



# TELEDYNE INSTRUMENTS

*Advanced Pollution Instrumentation*

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## Service Note

95-007 Rev B  
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### TROUBLESHOOTING MUX CIRCUIT ON MODELS 100, 200 MOTHERBOARDS

1. If you are experiencing problems with the following test functions, but all other test functions appear to work, then this procedure should be followed to troubleshoot the analyzer.
  - A. The test functions are:
    1. PMT TEMP nominally 10 degrees for M100, 15 for M200.
    2. DCPS mV nominally 2500 +-200 mVDC.
    3. Vacuum display (M200 only) nominally 3.0-6.0 IN-HG-A.
    4. O<sub>3</sub> flowmeter (WOO only) nominally 90 or 250 CC/MIN..
    5. Moly Temp (M200 only) nominally 315 degrees.
2. The mux circuit consists of 3 IC's located on the motherboard under the barrel assembly. U1 is the Mux chip itself. U2 is a buffer amp set up to 1: 1 gain, non-inverting. U3 is a voltage regulator which takes the -15V supply and provides a -5V supply for the other two chips.
3. The mux chip is an analog switch which has 8 inputs and one output. The input is selected by 3 address bits which are controlled by the CPU card via the I/O card. These signals are found at U1 pin 9-1 1. The CPU selects one output about every second, so the LSB (pin 1 1) switches high to low or low to high about every second.
4. When troubleshooting, check for the following:
  - A. -15VDC +-.3V at U3-2 and U2-11.
  - B. -5VDC +-.2V at U3-3 and U1-7.
  - C. +5VDC +-.2V at U1-16.
  - D. + 15VDC + -. 3V at U2-4.
5. Using the attached chart, look for the correct voltages at U1.
6. Check U1-3 for a signal which changes about once per second and goes from ground through all the voltages you measured on U1 pins 13,14,15,12,1, and 5, then returns to ground.
7. Check at U2-14 for a signal identical to the signal at U1-3.

ALL VOLTAGES ARE REFERENCED TO THE DCPS TPS

U1 PIN #	13	14	15	12	1	5	9	10	11
NOX FUNCTION	PMT TEMP NOMINAL = 15°C	DCPS STATUS OUTPUT	GND, REF.	VACUUM SENSOR NOMINAL = 6"-HG-A	O <sub>2</sub> FLOWMETER NOMINAL = 105 CC/MIN	MOLY TEMP NOMINAL = 315° C	MSB FOR MUX	MIDDLE BIT	LSB FOR MUX
NOX NOMINAL VOLTAGE	1.86-1.94 VDC	2.5 VDC ± .1 VDC	0 VDC ± 20 mV	NOMINAL = 1-4 VDC	NOMINAL = 2.3 VDC	NOMINAL = 3.15 VDC	SQUARE WAVE PERIOD ≈ 8 SEC.	SQUARE WAVE PERIOD ≈ 4 SEC.	SQUARE WAVE PERIOD ≈ 2 SEC.
SO <sub>2</sub> FUNCTION	PMT TEMP NOMINAL = 10°C	DCPS STATUS OUTPUT	GND, REF.	N/A	N/A	N/A	MSB FOR MUX	MIDDLE BIT	LSB FOR MUX
SO <sub>2</sub> NOMINAL VOLTAGE	1.28-1.33 VDC	2.5 VDC ± .1 VDC	0 VDC ± 20 mV	N/A	N/A	N/A	SQUARE WAVE PERIOD ≈ 8 SEC.	SQUARE WAVE PERIOD ≈ 4 SEC.	SQUARE WAVE PERIOD ≈ 2 SEC.
CUSTOMER'S ANALYZER VOLTAGES M100/M200									

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