

8088 PROCESSOR & PERIPHERAL BOARD TESTING

SUBJECT: MILNOR Micro-Processor and Peripheral Board Testing
Procedures Using 8088 Processor and Parallel Display

This procedure will allow testing of the 8088 processor and all peripheral boards utilized in MILNOR machines. This includes the 8088 processor, 8/16, 16 or 24 output boards, A to D and D to A boards.

We suggest a test fixture be assembled with the wiring harnesses to connect the processor board, power supply, inputs and potentiometers (A/D Board). (See Wiring Notes) You may also add indicator lights for testing outputs, and switches for testing inputs. This fixture should be field engineered.

Required materials from MILNOR:

- 1ea. 08BSEVFD3T Display (See Schematic 2)
- 1ea. 2x6 keypad 08ND0206N (See Schematic 5A)
- or
- 1ea. 5x6 keypad 08ND5X6WE (Washer), 08ND5X6DR (Dryer)
(See Schematic 5)
- 1ea. 08BSPCT Processor board or 08BSPDAT board (Expanded memory)
- 1ea. WUTEST86 Test Software ver. 89011 or later

Locally assembled:

- 1ea. Power supply electrical wiring harness
- 1ea. Serial harness from 1MTA33 to the Peripheral board serial input
(i.e. 1MTA2 for I/O board, 1MTA12 for 16 out board, etc.)
- 1ea. Power supply connection to the Peripheral board Power connector
(i.e. 1MTA1 for I/O board, 1MTA11 for 16 out board, etc)
- 1ea 1MTA30 to printer cable connection. (See Schematic 1)
- 1ea 1MTA30 to Serial Display Terminals 2 & 4. See Schematic 1
- 1ea 1MTA30 - RS232 loop back test connector, 9 pin DIN with terminals 2 & 3 jumped. (See Schematic 2)
- 1ea RS485 Loop back connector 1MTA29 1 & 2 connected to, 1MTA29-3 & 4 to 1MTA34-2 & 4, 1MTA34-1 & 3 to 1MTA32-1 & 3 and 1MTA32-2&4 to 1MTA33-1 & 3.

- 1ea. MTA connector with 2ea. 10K linear potentiometers for temp simulator. (See Schematic 3A & 3B)

This test fixture utilizes 13 menu driven procedures. Use the “NEXT” button to advance through the test.

MENU ITEMS

- 00 Test input / output boards; 8/16 board
- 01 Test outputs—both 16 and 24 output boards
- 02 Test analog to digital (A/D) boards
- 03 Test digital to analog (D/A) boards
- 04 Test RAM memory, banks 1 & 2
- 05 Test Direct inputs to the processor board
- 06 Test Keypad.
- 07 Test the display
- 08 Test EPROM.
- 09 Test Printer Port
- 10 Test Expanded RAM (only on 08BSPDAT board)
- 11 Test Expanded ROM (only on 08BSPDAT board)
- 12 Test the RS485 communication ports
- 13 Test the RS232 loop back

PROCEDURES FOR RUNNING TEST

Connect the suspected board to the power and serial wiring from the processor board. Set the dip switches as follows:

<u>BOARD</u>	<u>PART NUMBER</u>	<u>DIP SW. SETTINGS</u>
8/16 board	08BS816AT,BT	1 off, 2-8 on
8/16 board	08BS816 CT	Sw1=1, Sw2=0
16 output board	08BS016AT, BT	1&5 off, 2-4 & 6-8 on
24 output board	08BS024AT	Sw1=1, Sw2=1
A to D board	08BSADAT, BT	1&6 off, 2-5 & 7-8 on
A to D board	08BSADCT	Sw1=1,Sw2=2
D to A board	08BSDAAT, CT	1,5&6 off, 2-4 & 7-8 on
D to A board	08BSDAHT, CT	Sw1=1, Sw2=3

These are the only valid switch selections for this test software.

Install only EPROM #1 into socket IC 9 08BSPCT or IC 29 on 08BSPDAT board

Turn on the power; observe the display. Select the Menu option for the board you are testing by entering the 2-digit number on the keyboard. I.e. 00 = I/O board, 01 = 8/16 board, etc.

On boot up, the processor will request MILTRAC address and bytes in the network string. You have two options; 1.) Press NEXT, NEXT to skip these decisions. 2.) Enter an address and the number of bytes in your MILTRAC. Connect the test fixture to the MILTRAC serial link to test communications.

