

COMMUNICATIONS DISPLAY TERMINAL BUFFER MODULE CDBU804 FOR USE WITH
THE STATION CONTROLLER INTERFACE MODULE
INSTALLATION, CHECKOUT AND TROUBLESHOOTING

CONTENTS	PAGE
1. GENERAL	1
2. UNPACKING	1
3. INSTALLATION	2
4. BUFFER MODULE PROGRAMMING	7
IN/OUT CONTROLS	7
EXTERNAL MODE CONTROL	7
MODULO 6 COUNTER	8
TRANSMITTING DISTRIBUTOR	9
5. BUFFER MODULE IDENTIFICATION AND STRAP OPTIONS	9
6. CHECKOUT	12
7. TROUBLESHOOTING	15

1. GENERAL

1.01 This section provides the installation, checkout, and troubleshooting for the communications display buffer module CDBU804. Issue 1 of this section was a limited printing edition and did not receive general distribution. This reissue incorporates the latest engineering information. For information concerning the description and operation, refer to Section 578-120-101.

1.02 The buffer module is factory assembled, completely tested, and installed in a cabinet; this module can also be shipped separately.

1.03 Refer to the associated installation sections for the buffer interface cabinet, display module, cluster controller, and the hard copy output device.

2. UNPACKING

2.01 Unpacking instructions will vary depending upon how the buffer module is shipped. If the module is shipped in a cabinet, remove the hold down clamps and packing details within the module. Be sure to observe all packing instructions and cautions on the packing details attached to the module.

2.02 When the buffer module is shipped separately the following unpacking procedure should be performed.

- (1) Observe all unpacking instructions on the shipping carton.
- (2) Open one end of the carton and remove the four plastic corner protectors.
- (3) Grasp the metal frame and lift the module out from the container.
- (4) Read and remove all packing details and verify the identification code on the module with the customer's order, refer to (2.04).
- (5) Remove any tape or corrugated cardboard used to hold the module circuit cards into their receptacles.
- (6) Remove the muslin bag tied to the module frame. It should contain mounting hardware, a TP335600 connector assembly for connecting of customer furnished cabling from the print out device to the buffer, TP147307 and TP343650 wire straps, and cabling clamp to install the module.

SECTION 578-120-201

2.03 Visually inspect the buffer module for damaged parts, loose circuit cards, broken wires, or bent terminals which might cause a shorted condition. Repair any of these conditions before any further installation is performed or before ac power is applied to the module.

2.04 Attached to each buffer module is an identification plate marked with the module unit code. The two alphabet letters following the unit code identify the module operation arrangement and respective factory installed programming and strap options. Refer to the factory programming information in part 4 of this section for module features and factory code identification chart in part 5 for strap options.

Note: Check the ordering information to determine the features and options before conducting the checkout.

3. INSTALLATION

3.01 The buffer module is designed to be housed within the display module cabinet or for use in the 2541 buffer interface cabinet. The installation is different for each cabinet; refer to Figures 1, 2 and 578-140-700 for the installation of the buffer module into the 2541 buffer interface cabinet.

CAUTION: ALL AC POWER TO THE BUFFER SET MUST BE OFF BEFORE ATTEMPTING INSTALLATION AND THE REMOVAL OR INSERTION OF CIRCUIT CARD ASSEMBLIES.

