

# ALLIANCE-TR Multi-Operator DAS Low-power Remote Optic Unit (LROU) Product Specifications / Parts List

## SOLID ALLIANCE™ TR



ALLIANCE-TR is SOLiD's multi-operator, neutral host Distributed Antenna System (DAS) that efficiently delivers wireless RF signals into any indoor or outdoor location difficult to cover with traditional macro networks.

The LROU 2W remote optic unit consists of two radio units – Low-power Main Remote Unit (LMRU) and Low-power Add-on Remote Unit (LARU) – that together support up to 8 bands.

- Multi-operator / multi-service
- Support for up to 8 bands
- +33dBm output power per band
- MIMO supported
- Rugged design. IP66 certified
- Wall or rack mount, indoors or outdoors

## Description

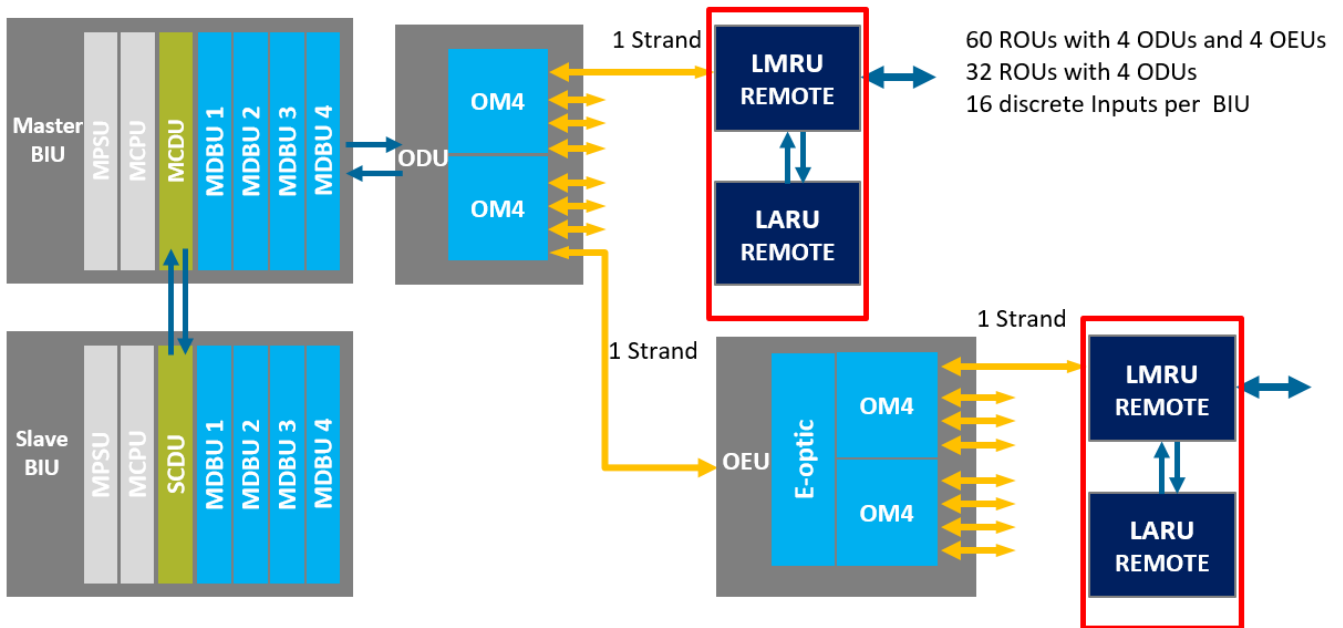
The ALLIANCE-TR Low-power Remote Optic Unit (LROU) is a multi-operator, 2W remote unit system consisting of two radio units – the main unit (LMRU) and add-on unit (LARU).

The LROU's compact size, low power consumption, and high-efficiency amplifier technology offers the operator both CAPEX and OPEX savings. The multi-band, multi-operator capability provides a cost-effective coverage solution without the need for adding multiple independent DAS systems.

