

## DIGITAL PERSONALITY MODULE

### Installing a Digital Personality Module (DPM)

**! CAUTION !**

The DPM is a static sensitive device and should be treated as such. MTS recommends a static wrist wrap be worn during installation and that these procedures are conducted in a clean environment.

1. Place the transducer hex in a vise.
2. Unscrew the cover using hand pressure only. Note that the cover has right hand threads. A specially designed cover wrench is available from MTS.

**! CAUTION !**

Hands must be clean. Ensure that no foreign material contacts the inside components.

3. Once the cover is removed, clean the inner threads of the cover and bracket with a lint free cloth. Spray **ONLY** the cover threads with Sherwin Williams #00217 Teflon® spray.
4. Remove DPM from the static sensitive bag by holding the module by its edges, being careful that the plastic does not contact the transducer mechanism. The old coil block design has a key that can interfere with a new DPM (if a DPM is being installed on a transducer with the old coil block design, be sure to cut off the key before installing the new DPM as indicated in the drawing below. Refer to the programming procedures on the next page if the DPM needs to be reprogrammed.

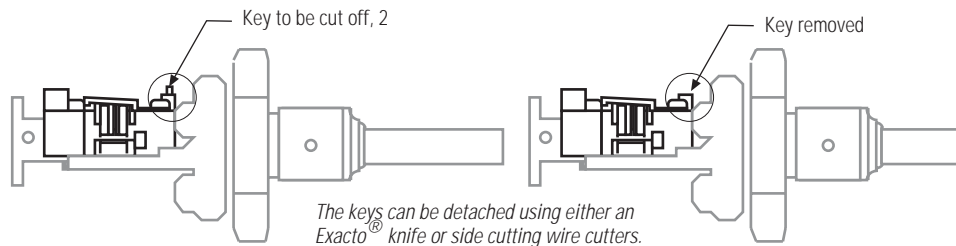
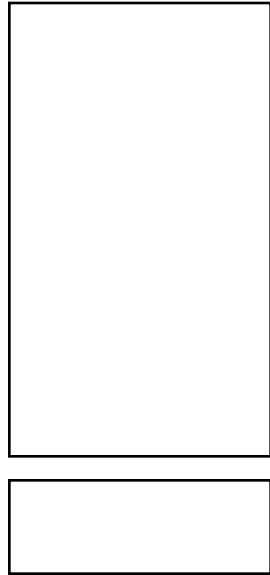


Figure 1

5. Place provided insulator on the bracket.
6. Align the 12 pin connector on the interconnect board with the socket on the RPM, ensure pins are straight, and press gently until PM is securely inserted.
7. Once the module is inserted, secure with the 2 provided Plastite screws until snug. **DO NOT OVER-TIGHTEN!**



*To assure full coverage under warranty and error-free future replication orders, install this label as instructed in Step 9.*

8. Carefully align the cover to the threads and hand tighten until snug against the gasket.
9. Once cover is secure, attach the provided label as shown in Figure 2.

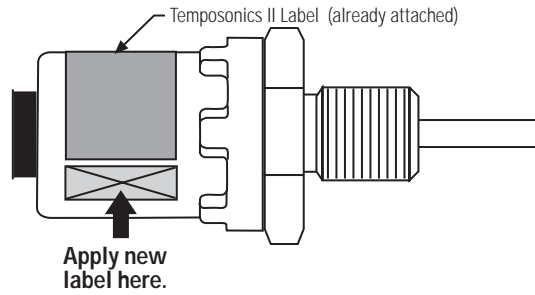


Figure 2

10. Connect transducer and verify proper operation.

## DPM Programming Procedure (Asynchronous Mode)

### NOTE

DPM programming switches are set from the factory. Call MTS before making any adjustments to the switches. A small flat head screw driver should be used to program the switches. (See Figure 1, next page, for switch locations).

### ! CAUTION !

The DPM is a static sensitive device and should be treated as such. MTS recommends a static wrist wrap be worn during installation and programming. These procedures are to be conducted in a clean environment.

1. SW1 and SW2 are programming switches used to set the number of recirculations from hexadecimal numbers 01 to 7F or from 81 to FF (refer to Table 2). Table 1 indicates the resolutions that are attainable with a given number of recirculations; these numbers assume a standard 27 to 28 MHz crystal is being used.
2. SW3 is the switch used to program, or set, the update time for internal interrogation. Update Time is programmed using hexadecimal numbers 0 to F (refer to Table 3). Follow the steps below to program Update Time.