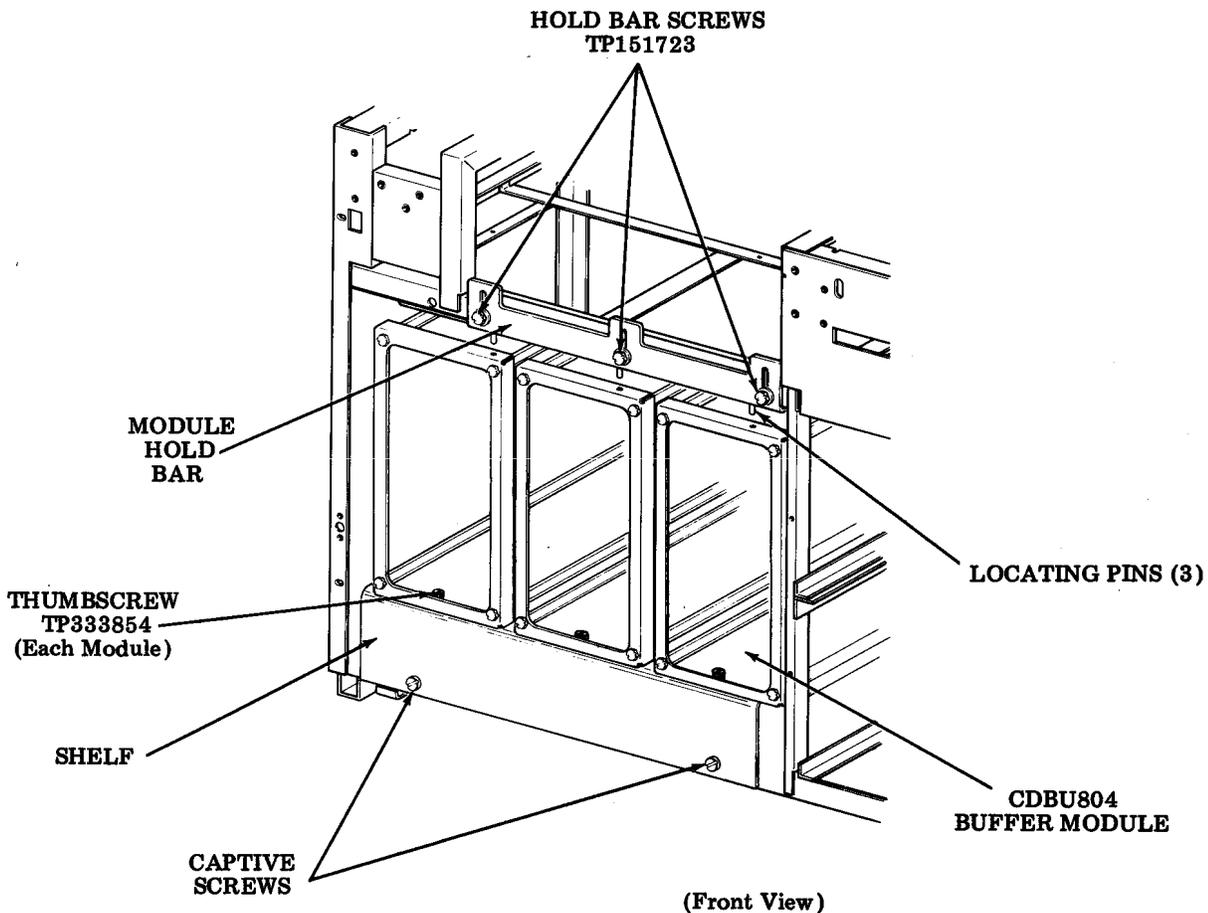


Figure 1 - Display Module Cabinet

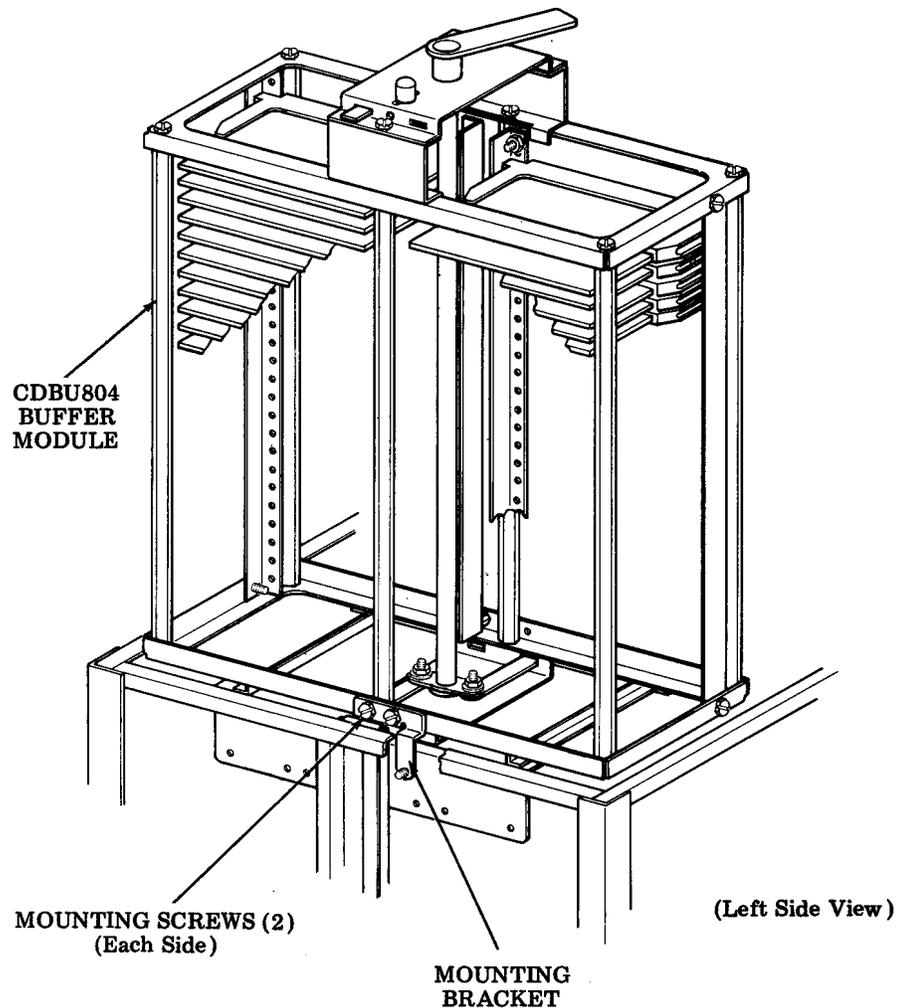
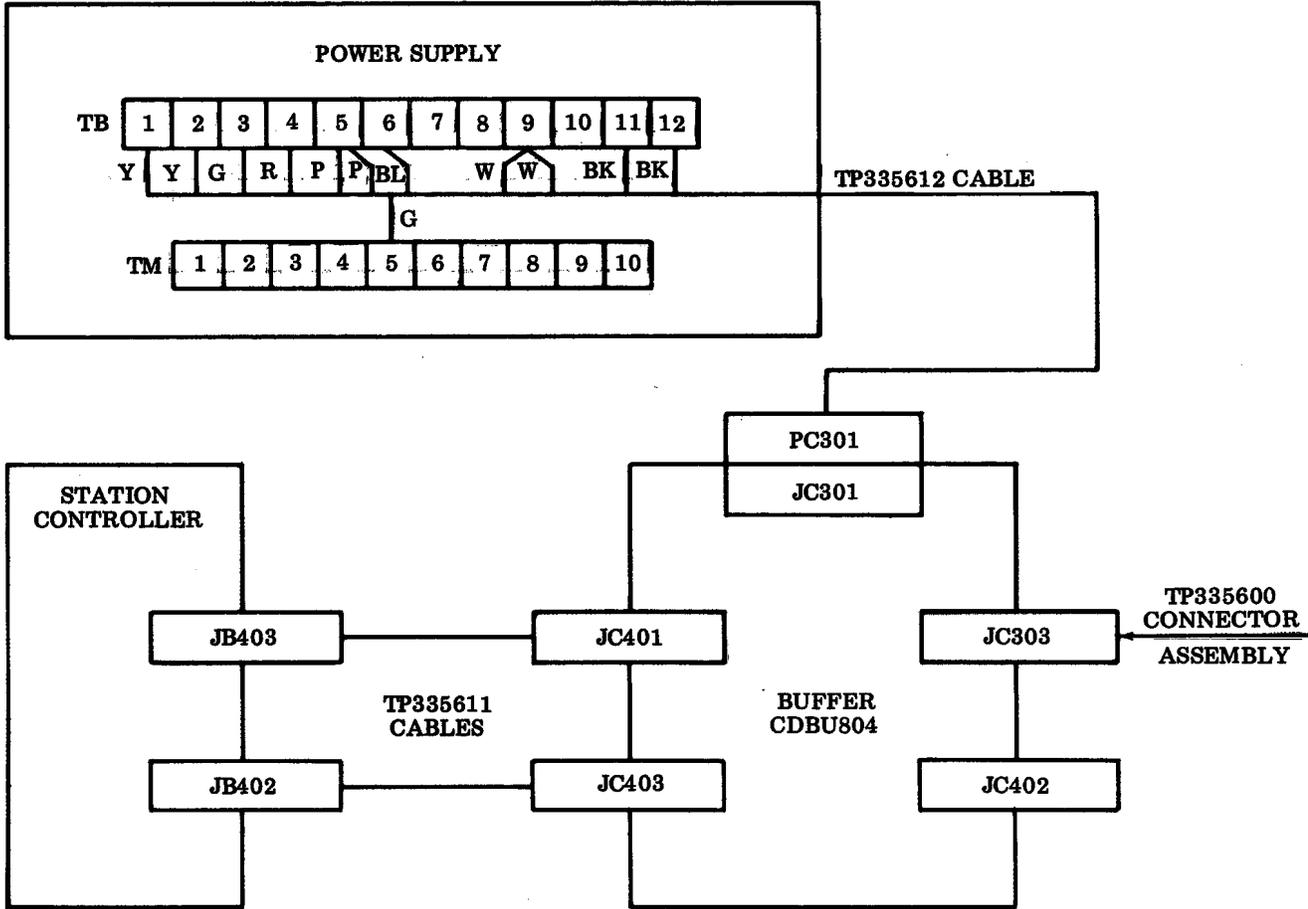


