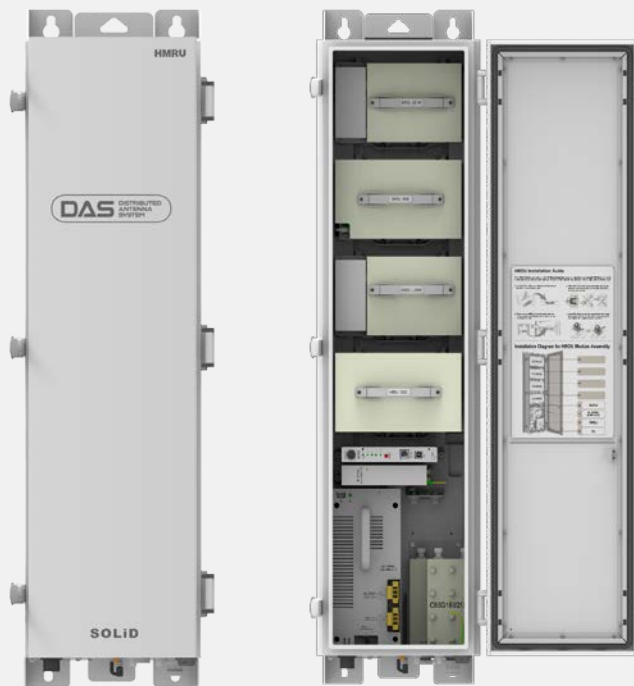


ALLIANCE-TR Multi-Operator DAS High-power Remote Optic Unit (HROU) Product Specifications / Parts List

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 HROU 20W remote optic unit consists of two radio units – High-power Main Remote Unit (HMRU) and High-power Add-on Remote Unit (HARU) – that together support up to 8 bands.

- Multi-operator / multi-service
- Support for up to 8 bands
- +43dBm output power per band
- MIMO supported
- Rugged design. IP66 certified
- Wall or rack mount, indoors or outdoors

Description

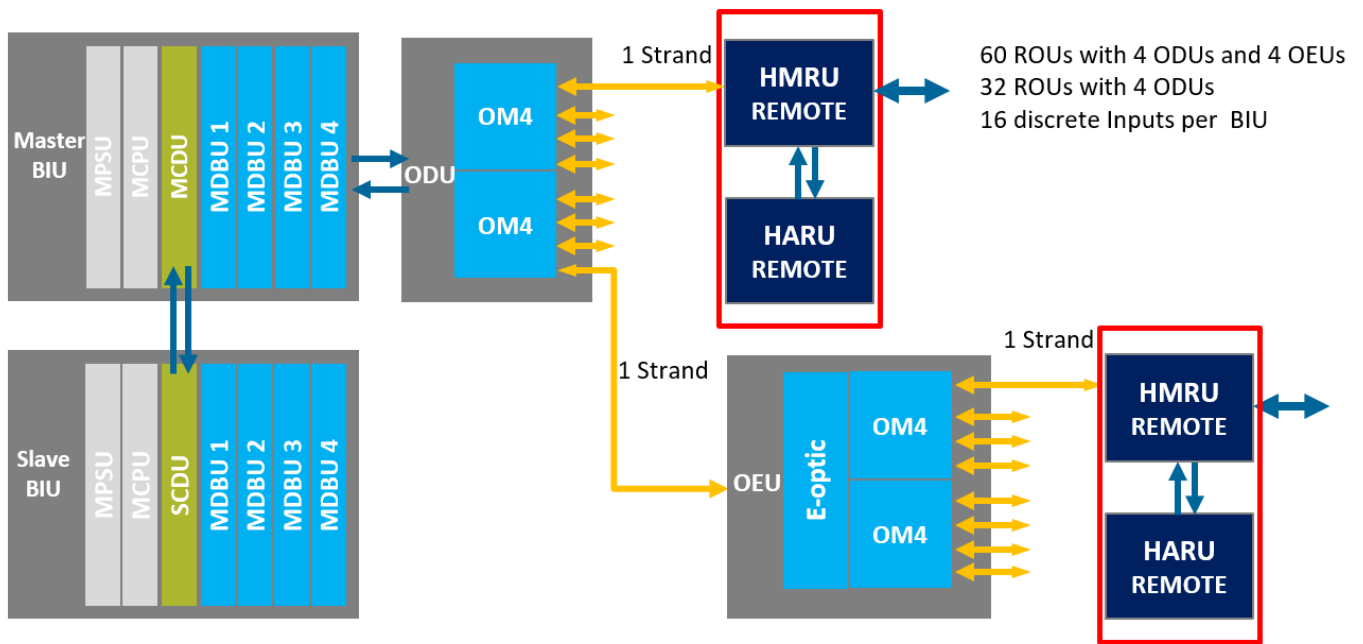
The ALLIANCE-TR High-power Remote Optic Unit (HROU) is a multi-operator, 20W remote unit consisting of two radio units – the main unit (HMRU) and add-on unit (HARU).

