

## 80186 PROCESSOR & PERIPHERAL BOARD TESTING

**SUBJECT:** MILNOR Micro-Processor and Peripheral Board Testing  
Procedures Using 80186 Processor and Serial Display

This procedure will allow testing of the 186 processor and all peripheral boards utilized in MILNOR machines. This includes any 186 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. 08PSS3401N Power supply (Or Equivalent)
- 1ea. 08BSEVFD1T Display (See Schematic 2)
- or
- 1ea. 08BSEVFD2T or 08BSEVFD3T Display (See Schematic 2)
- or
- 1ea. 08BSEVFD5V (19200 baud) or 08BSEVFD5U (9600 baud) Serial display (See Schematic 1)
- 1ea. 2x6 keypad 08ND0206N (See Schematic 5A)
- or
- 1ea. 5x6 keypad 08ND5X6WE (Washer), 08ND5X6DR (Dryer) (See Schematic 5B)
- 1ea. 08BSPET Processor board with
- 1ea. WUTES186P Test Software ver. 99001
- or
- 1ea. 08BSPE1T Processor board with
- 1ea. WUTES186Q Test Software ver. 20001

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 2 & 4 connected to, 1MTA29-1 & 3 to 1MTA34-2 & 4, 1MTA34-1 & 3 to 1MTA32-1 & 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
- 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 Keypads. Both the 2x6 and 5x6 washer / dryer keypads.
- 07 Test the display
- 08 Test EPROM
- 09 Test Printer Port
- 10 Test the RS485 communication ports
- 11 Test the RS232 loopback
- 12 Test the Dip switches (Only available with 08BSPE1T board)

### 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.

There are four decisions depending on the display utilized. Connection at 1MTA39-5 or 1MTA39-4 may need to be grounded before power is applied to the processor board. 0 = Open, 1 = Grounded.

For 08BSEVFD1T Display 1MTA39-5 = 1

For 08BSEVFD2T or 08BSEVFD3T Display 1MTA39-5 = 0

For 08BSEVFD5V (19200 baud) 1MTA39-4 = 0

For 08BSEVFD5U (9600 baud) 1MTA39-4 = 1

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.

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. Both inputs are open (OFF) the test will attempt to write to the RAM. If either or both inputs are closed then the test will fail.

- Operation 2  
Turn both inputs ON. Press "SKIP TO"  
If OK, the display will read "RAM TEST FINISHED-ALL RAM CHIPS PASS"  
If Failed, the display will read "RAM # (1or2) FAILED-CHECK FOR BENT PINS ON RAM"
  - The RAM chips are divided into 3 groups  
RAM 0 IC4 & IC5 Scratch pad. Used by the processor for machine operation  
RAM 1 IC6 & IC7 Used for machine configuration and formula programming.  
RAM 2 IC23 & IC24 Used for machine configuration and formula programming.
- ◆ 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
  - 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 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 11 RS232 loopback
  - Install the 1MTA30 connector with the jumper from terminal 4 to 5.
  - Test results are;
    - RS232 Port Active
    - RS232 Port Inactive
- ◆ Test 12 Dip Switch Test (Only available on the 08BSPE1T board)
  - SW1 Rotate from 0 to 3 and the display should read the same. If you continue to turn the switch through 4 to F, the display will only read 0 to 3. Only the first two positions are read. (1 & 2)
  - SW2 Rotate from 0 to F and the display will read the same.
  - After testing the DIP switches, reset both to F to reactivate the keypad.