Figure 2 - 2541 Buffer/Interface Cabinet

Display Module

3.02 To install the buffer module in the display cabinet, perform the following operations.

- (1) Install the TP335612 power/control cable (30 pin connector) to JC301 connector on the buffer unit; refer to cabling diagram, Figure 3.
- (2) Install and connect the interface cables between modules within the set by using TP335633 or TP335523, refer to Figures 4, 5, and 6.
- (3) Connect TP335600 connector assembly to the customer provided cable which is connected to the output printer; the other end is connected to JC303 on the buffer, (Figures 6 and 7).
- (4) Remove the cabinet front panel by twisting the two TP333880 fasteners 1/4 turn counterclockwise.
- (5) Lift up the front panel and remove from the set.
- (6) Loosen the three TP151723 screws that secure the module — hold bar in place, see Figure 1.
- (7) Slide the module — hold bar upward and tighten the screws enough to hold the bar up.
- (8) Loosen the two captive screws on the front of the module shelf (Figure 1) and pull the shelf open to the extended position.



Power on — Check individual voltages with respect to ground on JC301.

<u>JC 301</u>	<u>Terminal</u>
Circuit Ground (Signal Ground)	A4, B4, C4
+5 volts ±10%	A6, B6, C6
+6 volts ±10%	A8, B8, C8
-11 volts ±10%	A2, B2, C2
Frame Ground	A3, B3, C3

Note: The 335600 connector assembly is furnished with the CDBU804 buffer. The interconnecting cable from the buffer module to the print out device must be provided by the customer. The interconnecting cable should not exceed 50 feet.

Figure 3 - Cabling and Wiring From the Buffer to the Power Supply

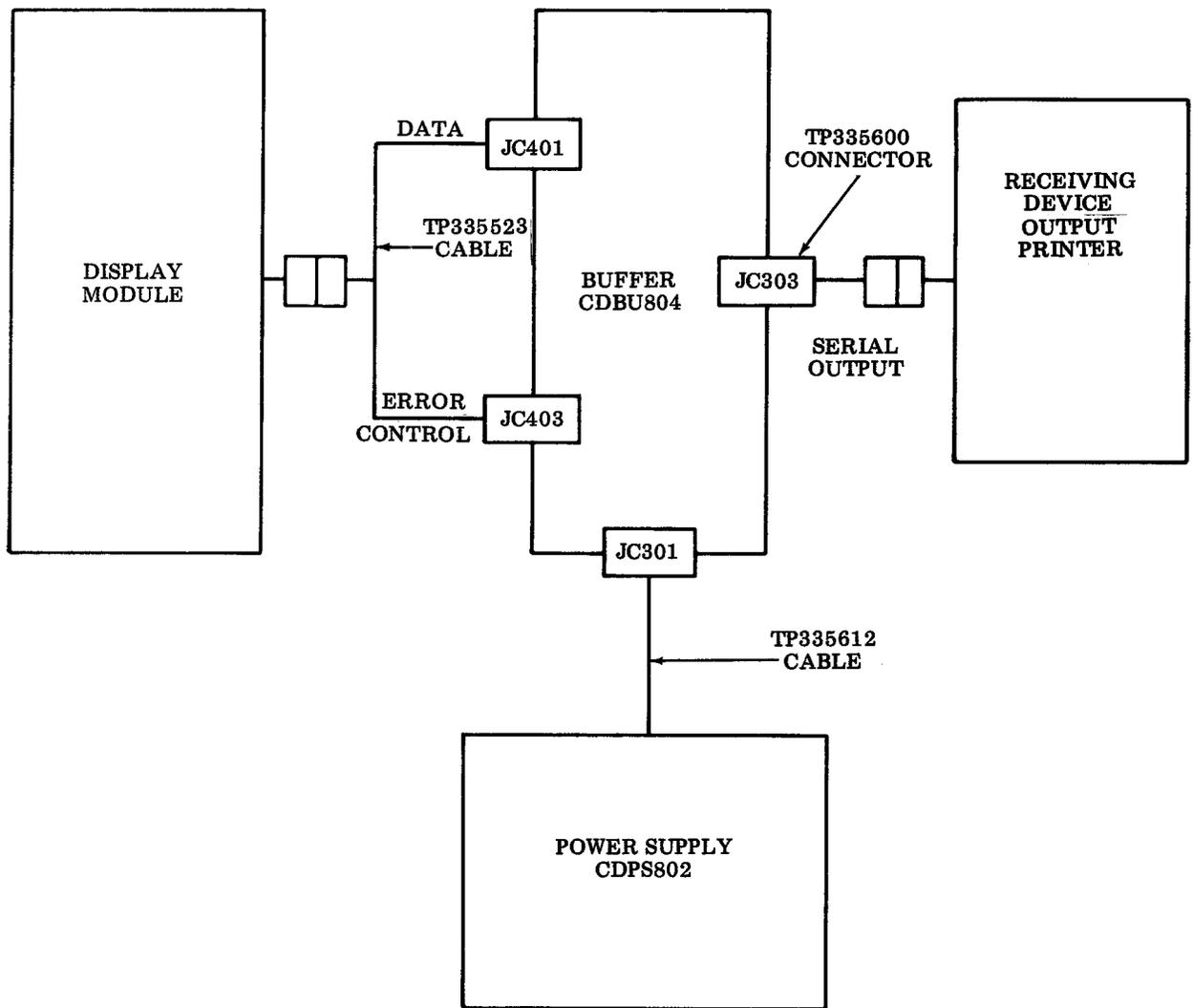


Figure 4 - Buffer Cabling for Use With Display Module

- (9) Place the module on the shelf so that the locating pins plug into the holes on the back of the shelf flange.
- (10) Remove the TP333854 thumbscrew from the muslin bag tied to the buffer.
- (11) Insert the thumbscrew into the lower front frame of the buffer and tighten. This screw secures the module frame to the shelf.

3.03 The buffer module is now ready to be programmed (4.01) and for the operational tests and checkout (6.01). After the checkout is completed and the set is operational, perform the following:

- (1) Close the module shelf and tighten the two captive screws.
- (2) Loosen the three screws on the module — hold bar and lower the bar so that the locating pins plug into the three modules on the shelf. Tighten the three screws.