The HROU’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.

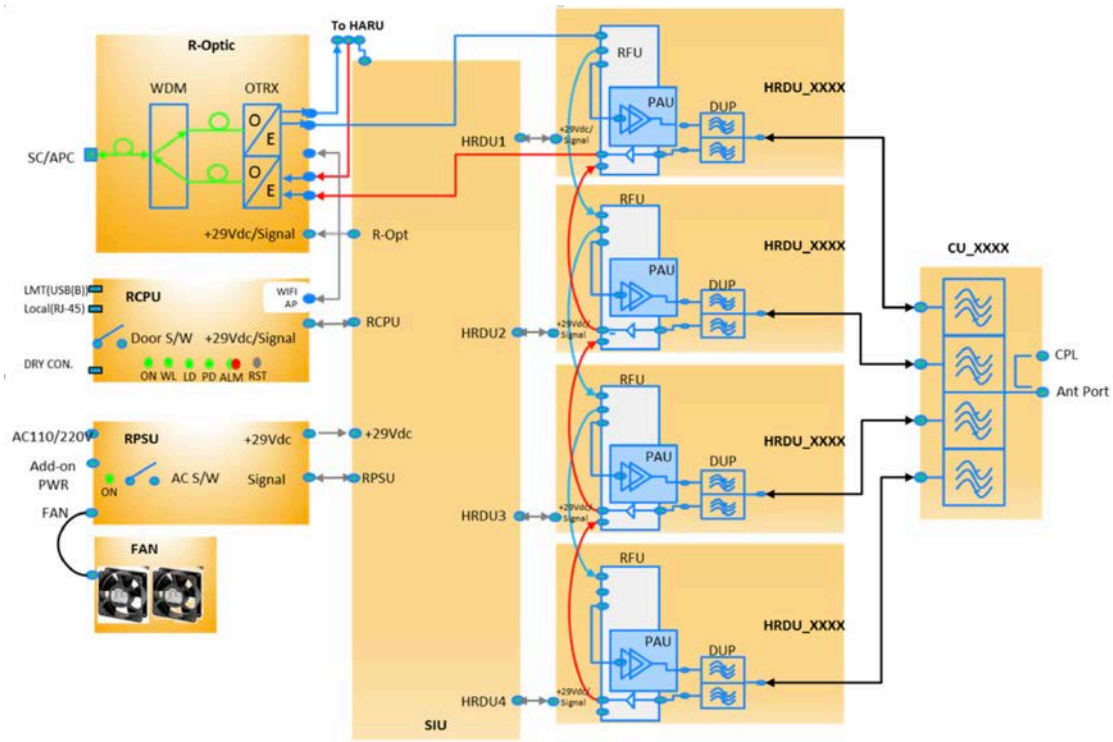
The main unit (HMRU) and optional add-on unit (HARU) together support a maximum of 8 bands. The HMRU connects to the HARU using RF jumper cables included in the product package. The DAS head end transmits optical signals to the HMRU through a WDM-based optical interface. In the HMRU, the R-Optic unit 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