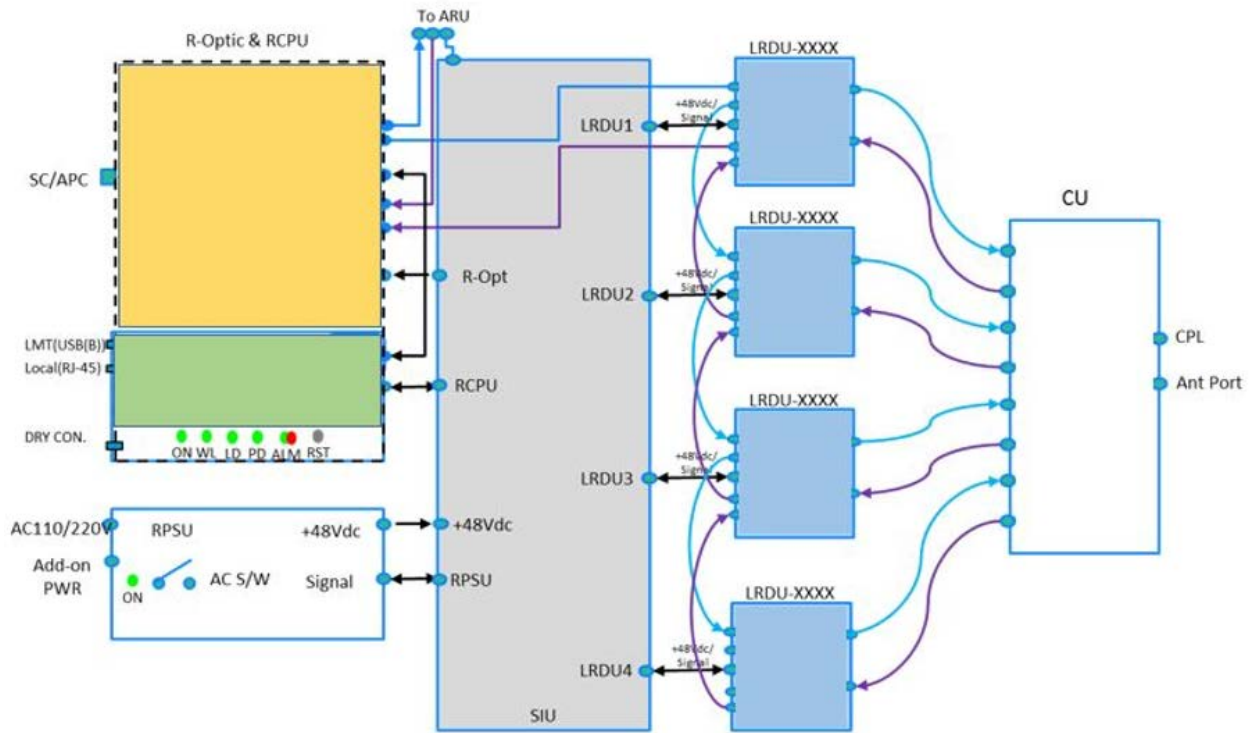
The main unit (LMRU) and optional add-on unit (LARU) together support a maximum of 8 bands. The LMRU connects to the LARU using RF jumper cables included in the product package. The DAS head end transmits optical signals to the LMRU through a WDM-based optical interface. In the LMRU, the R-Optic unit converts downlink signals from optical to RF and distributes them to one or two antenna ports. For the uplink, the process is reversed: the R-Optic unit converts RF signals to optical and transmits them back to the head end.