SECTION 578-120-201

(3) Replace the cabinet front panel by positioning the panel in the closed position and secure by twisting the fasteners 1/4 turn clockwise. Check panel to insure that it is locked closed.

3.04 The procedure for installing the CDBU804 buffer module into the 2541 Buffer/Interface set is as follows. Additional information and detailed illustrations for understanding this procedure can be found in Section 578-140-700. The buffer set parts illustrations in Section 578-140-800 also shows assembly information to aid installation of the module into the buffer set.

(1) Release the two top cover latches located on the left and right sides of the buffer cabinet. Pivot the cover open to the vertical position.

(2) Assemble the handle and latch assembly and module bottom plate assembly to the module frame according to the parts views provided in Section 578-140-800.

(3) Assemble the module to the module shelf using the two clamp brackets and mounting screws that are furnished.

(4) Remove the rear panel from the buffer set by loosening the two bumper type studs from the set rear panel. Using a screwdriver turn the two 1/4 turn fasteners counterclockwise and lift the rear panel from the buffer. This will permit routing station cords from the buffer to peripheral equipment.

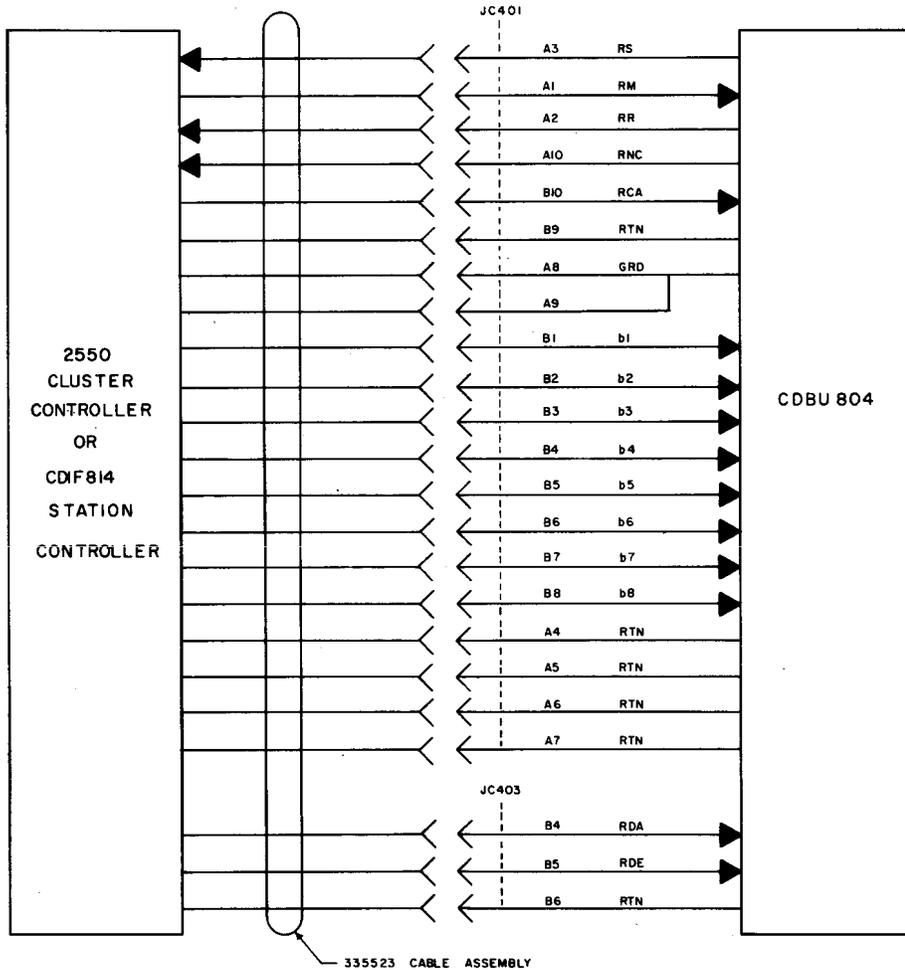


Figure 5 - Typical System Interconnections

(5) Connect cord connectors to module as shown in Figures 6 and 7, program CDBU804 (4.01), perform the checkout and operational tests, and replace buffer set back panel and condition buffer set for operation.

4. BUFFER MODULE PROGRAMMING

4.01 The following information is provided for programming module operation and for verification that factory programmed options are present in the module. A circuit card location chart is provided in Figure 8. The circuit cards in Figure 6 are shown as they would be viewed from the wired side of the module frame. For reference, refer to 9355WD wiring diagrams and 1193WD schematic diagrams included in the buffer module wiring diagram package, WDP0331.

In/Out Controls

4.02 When the CDBU804 buffer module is used with the CDIF814 station controller interface module, the TP322515 (MC515) in/out controls circuit card assembly in location XZ315 should be programmed for ETX character detection. Selection of the character detection is accomplished by placing the option screw into either A, B, or C positions on the card. Refer to Table A.

External Mode Control

4.03 The buffer should be factory programmed for option B. Remove the PTI circuit card from position XZA317 to check that the program screw is in position B; if not, place the screw in position B. For more information refer to 1969CD provided in the wiring diagram package.

