

INSTRUCTION MANUAL

RD20, RD22 Driver Module

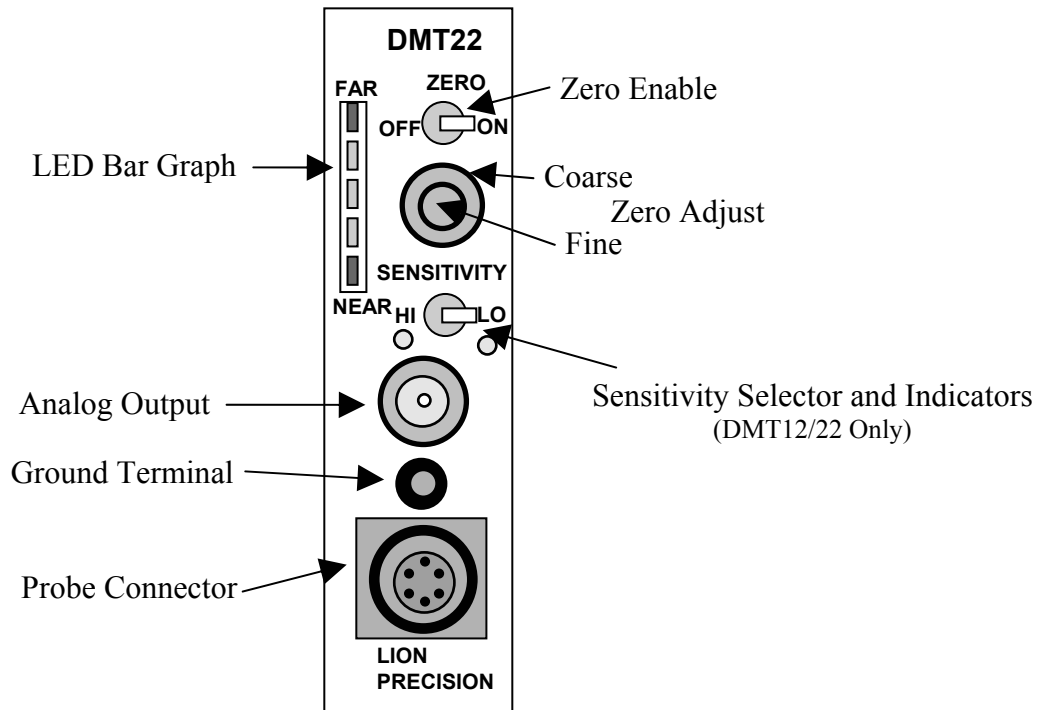
Measurement Systems
from
LION PRECISION

Features

RD20 and RD22 drivers feature DMT20 and DMT22 Probe Drivers respectively

- **Low noise output**
- **Selectable bandwidth**
- **Temperature stability**
- **2 user selectable sensitivities (DMT12 & DMT22 Only)**
- **Zero Adjust Enable/Disable**
- **LED Bar Graph for easy probe setup**

Basic Operation



Zero Adjust

Used to adjust the analog output voltage after the probe is initially positioned. Typically the analog output voltage is adjusted to zero volts at nominal standoff (center of active range). There is a coarse adjustment, the outer control, and a fine adjustment, the inner control. When the factory calibrates the module both of these adjustments are at their mid position when the probe is at nominal standoff.

Zero Enable

When in the off position, the zero adjust knob has no effect.



LED Bar Graph

The LED Bar Graph is used to identify the *calibrated range* of the probe. Green LED's indicate the probe is in its calibrated range and the output voltage is an accurate representation of the gap. Red LED's indicate the probe is out of range and the output voltage is not valid. At nominal standoff (center of range), the module is calibrated to output 0 volts. The zero control allows the operator to adjust the output to 0 volts when the probe is not precisely positioned at its original standoff.

It is possible to position the probe toward the end of the calibrated range and adjust the output voltage to 0 volts. In this situation, the probe can go out of its calibrated range while the output voltage continues to appear valid. The output voltage may continue to change, but the output is no longer guaranteed to be accurate.

The bar graph is independent of the zero control. The center (green) LED corresponds to the center of the probe's calibrated range. The "FAR" (red) LED will light if the maximum gap is exceeded. The "NEAR" LED will light if the minimum gap is exceeded. During initial probe positioning, turn on the module and position the probe until the center green LED is activated. To precisely position the probe at the center of the calibrated range, turn off the zero adjustment and monitor the output voltage. When the output voltage is 0 volts, the probe is at the same nominal gap at which it was calibrated. Regardless of zero adjustment, the output value is valid as long as the probe is in its calibrated range (green LED's) and the output is does not exceed 12 volts.



