cabling.

**3.04** Together, the Diagnostic diskette and the test plug, are used to fully verify the Comm-Stor II unit.

### **B. User Diagnostic Tests**

**3.05** The Diagnostic diskette contains the following tests:

- (a) LED/Switch Test
- (b) Hardware Features Check
- (c) Internal Tests: Memory/Diskette/Timer/Baud Rate
- (d) Terminal and Modem Port Tests
- (e) Printer Port Test

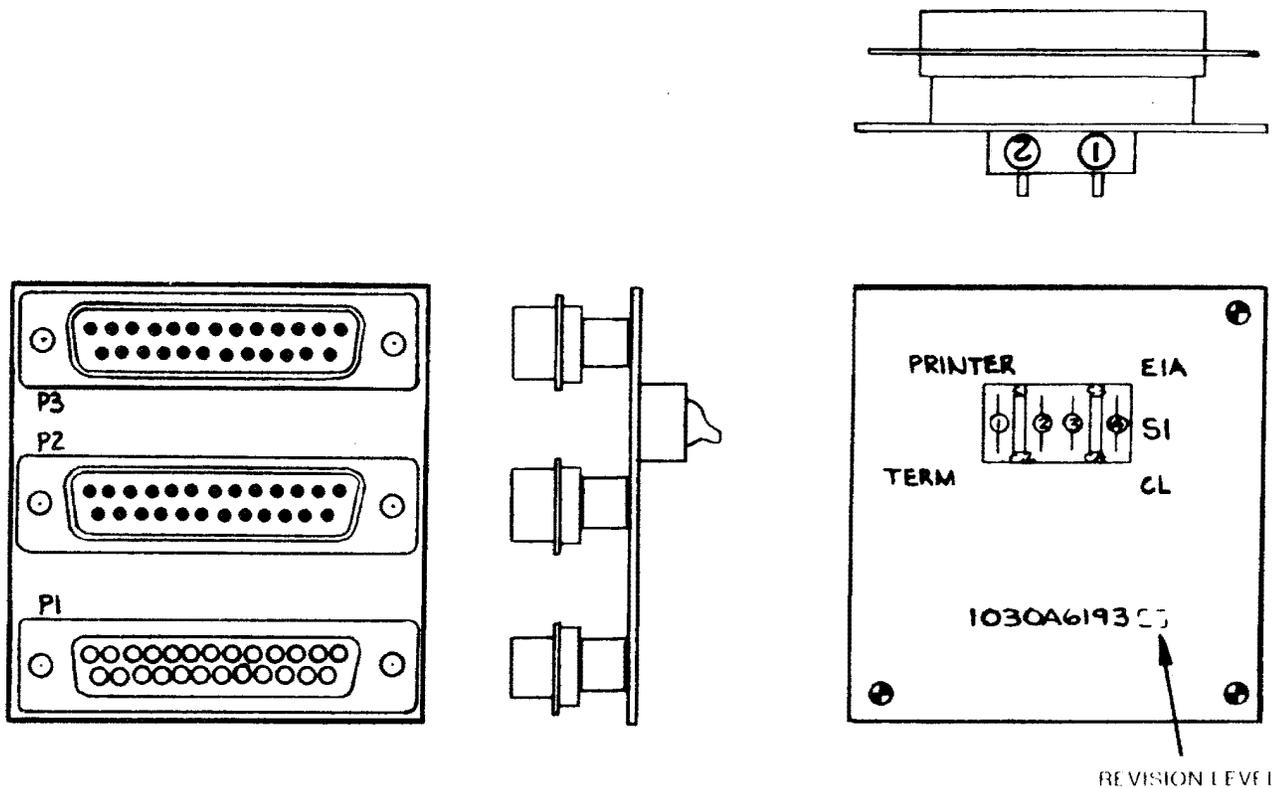


Fig. 1 — Diagnostic Test Plug

- (f) Isochronous Operation Test
- (g) Configuration Memory Test
- (h) Diskette Test
- (i) RAM Test\*
- (j) Drive/Diskette Verify Test\*
- (k) Configuration Memory Test\*
- (l) Checksum Test\*

\*These tests must be run with a terminal attached to the Comm-Stor II unit.

3.06 The results of tests (a) through (h) are displayed on the front panel light-emitting diodes (LEDs). These tests can be operated independently of the terminal. Results of the remaining tests, (i) through (l), are displayed on the terminal.

#### 4. BASIC TROUBLESHOOTING PROCEDURE

4.01 Begin by loading the Diagnostic diskette as described in Part 5.

4.02 Because of the complicated interconnection circuitry, it is recommended that a spare set of modules be used to swap/verify the operation of questionable areas as described in the User Diagnostic procedure.

**4.03** If the unit is completely inoperative, or will not load and execute the User Diagnostic procedure, refer to Checklist #1 in Part 8 of this practice.

**4.04** If the unit passes all tests in the User Diagnostic procedure, but other difficulties are still experienced, refer to Checklist #2 in Part 9 of this practice.

## 5. USER DIAGNOSTIC PROCEDURE

### A. General

**5.01** This part describes the procedure for running each of the Comm-Stor II unit User Diagnostic tests and provides a general explanation of the test results. If an error occurs at any time during a test, swap/verify the defective module.

**5.02** If a Comm-Stor II unit malfunction prevents reading of the Diagnostic diskette, the READY LED blinks.

**5.03** After the Diagnostic diskette is loaded, the STATUS LED blinks if one of the following conditions exists:

(a) The binary switch is set to the EXIT position and the modem baud rate switch is set to position 0, or

(b) The user has inserted the incorrect Diagnostic diskette for the system being tested.

**5.04** The first eight tests are selected by setting the modem baud rate switch on the rear panel of the unit (Fig. 2). These tests are listed in Table A. The remaining tests are selected via terminal commands. Diagnostic tests should be performed in the order they are presented in this practice.

### B. Definition of Terms

**5.05** The following terms are defined to assist the technician during test procedures:

*Test Plug* — is a three-port EIA connector which has two switches, numbered "1" and "2", for simulating the peripheral cabling. When mounted to

the rear panel of the Comm-Stor II unit, it covers all three ports.

*Drive 1* — refers to the top drive of a dual drive Comm-Stor II unit (Fig. 3).

*Drive 2* — refers to the bottom drive of a dual drive Comm-Stor II unit.

*READY* — is an LED which indicates that a diskette has been properly inserted into the drive and that the drive door is closed. READY 1 is the LED associated with drive 1 while READY 2 is the LED associated with drive 2 (Fig. 3).

*BUSY* — is an LED which indicates that data is being transferred to or from the diskette. BUSY 1 is the LED associated with drive 1 while BUSY 2 is the LED associated with drive 2 (Fig. 3).

*STATUS* — is an LED which indicates:

- That data is being transferred to or from any of the ports.
- The presence of a parity error.

The STATUS LED lights at half brilliance when data is being transferred to or from any port. The STATUS LED lights at full brilliance when a parity error occurs while data is not being transferred through any of the ports. If a parity error occurs during data transfer, the STATUS LED lights at half brilliance but returns to full brilliance after completion of data transfer.

### C. Start-Up Procedures

**5.06** Perform the following procedure to refresh the Comm-Stor II unit to factory standard configuration.

*Note:* This procedure must be performed prior to executing each diagnostic test, as the values stored in configuration memory may change as a result of each test. This procedure, however, does not need to be performed between each test if the tests are performed sequentially.

- (a) With the unit powered on, open both drive doors and remove any diskettes from the drives.
- (b) Power off the unit and remove all port cables from the rear panel.

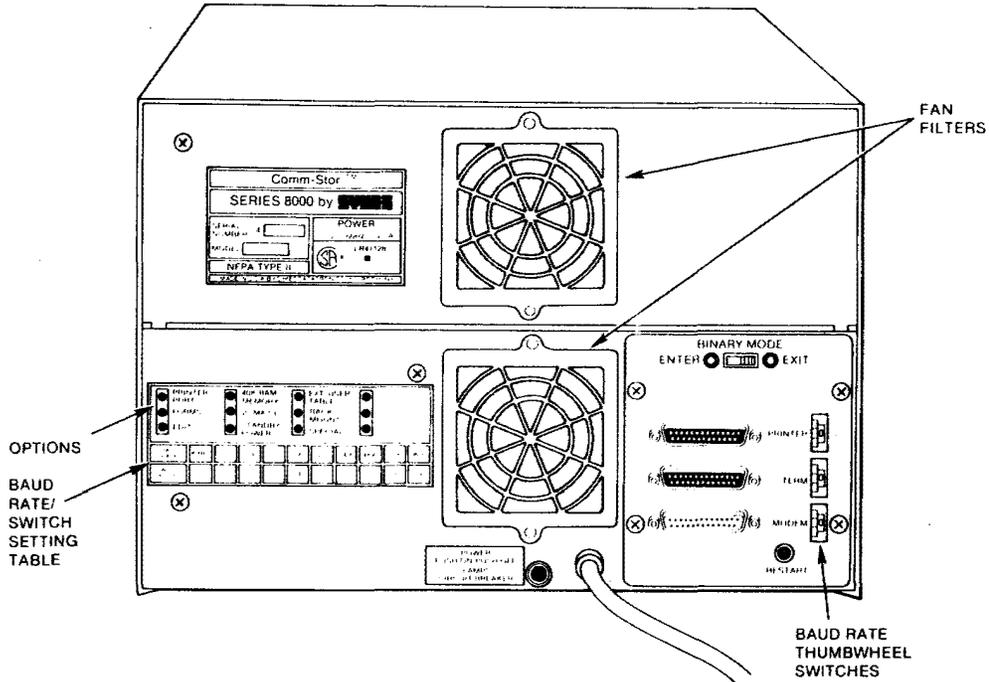


Fig. 2 — Rear View of the Comm-Stor II Unit

TABLE A

TEST SELECTIONS

MODEM SWITCH SETTING	TEST
1	LED/Switch Test
2	Internal Tests
3	Terminal and Modem Port Tests
4	Reserved
5	Printer Port Test
6	Isochronous Operation Test
7	Hardware Features Check
8	Configuration Memory Test
9	Diskette Test