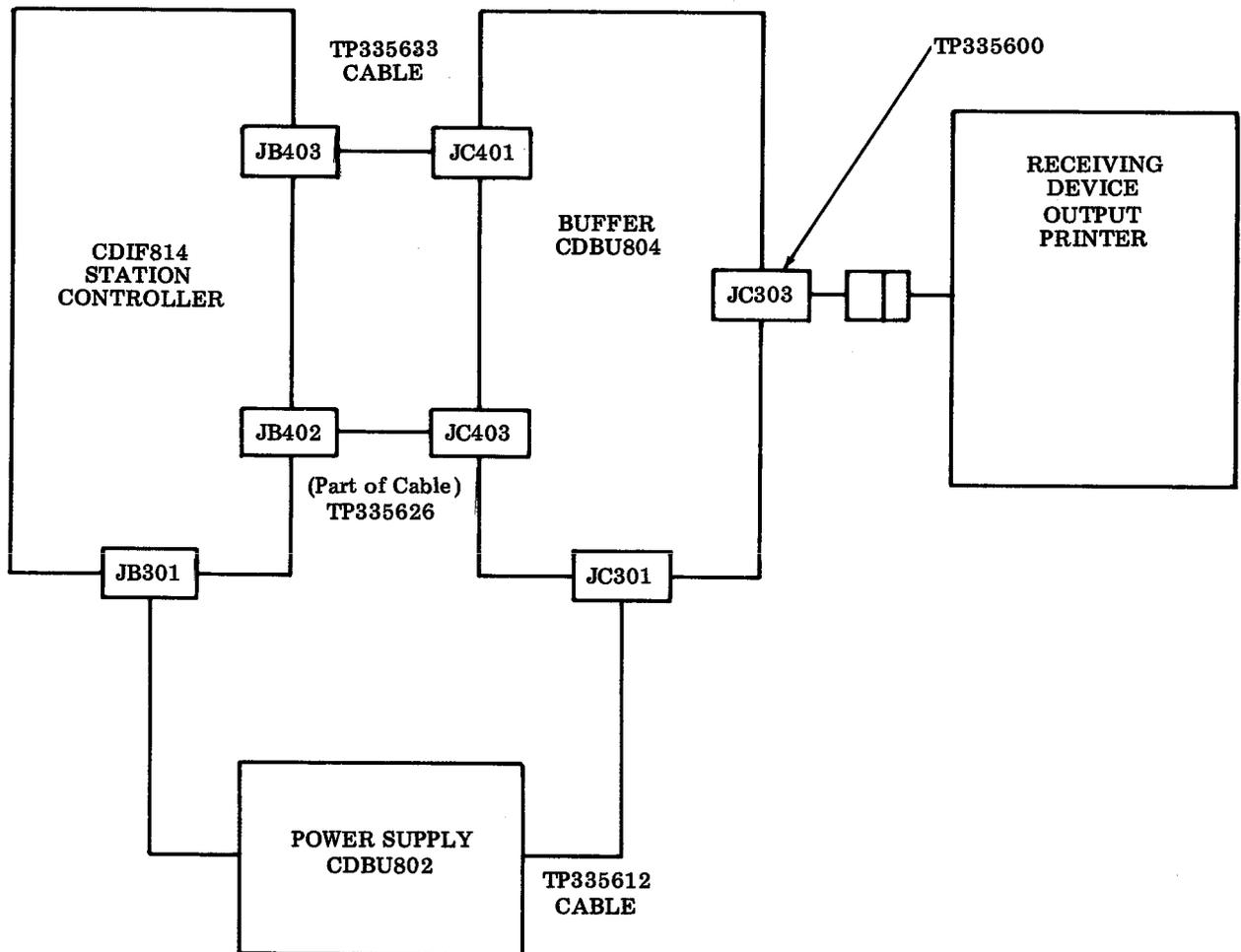


Figure 6 - Buffer Cabling for Use With Station Controller

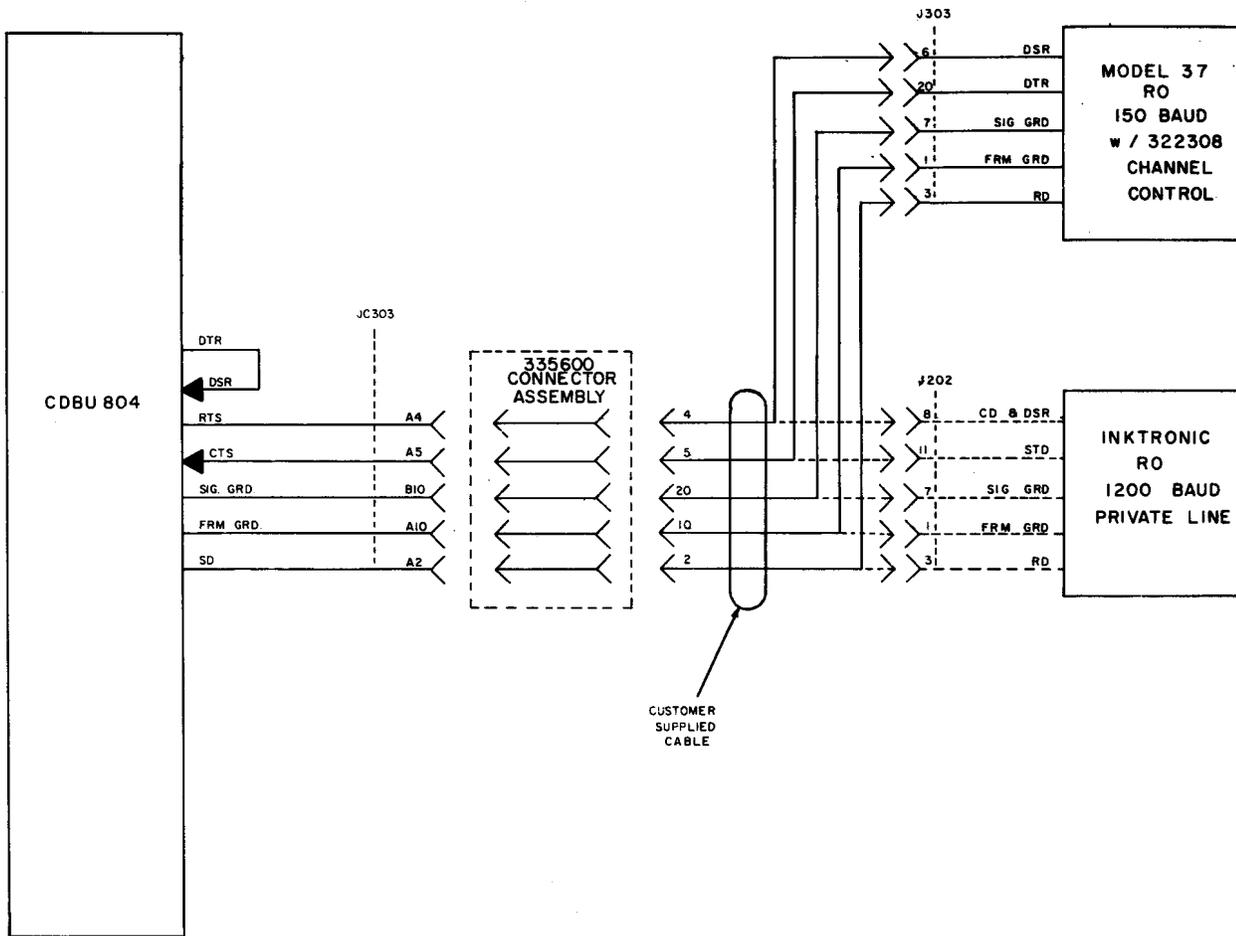


Figure 7 - Typical System Interconnections (continued)

Modulo 6 Counter

4.04 The modulo 6 counter (MC998) in the buffer module position XZC311 has six option screws that provide for resetting the counter circuitry. Remove the circuit card and place the screws as shown in Table B to program the counter for the desired buffer capacity. For example, if the counter is to be programmed for two thousand characters (2k) the six screws are placed in the following positions: X0, Y1, Z1 for the read counter and X*0, Y*1, Z*1 for the write counters. After completing the programming, replace the circuit card into position XZC311.