Sensitivity Selector (DMT22 Only)

Selects the LO or HI sensitivity calibration. The DMT22 is calibrated with two completely different calibrations. Typically, the LO sensitivity calibration is for general measurement and the HI sensitivity is for higher resolution measurements. The HI sensitivity calibration will require the probe to be moved closer to the target and the total measurement range will be significantly reduced. The current sensitivity selection is indicated by the HI and LO LED's. If the DMT22 is under computer control, the switch will have no effect and the LED's will indicate the computer selected sensitivity.



Analog Output

Provides connection to the analog output voltage, which is directly proportional to the distance between the probe and the surface of the material being measured. This voltage is also available at the card edge connector pin 8. A typical output voltage range is $\pm 10\text{VDC}$. The specific ranges are listed on the accompanying calibration sheets.



Ground

A banana plug type cable can be connected here for grounding the target. In most cases, separate grounding of the target is not necessary. If the target is completely isolated from ground by an insulator, grounding the target may be necessary.

Target grounding will usually reduce the noise in the output signal. When low noise operation is critical separate grounding is recommended even if the target is well grounded through another path.



Probe Connector

DMT20/22 Driver modules use a Lemo type connector for connecting to the probe. Connect the probe by aligning the red dots on the connectors and inserting the probe connector. To disconnect, pull on the knurled barrel of the probe connector to release it. DO NOT pull on the cable.

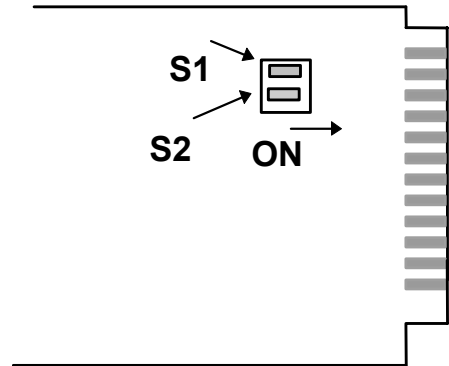
DMT10/12, older model drivers, use a Bendix connector. When plugging a probe into the module be sure to align the key-way and then turn the outer shell clockwise until it locks into place.

Bandwidth Settings

The DMT22 provides a 2-position dip switch for setting bandwidth. All other jumpers and dip switches are factory set and should not be changed since they will affect the calibration of the module. This dip switch is located as shown in the drawing below. The following table shows the bandwidths available and there associated dip switch settings. The bandwidth listed on the accompanying calibration sheets is measured in the 20kHz setting.

Bandwidths listed are approximate. Actual value depends on the probe being used and the calibration.

	S1	S2
20KHZ	OFF*	OFF*
10KHZ	ON	OFF
1KHZ	OFF	ON
100HZ	ON	ON



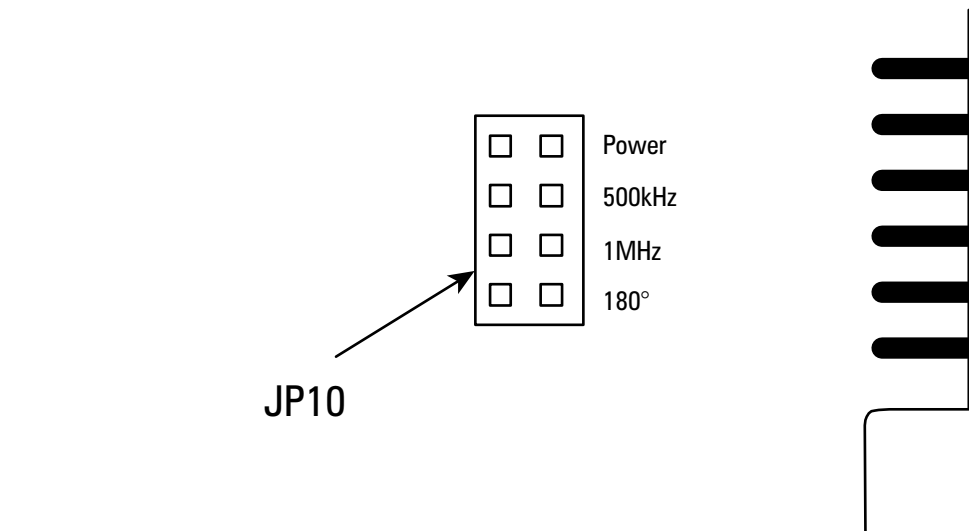
*Standard factory configuration

Multiple Drivers (Master Slave Operation)

Multiple sensors with a common target require synchronization of the driver oscillators. One driver module is configured as a Master and the others as Slaves. Oscillator phase (normal or 180°) can be selected on each driver. When an even number of sensors is used, performance is enhanced when half of the drivers are phased at 180°. When an odd number of sensors is used, there is no advantage to 180° phasing.