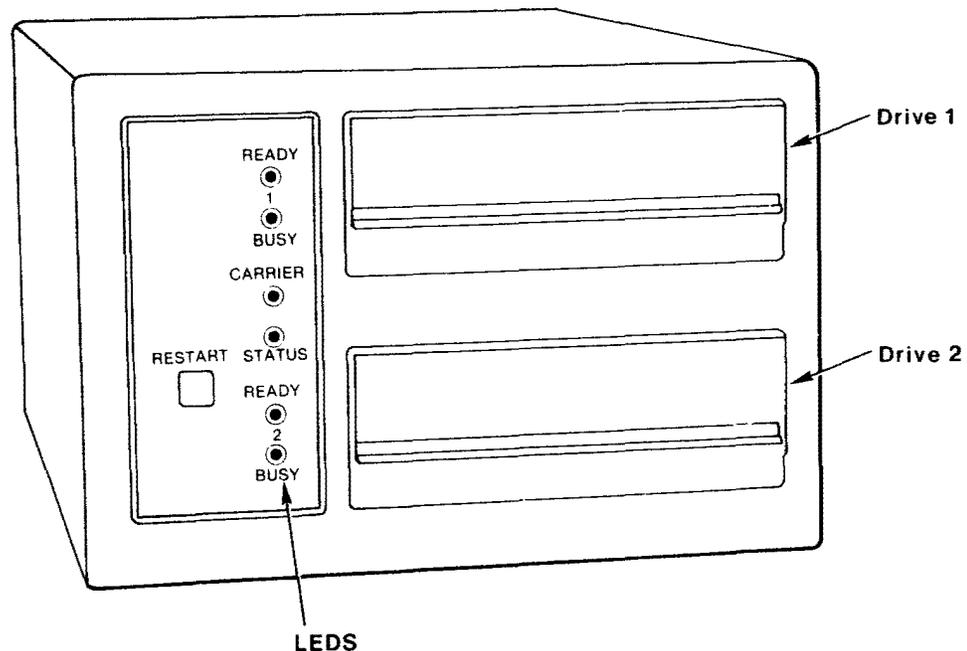


Fig. 3 — Front View of the Comm-Stor II Unit

- (c) Power on the unit.
- (d) Insert a Factory Standard Refresh diskette\* into drive 1 and close the drive door.
- (e) Press the RESTART switch. The Refresh procedures ensure that the Comm-Stor II unit is set to the standard factory configuration.
- (f) Remove the Refresh diskette from drive 1 when the READY 1 LED is the only LED lit.
- 5.07** The Refresh diskette required for each diagnostic test *must* contain the factory standard configuration. If such a diskette is not available, use a Configuration diskette (Part #1030A5186) and the following procedure to refresh the unit to its factory standard values.
- (a) Connect a terminal to the TERM port of the Comm-Stor II unit.
- (b) Power on the unit. Insert the Configuration diskette into drive 1 and press the RESTART switch.
- (c) The unit asks for a framing character. The standard response is a slash (/). Enter a response.
- (d) A period (.) prompt displays. Enter R[CR] to refresh the system to factory standard.†
- (e) The Comm-Stor II unit sends the following question to the terminal:
- SURE?**
- (f) Answer "Y" to the "--SURE?" prompt.
- (g) Remove the Configuration diskette from drive 1 when the READY 1 LED is the only LED lit.

\*This diskette is locally supplied. If this diskette is not available, refer to paragraph 5.07

† [CR] is the graphic representation for the carriage return key.

**5.08** The Diagnostic diskette may contain errors recorded from previous testing. Erase these errors from the diskette prior to running any diagnostic test. To erase these errors:

- (a) Place the binary switch on the rear panel of the Comm-Stor II unit to the EXIT position.
- (b) Set the modem baud rate switch to position 0.
- (c) Insert the Diagnostic diskette into drive 1. Close the drive door and press the RESTART switch.
- (d) When the STATUS LED begins blinking, remove the Diagnostic diskette from drive 1.

**5.09** Set the following switches to the described positions unless specified otherwise.

- (a) Set the binary switch to the EXIT position.
- (b) Set the terminal baud rate switch to position 0.
- (c) Set the modem baud rate switch to position 0.
- (d) Set the printer baud rate switch to position 0.

#### D. Diagnostic Procedures

**5.10** The following test procedures fully verify the Comm-Stor II unit. The terminal, printer, or data set do not have to be connected.

##### LED/Switch Test

**5.11** The LED/Switch test checks each LED and baud rate switch for any malfunctions. To test:

- (a) Refresh the unit to factory standard. Refer to paragraph 5.06 or 5.07.
- (b) Insert the Diagnostic diskette into drive 1 and close the drive door.
- (c) Set the modem baud rate switch to position 1.
- (d) Press the RESTART switch. The LED test starts immediately.

(e) LED Test: The front panel LEDs react immediately as follows:

**Requirement 1:** All the LEDs are lit (approximately one second).

**Requirement 2:** The READY 1 and BUSY 1 LEDs are lit (approximately one second).

**Requirement 3:** The LEDs flicker randomly (approximately 15 seconds) then extinguish.

**Requirement 4:** Walking lights: each LED is lit independently and sequentially (approximately one second each).

**Requirement 5:** The READY 1 LED lights again.

(f) If the proper LED patterns do not display, refer to Table B, Failure Interpretation, for the LED test.

(g) Switch Tests: The switch test values are represented by the LED display.

**Note:** This display is a binary representation of the baud rate switch settings (Table C).

**Requirement 1:** Set all baud rate switches to position 0. None of the LEDs should be lit.

**Requirement 2:** Move the binary switch to the ENTER position; the STATUS LED should be lit. Move the binary switch to the EXIT position; the STATUS LED should not be lit. If the proper LED pattern does not display, refer to Table B, Failure Interpretation, for the binary switch test.

**Requirement 3:** Move the printer baud rate switch through its settings of 0 through 9. (The modem and terminal baud rate switches must be set to position 0). Each baud rate setting should generate a corresponding LED display. Examine the LEDs at each setting and compare the values displayed with the values listed in Table C. Return the printer baud rate switch to position 0 and follow the same procedure for the terminal and modem baud rate switches.

(h) If the proper LED pattern does not display, refer to Table B, Failure Interpretation, for the baud rate switch tests.

**TABLE B**  
**FAILURE INTERPRETATION**

TEST FAILURE	PROBABLE CAUSE
LED Test	Swap/verify the Communications Ports board (1030A5162). If the LED still fails, replace the defective LED.
Baud Rate Switch	Swap/verify the MP/RAM board (1030A5171).
Binary Switch	Swap/verify I/O Panel (1030A6291). If the switch still fails, replace the Communications Ports board (1030A5162).

**TABLE C**  
**LED DISPLAY**

BAUD RATE SWITCH SETTING	STATUS	CARRIER	BUSY(1)	READY(1)
Binary Value	8	4	2	1
0	OFF	OFF	OFF	OFF
1	OFF	OFF	OFF	ON
2	OFF	OFF	ON	OFF
3	OFF	OFF	ON	ON
4	OFF	ON	OFF	OFF
5	OFF	ON	OFF	ON
6	OFF	ON	ON	OFF
7	OFF	ON	ON	ON
8	ON	OFF	OFF	OFF
9	ON	OFF	OFF	ON

*Note:* The LED display is a binary representation of the baud rate switch setting.

- (i) Remove the Diagnostic diskette from drive 1.

**Hardware Features Check**

**5.12** The Hardware Features check indicates the hardware that is installed in the unit and allows the remaining tests to check it.

*Note:* If performing the tests in sequence, proceed directly to Step (c).

To test:

- (a) Refresh the unit to factory standard. Refer to paragraph 5.06 or 5.07.
- (b) Insert a Diagnostic diskette into drive 1 and close the drive door.
- (c) Set the modem baud rate switch to position 7.
- (d) Press the RESTART switch.
- (e) The Comm-Stor II unit immediately performs the visual LED test. After completing this test, a series of LEDs light.
- (f) Open and close the drive 1 door.

*Requirement:* All LEDs blink in unison.

(g) The installed hardware features are indicated by a series of LED ON/OFF patterns. These LED patterns are generated each time the drive door is opened and closed. A different hardware feature is represented each time this procedure is performed.

For example, if the *third* pattern is:

STS	CAR	BSY(1)	RDY(1)
(OFF)	(ON)	(OFF)	(OFF)

this would indicate that the unit has two drives and the Standby mode is installed.