## Product Configuration

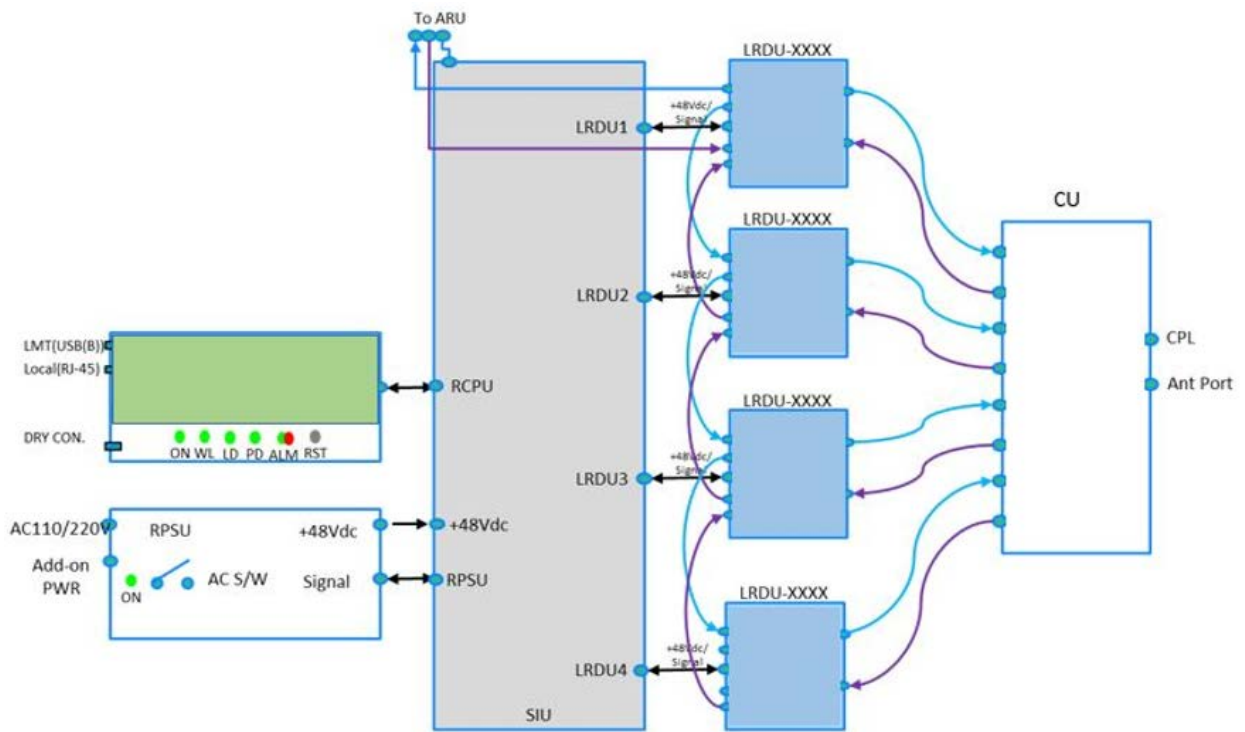
### System Configuration



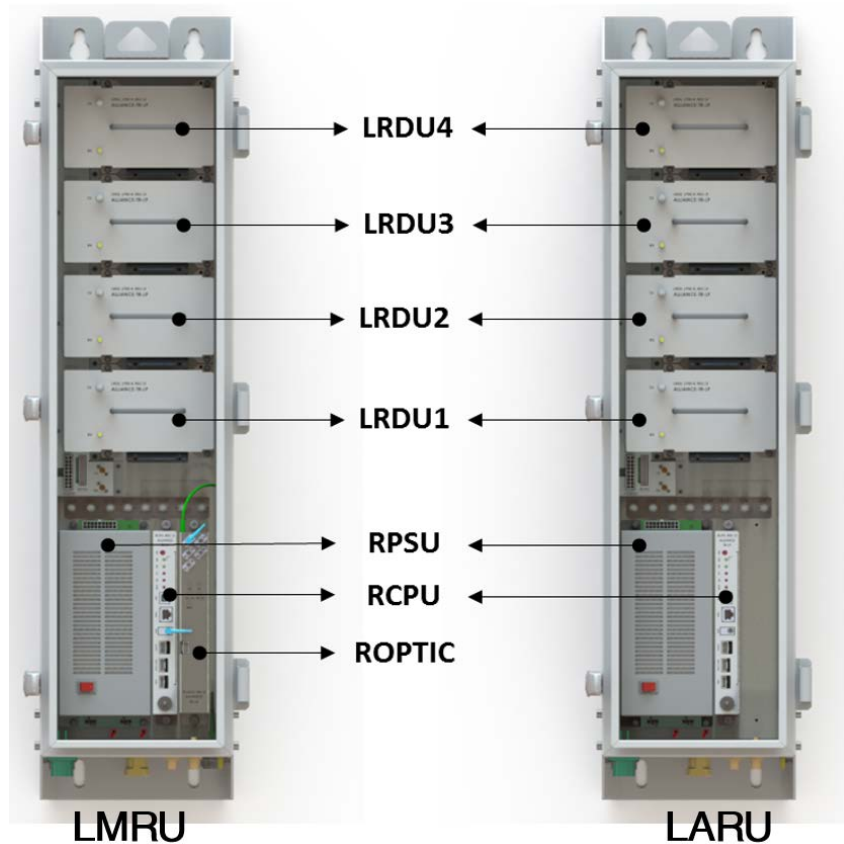
Functional Block Diagram (LMRU)