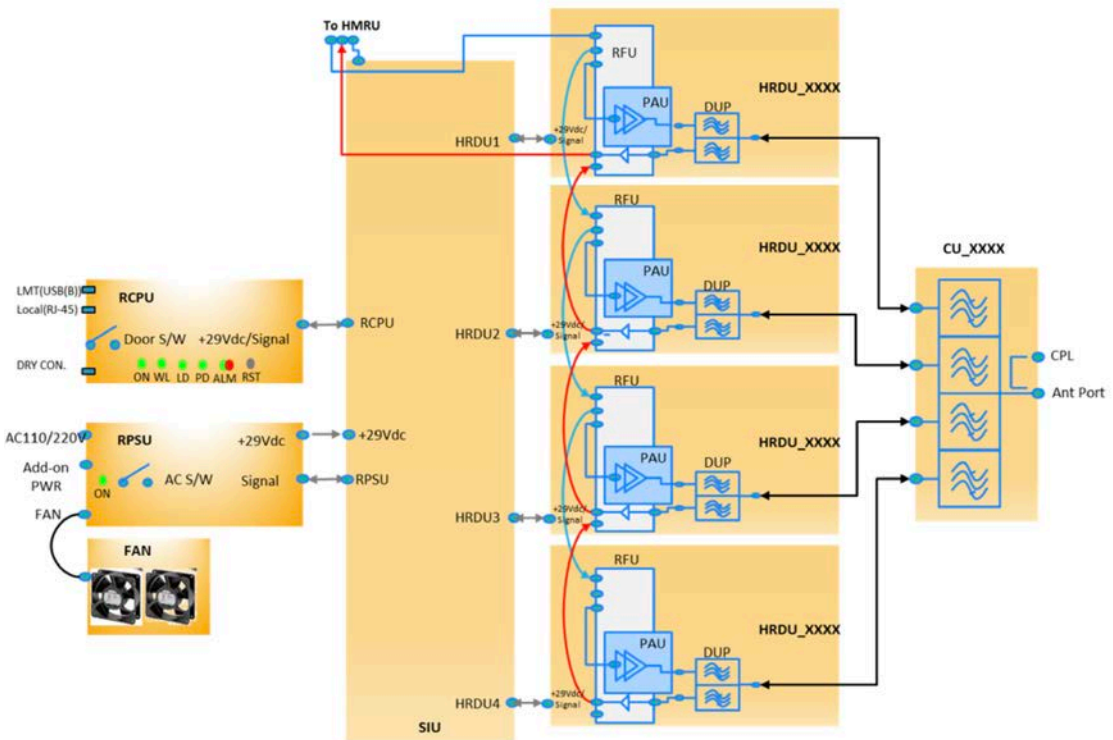
System Configuration



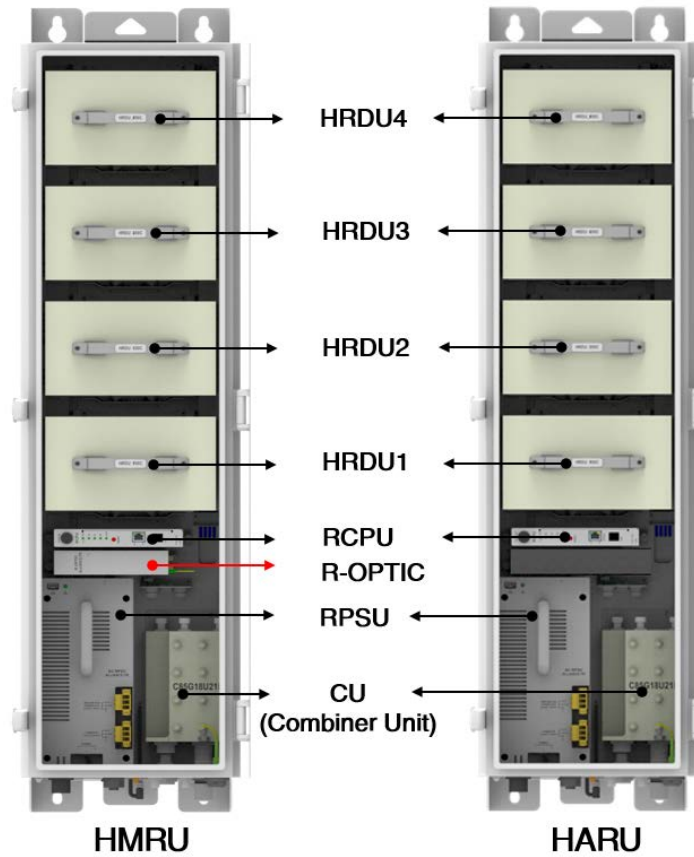
Functional Block Diagram (HMRU)