*Note 1:* If an installed feature is not indicated by this check, the associated component(s) either malfunctioned or is not properly installed. A faulty component should be replaced. *If a feature is not detected by this check, it is not tested in any of the Diagnostics tests.*

*Note 2:* The RAM size is indicated by the first or the second LED pattern. Therefore, one of these patterns shows *none of the LEDs lit*.

For example, if a unit contains 16K of RAM, the first pattern is:

STS	CAR	BSY(1)	RDY(1)
(OFF)	(OFF)	(OFF)	(OFF)

The second pattern is:

STS	CAR	BSY(1)	RDY(1)
(OFF)	(ON)	(ON)	(OFF)

(h) To obtain the first *two* patterns, open and close the drive 1 door. Record the *first* pattern. Open and close the drive 1 door again. Record the *second* pattern. Locate the combination of these two patterns in Table D. This pattern determines the RAM size. Patterns not listed indicate a hardware failure.

(i) Open and close the drive 1 door again to obtain the *third* LED ON/OFF pattern. This pattern determines the number of drives and whether Standby mode is installed. Locate this pattern in Table E and record the feature.

(j) Open and close the drive 1 door to obtain the *fourth* LED ON/OFF pattern. This pattern determines whether the Editor and the Forms options are installed. Locate this pattern in Table F and record the feature.

(k) Open and close the drive 1 door to obtain the *fifth* LED ON/OFF pattern. This pattern determines whether or not the printer port and the Extended User Command Table are installed. Locate the pattern in Table G and record the feature.

(l) Open and close the drive door to end the test. All the LEDs blink in unison.

**Internal Tests: Memory/Diskette/Timer/ Baud Rate**

**5.13** The Internal tests check all the hardware of the Comm-Stor II unit for any problems.

*Note:* If performing the tests in sequence, proceed directly to Step (c).

TABLE D  
 RAM SIZE

LED PATTERN #1				LED PATTERN #2				MEMORY SIZE
STS	CAR	BSY (1)	RDY (1)	STS	CAR	BSY (1)	RDY (1)	
OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	*
OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	0K
OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	4K
OFF	OFF	OFF	OFF	OFF	OFF	ON	ON	8K
OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	12K
OFF	OFF	OFF	OFF	OFF	ON	OFF	ON	14K
OFF	OFF	OFF	OFF	OFF	ON	ON	OFF	16K
OFF	OFF	OFF	OFF	OFF	ON	ON	ON	20K
OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	24K
OFF	OFF	OFF	OFF	ON	OFF	OFF	ON	28K
OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF	32K
OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF	36K
OFF	OFF	ON	ON	OFF	OFF	OFF	OFF	40K

\* An error in RAM is indicated.

TABLE E

NUMBER OF DRIVES/STANDBY MODE

LED PATTERN #3				NUMBER OF DRIVES/ STANDBY MODE
STS	CAR	BSY (1)	RDY (1)	
OFF	OFF	OFF	OFF	---
OFF	OFF	OFF	ON	1 Drive/ No standby Mode
OFF	OFF	ON	OFF	2 Drives/ No Standby Mode
OFF	OFF	ON	ON	1 Drive/ Standby Mode
OFF	ON	OFF	OFF	2 Drives/ Standby Mode

TABLE F

EDITOR/FORMS OPTIONS\*

LED PATTERN #4				EDITOR/FORMS OPTIONS
STS	CAR	BSY (1)	RDY (1)	
OFF	OFF	OFF	OFF	
OFF	OFF	OFF	ON	No Forms/ No Editor
OFF	OFF	ON	OFF	No Forms/ Editor
OFF	OFF	ON	ON	Forms/No Editor
OFF	ON	OFF	OFF	Forms/Editor
OFF	ON	OFF	ON	No Forms/ Extended Editor
OFF	ON	ON	OFF	Extended Forms/ No Editor
OFF	ON	ON	ON	Extended Forms/ Editor
ON	OFF	OFF	OFF	Forms/ Extended Editor
ON	OFF	OFF	ON	Extended Forms/ Extended Editor

\*The arithmetic attribute is verified during the Checksum Test.

TABLE G

PRINTER PORT/EXTENDED USER COMMAND TABLE

LED PATTERN #5				PRINTER PORT/ EXTENDED USER COMMAND TABLE
STS	CAR	BSY (1)	RDY (1)	
OFF	OFF	OFF	OFF	--
OFF	OFF	OFF	ON	No Printer Port/ No Extended User Command Table
OFF	OFF	ON	ON	Printer Port/No Extended User Command Table
OFF	OFF	ON	ON	No Printer Port/ Extended User Command Table
OFF	ON	OFF	OFF	Printer Port/ Extended User Command Table

To test:

- (a) Refresh the unit to factory standard. Refer to paragraph 5.06 or 5.07.
- (b) Insert the Diagnostic diskette into drive 1 and close the drive door.
- (c) Set the modem baud rate switch to position 2.
- (d) Press the RESTART switch.
- (e) The Comm-Stor II unit immediately performs the visual LED Test. After completing this test, a series of LEDs lights.
- (f) Open and close the drive 1 door. The Comm-Stor II unit executes the Internal tests. The tests run about *ten* minutes. Time length varies according to the memory size.

*Note: Dual drive 8220A systems only:* Upon completion of the Diskette portion of the Internal tests for drive 1, the READY 1 and BUSY 1 LEDs blink in unison. Remove the Diagnostic diskette from drive 1; insert it into drive 2 and and close the drive door. The requirement stated for drive 1 also applies to drive 2. Drive 2 tests run approximately *three* minutes.

**Requirement:** When the tests are completed, all the LEDs blink in unison.

- (g) Open and close the drive 1 door (or the drive 2 door in a dual drive unit).

**Requirement 1:** If at any time the LEDs blink in unison, go to Step (h).

**Requirement 2:** If a series of LEDs is lit, refer to Table H for RAM faults. If *no* LEDs are lit, go to Requirement 3.

**Requirement 3:** Open and close the drive door again. If a series of LEDs is lit, refer to Table I for configuration memory faults. If *no* LEDs are lit, go to Requirement 4.

**Requirement 4:** Open and close the drive door again. If a series of LEDs is lit, refer to Table J for ROM faults. If *no* LEDs are lit, go to Requirement 5.

**Requirement 5:** Open and close the drive door again. If a series of LEDs is lit, refer to Table K for drive 1 faults. If *no* LEDs are lit, go to Requirement 6.

**Requirement 6:** Open and close the drive door again. If a series of LEDs is lit, refer to Table L for drive 2 faults. If *no* LEDs are lit, go to Requirement 7.

**Requirement 7:** Open and close the drive door to end the test. All LEDs blink in unison.

- (h) If no further fault conditions exist, the test ends with all LEDs blinking in unison. Those fault tables bypassed by the diagnostic procedure contain no reportable results.

**TABLE H**  
**RAM FAULTS**

LED	INTERPRETATION	REMEDY
READY 1 or BUSY 1	The main memory is faulty. Random and unpredictable operating faults may occur.	Swap/verify the MP/RAM board (1030A5171)
CARRIER or STATUS	The expanded memory is faulty.	Swap/verify the Expanded RAM board (1030A5013 or 1030A5014)

**TABLE I**  
**CONFIGURATION MEMORY FAULTS**

LED	INTERPRETATION	REMEDY
READY 1	The main memory is faulty. Random and unpredictable operating faults may occur.	Swap/verify the MP/RAM board (1030A5171).
BUSY 1	The Extended User Command Table is faulty.	Swap/verify the MP/RAM board (1030A5171).

**TABLE J**  
**ROM/TIMER/BAUD RATE FAULTS**

LED	INTERPRETATION	REMEDY
READY 1	The main memory is faulty. Random and unpredictable operating faults may occur.	Swap/verify the ROM IIA board (1030A6486).
BUSY 1	A timer fault has occurred.	Swap/verify the Diskette Interface board (1030A6054).
CARRIER	A baud rate generator is faulty.	Swap/verify the Communications Ports board (1030A5162).

**TABLE K**  
**DRIVE 1 FAULTS**

LED	INTERPRETATION	REMEDY
READY 2 or BUSY 1	Diskette drive 1 cannot read properly.	Swap/verify the diskette drive assembly (1030A3501). If drive 1 still fails, replace the Diskette Interface board (1030A6054) and cable. Continued failure of drive 1 indicates a bad Diagnostic diskette.
CARRIER or STATUS	Diskette drive 1 cannot write properly.	(same as above)

TABLE L  
DRIVE 2 FAULTS

LED	INTERPRETATION	REMEDY
READY 2 or BUSY 2	Diskette drive 2 cannot read properly.	Swap/verify the diskette drive assembly (1030A3501). If drive 2 still fails, replace the Drive Interface board (1030A6054) and cable. Continued failure of drive 2 indicates a bad User Diagnostic diskette.
CARRIER or STATUS	Diskette drive 2 cannot write properly.	(same as above)

(i) Remove the Diagnostic diskette from the drive.

(h) The Comm-Stor II unit immediately performs the visual LED test. After completing this test, a series of LEDs lights.