TABLE A

IN/OUT CONTROL PROGRAMMING

SCREW	OPTION	POSITIONS		
		A	B	C
A	EOT	IN	OUT	OUT
B	ETX	OUT	IN	OUT
C	FF	OUT	OUT	IN

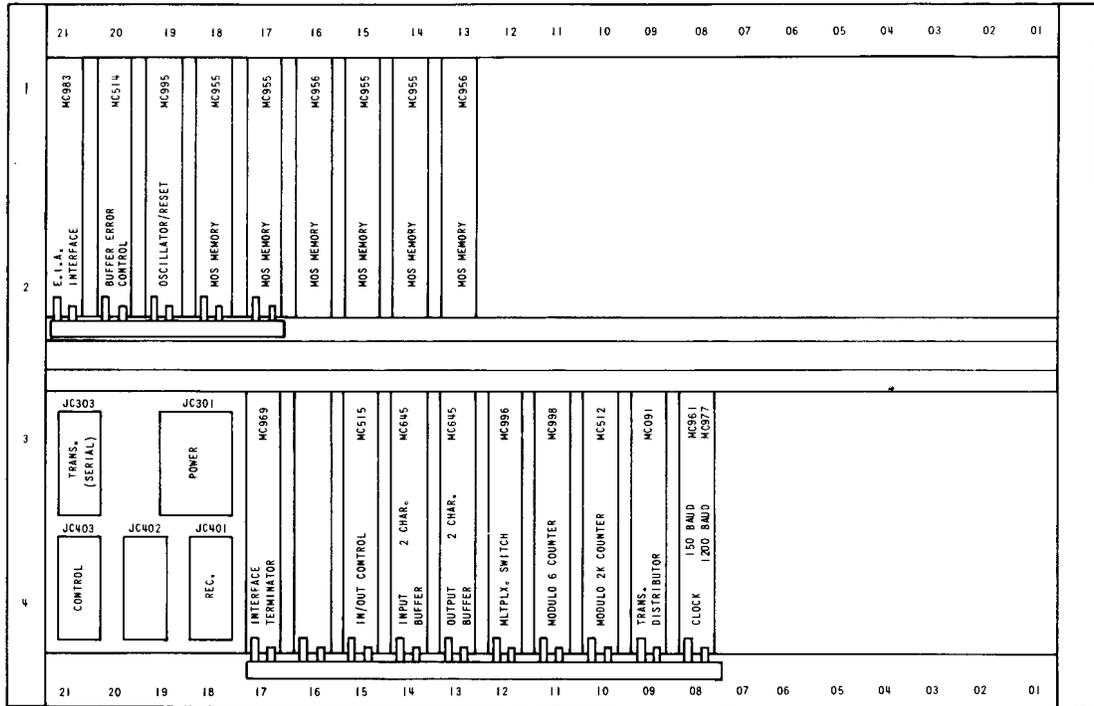


Figure 8 - CDBU804 Buffer Card Location (Wired Side)

TABLE B

BUFFER CAPACITY PROGRAMMING
MODULO 6 COUNTERS

BUFFER CAPACITY		2K	4K
READ COUNTERS	X	0	1
	Y	1	0
	Z	1	1
WRITE COUNTERS	X*	0	1
	Y*	1	0
	Z*	1	1

Transmitting Distributor

4.05 The TP322091 (MC091) transmitting distributor does not require any programming. However, the circuit card should be removed from module position XZC309 and checked to make certain that the option screw is removed from position A.

5. BUFFER MODULE IDENTIFICATION AND STRAP OPTIONS

5.01 The CDBU804 buffer module is factory coded for specific options; refer to the identification plate on the module for the code letters after CDBU804. Chart 1 contains the factory codes with their associated option codes, Table C has the identification and description of the option codes, and Chart 2 contains the wiring for the options.

CHART 1
OPTION INDEX

FACTORY CODE	OPTION CODE						
	A	B	C	D	E	F	G
CDBU804/DA	●	●		●			●
CDBU804/DB	●	●			●		●
CDBU804/DC	●			●		●	●
CDBU804/DD	●				●	●	●

Note: Late design modules do not have the "C" option programmed at the factory, refer to 9355WD.

TABLE C
OPTION IDENTIFICATION

OPTION	DESCRIPTION
A	Provides 10 unit code for transmitting distributor
B	Provides 150 baud clock for transmitting distributor
C	Operation without a data set or motor control
D	2000 characters of storage
E	4000 characters of storage
F	Provides 1200 baud clock for transmitting distributor
G	Operation without a data set but with motor control

CHART 2
OPTION PROGRAMMING

OPTION	FUNCTION	TO ENABLE OPTION
A	10 unit code (MC091) to hard copy output	Install TP147307 strap from XZC309 pin 26 to pin 36.
B	150 baud clock (MC961)	Install TP147307 strap from XZC308-13 XZC309-20.
C	Operation without data set and motor control	Install TP147307 and TP343650 straps: XZC121-4 to XZC121-3 XZC316-34 to XZC120-28 XZC121-15 to XZC121-19 XZC120-24 to XZC315-20
D	2000 characters of storage	Install TP147307 straps: XZC118-29 to XZC118-3 XZC118-30 to XZC118-4 XZC118-31 to XZC118-5 XZC117-29 to XZC117-3 XZC117-30 to XZC117-4 XZC117-31 to XZC117-5 XZC116-29 to XZC116-3 XZC116-30 to XZC116-4
E	4000 characters of storage	Install TP147307 straps: XZC118-29 to XZC118-7 XZC118-30 to XZC118-8 XZC118-31 to XZC118-9 XZC117-29 to XZC117-7 XZC117-30 to XZC117-8 XZC117-31 to XZC117-9 XZC116-29 to XZC116-7 XZC116-30 to XZC116-8 XZC115-29 to XZC115-3 XZC115-30 to XZC115-4 XZC115-31 to XZC115-5 XZC114-29 to XZC114-3 XZC114-30 to XZC114-4 XZC114-31 to XZC114-5 XZC113-29 to XZC113-3 XZC113-30 to XZC113-4
F	1200 baud clock to hard copy output	Install TP147307 strap from XZC308-2 to XZC309-20.
G	Operation without a data set but with motor control	Factory equipped.

SECTION 578-120-201

6. CHECKOUT

6.01 The preliminary checks should be performed before the installer tests the buffer module. The final checkout in Chart 3 contains specific test conditions to be used at the time of installation or before the troubleshooting procedures. The following are the preliminary checks to be performed prior to checkout and testing.

