

# OEM LASER RANGEFINDER MODULE - LRF200 SERIES

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## 1. DESCRIPTION

The LRF200 Series is manufactured from a precision machined aluminium chassis with O-ring sealed outer case optimised for stable operation over the wide temperature range experienced in homeland security and other demanding applications.

A laser diode and associated optical system generates a sequence of laser pulses which are transmitted to the object being measured. The reflected pulses are detected by the receiving optical system which focuses the light onto a high performance InGaAs detector. The detector output is amplified, digitised and then processed using Instro's novel DSP algorithms to calculate the distance to the object.

For any LRF, there is a trade off between the signal to noise ratio of the received signal; precision of the range measurement; maximum range; and energy and time required to make the measurement. Instro's patented digital signal processing based technology allows the trade-off between these factors to be optimised. As standard the LRF operates in an autonomous mode, adapting the measurement time to the strength of the returned signal and using the signal to noise ratio to optimum effect so that for objects at shorter ranges, the measurement precision is enhanced. Alternative trade-offs can be provided to suit different applications and Instro would be pleased to discuss these.



### Applications

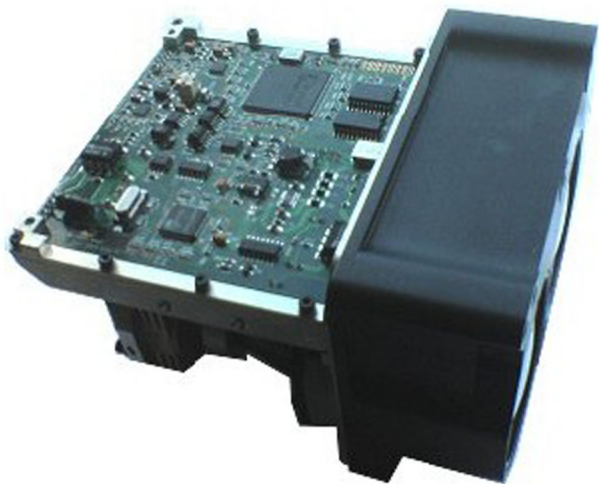
- Homeland Security
- Civil engineering
- Automotive & industrial metrology
- Object tracking

### Features

- Cost effective LRF solution
- Compact and Lightweight
- Rugged
- Measurement range 20m - 10Km
- Eye safe 1550nm wavelength
- First/Last Range Logic
- RS232 serial control interface
- 10 – 30 Vdc power supply

### Options

- Windows PC Starter kit
- Accessory PCB module
- Sealed enclosure
- Vehicle PSU and filtering
- Ruggedisation for vehicle applications
- Burst mode & Multiple target discrimination and reporting
- RS422 control interface
- High Precision Mode (0.1m)
- Weaver rail and telescope kits



## 2. OPTIONS

The following options are available or planned.

### 2.1 Chassis Version

For those customer's wishing to integrate the LRF200 Series within their own housing, the LRF200 Series can be supplied in an open frame configuration without the rear case or rear connector.

### 2.2 Vehicle Power Supply Filtering

To allow the LRF200 Series to be powered directly from a vehicle supply, an additional filter can be integrated into the case, to protect the LRF against the transients and surges normally experienced with such a supply. The filter is MIL-1275 compatible.

### 2.3 Vehicle Ruggedisation

The LRF200 Series in its basic form is compact and rugged unit. However, for those applications where sustained, high levels of shock and vibration are expected a ruggedisation option is available in which the larger components such as capacitors and inductors are glued or tied to the printed circuit board. This option is relevant for applications such as off-road surveillance vehicles and police or customs helicopters.



### 2.4 RS422 control interface

As an alternative to the standard RS232 control interface, Instro can supply the LRF with an RS422 interface for greater noise immunity.

### 2.5 Starter Kit

To allow customers to get the LRF up and running quickly, Instro offers a starter kit comprising Windows XP™ compatible control software, a power/data cable and a universal mains power supply module. The software allows the operator to set the minimum and maximum range gates; fire the LRF; display the first and last range measurements and put the unit into standby and sleep modes.

### 2.6 Weaver Rail and Telescope Kits

A Weaver rail kit can be fitted to the top of the LRF case to allow additional optical instruments to be attached to the LRF.