Functional Block Diagram (LARU)



Parts Description

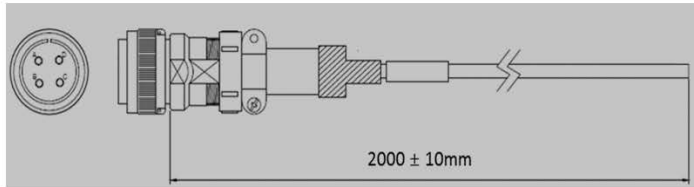


Part	Sub-Unit	Description	Remarks
LROU Common part	R-OPTIC	<b>Remote Optic</b> Converts TX optical signals to RF signals Converts RX RF signals to optical signals Compensates optical loss Communicates with ODU/OEU though Modem	LMRU Only
	RCPU	<b>Remote Central Processor Unit</b> Monitors status of each unit Communicates with BIU/ODU LED indicators show alarm status	Common
	RPSU	<b>Remote Power Supply Unit</b> Input power: AC 100~240V, Output power: 48V, 5.6V voltage	Common
	LCU	<b>Low-power Combining Unit</b> Combines multiple bands into one antenna port (Two antenna ports optional)	Common
	Enclosure	Satisfies IP66; Wall or rack mounting, indoor or outdoor	Common
LRDU_XXXX		<b>Low-power Remote Drive Unit</b> Consists of UDCU, PAU Filters and high amplifies TX signals Filters and amplifies RX signals in low noise amplifier	Max 4 per chassis

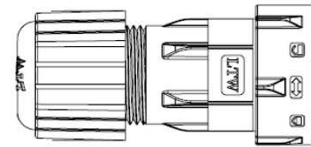
**Accessories**

Items marked LMRU ship with the main unit. Those marked LARU ship with the add-on unit. Cabling to interconnect the main and add-on units ships with the add-on.

Item	Description	Remarks
LMRU AC Power cable	LMRU AC power cable [2 meter, with MIL-5015 type Connector (MS-3106A- 18-10S) at one end, AWG #14 Wire at the other end]	Qty 1
LMRU Optical Connector	Optical Cable Assembly Connector [SOLI-FIBER-Assembly, by LTW]	Qty 1
LARU AC Power cable	LARU AC power cable for LMRU connection [1.5 meter, with MIL-5015 type Connector (MS-3106A-18-10S) and Circular Connector (C016_20H003_100_12, by LTW)]	Qty 1
LARU TX RF Cable	LMRU to LARU Tx RF Cable [SBA(M) ST_1.5M]	Qty 1
LARU RX RF Cable	LMRU to LARU Rx RF Cable [SBA(M) ST_1.5M]	Qty 1
LARU Signal Interface Cable	LMRU to LARU Signal Interface Cable [IEC 61076-2-101(8pin_F) ST_1.5m]	Qty 1