TEST PROCEDURES

- ◆ Test 00 I/O board
 - For 08BS816CT, Connect MTA4-20 to +12volts DC, Connect MTA4-10 to Signal Ground.
 - Output - testing relays K0 to K7 - Press the ↑ or ↓ buttons to activate the relays.
 - Input - Start with all inputs OPEN. Ground each input, and observe the display. The input number will be shown as it is grounded.
- ◆ Test 01 Output board
 - Select the type of output board 16 = 0 or 24 = 1 outputs
 - Output - testing relays K0 to K15 or K23 - Press the ↑ or ↓ buttons to activate the relays.
- ◆ Test 02 A/D board
 - Select the A/D board type A/B or C as defined in the part number of the board. 08BSADDAT or 08BSADDBT = 0 and 08BSADDCT = 1
 - Schematic 3A for 08BSADA&BT, 3B For 08BSADCT
 - Connect the pots to the first channel of the board. Rotate the pots while viewing the display. The readout will be a DC voltage from 0 to approximately 4.92 volts. With the A & B style boards there is a delay from the time the pot is set till the board responds. The C style boards respond as the pot turns.
- ◆ Test 03 D/A board
 - Select the D/A board type A/B, C or CHT (High Speed) as defined in the part number.
 - The output is best seen with an oscilloscope, however you can also use a voltmeter. The output is a 0 to 5 volt DC saw tooth signal.
 - Set the board jumpers J1 to J4 set to 1 & 2. Record the original settings so they may be restored correctly.
 - For A & B style boards attach negative probe to 1MTA43-10. The positive probe will be connected as follows:
Channel 0 1MTA43-5 then 1MTA43-6
Channel 1 1MTA43-2 then 1MTA43-3
Channel 2 1MTA43-8 then 1MTA43-9
 - For C style boards attach negative probe to 1MTA43-10. The positive probe will be connected as follows:
Channel 0 1MTA43-4 or 5
Channel 1 1MTA43-2 or 3

- Channel 2 1MTA43-1 or 7
 - For CHT (High Resolution) attach negative probe to 1MTA43-10. The positive probe will be connected as follows:
 - Channel 0 1MTA43-4 & 5 Low Resolution = 0 to 5 volts
 - Channel 1 1MTA43-1 & 2 = 0 to 5 volts
 - Channel 1 1MTA43-3 & 7 = 0 to 10 volts
 - ◆ Test 04 RAM Memory
 - To test the Random Access Memory on the 186 processors, two inputs MUST be grounded for access to both RAM banks. These inputs are 1MTA38-2 and 1MTA38-3.
 - Operation 1
RAM Protection Test. Input (Program Key) open (OFF) the test will attempt to write to the RAM. If the input is closed then the test will fail.
 - Operation 2
Turn the input (Program Key) ON. Press "SKIP TO"
If OK, the display will read "RAM TEST FINISHED-ALL RAM CHIPS PASS"
If Failed, the display will read "RAM # (1,2or3) FAILED-CHECK FOR BENT PINS ON RAM"
 - ◆ Test 05 Direct inputs
- Connect MTA39-2 to +12volts DC
 - Input - Start with all inputs OPEN. Ground each input, and observe the display. The input number will be shown as it is grounded
 - ◆ Test 06 Keypad
 - Select the keypad type: 0=Small (2x6) Keypad, 1=Dryer, 2=Washer / Extractor (5x6) Keypad
 - Press each key. The display will show the key name.
 - The "NEXT" key will NOT display. Your indication that this key is working is the test routine will exit.
 - ◆ Test 07 Display
- Lights all pixels of the display. Should appear as green blocks in each position.
 - ◆ Test 08 EPROM
 - Install WUTEST88 #2 into each EPROM socket for testing.
 - Power down before changing the chip.
 - Pass or Fail status. If failure should occur, check for bent or non- inserted pins of the EPROMS.
 - ◆ Test 09 Printer
- The LX300 printers does not have an "ON LINE" selector switch. The printer will always indicate that the "Clear To Send" line is not operating. This does not mean there is a problem with the printer as long as it passes the rest of the test.