**Terminal and Modem Port Tests**

5.14 The Terminal and Modem Port tests check the terminal and modem port lines and their respective UARTs.

*Note:* If performing the test in sequence, proceed directly to step (b).

To test:

- (a) Refresh the unit to factory standard. Refer to paragraph 5.06 or 5.07.
- (b) Power the unit off.
- (c) Mount the test plug on the rear panel of the unit. Set switch 1 up (EIA) and switch 2 down (TERM).
- (d) Power the unit on.
- (e) Insert the Diagnostic diskette into drive 1 and close the drive door.
- (f) Set the modem baud rate switch to position 3.
- (g) Press the RESTART switch.

(i) Refer to Table M and set the terminal baud rate switch on the back of the Comm-Stor II unit. The terminal *and* modem ports will be tested at the selected baud rate.

TABLE M  
BAUD RATE SPECIFICATION

This table specifies the terminal, modem and printer port baud rates. Run the test <i>once</i> if the modem and terminal baud rates are the same. Run the test a second time if the modem and terminal baud rates are different.	
DESIRED BAUD RATE	TERM SWITCH SETTING
110	1
134	2
150	3
300	4
1200	5
2400	6
4800	7
7200	8
9600	9

- (j) Open and close the drive 1 door to start the tests.

**Requirement:** The tests run about *three* minutes. When completed, all LEDs blink in unison.

- (k) Open and close the drive 1 door to obtain the test results as displayed by the LEDs.

**Requirement 1:** If at any time the LEDs blink in unison, go to Step (l).

**Requirement 2:** If a series of LEDs is lit, refer to Table N for the terminal receive/transmit faults. If *no* LEDs are lit, go to Requirement 3.

**Requirement 3:** Open and close the drive door again. If a series of LEDs is lit, refer to Table O for the terminal EIA control line faults. If *no* LEDs are lit, go to Requirement 4.

**Requirement 4:** Open and close the drive door again. If a series of LEDs is lit, refer to Table P for the modem receive/transmit faults. If *no* LEDs are lit, go to Requirement 5.

**Requirement 5:** Open and close the drive door again. If a series of LEDs is lit, refer to Table Q for the modem EIA control line faults. If *no* LEDs are lit, go to Requirement 6.

**Requirement 6:** Open and close the drive door to end the test. All LEDs blink in unison.

- (l) If no further faults exist, the test ends with all LEDs blinking in unison. Those tables bypassed by the diagnostic procedure contain no reportable results.

- (m) Remove the test plug from the unit, and the Diagnostic diskette from the drive.

#### Printer Port Test (if the option is installed)

- 5.15 The Printer Port test checks the printer port lines and the UART.

**Note:** If performing the tests in sequence, proceed directly to step (b).

To test:

- (a) Refresh the unit to factory standard. Refer to paragraph 5.06 or 5.07.
- (b) Power the unit off.
- (c) Mount the test plug on the rear panel of the unit. Set switch 1 up (EIA) and switch 2 up (PRINTER).
- (d) Power the unit on.
- (e) Insert the Diagnostic diskette into drive 1 and close the drive door.
- (f) Set the modem baud rate switch to position 5.
- (g) Press the RESTART switch.
- (h) The Comm-Stor II unit immediately performs the visual LED test. After completing this test, a series of LEDs lights.
- (i) Refer to Table M and set the terminal baud rate switch on the rear panel of the Comm-Stor II unit.
- (j) Open and close the drive 1 door to start the test.

**Requirement:** The test runs about *three* minutes. When completed, all LEDs blink in unison.

- (k) Open and close the drive 1 door to obtain the test results as displayed by the LEDs.

**Requirement 1:** If at any time the LEDs blink in unison, go to Step (l).

**Requirement 2:** If a series of LEDs is lit, refer to Table R for the printer receive/transmit faults. If *no* LEDs are lit, go to Requirement 3.

**TABLE N**  
**TERMINAL RECEIVE/TRANSMIT FAULTS**

LED	INTERPRETATION	REMEDY
READY 1 or BUSY 1	The terminal port cannot receive and/or transmit characters properly.	Swap/verify the Communications Ports board (1030A5162).
CARRIER	One or more of the following faults may occur:  (a) The terminal port may not respond to a break (i.e., long space) from the terminal.  (b) The terminal port cannot send a break to the terminal.  (c) A terminal parity error indication may be falsely given.	Swap/verify the Communications Ports board (1030A5162).
STATUS	The STATUS LED is not used during this test.	_____

**TABLE O**  
**TERMINAL EIA CONTROL LINE FAULTS**

LED	INTERPRETATION	REMEDY
ANY LED	The terminal port is faulty.	Swap/verify the Communications Ports board (1030A5162).

TABLE P

MODEM RECEIVE/TRANSMIT FAULTS

LED	INTERPRETATION	REMEDY
READY 1 or BUSY 1	The modem port cannot receive and/or transmit characters properly.	Swap/verify the Communications Ports board (1030A5162).
CARRIER	One or more of the following faults may occur: (a) The modem port may not respond to a break (i.e., long space) from the data set. (b) The modem port cannot send a break to the data set. (c) A modem parity error indication may be falsely given.	Swap/verify the Communications Ports board (1030A5162).
STATUS	Under certain conditions, transmission from the data set to the terminal may be faulty.	Swap/verify the Communications Ports board (1030A5162).

TABLE Q

MODEM EIA CONTROL LINE FAULTS

LED	INTERPRETATION	REMEDY
ANY LED	The modem port is faulty.	Swap/verify the Communications Ports board (1030A5162).

TABLE R  
 PRINTER RECEIVE/TRANSMIT FAULTS

LED	INTERPRETATION	REMEDY
READY 1 or BUSY 1	The printer port cannot transmit characters properly.	Swap/verify the Printer Port board (1030A5012 or 1030A5014).
CARRIER	The printer port may not be able to send a break (i.e., long space) to the printer.	Swap/verify the Printer Port board (1030A5012 or 1030A5014).
STATUS	The STATUS LED is not used.	_____

**Requirement 3:** Open and close the drive door again. If a series of LEDs is lit, refer to Table S for the printer EIA control line faults. If no LEDs are lit, go to Requirement 4.

**Requirement 4:** Open and close the drive door again. If a series of LEDs is lit, refer to Table P for the modem receive/transmit faults. If no LEDs are lit, go to Requirement 5.

**Requirement 5:** Open and close the drive door again. If a series of LEDs is lit, refer to Table Q for the modem EIA control line faults. If no LEDs are lit, go to Requirement 6.

**Requirement 6:** Open and close the drive door to end the test. All LEDs blink in unison.

(l) If no further faults exist, the test ends with all LEDs blinking in unison. Those tables bypassed by the diagnostic procedures contain no reportable results.

(m) Remove the test plug from the unit, and the Diagnostic diskette from the drive.

**Isochronous Test\***

5.16 The Isochronous test checks the isochronous logic.

**Note 1:** If a data set is not used with the Comm-Stor II unit, this test need not be performed.

**Note 2:** If performing the tests in sequence, proceed directly to step (b).

To test:

- (a) Refresh the unit to factory standard. Refer to paragraph 5.06 or 5.07.
- (b) Power the unit off.

\_\_\_\_\_

\*This test may be performed only on units containing the following hardware components:  
 Communications Ports board #1030A5162  
 I/O Panel #1030A6291  
 MP/RAM board #1030A5171

TABLE S  
PRINTER EIA CONTROL LINE FAULTS

LED	INTERPRETATION	REMEDY
ANY LED	The printer port is faulty.	Swap/verify the Printer Port board (1030A5012) or (1030A5014).

(c) Mount the test plug on the rear panel ports. Set switch 1 up (EIA) and switch 2 down (TERM).

(d) Power the unit on.

(e) Insert a Diagnostic diskette into drive 1 and close the drive door.

(f) Set the modem baud rate switch to position 6.

(g) Press the RESTART switch.

(h) The Comm-Stor II unit immediately performs the visual LED test. After completing this test, a series of LEDs lights.

(i) Open and close the drive 1 door to start the test.

**Requirement:** The test runs about *three* minutes. When completed, all LEDs blink in unison.

(j) Open and close the drive 1 door to obtain the test results as displayed by the LEDs.

**Requirement 1:** If at any time the LEDs blink in unison, go to Step (k).

**Requirement 2:** If a series of LEDs is lit, refer to Table N for the terminal receive/transmit faults. If *no* LEDs are lit, go to Requirement 3.

**Requirement 3:** Open and close the drive door again. If a series of LEDs is lit, refer to Table O for the terminal EIA control line faults. If *no* LEDs are lit, go to Requirement 4.

**Requirement 4:** Open and close the drive door again. If a series of LEDs is lit, refer to Table P for the modem/receive transmit faults. If *no* LEDs are lit, go to Requirement 5.

**Requirement 5:** Open and close the drive door again. If a series of LEDs is lit, refer to Table Q for the modem EIA control line faults. If *no* LEDs are lit, go to Requirement 6.

**Requirement 6:** Open and close the drive door to end the test. All LEDs blink in unison.

(k) If no further faults exist, the test ends with all LEDs blinking in unison. Those tables bypassed by the diagnostic procedures contain no reportable results.

(l) Remove the test plug from the unit, and the Diagnostic diskette from the drive.

**Configuration Memory Test**

**5.17** The Configuration Memory test checks the main configuration memory, the Extended User Command Table memory, and the battery.

