0.12 Trime SM23-U Board Installation in PAM Electronics

"Installation:" "Wiring:" "Checking TRIME Data via EVE:" "Trouble-Shooting:"

Installation:

The diagram below shows how to install the SM23-U board in the electronics box. The board is easy to install, but here are some important notes.

1) Turn off electronics box, and remove power cable before beginning.

2) Remove any jumpers (shunts) on JP3 as shown in the diagram. The board will not function properly if they are not removed.

3) Install the SM-23U board. It has four plastic standoffs (legs). The front two (next to the connector) should be unscrewed and mounted through the two holes in the main front panel board. Do not try to mount the rear standoffs through the other two holes. They have been filed down so that rest on top of the board.

4) Check the clearance under the SM-23U board. The board should not be touching any components on the PAM front panel.

5) Test the TRIME system. With the TRIME-MUX6 connected and the electronics box turned on, an LED on the TRIME-MUX6 should come on.

6) Using a laptop and the EVE "talk" program it is possible to check the communications with the TRIME. Use "/tyCo/6" and the "IMP232" mode. This will provide a menu for commands to the TRIME. The TRIME is set to address 1.



PAM III Connector / Front Panel Power board (top view)



	Trime Plug	Amp 9-Pin	JP4 on Front Panel / SM23U	RJ45 to SIO
+12V Power	1	8	1,2	
IMP Bus R/T	2	1	9	
Ground	3	7	4,5,11	4
IMP bus Com	4	2	7	
RS232 Tx to EVE			13	5
RS232 Rx from EVE			15	6

Checking TRIME Data via EVE:

After the SM23U board is attached to the EVE electronics box and the sensor is connected to the box with its probes attached, verify that the station configuration is properly set up for its operation. The statement in the configuration should look somthing like:

TRIME Mux-6 Sensor Ingest ### SIO: /tyCo/6 9600 odd 8 IMP232: TDR /tyCo/6 0x01 300sec **TRIME-MUX6 P**1 T1 P2 T2 P3 T3 P4 T4 P5 T5 P6 T6 : DO: AVG TDR.P1 DO: AVG TDR.P2 DO: AVG TDR.P3 DO: AVG TDR.P4 DO: AVG TDR.P5 DO: AVG TDR.P6 DO: AVG TDR.T1 DO: AVG TDR.T2 DO: AVG TDR.T3 DO: AVG TDR.T4 DO: AVG TDR.T5 DO: AVG TDR.T6 MESG: TRIME $ID = \% d \langle n \rangle$ Errors = $%d\langle n \rangle$ Probe DatanP1 = %5.3f%% %4.2f P2 = %5.3f%% %4.2f P3 = %5.3f%% %4.2f/n/ $P4 = \% 5.3 f\% \% \ \% 4.2 f \ P5 = \% 5.3 f\% \% \ \% 4.2 f \ P6 = \% 5.3 f\% \% \ \% 4.2 f \ n$ TDR/ID TDR/ERR TDR.P1 TDR.T1 TDR.P2 TDR.T2 TDR.P3 TDR.T3 TDR.P4 TDR.T4 TDR.P5 TDR.T5 TDR.P6

And some OUTPUT statement should include the data (only 1 sensor output parameter shown):

```
OUTPUT: TDRDATA 300 sec ASCII HEX
%.3g %.3g
TDR.P1.AVG S 12 10 0 |name="q.1.soil" |long_name="soil moisture p1" |units="%vol"
TDR.T1.AVG S 12 10 0 |name="amp.q.1.soil" |long_name="TDR amplitude p1" |units="%amp".
```

With the proper config.dat file running, verify the Trime sensor data is coming in by entering 'trime' at the prompt. Note it takes a long time for the Trime to multiplex through the probes to collect data. This can be observed on its from panel LEDs as the sampling takes place.

Eve> trime ID = 7260 Errors = 0 Probe Data P1 = 0.000% 47.00 P2 = 0.000% 49.00 P3 = 0.000% 46.00 P4 = 0.000% 46.00 P5 = 0.000% 45.00 P6 = 0.000% 45.00

It is also advisable to interact with the Trime sensor itself to confirm operations:

```
Eve> entersys
System EVE# talk
Choose one of the following ports for communications:..... 6)/tyCo/6 IMP232 Bus:
Enter port selection (1 - 6) or (\langle cr \rangle to quit) \rightarrow 6
    IMP232 Bus Command program ------
    1) Change baud
    2) Query sensor
    3) Query all possible sensors
    4) Get sensor info
    5) Set station address
    6) Get polynomial fit
    7) start measurement
    8) get measurement data
    9) Reset Trime Mux to chan 1
    10) Set Trime Mux to a channel
    11) Show Trime probe number
    12) Show Trime-Mux6 Probe numbers
    0) Exit menu
Option \rightarrow 12
    Enter sensor address (00 - fa) [01] \rightarrow
    TRIME-MUX 6 Probe status ChanProbe Num 11 22 33 44 55 66
    OK
IMP232 Bus Command program -----
Option -> 4
    Enter sensor address (00 - fa) [01] \rightarrow
    IMP module info: Name: SM-TRMUX2-6 S/N = 7260 Hardware Version = 80 Software Version
    = 16 Module type code = 10 Startup baud rate = 9600 timeout = 30000 usec Delay time = 10000
    usec Response Time = 0 usec
    OK
IMP232 Bus Command program -----
Option -> 8
    Enter sensor address (00 - fa) [01] \rightarrow
    Data values are ch1 = 0.000000 ch2 = 0.000000
    OK
IMP232 Bus Command program -----
Option \rightarrow 0
System EVE#
```

If the Trime data fails to come in to EVE, here are a few things to check:

- 1) Make sure JP3 jumpers are removed.
- 2) Make sure the transorb pack U10, is an LCA15 and not an LCA12.

These transorbs are part of the surge suppression on the PAM electronics box. The LCA12 break-down voltage is lower than the LCA15. The LCA15 is used because of the high voltage (ie +19) used by the Trime for communications. It is also possible that U10 has failed after a lightning hit. If it fails 'shorted' then it would cause the SM23U to not be able to work properly.

3) Test the EVE serial port.

Try moving the cable from EVE's tyCo/6 from its jack J44 on the front panel to either another jack or to an RJ45-DB25 (or DE9) adaptor to a PC computer and make sure that tyCo/6 and its cable is working by using eve-talk.

- 4) Make sure the EVE configuration is correct:
- 5) Examine the 4-pin Trime connector pin voltages (Per discussion between Shin and Mr Fundinger

The voltage between pins 2-4 should be between 18-24V when the EVE / SM23U interface is sending a command to the TRIME Mux. During a measurement this signal is the command pulse to the Mux. The voltage will be between 5-8V when the Trime Mux is sending to the EVE / SM23U.

Note these readings mean that the nominal values are:

- 1 +12 Power
- 2 Gnd IMP R/T: Pulled to +12 during Xmit, -5 during Rcv
- 3 Gnd Actual Ground
- 4 -12 IMP bus Com

If these voltages are confirmed, then the cable and SM23U are probably OK. If not, suspect the cable and try looking for these same measurements at the PAM Amp 9-Pin connector on the electronics box. (See wiring diagram above).

6) Examine the lights on the Trime Mux

Make sure the Trime (slowly) goes through sampling of the channels as shown by the LEDs.