Functional Block Diagram (HARU)



Parts Description

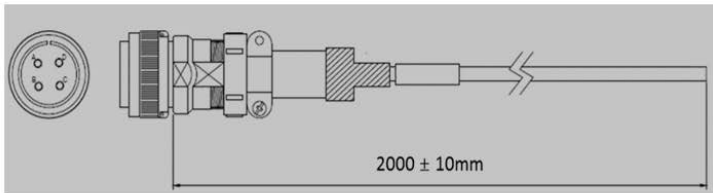


Part	Sub-Unit	Description	Remarks
HROU Common part	R-OPTIC	Remote Optic Converts TX optical signals to RF signals Converts RX RF signals to optical signals Compensates optical loss Communicates with ODU/OEU though Modem	HMRU Only
	RCPU	Remote Central Processor Unit Monitors status of each unit Communicates with BIU/ODU LED indicators show alarm status	Common
	RPSU	Remote Power Supply Unit Input power: 100~240V, Output power: 29V single voltage	Common
	FAN Unit	2 Fans are included	Common
	CU	Combining Unit Combines multiple bands into one antenna port. (Two antenna ports optional)	
	Enclosure	Satisfies IP66; Wall or rack mounting, indoor or outdoor	Common
HRDU_XXXX		High-power Remote Drive Unit Consists of UDCU, PAU and cavity filter Filters and high amplifies TX signals in power amplifier unit Filters and amplifies RX signals in low noise amplifier Remove out-of-band signals through cavity duplexer	Max 4 per chassis

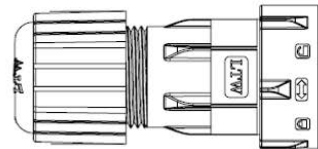
Accessories

Items marked HMRU ship with the main unit. Those marked HARU ship with the add-on unit. Cabling to interconnect the main and add-on unit ships with the add-on.

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



HROU AC Power cable



HMRU Optical Connector



HARU AC Power cable



HARU TX RF Cable



HARU RX RF Cable



HARU Signal Interface Cable

Specifications

General Data

Category		Specification
Downlink output Power		+43dBm 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 5dBo optical loss) 8 dB (5dBo < optical loss \leq 10dBo)
Ripple		\pm 2dB
System Delay	TX	< 12 usec
	RX	< 5 usec
Maximum Power Consumption		Under 700W at full load
HROU Dimension (W x H x D)		320 x 1165 x 260 mm (including mounting bracket)
Maximum Weight		57kg 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 (with Fan unit)
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)	
HRDU_800I	851 - 866	15	43	806 - 821	15	IDEN
HRDU_850C	869 - 894	25	43	824 - 849	25	GSM, EDGE, UMTS, LTE
HRDU_900	925 - 960	35	43	880 - 915	35	GSM, EDGE, UMTS
HRDU_1800	1805 - 1880	75	43	1710 - 1785	75	GSM, EDGE, LTE
HRDU_1800_B	1805 - 1880	75	43	1710 - 1785	75	LTE
HRDU_U2100	2110 - 2170	60	43	1920 - 1980	60	UMTS, LTE
HRDU_U2100_B	2110 - 2170	60	43	1920 - 1980	60	
HRDU_L2600F	2620 - 2690	70	43	2500 - 2570	70	LTE (FDD)
HRDU_L2600F_B	2620 - 2690	70	43	2500 - 2570	70	
HRDU_1900P	1930 - 1995	60	43	1850 - 1915	65	GSM, UMTS, LTE, CDMA
HRDU_L700A	758 - 803	45	43	703 - 748	45	LTE
HRDU_L700A_B	758 - 803	45	43	703 - 748	45	
HRDU_L700	728 - 756	28	43	699 - 716 777 - 787	28	LTE
HRDU_L700_B	728 - 756	28	43	699 - 716 777 - 787	28	
HRDU_L800	791 - 821	30	43	832 - 862	30	LTE
HRDU_L800_B	791 - 821	30	43	832 - 862	30	
HRDU_L2300T	2300 - 2400	100	43	2300 - 2400	100	LTE (TDD)
HRDU_L2300T_B	2300 - 2400	100	43	2300 - 2400	100	
HRDU_L2600T	2570 - 2620	50	TBD	2570 - 2620	50	LTE (TDD)
HRDU_L2600T_B	2570 - 2620	50	TBD	2570 - 2620	50	
TR_HRDU_AWS13	2110 - 2180	70	43	1710 - 1780	70	UMTS, LTE