**Step A:** Knowing the stroke length, the null, and the resolution desired, use Table 1 to find the corresponding number of recirculation required.

**Step B:** Find the minimum required update time ( $U_{min}$ ) using the formula below:

$$U_{min} = (2.5 + \text{Null} + \text{Stroke}) (0.01086 \text{ ms/in.} \times N)$$

Where:

Stroke = stroke length in inches (1 to 300 inches)

N = number of recirculations

Null = null length in inches

**Step C:** Go to Table 3 to select the switch setting SW3 that yields the closest update time which is greater than or equal to  $U_{min}$ .

**Step D:** Use the following formula to verify the exact update time of the transducer.

$$\text{Update Time} = (N + 1) (\text{SW3} + 1) (0.2 \text{ ms})$$

Where:

N = number of recirculations

SW3 = switch setting in decimal

**EXAMPLE:** Given:

Stroke Length = 20 inches

Null = 2 inches

Resolution = 0.001 inch

**SOLUTION:** a. From Table 1, the corresponding recirculation is N = 4.

b. From Step B, above, the minimum required update time is:

$$\text{Umin} = (2.5 + 2 + 20) (0.01086) (4) = 1.064 \text{ ms}$$

c. The programming table shows that the closest update time greater than or equal to Umin corresponding to N = 4 is 2.00 ms; and SW3 = 1.

d. Verifying the update time, from Step 2, the exact update time is:

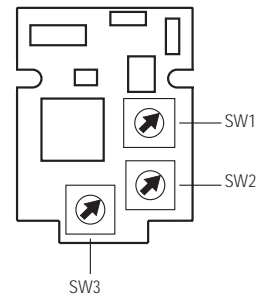
$$\text{Update Time} = (4 + 1) (1 + 1) (0.2 \text{ ms}) = 2 \text{ ms}$$

### Switch Settings

**Table 1**

Resolution vs. Recirculations w/27-28 MHz Crystal

<u>Resolution</u>	<u>Recirculation</u>
0.004	1
0.002	2
0.001	4
0.0005	8
0.00025	16
0.000125	32



**Figure 3**  
Switch Locations

**Table 2**

Recirculation Switch Settings

<u>Internal Interrogation</u>			<u>External Interrogation</u>	
<u>SW 2</u>	<u>SW 1</u>	<u>Recirculation</u>	<u>SW 2</u>	<u>SW 1</u>
0	1	1	8	1
0	2	2	8	2
0	4	4	8	4
0	8	8	8	8
1	0	16	9	0
2	0	32	A	0
4	0	64	C	0
7	F	127	F	F



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Table 3-a: INTERNAL INTERROGATION DPM PROGRAMMING.

SW2	SW1	N	SW3	U	U	U	U	U	U	U	U	U	U	U	SW3	U
0	1	1	0	0.40	1	0.80	2	1.20	3	1.60	4	2.00	5	2.40	6	2.80
0	2	2	0	0.60	1	1.20	2	1.80	3	2.40	4	3.00	5	3.60	6	4.20
0	3	3	0	0.80	1	1.60	2	2.40	3	3.20	4	4.00	5	4.80	6	5.60
0	4	4	0	1.00	1	2.00	2	3.00	3	4.00	4	5.00	5	6.00	6	7.00
0	...	...														
0	8	8	0	1.80	1	3.60	2	5.40	3	7.20	4	9.00	5	10.80	6	12.60
0	...	...														
0	F	15	0	3.20	1	6.40	2	9.60	3	12.80	4	16.00	5	19.20	6	22.40
1	0	16	0	3.40	1	6.80	2	10.20	3	13.60	4	17.00	5	20.40	6	23.80
1	...	...														
1	F	31	0	6.40	1	12.80	2	19.20	3	25.60	4	32.00	5	38.40	6	44.80
2	0	32	0	6.60	1	13.20	2	19.80	3	26.40	4	33.00	5	39.60	6	46.20
2	...	...														
2	F	47	0	9.60	1	19.20	2	28.80	3	38.40	4	48.00	5	57.60	6	67.20
3	0	48	0	9.80	1	19.60	2	29.40	3	39.20	4	49.00	5	58.80	6	68.60
3	...	...														
3	F	63	0	12.80	1	25.60	2	38.40	3	51.20	4	64.00	5	76.80	6	89.60
4	0	64	0	13.00	1	26.00	2	39.00	3	52.00	4	65.00	5	78.00	6	91.00
4	...	..														
4	F	79	0	16.00	1	32.00	2	48.00	3	64.00	4	80.00	5	96.00	6	112.00
5	0	80	0	16.20	1	32.40	2	48.60	3	64.80	4	81.00	5	97.20	6	113.40
5	...	...														
5	F	95	0	19.20	1	38.40	2	57.60	3	76.80	4	96.00	5	115.20	6	134.40
6	0	96	0	19.40	1	38.80	2	58.20	3	77.60	4	97.00	5	116.40	6	135.80
6	...	...														
6	F	111	0	22.40	1	44.80	2	67.20	3	89.60	4	112.00	5	134.40	6	156.80
7	0	112	0	22.60	1	45.20	2	67.80	3	90.40	4	113.00	5	135.60	6	158.20
7	1	113	0	22.80	1	45.60	2	68.40	3	91.20	4	114.00	5	136.80	6	159.60
7	...	...														
7	F	127	0	25.60	1	51.20	2	76.80	3	102.40	4	128.00	5	153.60	6	179.20