An optional 6X optical sight is offered as an option to fit to the Weaver rail. The photograph to the left shows the Weaver rail and telescope fitted to the LRF.

### 3. OUTLINE SPECIFICATION

<b>Physical Characteristics</b>		
Configuration	Open frame chassis	Cased version
Manufacturers part No	00-1181-9018	00-1181-9002
Dimensions and mechanical interface	Refer to outline drawing DOL 00-1181-9018	Refer to outline drawing DOL 00-1181-9002
Mass (approx)	0.89Kg (1.96lbs)	1.24g (2.73lbs)
<b>Performance Characteristics</b>		
Eye safety	Class 1M Eye Safe	
Wavelength:	1550nm (nominal)	
Typical range	5 – 8Km	
Maximum measurement range	10Km	
Minimum measurement range	20m	
Range Accuracy	Between 1m (1 $\sigma$ ) and 5m (1 $\sigma$ ) depending on target distance	
Range Resolution	1m (Option: 0.1m)	
Multiple object capability	First/Last reflections are returned	
<b>Environmental Characteristics</b>		
Operating temperature	-30°C to +50°C	
Storage temperature	-40°C to +70°C	
Sealing	Lenses are sealed to front face of LRF, rear is open	IP67 Sealing
<b>Electrical Characteristics</b>		
Operating voltage	10 -30Vdc, ripple<100mVpp	
Power consumption	Peak power <26 Watts / Idle power: 2.6 Watts / Sleep Power: 0.4W	
Electrical connections	PCB mounted connector	Single 38999 series connector
Communications	External computer RS232 (RS422 option)	

The above figures are provision ratings and assume typical applications. Actual performance will depend on many parameters including configuration and environmental conditions. If your intended application requires a different specification, please consult an Instro Sales Support Engineer for advice.

### 4. LASER SAFETY

Laser safety guidelines documents are available on request.



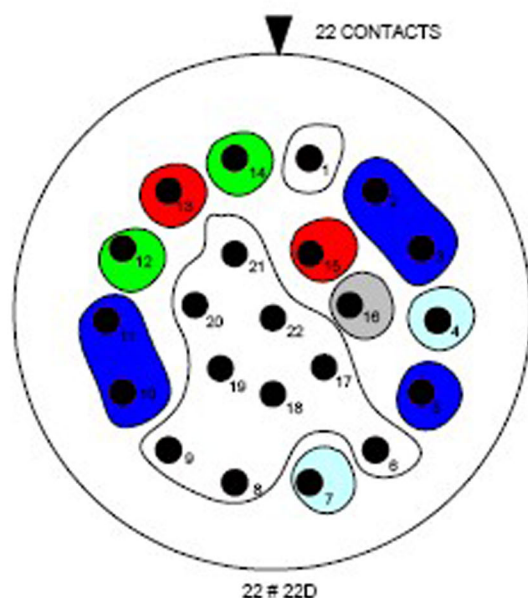
## 5. INTERFACES

### 5.1 Communication interface

The LRF module is controlled by means of a serial communications link complying with TIA/EIA RS-232, refer to INSTRO protocol document SCP 00-1181-0001 (available on request)

### 5.2 Electrical interface- Enclosed version (00-1181-9002)

- LRF Connector- Mil-C-D38999-24-WC-35-PN
- Mates with- Mil-C-D38999-26-WC-35-SN

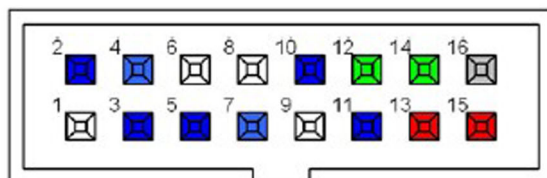


#### 5.2.1 Connector pin out detail

Pin	Description	Group	Function	Notes
15	LRF_Driver_Power	Power	Power supply input to the laser driver circuit. This is separated from the LRF system power to enable external electrical interlock to be implemented for laser safety.	-
13	LRF_Power		Power supply to the LRF system, excluding the laser driver.	-
14	LRF_Driver_Power_0V	Power Return	Power supply input to the laser driver circuit. This is separated from the LRF system power to enable external electrical interlock to be implemented for laser safety.	-
12	LRF_Power_0V		Power supply to the LRF system, excluding the laser driver.	-
2	RS 232 TX	Comms	RS232 data output pair	-
3	RS 232 RX		RS232 data input pair	-
10	Reserved		Reserved	-
11	Reserved		Reserved	-
5	RS Shield		RS Shield	-
4	Reserved	Prog	In circuit programming	Instro use only
7	Reserved		In circuit Programming	Instro use only
16	Chassis Ground	GND	Connected to LRF Chassis	-
1, 6, 8, 9, 17-22	No Connect	-	-	-