**Note:** If the tests are performed in sequence, proceed directly to step (b).

To test:

(a) Refresh the unit to factory standard. Refer to paragraph 5.06 or 5.07.

(b) Power the unit off.

(c) Remove the test plug or any port cables from the rear panel.

(d) Power the unit on.

(e) Insert the Diagnostic diskette into drive 1 and close the drive door.

(f) Set the modem baud rate switch to position 8.

- (g) Press the RESTART switch.
- (h) The Comm-Stor II unit immediately performs the visual LED test. After completing this test, a series of LEDs lights.
- (i) Open and close the drive 1 door to start the test.

**Requirement:** When the BUSY 1 LED remains lit, power the Comm-Stor II unit off. Wait about *one* minute.

- (j) Power the Comm-Stor II unit on.

**Requirement:** The LED test is again automatically performed.

- (k) Open and close the drive 1 door.

**Requirement 1:** If the BUSY 1 or the CARRIER LED begins *blinking*, refer to Table T for the configuration memory faults.

**Requirement 2:** If the BUSY 1 LED remains lit, no faults exist. Power the Comm-Stor II unit off. Wait about *one* minute.

- (l) Power the Comm-Stor II unit on.

**Requirement:** The LED test is again automatically performed.

- (m) Open and close the drive 1 door.

**Requirement 1:** If the BUSY 1 LED or the CARRIER LED begins blinking, refer to Table T for the configuration memory faults.

**Requirement 2:** If *all* LEDs blink in unison, the test is finished and no further faults exist.

**Note 1:** Wait at least *one* minute where required. However, if the suspected configuration memory fault is time related, more or less time may be required between steps.

**Note 2:** If the problem is thought to be heat related, the user may press the RESTART switch between steps rather than power the unit off.

- (n) Remove the Diagnostic diskette from the drive.

#### Diskette Test (Read Only)

**5.18** The Diskette test checks a diskette to determine if data can be read. This test need only be run if a diskette is suspected to contain errors.

**Note 1:** The user should first verify the system's operation by running the Internal tests.

**Note 2:** If the tests are performed in sequence, proceed directly to Step (b).

To test:

- (a) Refresh the unit to factory standard. Refer to paragraph 5.06 or 5.07.
- (b) Power the unit off.
- (c) Remove the test plug or the port cables from the rear panel of the unit.
- (d) Power the unit on.
- (e) Insert the Diagnostic diskette into drive 1; close the drive door.
- (f) Set the modem baud rate switch to position 9.
- (g) Press the RESTART switch.
- (h) The Comm-Stor II unit immediately performs the visual LED test. After completing this test, a series of LEDs lights.
- (i) Open and close the drive 1 door.

**Requirement 1:** The READY 1 and BUSY 1 LEDs begin blinking. Remove the Diagnostic diskette and insert the diskette to be tested into drive 1.

**Requirement 2:** The READY 1 and BUSY 1 LEDs stop blinking but remain lit during the test. The test runs about *two* minutes.

**Requirement 3:** If no errors occur, the READY 1 and BUSY 1 LEDs start blinking again (READY 2 and BUSY 2 blink on a dual drive unit). Another diskette may be inserted into the drive (drive 2 on a dual drive unit) and tested.

TABLE T  
CONFIGURATION MEMORY FAULTS

BLINKING LED	INTERPRETATION	REMEDY
BUSY 1	The battery or the main configuration memory is faulty.	Swap/verify the battery (300D0001.) If the problem persists, replace the MP/RAM board (1030A5171).
CARRIER	The battery or the Extended User Command Table memory is faulty.	(Same as above.)

*Note:* In dual drive units additional diskettes are tested by alternating between drives 1 and 2.

*Requirement:* If an error occurs, the CARRIER LED begins blinking. Remove the faulty diskette from the drive and discard it. If a failure occurs, the test needs to be restarted. To test additional diskettes, proceed as described in Requirement 3.

*Note:* The user can attempt to copy a faulty diskette to save valuable data.

#### RAM Test

5.19 The RAM test provides a detailed analysis of the problem area in RAM (Table U). This test need only be run if a RAM failure existed during the Internal tests. This test allows troubleshooting to the component level.

To test:

- (a) Be sure the terminal is connected to the Comm-Stor II unit's terminal (TERM) port and is in the On-line mode.
- (b) Power the Comm-Stor II unit on.
- (c) Remove any diskettes from the drives.
- (d) Refresh the unit to factory standard. Refer to paragraph 5.06 or 5.07.
- (e) Insert the Diagnostic diskette into drive 1; close the drive door.

(f) Set the terminal baud rate switch to the same rate as the terminal. Set the modem baud rate switch to position 0 and the printer baud rate switch to position 0. Set the binary switch to the ENTER position.

(g) Press the RESTART switch. The following message displays at the terminal:\*

\*\*\* USER DIAGNOSTIC, VER. \_\_\_\_ \*\*\*  
ENTER A COMMAND FOLLOWED BY A RETURN  
#

(h) After the number sign prompt (#) appears, type M[CR] on the terminal. After a slight delay, the letter M echoes to the terminal and the following statement displays:

**STANDARD RAM?**

Type Y.

(i) The system responds by printing the following message at the terminal:

**EXP RAM?**

Type Y if the optional 4K Expanded RAM board is installed or N [CR] if it is not. The memory test executes beginning at Bank 00.

\*The version level of the diskette is filled in by the Comm-Stor II unit.

**TABLE U**  
**USER DIAGNOSTIC MEMORY TEST**

BANK	ADDRESS RANGE	FUNCTION	BOARD	IC LOCATION							
				0	1	2	3	4	5	6	7
00	0020-03FF	Standard System	MP/RAM	A1	A3	B1	B3	C3	C3	D1	D3
01	0400-07FF	1K Forms	MP/RAM	A2	A4	B2	B4	C2	C4	D2	D4
02	0800-0BFF	4K RAM	4K RAM/Printer	A1	B1	C1	D1	E1	F1	H1	J1
03	0C00-0FFF	4K RAM	4K RAM/Printer	A1	B1	C1	D1	E1	F1	H1	J1
04	1000-13FF	4K RAM	4K RAM/Printer	A1	B1	C1	D1	E1	F1	H1	J1
05	1400-17FF	4K RAM	4K RAM/Printer	A1	B1	C1	D1	E1	F1	H1	J1
10	4000-40FF	Standard CMOS RAM	MP/RAM	F3	F3	F3	F3	E2	E2	E2	E2

- (1) The RAM test performs read/write tests on all memory addresses. The test procedure is loaded and executed in Bank 00. If "FORMS?" and "EXP RAM?" questions are answered NO, then Banks 01-05 are not tested.
- (2) If an error occurs, the following information displays: the bank number, the first address which failed within that bank, the value written, and the value read. The bits within these values are organized as follows: 7654.3210. Bit 7 is the Most Significant Bit (MSB).
- (3) Only the first 4K of RAM may be tested on the Expanded 16K RAM board. If a failure occurs, use the table above and change the device in Row 1, even if 2, 3, and 4 is indicated.

Type Y [CR] if the optional 4K Expanded RAM board is installed or N [CR] if it is not. The memory test executes beginning at Bank 00.

**Requirement 1:** The following table is displayed at the terminal:

Global W/R Test			
Bank	LOC	Write	Read
XX	XX	XX	XX
XX	XX	XX	XX

**Where:** BANK = hexadecimal RAM Bank number  
 LOC = hexadecimal memory address  
 WRITE = a 1 or a 0 indicates the logic level of each data bit written into RAM.  
 READ = a 1 or 0 indicates the logic level of each data bit read from RAM.

The Global Write/Read test writes a unique value (a number) into each memory location. After the entire memory is written into, each location is read and compared to the expected value. This test detects addressing faults in both the address logic and in the memory chips themselves. Only the first error in each bank is reported.

**Requirement 2:** After completing the above test, the Comm-Stor II unit begins execution of the Global Pattern test. This test writes a unique pattern into memory. After the entire memory is written into, each location is read and compared to the expected value. The test is repeated seven times with a different pattern used each time. This test detects pattern sensitivity and addressing faults.

**Requirement 3:** After completing the Global Pattern test, the Comm-Stor II unit responds with the following message:

**PRESS RETURN KEY**

- (j) Type [CR] to perform the final test, W/R ALL V.

This performs a Write/Read test at each location, writing and reading four different hexadecimal values in the following sequence.

- (1) Write the value.

- (2) Read the location (up to six tries) until the correct value is read.
- (3) If the correct value cannot be read, go back and write it again.
- (4) If it still cannot be read in six attempts, repeat the cycle up to six times until the correct value is read.

When an error is found (even if it disappears during entry), no more locations in that bank are tested. The test advances to the next bank.

A typical error display is:

BANK	LOC	WRITE	READ
02	0801	1100.0010	1100.0000

5  
 ↑  
 The number of write tries.  
 4  
 ↑  
 The number of read tries after the last write.

If the value cannot be read after six read-write cycles, then an H (HARD ERROR) is displayed in place of the retry numbers.

At the completion of this test, the diagnostic returns to the beginning of the RAM test.

- (k) Remove the Diagnostic diskette from the drive when the test is finished.