- (1) Check that all cables are connected properly and that the right cable is used. Where a connection to an external device is required make sure that the interconnecting cable meets all interface requirements.

(2) Check optional features per system requirements in terms of data transfer rates, codes and format. Also, check optional wiring or wire the options required for the set. Refer to the option chart.

(3) Check all circuit cards to insure that they are firmly in place and in the right location. Do not flex circuit card assemblies.

(4) Check that the external apparatus interfacing with the buffer module performs per terminal requirements.

6.02 The checkout charts are provided to selective tests to assure the module and system is functioning per system requirements. Checkout Chart 3 provides testing for the buffer wired per "C" option and a receiving device.

CHECKOUT CHART 3

OPERATIONAL TEST WITH DISPLAY AND A RECEIVING DEVICE
(Buffer Wired With "C" Option)

STEP	ACTION	VERIFICATION
1	Connect buffer into test arrangement Figure 9.	Check the wiring options against those required by 9355WD.
2	With power off check the circuit cards for the correct screw options.	ZC317-MC969 OPTION B ZC315-MC515 OPTION B ZC311-MC998 1998SD-1 ZC309-MC091 remove screw
3	Check that the output baud rate satisfies the receiver requirements.	MC961 Position ZC308 MC977
4	Check that the display device has the END ON ETX option installed.	9262WD
5	Turn power on in LOCAL mode. Type two full lines of "U*". Include the Functions Return and New Line; end message with ETX character.	The message should be displayed on the monitor.
6	Depress the HOME button.	Cursor should go to the first character position.
7	Depress and release the TRANSMIT button.	The TRANSMIT button is lighted and cursor moves through the message. (Sets with the blanking option, the display will blank). At the end of the message the cursor

CHECKOUT CHART 3

OPERATIONAL TEST WITH DISPLAY AND A RECEIVING DEVICE
(Buffer Wired With "C" Option) (Continued)

STEP	ACTION	VERIFICATION
7 (contd)		should be in the next position after the ETX character and the set back in the LOCAL mode.
	CAUTION: EXTREME CARE MUST BE EXERCISED WHILE PERFORMING THE FOLLOWING STEPS OR POSSIBLE DAMAGE TO THE ELECTRONIC CIRCUITRY IN THE MODULE MAY RESULT.	
8	Place a TP147307 strap from card connector XZC120 Pin 30 to XZC120 Pin 36.	Double check the placement of the strap.
9	Place one end of a TP147307 strap on Terminal B4 of module connector JC403. Do not let the free end of the strap touch against anything.	Double check that the strap is on JC403 Terminal B4.
10	Momentarily touch the free end of the strap to card connector XZC317 Pin 35, being careful not to short to Pin 36.	Data transmission out of the serial output port to the receiving device should begin.
11	After the message has been completed repeat Steps 6 and 7.	
12	Steps 10 and 11 will now be repeated but while the buffer is transmitting to the receiving device repeat Steps 6 and 7. Remove the strap from Step 9.	While the buffer is transmitting to the receiving device, data transfer from the CDT to the buffer should not occur.
13	When the message from Step 12 has been completely transmitted out of the buffer to the receiving device, the data transfer between the CDT and buffer will take place.	The TRANSMIT button remains illuminated from the time it is depressed until the end of the CDT to buffer data transfer. Data will now be in storage in the buffer.
14	Place one end of a TP147307 strap on module connector JC403 Terminal B5, observing the precautions mentioned above.	
15	Momentarily touch the free end of the strap to card connector XZC317 Pin 35, again being careful not to short Pins 35 and 36 on the connector.	Data should be cleared from storage and data transfer should again be possible by repeating Steps 6 and 7.
16	Remove the strap from JC403, Terminal B5.	
17	Temporarily turn power off to the buffer and CDT. This completes the checkout.	