Update time: U = (N +1) \* (SW3 +1) \* .2 ms

Table 3-b: INTERNAL INTERROGATION DPM PROGRAMMING.

SW2	SW1	N	SW3	U	U	U	U	A	U	B	U	C	U	D	U	E	U	SW3	U
0	1	1	8	3.60	9	4.00	4.40	A	4.40	B	4.80	C	5.20	D	5.60	E	6.00	F	6.40
0	2	2	8	5.40	9	6.00	6.60	A	6.60	B	7.20	C	7.80	D	8.40	E	9.00	F	9.60
0	3	3	8	7.20	9	8.00	8.80	A	8.80	B	9.60	C	10.40	D	11.20	E	12.00	F	12.80
0	4	4	8	9.00	9	10.00	11.00	A	11.00	B	12.00	C	13.00	D	14.00	E	15.00	F	16.00
0	...	...																	
0	8	8	8	16.20	9	18.00	19.80	A	19.80	B	21.60	C	23.40	D	25.20	E	27.00	F	28.80
0	...	...																	
0	F	15	8	28.80	9	32.00	35.20	A	35.20	B	38.40	C	41.60	D	44.80	E	48.00	F	51.20
1	0	16	8	30.60	9	34.00	37.40	A	37.40	B	40.80	C	44.20	D	47.60	E	51.00	F	54.40
1	...	...																	
1	F	31	8	57.60	9	64.00	70.40	A	70.40	B	76.80	C	83.20	D	89.60	E	96.00	F	102.40
2	0	32	8	59.40	9	66.00	72.60	A	72.60	B	79.20	C	85.80	D	92.40	E	99.00	F	105.60
2	...	...																	
2	F	47	8	86.40	9	96.00	105.60	A	105.60	B	115.20	C	124.80	D	134.40	E	144.00	F	153.60
3	0	48	8	88.20	9	98.00	107.80	A	107.80	B	117.60	C	127.40	D	137.20	E	147.00	F	156.80
3	...	...																	
3	F	63	8	115.20	9	128.00	140.80	A	140.80	B	153.60	C	166.40	D	179.20	E	192.00	F	204.80
4	0	64	8	117.00	9	130.00	143.00	A	143.00	B	156.00	C	169.00	D	182.00	E	195.00	F	208.00
4	...	...																	
4	F	79	8	144.00	9	160.00	176.00	A	176.00	B	192.00	C	208.00	D	224.00	E	240.00	F	256.00
5	0	80	8	145.80	9	162.00	178.20	A	178.20	B	194.40	C	210.60	D	226.80	E	243.00	F	259.20
5	...	...																	
5	F	95	8	172.80	9	192.00	211.20	A	211.20	B	230.40	C	249.60	D	268.80	E	288.00	F	307.20
6	0	96	8	174.60	9	194.00	213.40	A	213.40	B	232.80	C	252.20	D	271.60	E	291.00	F	310.40
6	...	...																	
6	F	111	8	201.60	9	224.00	246.40	A	246.40	B	268.80	C	291.20	D	313.60	E	336.00	F	358.40
7	0	112	8	203.40	9	226.00	248.60	A	248.60	B	271.20	C	293.80	D	316.40	E	339.00	F	361.60
7	1	113	8	205.20	9	228.00	250.80	A	250.80	B	273.60	C	296.40	D	319.20	E	342.00	F	364.80
7	...	...																	
7	F	127	8	230.40	9	256.00	281.60	A	281.60	B	307.20	C	332.80	D	358.40	E	384.00	F	409.60

Update time: U = (N +1) \* (SW3 +1) \*.2 ms