**Drive/Diskette Verify Test**

**5.20** The Drive/Diskette Verify test provides a means of reading and verifying track/sector identification fields (IDs) and data cyclical redundancy checks (CRC) characters for every sector on the diskette.

**5.21** The purpose of this test is to check the diskette drive and the diskette drive electronics' ability to read. If marginal problems exist, it is imperative that the test be run with several other diskettes or a known good diskette.

**5.22** This test can also be used to check and verify diskettes. After the diskette drive and electronics have been verified by successfully

reading known good diskettes, the Verify test can be used to verify questionable diskettes. Marginal or bad sectors are indicated by a display which indicates the track number (0-76), the sector number (01-26), and an "S" which indicates a search error or "CC" which indicates a CRC or data error.

To test:

- (a) Connect a terminal to the terminal (TERM) port on the Comm-Stor II unit.
- (b) Refresh the unit to factory standard. Refer to paragraph 5.06 or 5.07.
- (c) Set the terminal baud rate switch to the same rate as the terminal. Refer to the baud rate table on the rear panel of the unit for the correct position.
- (d) Set the modem baud rate switch to position 0.
- (e) Set the binary switch to the ENTER position.
- (f) Insert the Diagnostic diskette into drive 1 and close the drive door.
- (g) Press the RESTART switch. The following message is displayed at the terminal:

\*\*\* USER DIAGNOSTIC, VER. \_\_\_\_\_ \*\*\*  
ENTER A COMMAND FOLLOWED BY A RETURN  
#

- (h) After the number sign prompt (#) appears, type V[CR] on the terminal. After a slight delay, the letter V is echoed to the terminal and the following statement is displayed:

**INSERT IN**

- (i) Test the system's ability to read a diskette. Insert a known good scratch diskette into drive 1 or drive 2.

*Note:* Marginal diskettes can be tested in known good systems using the same procedure.

- (j) After the scratch diskette has been inserted, the following message is displayed on the terminal.

TRK

Answer this prompting message with the decimal number of the track to be tested (0-76), or answer it with an upper case "A" which designates all tracks and sectors on the diskette.

- (k) Type a [CR]; the following prompt statement is displayed on the terminal:

**ID REVS (ID Revolutions)**

Answer this message with a C[CR]. The "C" causes the same search retry sequence used by the Comm-Stor II unit in normal operation (up to 12 search retries). If marginal diskettes are being tested, a number 1 through 9 can be entered to limit the number of search retries.

Limiting the number of retries greatly increases the probability of an error indication when the diskette or diskette drive electronics are marginal.

*Note:* It is normal to have some search errors when the value for ID REVS equals 1 or 2.

- (l) The test begins automatically after a carriage return has been entered following the ID REVS number.

The following table is displayed:

TRK	SEC	
RUN1		
XX	YY	ZZ

**Where:**

TRK = track number  
SEC = sector number  
RUN1 = test cycle 1  
If Read errors occur.

Read errors are indicated in the above table by the track (XX) and sector (YY) numbers where the error occurred. The third column (ZZ) describes the type of error: S = "search" or "diskette" type ID error; CC = "CRC" or "Bad Read" type data error.

If all tracks are tested, the beginning of each read cycle is indicated by the display RUN1, RUN2, RUN3, etc. Otherwise, only RUN1 is indicated.

The test runs continuously until interrupted. Striking the space bar on the terminal stops the test and brings the procedure back to the TRK message. Striking the character "I" brings the procedure back to the INSERT IN message.

- (m) Remove the Diagnostic diskette from the drive when the test is finished.

### Configuration Memory Test

5.23 The Configuration Memory test confirms:

- (a) The ability of configuration memory devices to be addressed and read,
- (b) The ability of the configuration memory and associated devices to retain information when the main power is disconnected.

5.24 The purpose of this test is to determine the Comm-Stor II unit's ability to retain all configurable parameters. This test should be run if the unit fails to configure properly or loses parameters after refresh.

5.25 The test procedure:

- (a) Reads the previous configuration memory page(s) into RAM from the diskette.
- (b) Compares this image with the contents of each memory page beginning at location 4000.
- (c) Reports if the comparison was "Good" or "Bad" for each memory page.
- (d) Writes the contents of both pages out to the diskette.

5.26 To test:

- (a) Connect a terminal to the Comm-Stor II unit's terminal (TERM) port.
- (b) Power the Comm-Stor II unit on.
- (c) Refresh the unit to factory standard. Refer to paragraph 5.06 or 5.07.
- (d) Set the terminal baud rate switch to the same rate as the terminal. Set the modem baud rate switch to position 0. Set the printer baud rate switch to position 0. Set the binary switch to the ENTER position.
- (e) Insert the Diagnostic diskette into drive 1. Close the drive door.
- (f) Press the RESTART switch. The following message is displayed at the terminal:

\*\*\* USER DIAGNOSTIC, VER. \_\_\_\_\_ \*\*\*  
ENTER A COMMAND FOLLOWED BY A RETURN  
#

- (g) After the number sign prompt (#) appears, type C[CR] on the terminal. After a slight delay, the letter C is echoed to the terminal and the following statement is displayed:

### EXT TABLE?

Respond by typing Y[CR].

*Requirement:* The test executes and prints the following information for each memory page:

PAGE 0	(GOOD or BAD)
EXT TABLE	(GOOD or BAD)

*Note:* The test results should be ignored the first time the test is run. This enables the system to write the contents of configuration memory onto the diskette. When the question "EXT TABLE?" is asked again, the results will be valid.

- (h) Two test sequences are possible:

Sequence 1: (1) Run the test.

- (2) Power the unit off, wait five seconds, then restore power.

- (3) Repeat the test immediately.

Sequence 1 will check the following hardware components:

- The configuration memory chips in their power down mode.
- The configuration memory support chips.
- The on-board filter capacitor (which acts as a short-term power source for the configuration memory system).

Sequence 2: (1) Run the test.

- (2) Power the unit off.

- (3) Wait until the next day to repeat the test.

Sequence 2 will check the previous hardware as well as the operation of the battery on the mother board.

The Configuration Memory test does not alter configuration memory.

### The Checksum Test

**5.26** The checksum test indicates all the hardware that is installed in the Comm-Stor II unit. This test is similar to the hardware feature check except that this test provides a display of hardware values. To test:

*Note:* If the tests are performed in sequence, go directly to step (e).

- (a) Power on the Comm-Stor II unit.
- (b) Refresh the unit to factory standard. Refer to paragraph 5.06 or 5.07.
- (c) Set the modem baud rate switch to position 0.
- (d) Set the binary switch to the ENTER position.
- (e) Set the terminal baud rate switch to the same rate as the terminal. Refer to the baud rate table on the rear panel of the unit for the proper setting.
- (f) Insert the Diagnostic diskette into drive 1 and close the drive door.
- (g) Press the RESTART switch.

*Requirement:* The following displays on the terminal:

```
***USER DIAGNOSTIC, VER. _____ ***  
ENTER A COMMAND FOLLOWED BY A RETURN  
#
```

- (h) After the number sign (#) prompt, type X[CR].

*Requirement:* An asterisk (\*) displays on the terminal.

- (i) Following the asterisk (\*) prompt, type F[CR].

*Requirement:* A display of the current hardware values appear on the terminal. Save a

printout of these values as a means of comparing future test results. A sample display is shown in Table V.

## 6. COMMUNICATIONS CHECKOUT

**6.01** The following on-line check (Table W) should be performed immediately after installing the Comm-Stor II unit and whenever send/receive problems are indicated. This procedure will determine whether the Comm-Stor II unit can communicate with the network controller through the modem port.

## 7. LOCAL TERMINAL TESTS

**7.01** The terminal tests consist of the following:

- (a) Enter File Test
- (b) Display File Test
- (c) Move File to Work Space
- (d) List Work Space
- (e) Search/Replace
- (f) Save File (same location)
- (g) Enter Form File (optional)
- (h) Load Form File
- (i) Enter Test File
- (j) Display Test File
- (k) Print File (optional)

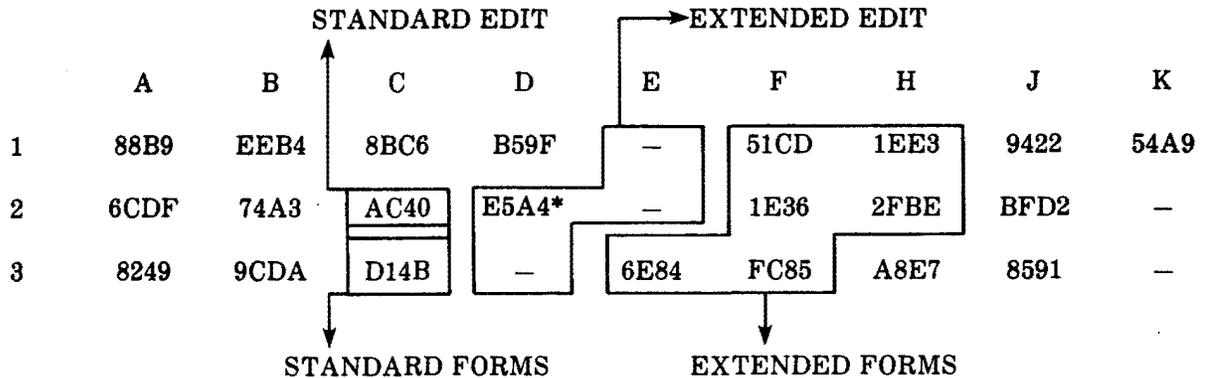
*Note:* If failure occurs, refer to Table X. Locate the step in which the failure occurred and follow the indicated action.