Use provided jumper straps to configure the oscillator. 1MHz/500kHz selection is an integral part of the original calibration and should not be changed.

Oscillator configuration JP10	
Pins	Function
Power	Jumper for Master, leave open for Slave
1MHz	Selects 1MHz frequency
500kHz	Selects 500kHz frequency
180°	Jumper for 180°, leave open for Normal



Card Edge Connector P1

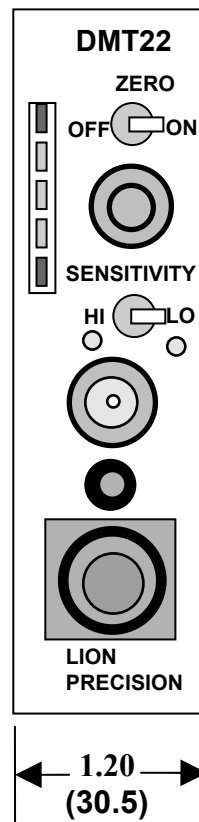
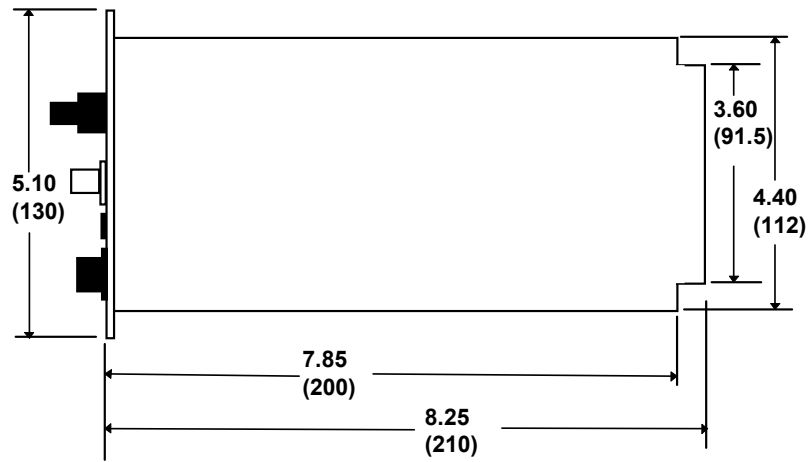
The card-edge connector is a 0.156" centers, 22 conductor type. Each pin and its corresponding signal are identified in the following table. Pin 1 is identified at the lower edge of the component side of the PCB.

All pins not listed in the table should be unconnected. Some of the unlisted pins are used in Lion Precision computer controlled systems and could cause driver malfunction if connected improperly

Card Edge Connections	
PIN	SIGNAL (All digital input/outputs are TTL)
1	Analog Ground
2	Clock Out/In for sync of multiple modules
3	NC
4	Sensitivity Output; High for LO sensitivity (DMT12 & DMT22 Only)
5	NC
6	NC
7	Sensitivity Switch disable; Low = Disabled (DMT12 & DMT22 Only)
8	Analog Out; Typically $\pm 10\text{VDC}$
9	Out of Range; High if probe is currently out of calibrated range
10	Filter Bit 1; Corresponds to filter dip switch S2
11	Filter Bit 0; Corresponds to filter dip switch S1
12	NC
13	NC
14	NC
15	NC
16	Remote sensitivity control input; Low = HI sensitivity, High = LO sensitivity (DMT12 & DMT22 Only)
17	NC
18	NC
19	+15 Power In
20	-15 Power In
21	NC
22	Power Ground