#### **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

##### Serial Display and Printer

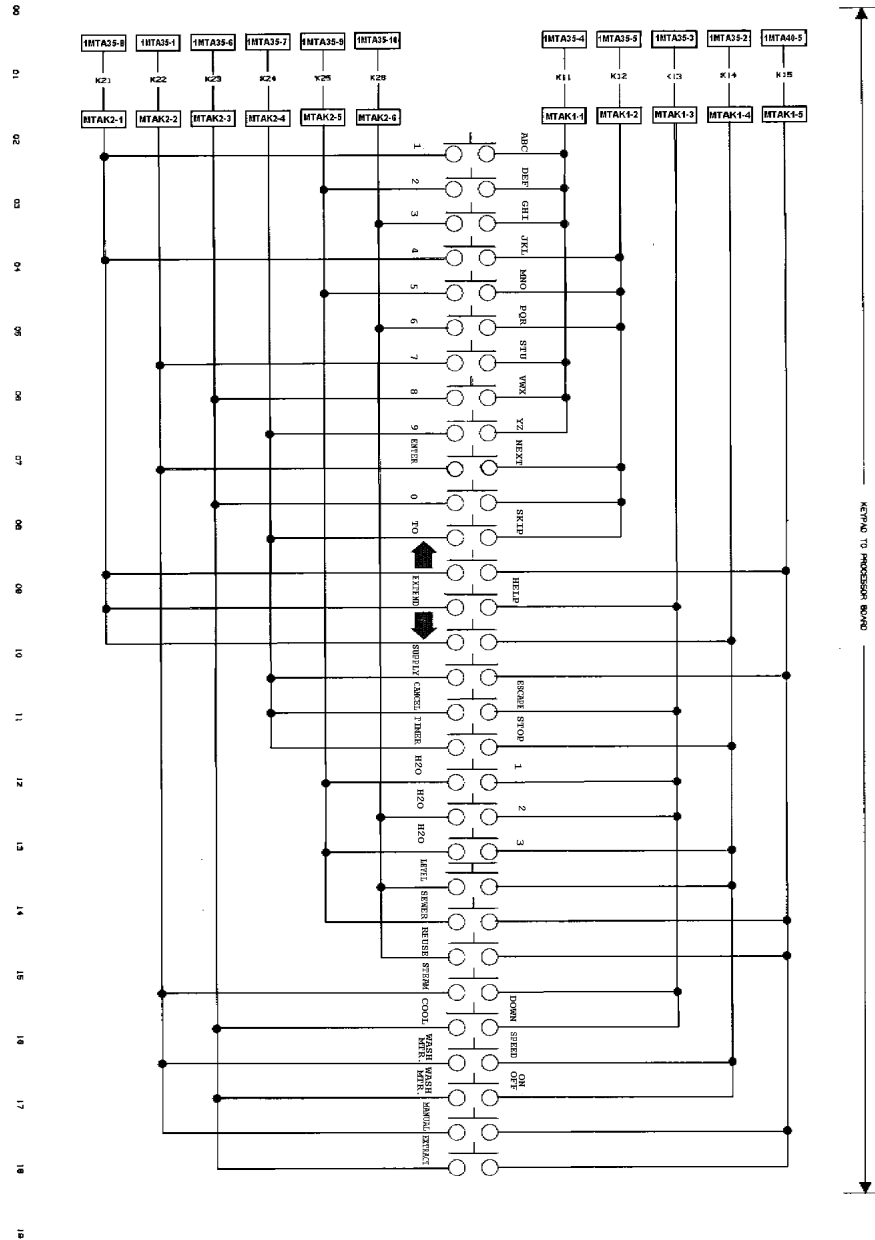
1MTA30- See Schematic 1

##### A/D board Temp probe simulator

See Schematic 3A or 3B.