**7.02** To test:

- (a) Place the terminal in the On-line mode.
- (b) Insert a User diskette into drive 1 and close the drive door.

TABLE V  
CHECKSUM DISPLAY

\*\*\*USER DIAGNOSTIC, VER. \_\_\_\_\_\*\*\*  
ENTER A COMMAND FOLLOWED BY A RETURN  
#X  
\*F



MP/RAM: 2K  
EXT USER: IN  
RAM OPTION: 16K  
STANDBY: IN  
NO. DRIVES: DUAL  
FEATURES: PRINTER PORT  
EDIT

Note 1: Option Location

Location	Checksum Value	Option
H2	3098	Ext. Forms (no Math)
H2	2FBE	Ext. Forms (Math)

Note 2: Patch PROM Level

Level / Location	K1	J3	J2	J1	H3
AT.05	54A9	8591	BFD2	9422	A8E7
AT.04	OD17	8591	BFD2	9422	A8E7
AT.03	6AFB	CDBE	BAA4	A05A	624**
AT.02	6AFA	CDBE	BAA4	A05A	624D**
AT.01	09C8	C644	C429	9295	---

\*This value may alternately be 9215 if Extended Editor is installed.

\*\*This value is present in units with the extended forms option with AT.04 or higher patch PROMs.

TABLE W  
 ON-LINE CHECK

STEP	PROCEDURE	TROUBLE ANALYSIS
1	Power on the Comm-Stor II unit and insert a User diskette.	
2	Check to be sure the data set is properly connected to the Comm-Stor II unit's modem port.	
3	Place a telephone call to the Data Test Center (DTC). Advise the desk representative that an <i>On-Line test</i> of the Comm-Stor II unit is being performed and that the FOX message is to be sent.	
4	Establish the data connection.	
5	The DTC will send a FOX message by entering: [CR][LF] .R FOX[CR][LF]	
6	<p>THE DTC will cause the FOX message to be displayed on the station terminal by entering:</p> <p>[CR] [LF]            .D FOX [CR] [LF]</p> <p>The FOX message should be displayed on the terminal as follows:</p> <p>THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK 1234567890[CR]            THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK 1234567890[CR]            THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK 1234567890[CR]            THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK 1234567890[CR]            THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK 1234567890[CR]            THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK 1234567890[CR] [ETX]</p> <p><i>Note:</i> Carriage returns [CR] may appear as ≡ on DATASPEED* 40/1, and 40/2 terminals, and not at all on 43 Teleprinters.</p>	<p>If the Comm-Stor II unit does not respond to the .D command:</p> <ul style="list-style-type: none"> <li>(a) Check the EIA cables and connections.</li> <li>(b) Check the baud rate settings.</li> <li>(c) The User diskette is not inserted or a bad User diskette has been inserted.</li> <li>(d) Check data set operation.</li> <li>(e) Check the following Comm-Stor II unit Configuration Parameters: 3, 5, 77, 86, 101, 67, 58, 37, 41-46.</li> <li>(f) Check the data terminal operation.</li> <li>(g) Obtain the test from another test center.</li> </ul>



TABLE W (Cont)

ON-LINE CHECK

STEP	PROCEDURE	TROUBLE ANALYSIS
	<p><i>Requirement: On DATASPEED 40/1 and 40/2 terminals the following display will appear followed by the terminal bell:</i></p> <pre> ≡ 5 NULLS ≡ 5 DELETES ≡ 5 CRS ≡ ≡ ≡ ≡ ≡ 5 BAD PARITY????? 5 BELLS B_LB_LB_LB_LB_L  On 43 Teleprinters, the following display will appear followed by the terminal bell:  5 NULLS 5 DELETES 5 CRS  5 BAD PARITY????? 5 BELLS           </pre>	
10	<p>Display the directory listing of the message, TESTFILE by entering:</p> <pre>.DD TESTFILE[CR]</pre> <p><i>Requirement: On DATASPEED 40/1 and 40/2 terminals, the following display will appear:</i></p> <pre>TESTFILE      65      ≡</pre> <p><i>On 43 Teleprinters, the following display will appear:</i></p> <pre>TESTFILE      65</pre>	Same as Step 6.

**TABLE X**  
**TERMINAL TESTS ERROR ANALYSIS**

<b>TEST STEP</b>	<b>ACTION</b>
(d)	(a) Check the User Diskette (b) Check Configuration Parameter #89 (Enter Command).
(f)	Check Configuration Parameter #8 (End of Text Character).
(g)	Check Configuration Parameter #86 (Display Command).
(h)	(a) Check Configuration Parameter #115 (Edit Command). (b) Check User Diskette (Work Space).
(i)	Check User Diskette Parameter #122 (List Command).
(j)	Check Configuration Parameter #125 (Search Command).
(k)	Check Configuration Parameter #116 (Save Command).
(q)	Check Configuration Parameter #129 (Forms Complete Command).
(r)	Check Configuration Parameter #126-#137 (Forms Commands).
(v)	Check Configuration Parameters #61-#66 (Printer Commands).

- (c) Press the RESTART switch.

*Requirement:* The Comm-Stor II unit will respond by displaying an asterisk (\*) prompt. If this does not happen, verify that the diskette has been inserted properly (the READY 1 LED should be lit). Also, verify that the unit is properly configured.\*

- (d) Enter the following command on the terminal:

**.E TEST[CR]**

*Requirement:* The unit should respond by lighting the BUSY 1 LED and returning the cursor/printhead to the left margin.

- (e) Enter the following data on the terminal:

**THIS IS A TEST OF THE COMM-STOR II SYSTEM.[CR]  
ABCDEFGHIJKLMN OPQRSTUVWXYZ[CR]  
0123456789[CR]  
LOCAL TEST[CR]**

- (f) Enter the configured end of text character (Parameter #8 — usually a Control C)\* on the terminal.

*Requirement:* The Comm-Stor II unit should respond by powering off the BUSY 1 LED.

- (g) Enter the following command on the terminal:

**.D TEST [CR]**

*Requirement:* The Comm-Stor II unit should respond by sending the data entered in step (e) to the terminal. Verify data.

- (h) Enter the following command on the terminal:

**.ED TEST [CR]**

*Requirement:* The Comm-Stor II unit should respond by returning the cursor/printhead to the left margin after a short delay.

- (i) Enter the following command on the terminal:

**;L [CR]**

*Requirement:* The Comm-Stor II unit should respond by displaying the data entered in step (e). Verify data.

- (j) Enter the following command on the terminal:

**;S/LOCAL TEST/TEST OK/[CR]**

*Requirement:* The Comm-Stor II unit should respond by sending:

**TEST OK**

to the terminal.

- (k) Enter the following command on the terminal:

**.SV TEST [CR]**

*Requirement:* The Comm-Stor II unit should respond by sending:

**--SURE?**

to the terminal.

- (l) Enter a Y on the terminal.

*Requirement:* The Comm-Stor II unit should respond by returning the cursor/printhead to the left margin.

- (m) Enter the following command on the terminal:

**.D TEST [CR]**

*Requirement:* The Comm-Stor II unit should respond by sending:

**THIS IS A TEST OF THE COMM-STOR II SYSTEM.  
ABCDEFGHIJKLMN OPQRSTUVWXYZ  
0123456789  
TEST OK**

to the terminal.

\*Refer to Section 999-302-150, *How to Configure . . . Comm-Stor II Unit.*

(n) If the Comm-Stor II unit has the forms option, enter the following command on the terminal or proceed to step (v).

**.E TESTFORM [CR]**

*Requirement:* The Comm-Stor II unit should respond by lighting the BUSY 1 LED and returning the cursor/ printhead to the extreme left margin.

(o) Enter the following data on the terminal:

NAME [            ] [CR]  
ADDRESS [            ] [CR]

(p) Enter the configured end of text character on the terminal.

*Requirement:* The Comm-Stor II unit should respond by turning off the BUSY 1 LED.

(q) Enter the following command on the terminal:

**.FC TESTFORM**

*Requirement:* The Comm-Stor II unit should respond by returning the cursor/printhead to the left margin.

(r) Enter the following command on the terminal:

**.E FILE 1 [CR]**

*Requirement:* The Comm-Stor II unit should respond by sending the following data to the terminal:

NAME [

(s) Enter the following data on the terminal:

**JAMES SMITH [CR]**

*Requirement:* The Comm-Stor II unit should respond by sending the following data to terminal:

ADDRESS [

(t) Enter the following data on the terminal:

**ANYWHERE, USA [CR]**

*Requirement:* The Comm-Stor II unit should respond by returning the cursor/printhead to the left margin and turning off the BUSY 1 LED.

(u) Enter the following command on the terminal:

**.D FILE 1**

*Requirement:* The Comm-Stor II unit should respond by sending the following data to the terminal:

NAME [JAMES SMITH]  
ADDRESS [ANYWHERE, USA]

(v) If the Comm-Stor II unit has a printer port, enter the following command on the terminal:

**.P TEST [CR]**

*Requirement:* The Comm-Stor II unit should respond by sending the following data to the printer.