- The Epson LX800, LX810 and Citizen GSX-190 does have the “ON LINE” switch. Follow the on display prompts for testing.
 - ◆ Test 10 Test Expanded RAM (only on 08BSPDAT board)
 - Turn the program key to program position
 - Press Next
 - Turn the program key to Run

 - ◆ Test 11 Expanded ROM (only on 08BSPDAT board)
 - Press Next
 - Pass or Fail
 - ◆ Test 12 RS485 loopback
 - Install the jumper connector from MTA29 to MTA34 to MTA33 to MTA32.
 - Press the ↑ or ↓ buttons to select the serial ports
 - N = Port (1-4)
 - 1=MTA32 3=MTA34
 - 2=MTA33 4=MTA29
 - Test results.
 - Port “N” OK
 - Port “N” Failed
 - Port “N” Not Receiving
 - Port “N” Not Transmitting
- ◆ Test 13 RS232 loopback
 - Install the 1MTA30 connector with the jumper from terminal 6 to 7.
 - Test results are;
 - RS232 Port Active
 - RS23 Port Inactive

Wiring Notes:

Power supply connections

- MTP1-5 = AC power high
- MTP1-3 = AC power neutral
- MTP2-1 = +12 volts DC
- MTP2-2 = +5 volts DC
- MTP2-5 = GROUND
- MTP2-6 = -12 volts DC

Processor board

- 1MTA31-3 = 5 volts DC
- 1MTA31-5 = +12volts DC
- 1MTA31-7 = -12 volts DC
- 1MTA31-10 = GROUND

- 1MTA33-1 = Serial Low
- 1MTA33-3 = Serial High

Peripheral Boards

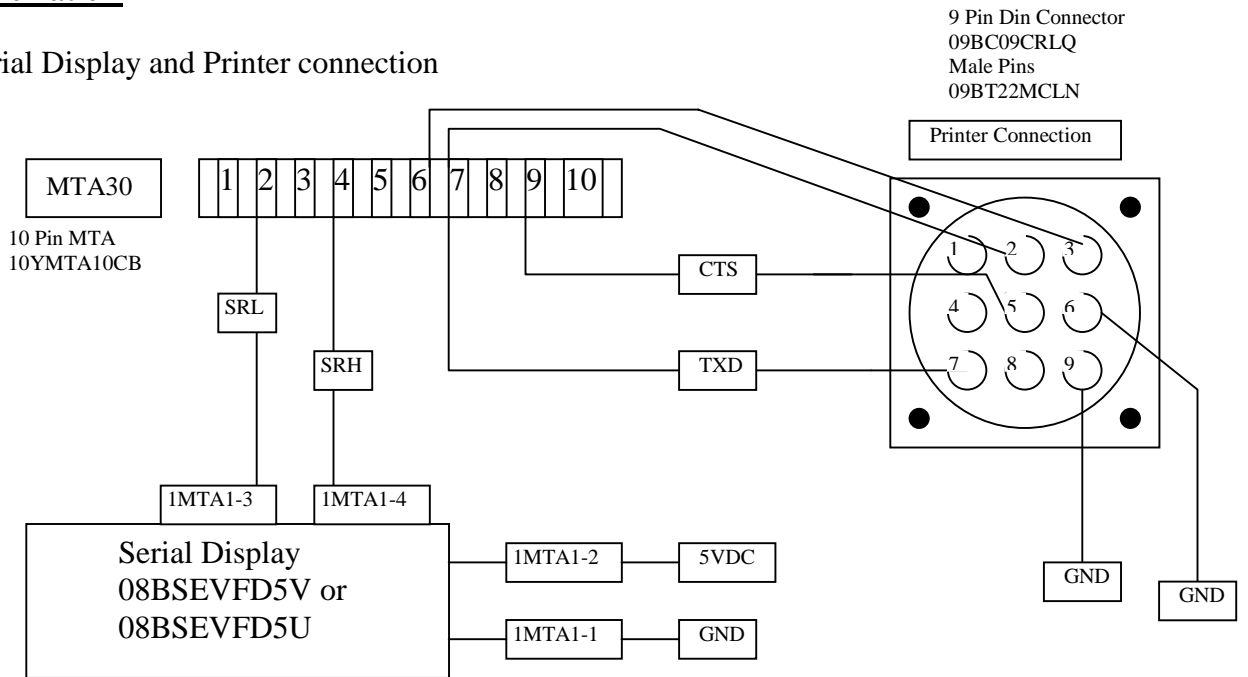
- *MTA1-3 = 5 volts DC
- *MTA1-5 = +12volts DC