*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)
High-power Remote Unit Chassis				
HMRU_C_AC	67	31.5	320 x 1165 x 260 mm	29
HARU_C_AC	56	30.5	320 x 1165 x 260 mm	29
Common Part Units				
HMRU_RCPU	10	0.4	200 x 26 x 148	123.9
HARU_RCPU	10	0.4	200 x 26 x 148	123.9
RPSU_AC	40	2.7	140 x 280 x 112	111.8
R-OPTIC	11	1.1	180 x 35 x 125	59.2
HROU_FAN	6	0.4	230 x 32 x 90	-
HRDU_BLK	-	0.2	67 x 175 x 318.2	-
High-power RF Drive Unit (HRDU)				
HRDU_800I	150	4.9	233 x 155 x 143	56
HRDU_850C	150	5.3	233 x 155 x 143	53
HRDU_900	150	5.6	233 x 155 x 148	58
HRDU_1800	150	4.4	233 x 155 x 111	60
HRDU_1800_B	135	5.0	233 x 155 x 120	60
HRDU_U2100	125	3.5	233 x 155 x 98	53
HRDU_U2100_B	145	4.4	233 x 155 x 107	53
HRDU_L2600F	125	4.5	233 x 155 x 120	57
HRDU_L2600F_B	130	5.2	233 x 155 x 129	57
HRDU_1900P	150	4.5	233 x 155 x 131	60
HRDU_L700A	140	5.2	233 x 155 x 148	60
HRDU_L700A_B	145	TBD	TBD	TBD
HRDU_L700	140	5.2	233 x 155 x 148	60
HRDU_L700_B	TBD	TBD	TBD	TBD
HRDU_L800	135	4.8	233 x 155 x 139	60
HRDU_L800_B	140	5.4	233 x 155 x 148	60
HRDU_L2300T	140	4.3	233 X 155 X 95	60
HRDU_L2300T_B	140	4.3	233 X 155 X 95	60
HRDU_L2600T	TBD	TBD	TBD	TBD
HRDU_L2600T_B	TBD	TBD	TBD	TBD
HRDU_AWS13	125	3.5	233 x 155 x 98	53