**THIS IS A TEST OF THE COMM-STOR SYSTEM.  
ABCDEFGHIJKLMNPOQRSTUVWXYZ  
0123456789  
TEST OK**

(w) This concludes local testing of the Comm-Stor II unit.

**8. CHECKLIST #1 — DIAGNOSTIC DOES NOT RUN**

**8.01** Table Y lists the most common causes for Comm-Stor II unit failure. Observe the symptoms and proceed with the indicated remedies.

**9. CHECKLIST #2 — OTHER DIFFICULTIES**

**9.01** This part applies to the Comm-Stor II unit which has passed the User Diagnostic tests without failure. Table Z lists potential trouble symptoms and recommended remedies. Observe the symptoms and proceed with the indicated remedy.

TABLE Y  
 CHECKLIST #1

SYMPTOM	INTERPRETATION	REMEDY
<p><b>Unit is completely inoperative.</b></p>	<p>Cooling fan is not spinning, drive motor is not spinning, no illumination of the power switch, no front panel LED illumination.</p>	<p><i>Note:</i> The voltmeter used in the following procedures must contain the following ranges:</p> <p>0-50 VDC          0-115 VAC</p> <p>(a) Reset the circuit breaker by pressing the power switch/circuit breaker switch located on the rear panel.</p> <p>(b) Check the power outlet for 115 VAC.</p> <p>(c) Unplug the unit from the power source. Remove the top cover. Check the power harness connectors to make sure they are mated together properly and there are no loose wires.</p> <p>(d) Check the AC power connections at the power switch/circuit breaker, and the harnessing.</p> <p>(e) With the unit unplugged, check the continuity of the power switch/circuit breaker, and the harnessing.</p>
<p><b>No power indication.</b></p>	<p>No illumination of the power switch. No illumination of LEDs when the unit is powered on or restarted.</p>	<p>(a) Check the DC power supply voltage at the base card edge connectors (Fig. 4):</p> <p>+ 5.1 - + 5.2 VDC @ pin 6          + 23 - + 25 VDC @ pin 8          + 11 - + 13 VDC @ pin 100          - 11 - - 13 VDC @ pin 98          Ground @ pins 2,66</p> <p>If one or more of the DC voltages are not present at the base card edge connector, refer to Section 578-400-750, <i>Routine Maintenance Procedures</i> for power supply adjustment procedure.</p>

TABLE Y (Cont)

CHECKLIST #1

SYMPTOM	INTERPRETATION	REMEDY
		<p>(b) If one or more of the power supply voltages are low, the power supply may be defective or a defective component on one of the circuit boards could be loading down a particular voltage. Swap/verify the power supply. Swap/verify the circuit boards one at a time.</p>
<p><b>LEDs do not illuminate when the system is restarted.</b></p>	<p>No head load solenoid activity when the system is restarted with the diskette inserted.</p>	<p>(a) Check the DC voltages (refer to Step (b), above) at the base card edge connector.</p> <p>(b) Check the battery voltage for 4.0 VDC minimum.</p> <p>(c) Check all battery connections.</p> <p>(d) Check the front panel LED harness connection on the Communications Ports board.</p> <p>(e) If all the DC voltages appear to be normal, use the following sequences.</p> <p>(1) Power the unit off; remove the Diskette Interface board, and power the unit on. If the LEDs light, the problem is in the Diskette Interface board or in the diskette drive assembly. Swap/verify these assemblies one at a time.</p> <p>(2) Power the unit off, remove the Printer board if installed, and power the unit on. If the LEDs illuminate, the problem is in the Printer Option board.</p> <p>(3) Power the unit off; swap/verify the MP/RAM board.</p>

TABLE Y (Cont)

CHECKLIST #1

SYMPTOM	INTERPRETATION	REMEDY
		<p>(4) Power the unit off; swap/verify the ROM IIA board.</p> <p>(5) Power the unit off; swap/verify the base card.</p>
<p>LEDs light for one second and go off, but the User Diagnostic program does not load off the diskette.</p>	<p>Bad Diagnostic diskette.</p> <p>Faulty drive ribbon wire cables.</p> <p>Faulty diskette drive assembly.</p> <p>Faulty Diskette Interface board.</p>	<p>(a) Check the Diagnostic diskette on another system. If problem persists, use another Diagnostic diskette.</p> <p>(b) Check for drive motor rotation. If the motor does not rotate, swap/verify the drive motor assembly.</p> <p>(c) Swap/verify the drive ribbon wire cables.</p> <p>(d) Swap the diskette drive assembly and restart the test.</p> <p>(e) Swap/verify the Diskette Interface board.</p> <p>(f) Swap/verify the remaining circuit boards one at a time.</p>

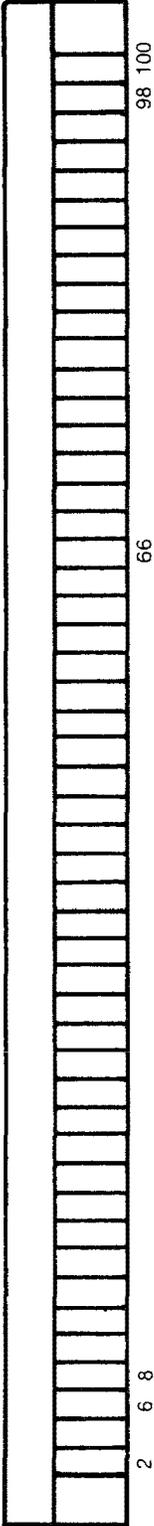


Fig. 4 — Base Board Pin Locations

TABLE Z  
 CHECKLIST #2

SYMPTOM	INTERPRETATION	REMEDY
<p>The system will not respond to certain keyboard commands.</p>	<p>Invalid configuration parameters or faulty MP/RAM board.</p> <p>Faulty ROM IIA board.</p>	<p>(a) Using a Configuration diskette, display all parameters and check for valid configuration responses. Change invalid parameters if necessary and recheck. This can be done by refreshing the unit. If over the course of time the Configuration parameters change, check the battery voltage; if correct, replace the MP/RAM board.</p> <p>(b) Swap/verify the ROM IIA board.</p>
<p>Unit will not respond with "carriage return," "line feed," or "asterisk" when restarted.</p>	<p>Terminal baud rates switch is not set to the same rate as the terminal.</p> <p>Parity of the terminal and of the Comm-Stor II unit are not set to the same value.</p> <p>System was not refreshed after MP/RAM board removal/replacement.</p> <p>Invalid configuration parameters.</p>	<p>(a) Change the baud rate.</p> <p>(b) Change the parity value of the Comm-Stor II unit to match the the terminal parity value.</p> <p>(c) Refresh the system.</p> <p>(d) Check the configuration parameters.</p>
<p>"Error-Diskette" Message.</p>	<p>Probable worn or damaged diskette.</p>	<p>(a) Check the unit with other diskettes.</p> <p>(b) Check the diskette drive assembly head-to-track alignment. Refer to Section 578-400-750, <i>Routine Maintenance Procedures</i>.</p>
<p>"Error-Bad-Read" Message.</p>	<p>Probable worn or damaged diskette.</p> <p>Diskette drive is out of alignment.</p> <p>Faulty Diskette Interface board.</p>	<p>(a) Check the system with other diskettes.</p> <p>(b) Check the head-to-track alignment of the system which is reading the diskette.</p> <p>(c) Swap/verify the Diskette Interface board of the system which wrote on the diskette as well as the system reading the diskette.</p>

TABLE Z (Cont)

CHECKLIST #2

SYMPTOM	INTERPRETATION	REMEDY
		<p>(d) Check read/write compatibility. Write (.E____) and then read (.D____) a diskette.</p> <p>If successful, attempt reading the same diskette on another system. Check FDD Head/Track alignment.</p>
<p><b>"Error-System" Message.</b></p>	<p>Caused by a User diskette with a bad directory.</p> <p>Faulty ROM II A board.</p> <p>Faulty MP/RAM board.</p> <p>Faulty Diskette Interface board.</p> <p>Faulty Communications Ports board.</p>	<p>(a) Copy the diskette.</p> <p>(b) Swap/verify the ROM IIA board.</p> <p>(c) Swap/verify the MP/RAM board.</p> <p>(d) Swap/verify the Diskette Interface board.</p> <p>(e) Swap/verify the Communications Ports board.</p>
<p><b>Erroneous data transfer between the Comm-Stor II unit and the terminal, modem, or printer.</b></p>	<p>Incorrect baud rate.</p> <p>Incorrect parity.</p> <p>Faulty Communications Ports board.</p> <p>Faulty Printer board.</p> <p>Faulty MP/RAM board.</p>	<p>(a) Check for proper baud rate adjustment of the Com-Stor II unit and the peripheral device.</p> <p>(b) Check for proper parity adjustment of the Comm-Stor II unit and terminal.</p> <p>(c) Swap/verify the Communications Ports board for terminal or modem data transfer problems.</p> <p>(d) Swap/verify the Communications Ports board for terminal or modem port data transfer problems.</p> <p>(e) Swap/verify the MP/RAM board if erroneous data transfer exists through <i>all</i> I/O ports.</p>