*MTA1-7 = -12 volts DC
 *MTA1-10 = GROUND

*MTA2-1 = Serial Low
 *MTA2-3 = Serial High

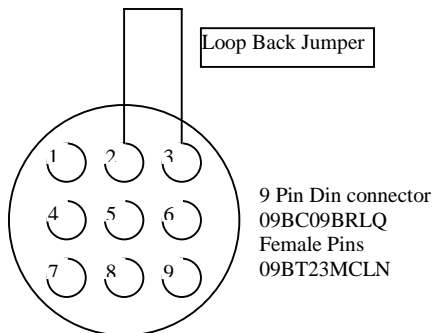
Schematic 1

Serial Display and Printer connection

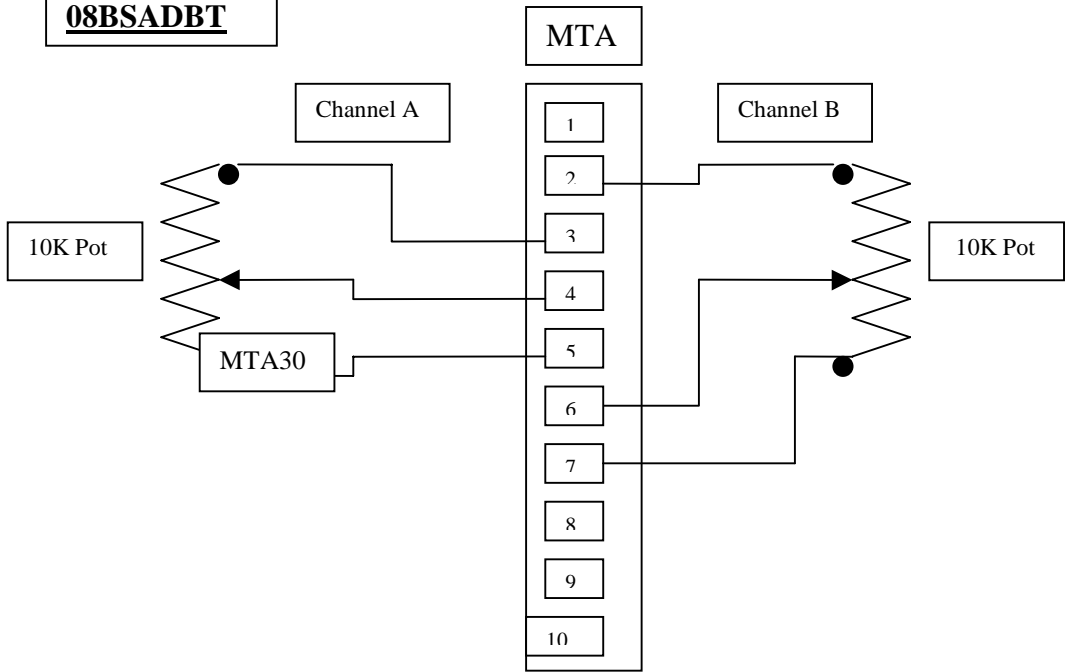


Schematic 2

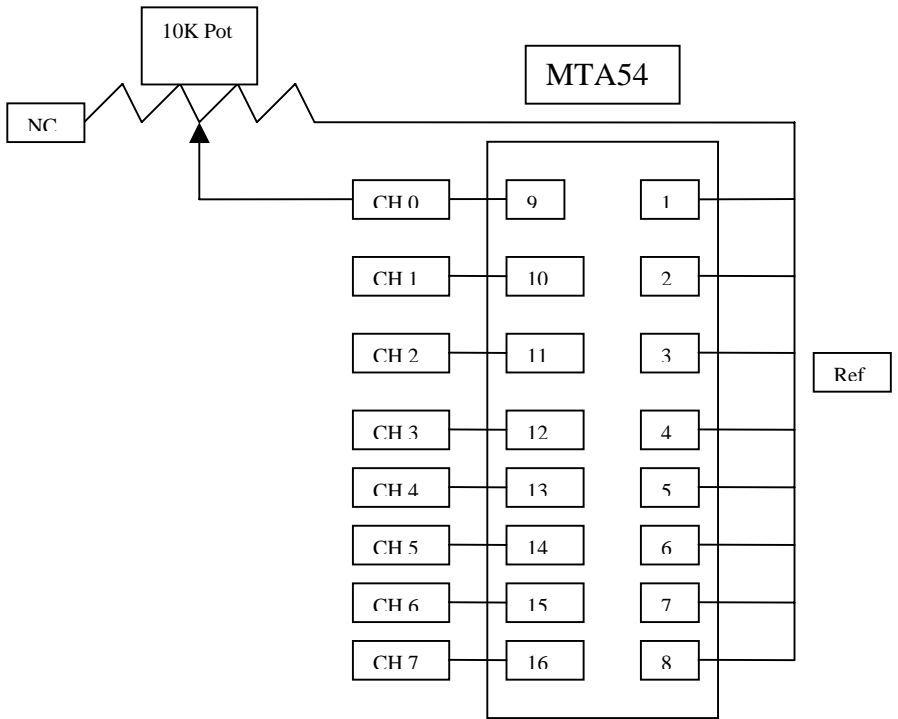