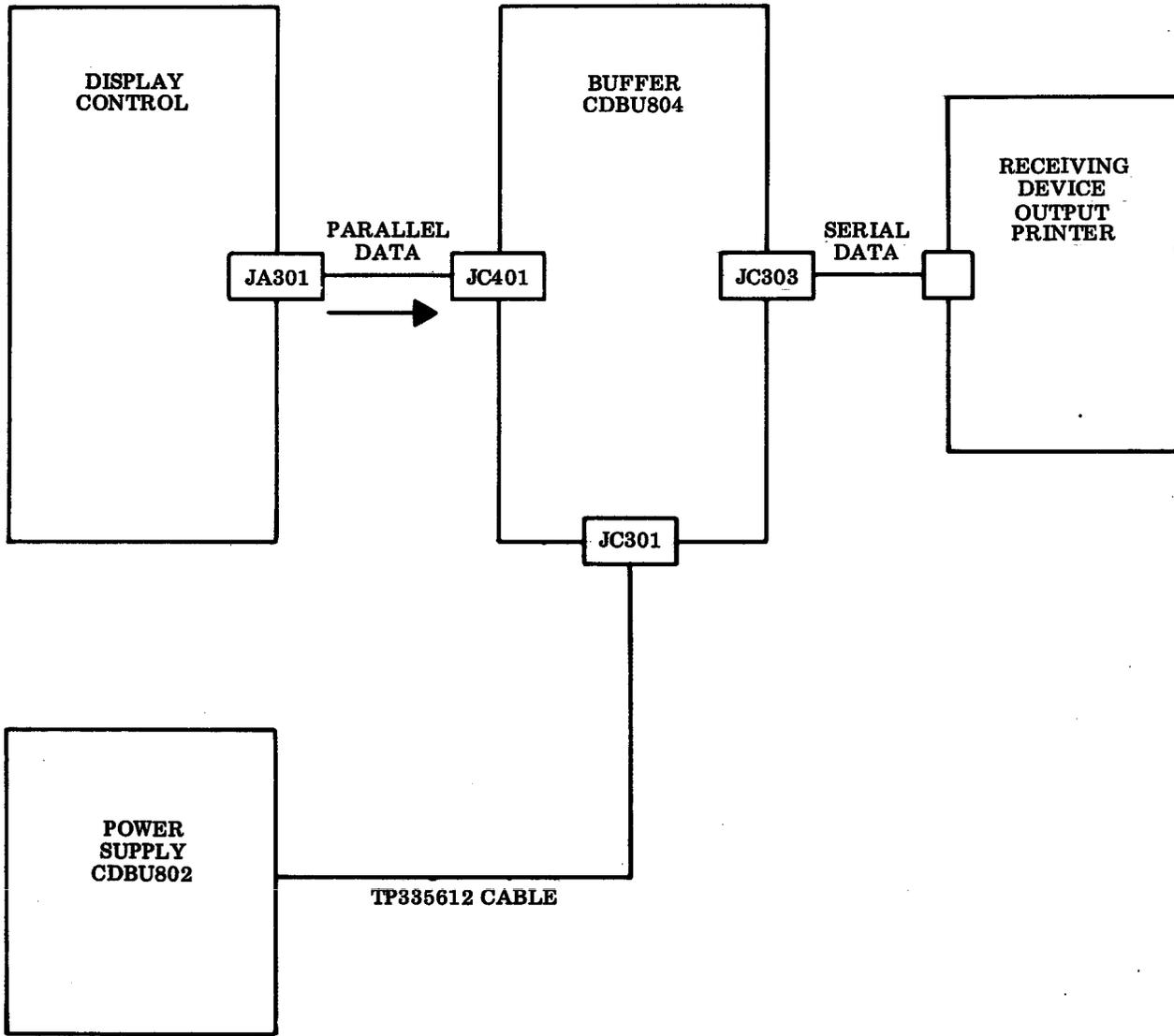


Figure 9 - Display Control, Buffer and Printer Test Arrangement

7. TROUBLESHOOTING

7.01 In troubleshooting the CDBU804 buffer unit the most expedient method would be to attempt to analyze the problem and isolate the malfunction to a particular circuit card or group of cards. The problem could then be corrected by substitution with circuit cards known to be operating correctly.

7.02 At the time of initial installation it is important that the checkout procedures be followed (6.01). Often malfunctions caused by incorrect or omitted options may be found more readily during checkout than at a later time when an entire system is interconnected. It may also be helpful to use the checkout test configurations for troubleshooting to eliminate as much external circuitry as possible.

7.03 The troubleshooting charts list several types of failures that could occur and the possible causes of such failures. Most often these failures can be traced to one of the items

listed in the charts. Beyond this general outline provided by the charts, further troubleshooting would require the use of an oscilloscope and necessitate the tracing of signals through the module from point to point. Should this approach be desired, it is recommended that the troubleshooter familiarize himself with the operation of the module through careful study of the circuit descriptions (CDs) and schematic diagrams (SDs) included in the 0331 Wiring Diagram Package. The 1193SD provides a complete schematic showing the interconnection of all circuit cards and is divided into functional schematics showing the control signals (FS1), data signals (FS2) and the MOS memory (FS3).

7.04 Do not begin random probing or substitutions of circuit cards until the operating trouble is isolated to a specific area in the terminal logic circuitry and a procedure or method is realized. The systematic approach presented in Chart 4 is intended to prevent the possibility of introducing additional troubles and to restore operating in a minimum amount of time.

CHART 4
TROUBLESHOOTING PROCEDURES

NO.	SYMPTOM	POSSIBLE CAUSE	CORRECTIVE PROCEDURE
			RELATED COMPONENT
1	Data does not transfer into buffer from cluster or station controller.	<p>Wrong option screw in PTI terminator card.</p> <p>Receiving device connected to output port is in alarm.</p> <p>Power supply failure.</p> <p>Any of the control handling circuit cards may be defective.</p> <p>Defective cables.</p> <p>Defective cluster or station controller.</p>	<p>MC969 (ZC317) should have option "B".</p> <p>Receiving device.</p> <p>Check voltages on JB301 (Figure 3).</p> <p>MC969 (ZC317) MC515 (ZC315) MC645 (ZC314) MC998 (ZC311) MC512 (ZC310) MC514 (ZC120) MC995 (ZC119)</p>

CHART 4

TROUBLESHOOTING PROCEDURES (Continued)

NO.	SYMPTOM	POSSIBLE CAUSE	CORRECTIVE PROCEDURE
			RELATED COMPONENT
2	One data level always marking or spacing.	<p>Defective MOS memory circuit card.</p> <p style="text-align: center;"><u>Data Level</u></p> <p style="text-align: center;">1, 2 or 3 4, 5 or 6 7 or 8</p> <p>Incorrect or missing programming strap on the MOS memory circuit card connectors.</p> <p>Any of the data handling circuit cards may be defective.</p> <p>Defective cable.</p> <p>Defective cluster or station controller.</p>	<p style="text-align: center;">Characters</p> <p style="text-align: center;"><u>2000</u> <u>4000</u></p> <p>MC955(ZC118) MC955(ZC118/115) MC955(ZC117) MC955(ZC117/114) MC956(ZC116) MC956(ZC116/113)</p> <p>Check 1193SD and 9355WD for strapping information.</p> <p>MC966 (ZC312) MC645 (ZC314) MC645 (ZC313) MC091 (ZC309) MC969 (ZC317)</p> <p>TP335611 or TP335523 to JC401.</p>
3	Buffer receives data but will not transmit.	<p>Control signal cable missing or defective.</p> <p>Wrong option screw in the in/out control circuit card.</p> <p>Receiving device not functioning properly or defective cable.</p> <p>Missing or incorrect strapping on the MOS memory circuit card connectors.</p> <p>If the first message, after turning power on, is transmitted but any subsequent message is not transmitted the buffer error control or in/out controls or MOS memory circuit card may be defective.</p>	<p>Check TP335611 or TP335523 connected in JC403.</p> <p>MC515 (ZC315) should have screw in "B" location (ETX detect).</p> <p>MC983 (ZC121)</p> <p>Try connecting JC303-A6 to JC303-A1 and JC303-A4 to JC306-A5 with a TP147307 strap.</p> <p>Check part 5 of this section, 1193SD and 9355WD for strapping information.</p> <p>MC514 (ZC120) MC515 (ZC315) MC955 (ZC118) MC956 (ZC116)</p>

CHART 4

TROUBLESHOOTING PROCEDURES (Continued)

NO.	SYMPTOM	POSSIBLE CAUSE	CORRECTIVE PROCEDURE
			RELATED COMPONENT
3 (contd)		No RDA signal. Any one of the remaining circuit cards may be defective.	Defective cluster or station controller or cable in JC403.
4	Parts of the transmitted message are missing.	Modulo 6 counter and decoders not properly programmed. Defective receiving device.	Refer to programming in part 4 and MC998 (ZC311) or 1998SD-1.
5	Transmitted data is errored, no pattern to errors.	Incorrect clock to the transmitting distributor. Defective unit code. Wiring option on transmitting distributor. Defective circuit card. Defective receiving device. Defective cable. Defective cluster or station controller.	MC961 or MC977 and wiring options in part 5. MC901 (ZC309) MC961 or MC977 (ZC308) MC998 (ZC311) MC512 (ZC310)