LROU AC Power cable



LMRU Optical Connector



LARU AC Power cable



LARU TX RF Cable



LARU RX RF Cable



LARU Signal Interface Cable

## Specifications

### General Data

Category		Specification
Downlink Output Power		+33dBm composite power per band
Uplink normal input Power		- 50 dBm
Nominal Impedance		50 ohm
VSWR		1.5:1 at all in / out ports
Antenna Port Type		DIN 7/16 Female
Front Panel LED Indicator	ON	Power ON: Green, Power OFF: Gray
	ALM	Normal: Green, Alarm: Red
	LD	Normal: Green, Alarm: Red
	PD	Normal: Green, Alarm: Red
	WL	Green LED flickering: Communication Status
Noise Figure		6 dB ( $\leq 5\text{dBo}$ optical loss) 8 dB ( $5\text{dBo} < \text{optical loss} \leq 10\text{dBo}$ )
Ripple		$\pm 2\text{dB}$
System Delay	TX	< 3 usec
	RX	< 3 usec
Maximum Power Consumption		Max. 200W for TR_LMRU_C85G18U21L26 Max. 250W depending on band combination
LROU Dimension (W x H x D)		220 x 910 x 224.5 mm (Including mounting bracket)
Maximum Weight		32.5kg at full load
Mounting Type		Wall Mounting (optional pole mounting)
Power Supply Range		Operational Range 100V through 240V AC

### Environmental Data

Category	Specification
Environmental Condition & IP Rating	IP66
Operating Temperature (°C)	-25°C ~ +55°C (without Fan)
Operating Humidity	5% ~ 90% non-condensing

### Regulatory Conformity at System Level

Category	Specification
Type Approval & Certification	EN 62311, EN 60950-1, EN 60950-22
EMC(CE)	EN 301 489-01, EN 301 489-08, EN 301 489-23
RF(CE)	EN 300 609-4, EN 301 908-1, EN 301 908-11, EN 301 908-15
EMC&RF(ANATEL)	3GPP TS 36.143 Resolution 554, Resolution 442, Resolution 544, Resolution 454
EMC&RF(Russia)	CU, FAC
FCC	FCC Part 22 Subpart H, FCC Part 24 Subpart E, FCC Part 27 Subpart C

**Optical Data**

Part		Specification
Connector	RF	SMBL/PDM FEMALE / 50 ohm
	Optic	SC / APC, Single mode (STEP FERRULE)
	Power/Signal	D-SUB 3 ROW 15P MALE
Laser Diode		1550nm, 5mW DFB Laser
Photo Diode		1310nm, 10mW Non-destructive
Optic Loss		1dBo~ 5dBo @ OM4 1dBo~10dBo @ OM1

**Electrical Data**

Unit	Downlink (Tx)			Uplink (Rx)		Modulation
	Frequency (MHz)	Bandwidth (MHz)	Output Power (dBm)	Frequency (MHz)	Bandwidth (MHz)	
LRDU_800I	851 - 866	15	33	806 - 821	15	iDEN, UMTS, LTE
LRDU_850C	869 - 894	25	33	824 - 849	25	GSM, EDGE, UMTS, LTE
LRDU_900	925 - 960	35	33	880 - 915	35	GSM, EDGE, UMTS
LRDU_L800	791 - 821	30	33	832 - 862	30	LTE
LRDU_L800_B	791 - 821	30	33	832 - 862	30	
LRDU_1800	1805 - 1880	75	33	1710 - 1785	75	GSM, EDGE, LTE
LRDU_1800_B	1805 - 1880	75	33	1710 - 1785	75	LTE
LRDU_U2100	2110 - 2170	60	33	1920 - 1980	60	UMTS, LTE
LRDU_U2100_B	2110 - 2170	60	33	1920 - 1980	60	
LRDU_L2600F	2620 - 2690	70	37	2500 - 2570	70	LTE (FDD)
LRDU_L2600F_B	2620 - 2690	70	37	2500 - 2570	70	
LRDU_1900P	1930 - 1995	60	33	1850 - 1915	65	GSM, UMTS, LTE, CDMA
LRDU_L700A	758 - 803	45	33	703 - 748	45	LTE
LRDU_L700A_B	758 - 803	45	33	703 - 748	45	
LRDU_L700	728 - 756	28	33	699 - 716 777 - 787	28	LTE
LRDU_L700_B	728 - 756	28	33	699 - 716 777 - 787	28	
LRDU_AWS13	2110 - 2180	70	33	1710 - 1780	70	UMTS, LTE
LRDU_AWS13_B	2110 - 2180	70	33	1710 - 1780	70	