*Grayed color module indicates future availability

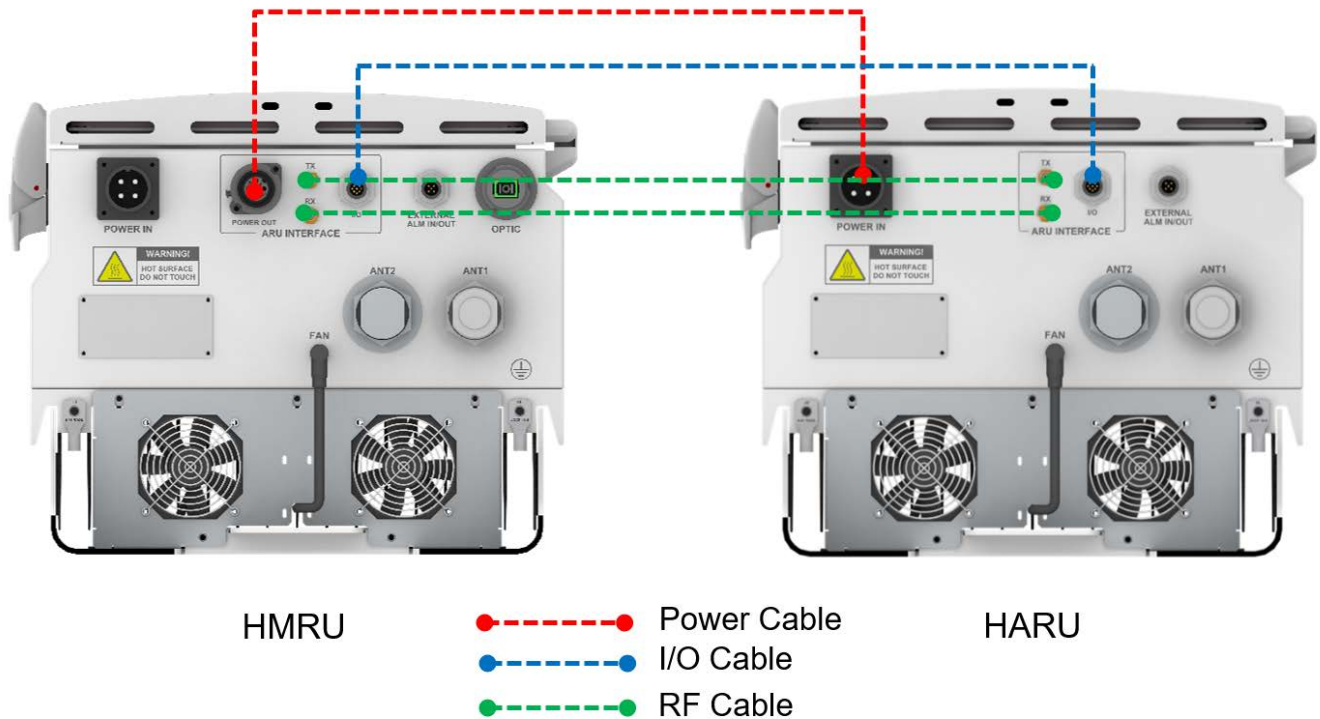
HMRU Connection to HARU

When co-locating the HMRU and HARU, 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 HARU for providing the RF signaling and communications interface to the HMRU.

Item	Description	Remarks
Power Cable Connection	AC power cable with HMRU 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 (I/O) Cable Connection	Data Interface (I/O) cable with HMRU connection [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 HMRU to the HARU as shown below.



[Interconnection between HMRU & HARU]

Ordering Information

- HMRU and HARU common enclosures are available in various configurations based on the type of combiner unit (CU).
- HRDUs 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.

High-power Main Remote Unit (HMRU)

Part Name	Order Description
TR_HMRU_C_AC	ALLIANCE-TR High-power Main Remote Unit Common - AC (Quad-band_w/o CU)
TR_HMRU_C_AC_L70AC85P19A21	ALLIANCE-TR High-power Main Remote Unit Common - AC (Quad-band_CU LTE700APT & 850CEL & 1900PCS & 2100AWS)
TR_HMRU_C_AC_LBG18U21L26	ALLIANCE-TR High-power Main Remote Unit Common - AC (Quad-band_CU_Lowband 700~900MHz & GSM1800 & UMTS2100 & LTE2600)
TR_HMRU_C_AC_LBG18U21L18	ALLIANCE-TR High-power Main Remote Unit Common - AC (Triple+one band_2ANT port_CU_Lowband 700~900MHz & GSM1800 & UMTS2100+LTE1800)
TR_HMRU_C_AC_LBP19L26L26	ALLIANCE-TR High-power Main Remote Unit Common – AC Triple+one band_2ANT port_CU_700~900MHz & GSM1900 & LTE2600+ LTE2600)
TR_HMRU_C_AC_L70AC85P19L26	ALLIANCE-TR High-power Main Remote Unit Common - AC (Quad-band_CU_LTE700APT & 850CEL & 1900PCS & LTE2600)
TR_HMRU_C_AC_G90G18U21C85	ALLIANCE-TR High-power Main Remote Unit Common - AC (Triple+one band_2ANT Port_CU_GSM900 & GSM1800 & UMTS2100 + 850CEL)
TR_HMRU_C_AC_LBP19AWS13L26	ALLIANCE-TR High-power Main Remote Unit Common - AC (Quad-band_CU Lowband 700~900MHz & 1900PCS & AWS13 & LTE2600)
TR_HMRU_C_AC_L70AC85P19AWS13	ALLIANCE-TR High-power Main Remote Unit Common - AC (Quad-band_CU LTE700APT & 850CEL & 1900PCS & AWS13)