Loop Back Connector
 RS 232



Schematic 3A
08BSADBT



Schematic 3 B
08BSADCT



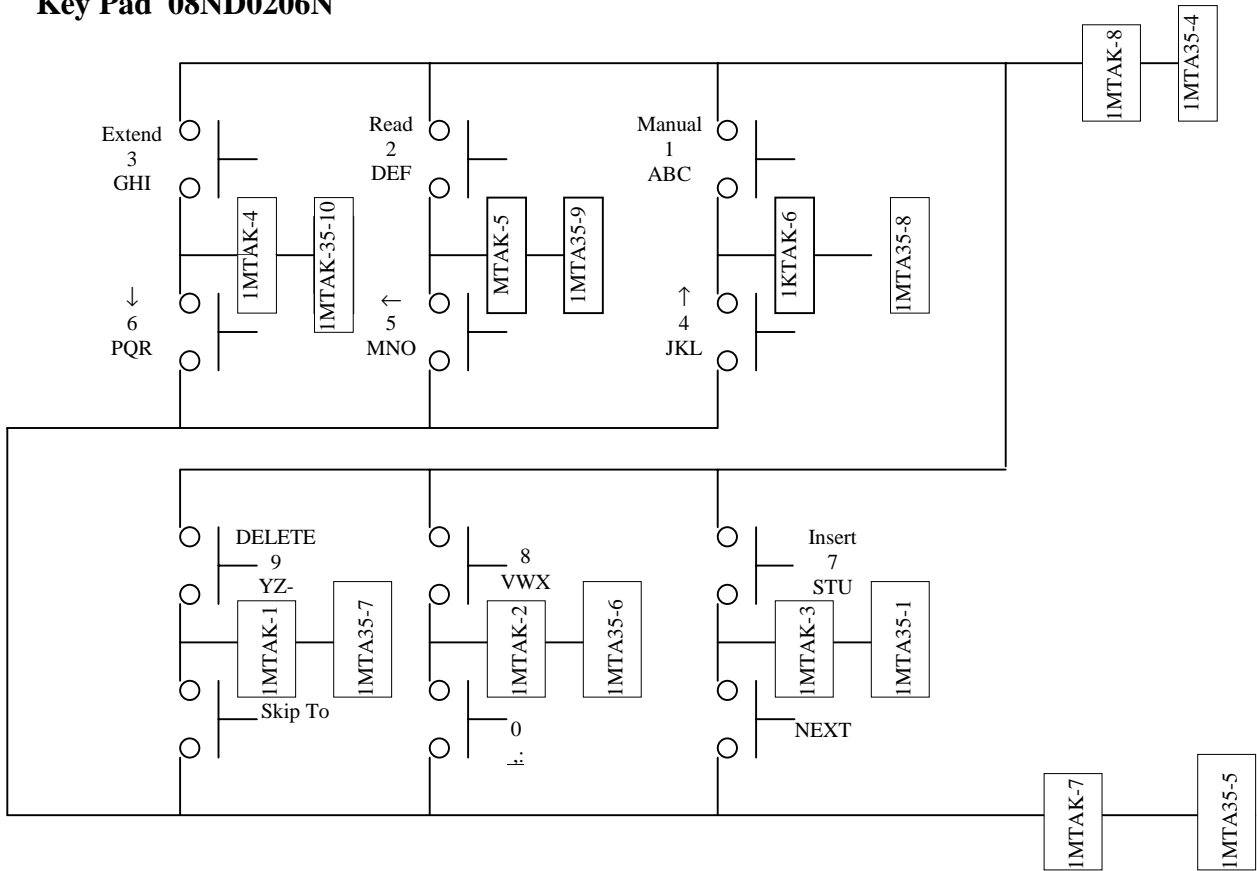
Schematic 4
Parallel Display



NOTES

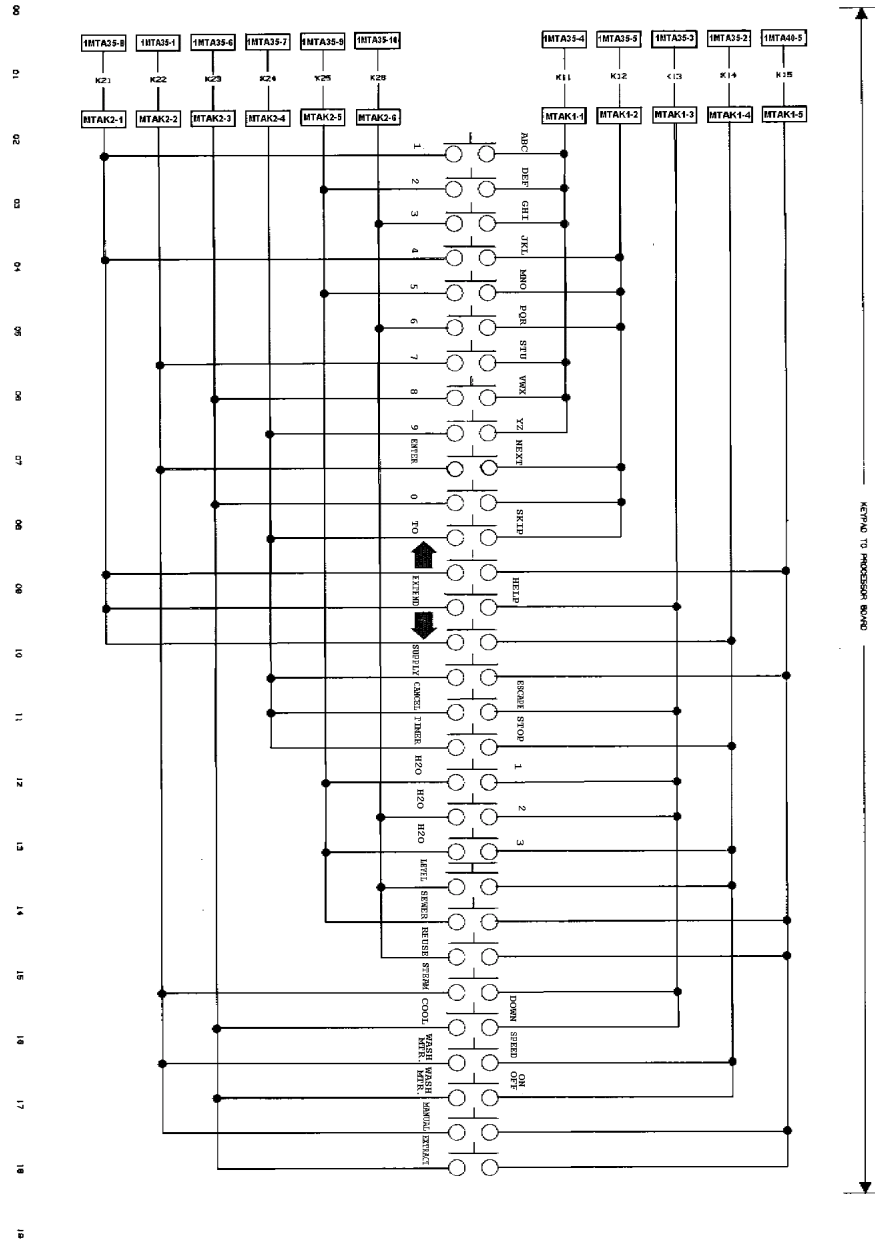
1. 1MTA36, 1MTA37 ARE LOCATED ON BPB (PROCESSOR BOARD)
2. 2MTA36, 2MTA37 ARE LOCATED ON DISPLAY BOARD

Schematic 5A
Key Pad 08ND0206N



Schematic 5B Key Pad 08ND5X6WE/DR

Schematic 5B
Key Pad 08ND5X6WE/DR



MICRO 6 SYSTEMS
MARK II
SCHEMATIC: KEYPAD (SERIAL CONTROLS)
PELLERIN MILNOR CORPORATION