\*Grayed color module indicates future availability



**Power Consumption, Weight, Volume, MTBF**

Unit	Power Consumption (W)	Weight (kg)	Dimension W x H x D (mm)	MTBF (Year)
<b>Low-power Remote Unit Chassis</b>				
LMRU_C_AC	20	26.9	220 x 910 x 224.5 mm	35
LARU_C_AC	10	26.1	220 x 910 x 224.5 mm	74
<b>Common Part Units</b>				
LMRU_RCPU	6	0.3	33 x 238 x 70	141
LARU_RCPU	3	0.3	33 x 238 x 70	199
LRPSU_AC	6	1.5	105 x 240 x 70	118
LR-OPTIC	12	0.8	33 x 238 x 70	76
<b>Low-power RF Drive Unit (LRDU)</b>				
LRDU_800I	40	1.4	170 x 95 x 53	70
LRDU_850C	35	1.4	170 x 95 x 53	59
LRDU_900	40	1.4	170 x 95 x 53	70
LRDU_L800	30	1.4	170 x 95 x 53	65
LRDU_L800_B	30	1.4	170 x 95 x 53	65
LRDU_1800	45	1.4	170 x 95 x 53	70
LRDU_1800_B	45	1.4	170 x 95 x 53	70
LRDU_U2100	30	1.4	170 x 95 x 53	65
LRDU_U2100_B	35	1.4	170 x 95 x 53	65
LRDU_L2600F	55	1.4	170 x 95 x 53	70
LRDU_L2600F_B	60	1.4	170 x 95 x 53	70
LRDU_1900P	30	1.4	170 x 95 x 53	70
LRDU_L700A	25	1.4	170 x 95 x 53	70
LRDU_L700A_B	25	1.4	170 x 95 x 53	TBD
LRDU_L700	TBD	TBD	TBD	TBD
LRDU_L700_B	TBD	TBD	TBD	TBD
LRDU_AWS13	30	1.4	170 x 95 x 53	70
LRDU_AWS13_B	30	1.4	170 x 95 x 53	70