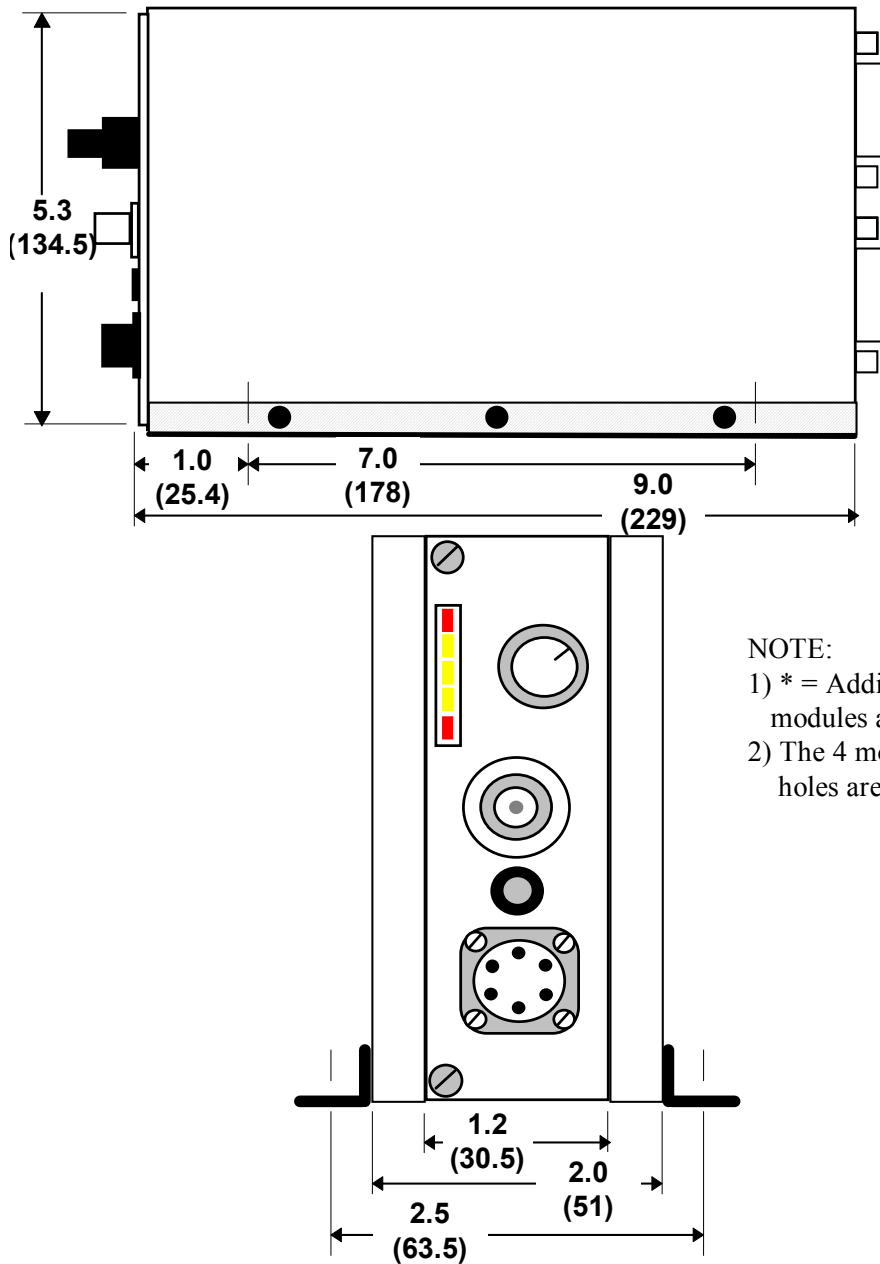
Mechanical Data:

**IN
(MM)**

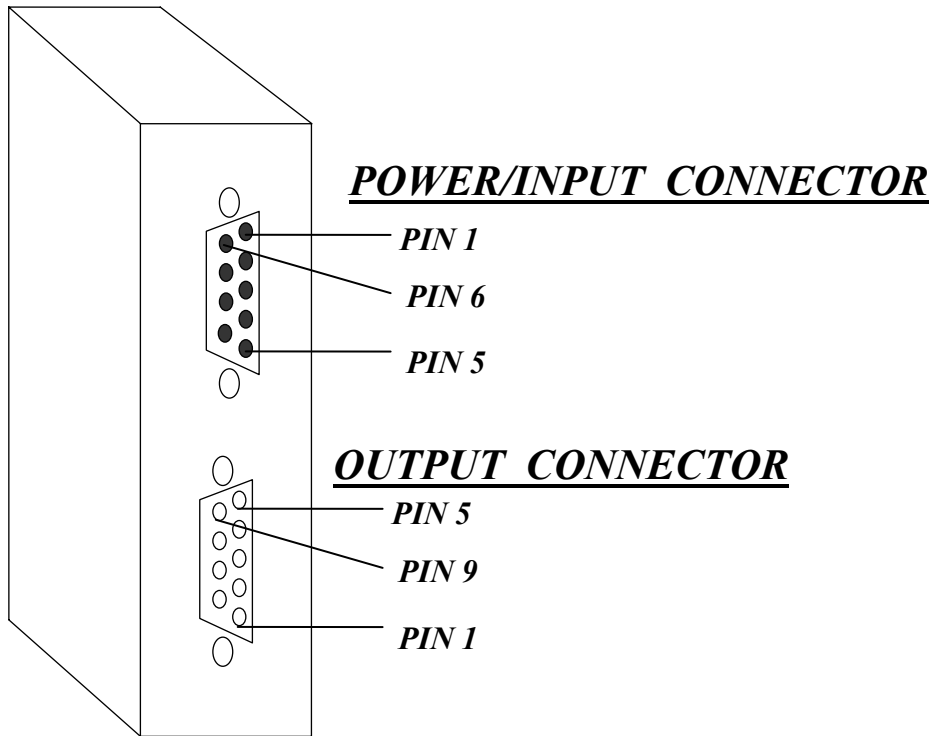


RD Model Drivers (Remote Drivers)

RD20 and RD22 provide for operating a DMT amplifier(s) independent of the standard modular system. The system consists of a simple mounting system for one or more modules. Connectors on the rear provide connection for a remote power supply and connection to output analog voltages. Physical dimensions are shown below. Connector pin-outs follow.



DMT Remote Connections and Power Supply

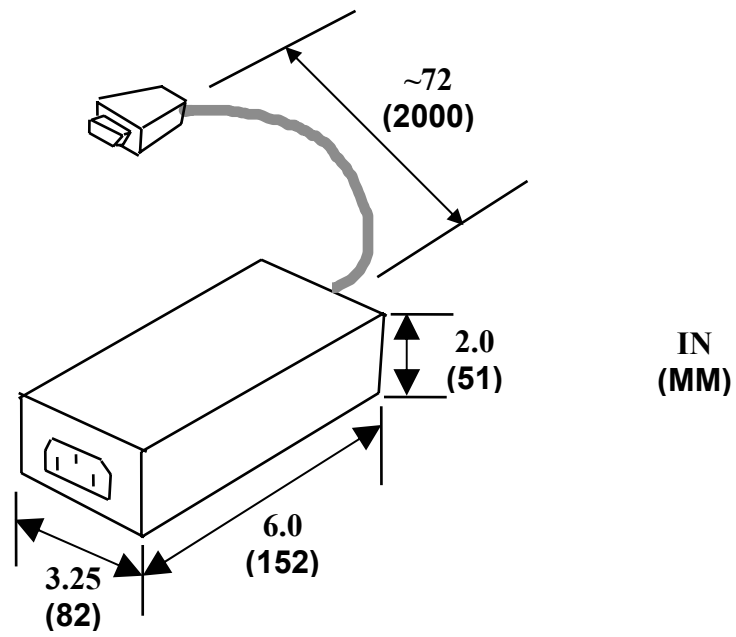


Power/Input Connector

Output Connector

Pin	Signal	Description	Pin	Signal	Description
1	Ground	Power Ground	1	Channel 1 Output	Analog out for channel 1
2	NC	No connection	2	Analog Ground	Analog output reference
3	-15VDC	Negative power	3	Channel 2 Output	Analog out for channel 2
4	+15VDC	Positive power	4	Channel 3 Output	Analog out for channel 3
5	Remote sensitivity enable	Logic low enables remote control of sensitivity on pins 6-9	5	Channel 4 Output	Analog out for channel 4
6	Channel 1 sensitivity	Logic Low = High Sensitivity Logic High = Low Sensitivity	6	Out of range, Ch 1	Logic High output indicates out of range
7	Channel 2 sensitivity	Logic Low = High Sensitivity Logic High = Low Sensitivity	7	Out of range, Ch 2	Logic High output indicates out of range
8	Channel 3 sensitivity	Logic Low = High Sensitivity Logic High = Low Sensitivity	8	Out of range, Ch 3	Logic High output indicates out of range
9	Channel 4 sensitivity	Logic Low = High Sensitivity Logic High = Low Sensitivity	9	Out of range, Ch 4	Logic High output indicates out of range

Power Supply Dimensions



Specifications

Power Requirements	± 15 VDC $\pm 10\%$ @ 130 mA each
Linearity Error	$\pm 0.3\%$ Full Scale or better, dependent on calibration
Bandwidth	Static to 10KHz $\pm 5\%$ -3db: 20KHz Typical
Ranges	Dual; Selectable per calibration
Meets ANSI/ASME B5.54 Standard	Yes
Probe Interchangeability	Yes, typical sensitivity variation 2% for same probe model
Operating Temperature	4°-66°C 40°-150°F
Thermal Stability	0.3% F.S.
Oscillator Frequency	Probe cable < 12 feet - 1MHz, > 12 ft - 500KHz
Output Impedance	0 Ω
Noise Output	6 mV p-p @ 10kHz B.W.