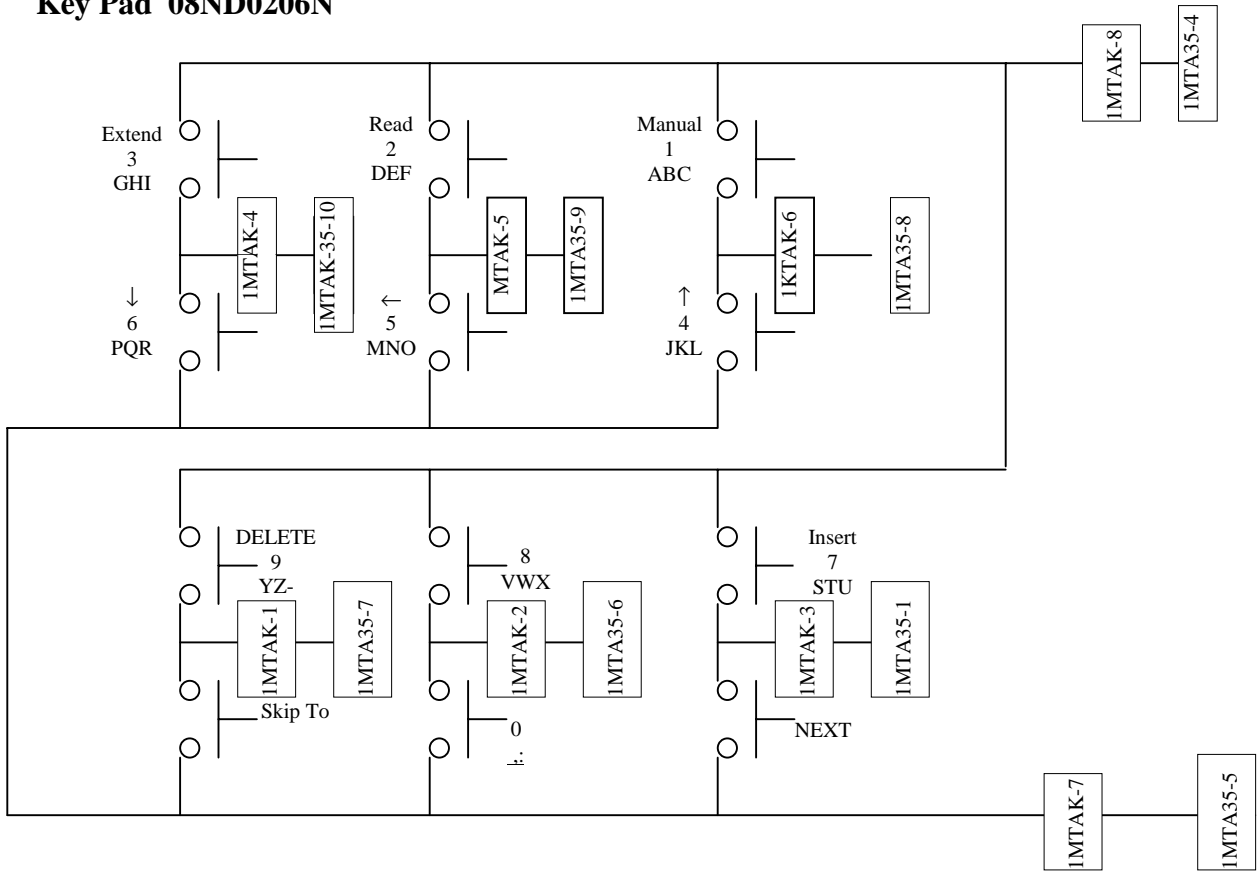
**Schematic 5B**  
**Key Pad 08ND5X6WE/DR**

Schematic 5B  
Key Pad 08ND5X6WE/DR



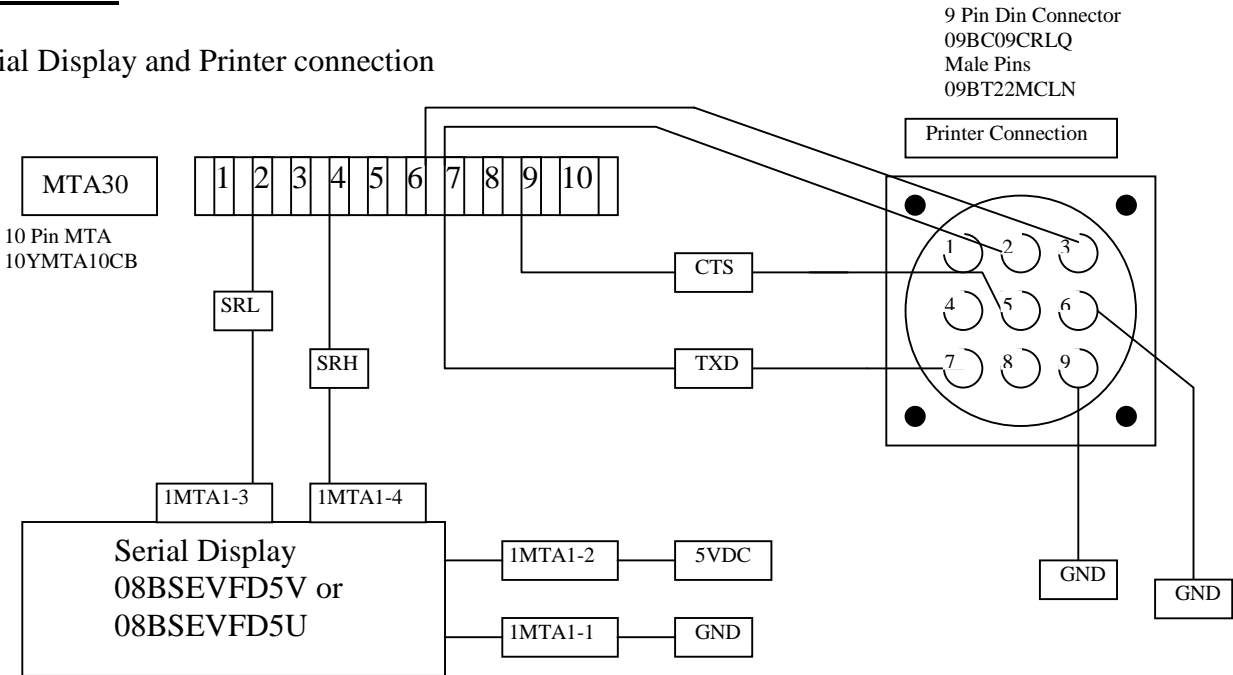
MICRO 6 SYSTEMS  
MARK II  
SCHEMATIC: KEYPAD (SERIAL CONTROLS)  
PELLERIN MILNOR CORPORATION