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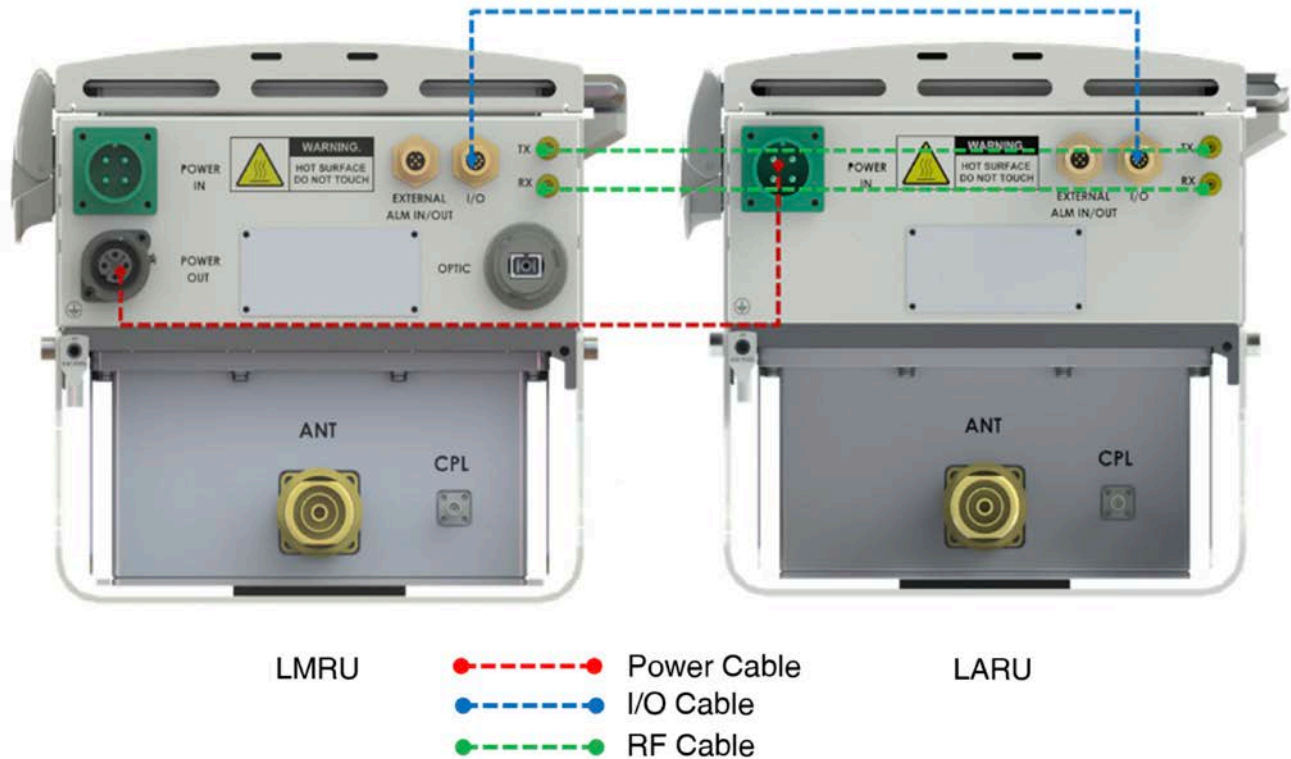
### LMRU Connection to LARU

When co-locating the LMRU and LARU, SOLiD recommends a minimum separation of 100mm between the two enclosures to allow for opening the doors of each unit. The recommended maximum distance is 1200mm assuming the two units are installed at the same height. Note that the interconnect cables are 1500mm, but the location of the connecting ports on the bottom of each unit allow for a maximum 1200mm separation.

These items ship with the LARU for providing the RF signaling and communications interface to the LMRU.

Item	Description	Remarks
Power Cable Connection	AC power cable with LMRU connection [1.5 meter, with MIL-5015 type Connector (MS-3106A-18-10S) and Circular Connector (C016_20H003_100_12, by LTW)]	Qty 1
Data Interface Cable Connection	Data Interface cable with LMRU connection Qty 1 [1.5 meter, with IEC 61076-2-101 type Connector (8pin_Female) at both ends]	Qty 1
Coaxial cable	RF interface cable [1.5 meter, with SMA male connector at both ends]	Qty 2

Use the supplied cabling to connect the LMRU to the LARU as shown below.



[Interconnection between LMRU & LARU]

### Ordering Information

- LMRU and LARU common enclosures are available in various configurations based on the type of combiner unit (LCU).
- LRDUs are installed in specified slots per SOLiD guidelines. These guidelines are based on testing for optimal thermal and RF performance.
- Other band combinations are available based on the customer’s requirement.

### Low-power Main Remote Unit (LMRU)

Part Name	Order Description
TR_LMRU_C_AC_C85G18U21L26	ALLIANCE-TR Low-power Main Remote Unit Common - AC (Quad-band_CU_850CEL & GSM1800 & UMTS2100 & LTE2600)
TR_LMRU_C_AC_C85P19L26L26	ALLIANCE-TR Low-power Main Remote Unit Common - AC (Triple+one band_2ANT port_CU_850CEL & 1900PCS & LTE2600+LTE2600)
TR_LMRU_C_AC_G90G18U21L26	ALLIANCE-TR Low-power Main Remote Unit Common - AC (Quad-band_CU_GSM900 & GSM1800 & UMTS2100 & LTE 2600)
TR_LMRU_C_AC_L70AC85P19L26	ALLIANCE-TR Low-power Main Remote Unit Common - AC (Quad-band_CU_LTE700APT & 850CEL & 1900PCS & LTE2600)
TR_LMRU_C_AC_L70AC85P19AWS13	ALLIANCE-TR Low-power Main Remote Unit Common - AC (Quad-band_CU_LTE700APT & 850CEL & 1900PCS & AWS13)