### 5.3 Electrical interface- Chassis version (00-1181-9018)

The unit is fitted with a MOLEX 87831-1620 16 way PCB mounted connector which is designed to mate with a cable mounted MOLEX 51110-1651 16 way connector.



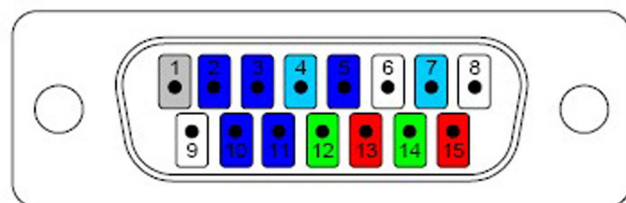
PCB Connector  
(Viewed face on)

#### 5.3.1 Power & Comms PCB mounted connector pin out detail (CONN 3)

Pin	Description	Group	Function	Notes
15	LRF_Driver_Power	Power	Power supply input to the laser driver circuit. This is separated from the LRF system power to enable external electrical interlock to be implemented for laser safety.	-
13	LRF_Power		Power supply to the LRF system, excluding the laser driver.	-
14	LRF_Driver_Power_0V	Power Return	Power supply input to the laser driver circuit. This is separated from the LRF system power to enable external electrical interlock to be implemented for laser safety.	-
12	LRF_Power_0V		Power supply to the LRF system, excluding the laser driver.	-
2	Reserved	Comms	Reserved	-
3	RS 232 RX		RS 232 data input pair	-
10	RS 232 TX		RS 232 data output pair	-
11	Reserved		Reserved	-
5	RS Shield		RS Shield	-
4	Reserved	Prog	In circuit programming	Instro use only
7	Reserved		In circuit Programming	Instro use only
16	Chassis GND	GND	Connected to LRF Chassis	-
1	No Connect	-	-	-
6	No Connect	-	-	-
8	No Connect	-	-	-
9	No Connect	-	-	-

## 5.4 Electrical interface- Chassis version (00-1181-9018) via adapter cable

The unit can be fitted with an adapter cable, supplied as part of the Starter Kit. The adapter cable is fitted with a AMPLIMITE HD20 / 15 Way D-Type PLUG 747908-2 which is designed to mate with a AMPLIMITE HD20 / 15 Way D-Type SOCKET 747909-2. The opposite end of the adapter cable is designed to mate with the power & communications PCB connector (shown on the previous page).



D Type Connector  
(Viewed face on)

### 5.4.1 Power & Comms Adapter Cable Connector Pin-Out Detail

Pin	Description	Group	Function	Notes
15	LRF_Driver_Power	Power	Power supply input to the laser driver circuit. This is separated from the LRF system power to enable external electrical interlock to be implemented for laser safety.	-
13	LRF_Power		Power supply to the LRF system, excluding the laser driver.	-
14	LRF_Driver_Power_0V	Power Return	Power supply input to the laser driver circuit. This is separated from the LRF system power to enable external electrical interlock to be implemented for laser safety.	-
12	LRF_Power_0V		Power supply to the LRF system, excluding the laser driver.	-
2	RS 232 TX	Comms	RS 232 data output pair	-
3	RS 232 RX		RS 232 data input pair	-
10	Reserved		Reserved	-
11	Reserved		Reserved	-
5	RS Shield		RS Shield	-
4	Reserved	Prog	In circuit programming	Instro use only
7	Reserved		In circuit Programming	Instro use only
1	Chassis GND	GND	Connected to LRF Chassis	-
6	No Connect	-	-	-
8	No Connect	-	-	-
9	No Connect	-	-	-