**Schematic 5A**  
**Key Pad 08ND0206N**



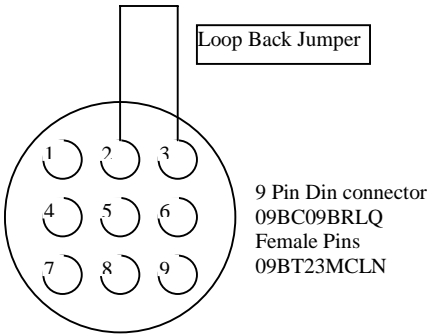
**Schematic 1**

Serial Display and Printer connection



**Schematic 2**

Loop Back Connector  
RS 232



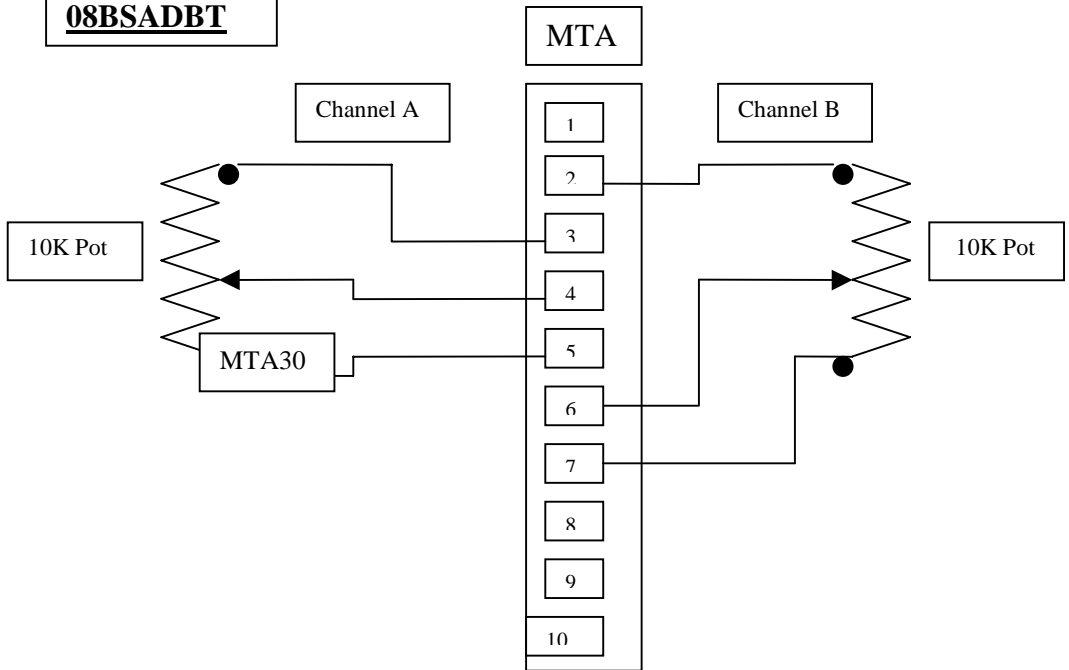


**Schematic 4**  
**Parallel Display**



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

**Schematic 3A**  
**08BSADBT**



**Schematic 3 B**  
**08BSADCT**