### Low-power Add on Remote Unit (LARU)

Part Name	Order Description
TR_LARU_C_AC_I80G18U21L26	ALLIANCE-TR Low power Add on Remote Unit Common - AC (Quad-band_CU_800IDEN & GSM1800 & UMTS2100 & LTE2600)
TR_LARU_C_AC_L80L80G18L26	ALLIANCE-TR Low power Add on Remote Unit Common - AC (Triple+one band_2 ANT port_CU_ LTE800 + LTE800 & GSM1800 & LTE2600)

**Low-power Remote Drive Unit (LRDU)**

Part Name	Order Description
TR_LRDU_800I	ALLIANCE-TR LRDU module for 800 IDEN
TR_LRDU_850C	ALLIANCE-TR LRDU module for 850 Cellular
TR_LRDU_900	ALLIANCE-TR LRDU module for GSM 900
TR_LRDU_L800	ALLIANCE-TR LRDU module for LTE 800
TR_LRDU_L800_B	ALLIANCE-TR LRDU module for LTE 800 MIMO path
TR_LRDU_1800	ALLIANCE-TR LRDU module for GSM 1800 & LTE 1800
TR_LRDU_1800_B	ALLIANCE-TR LRDU module for LTE 1800 MIMO path
TR_LRDU_U2100	ALLIANCE-TR LRDU module for UMTS 2100
TR_LRDU_U2100_B	ALLIANCE-TR LRDU module for UMTS 2100 & LTE 2100 MIMO path
TR_LRDU_L2600F	ALLIANCE-TR LRDU module for LTE 2600 FDD
TR_LRDU_L2600F_B	ALLIANCE-TR LRDU module for LTE 2600 FDD MIMO path
TR_LRDU_1900P	ALLIANCE-TR LRDU module for 1900 PCS
TR_LRDU_L700A	ALLIANCE-TR LRDU module for LTE 700 APT
TR_LRDU_L700A_B	ALLIANCE-TR LRDU module for LTE 700 APT MIMO Path
TR_LRDU_L700	ALLIANCE-TR LRDU module for LTE 700
TR_LRDU_L700_B	ALLIANCE-TR LRDU module for LTE 700 MIMO Path
TR_LRDU_AWS13	ALLIANCE-TR LRDU module for AWS13
TR_LRDU_AWS13_B	ALLIANCE-TR LRDU module for AWS13 MIMO Path

\*Grayed color module indicates future availability

**Spare Units and Accessories**

Part Name	Order Description
<b>Common Part Spare Units</b>	
TR_LR-OPTIC	ALLIANCE-TR LROU Remote Optic module
TR_LMRU_RCPU	ALLIANCE-TR LMRU Remote Central Processor Unit
TR_LARU_RCPU	ALLIANCE-TR LARU Remote Central Processor Unit
TR_LRPSU_AC	ALLIANCE-TR LROU Power Supply Unit-AC
TR_LRDU_BLK	ALLIANCE-TR LRDU Blank card for port termination
<b>Accessories</b>	
TR_ROU_AC_CA	ALLIANCE-TR ROU AC Power cable, 2m
TR_MRU_FO_CON	ALLIANCE-TR MRU Optical Connector
TR_ARU_AC_CA	ALLIANCE-TR ARU AC Power cable ,1.5m
TR_ARU_Tx_CA	ALLIANCE-TR ARU TX RF Cable,1.5m
TR_ARU_Rx_CA	ALLIANCE-TR ARU RX RF Cable,1.5m
TR_ARU_SI_CA	ALLIANCE-TR ARU Signal Interface Cable, 1.5m



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