High-power Add on Remote Unit (HARU)

Part Name	Order Description
TR_HARU_C_AC	ALLIANCE-TR High-power Add on Remote Unit Common - AC (Quad-band_w/o CU)
TR_HARU_C_AC_LBG18U21L26	ALLIANCE-TR High-power Add on Remote Unit Common - AC (Quad-band_CU_Lowband 700~900MHz & GSM1800 & UMTS2100 & LTE2600)

High-power Remote Drive Unit (HRDU)

Part Name	Order Description
TR_HRDU_800I	ALLIANCE-TR HRDU module for 800 IDEN
TR_HRDU_850C	ALLIANCE-TR HRDU module for 850 Cellular
TR_HRDU_900	ALLIANCE-TR HRDU module for GSM 900
TR_HRDU_1800	ALLIANCE-TR HRDU module for GSM 1800 & LTE 1800
TR_HRDU_1800_B	ALLIANCE-TR HRDU module for LTE 1800 MIMO path
TR_HRDU_U2100	ALLIANCE-TR HRDU module for UMTS 2100
TR_HRDU_U2100_B	ALLIANCE-TR HRDU module for UMTS 2100 & LTE 2100 MIMO path
TR_HRDU_L2600F	ALLIANCE-TR HRDU module for LTE 2600 FDD
TR_HRDU_L2600F_B	ALLIANCE-TR HRDU module for LTE 2600 FDD MIMO path
TR_HRDU_1900P	ALLIANCE-TR HRDU module for 1900 PCS
TR_HRDU_L700A	ALLIANCE-TR HRDU module for LTE 700 APT
TR_HRDU_L700A_B	ALLIANCE-TR HRDU module for LTE 700 APT MIMO Path
TR_HRDU_L700	ALLIANCE-TR HRDU module for LTE 700
TR_HRDU_L700_B	ALLIANCE-TR HRDU module for LTE 700 MIMO Path
TR_HRDU_L800	ALLIANCE-TR HRDU module for LTE 800
TR_HRDU_L800_B	ALLIANCE-TR HRDU module for LTE 800 MIMO path
TR_HRDU_L2300T	ALLIANCE-TR HRDU module for LTE 2300 TDD
TR_HRDU_L2300T_B	ALLIANCE-TR HRDU module for LTE 2300 TDD MIMO path
TR_HRDU_L2600T	ALLIANCE-TR HRDU module for LTE 2600 TDD
TR_HRDU_L2300T_B	ALLIANCE-TR HRDU module for LTE 2600 TDD MIMO path
TR_HRDU_AWS13	ALLIANCE-TR HRDU module for AWS13

*Grayed color module indicates future availability

Spare Units and Accessories

Part Name	Order Description
Common Part Spare Unit	
TR_R-OPTIC	ALLIANCE-TR HROU Remote Optic module
TR_HMRU_RCPU	ALLIANCE-TR HMRU Remote Central Processor Unit
TR_HARU_RCPU	ALLIANCE-TR HARU Remote Central Processor Unit
TR_RPSU_AC	ALLIANCE-TR HROU Power Supply Unit-AC
TR_HROU_FAN	ALLIANCE-TR HROU FAN Unit
TR_HRDU_BLK	ALLIANCE-TR HRDU Blank card for port termination
Accessories	
TR_HROU_AC_CA	ALLIANCE-TR HROU AC Power cable, 2m
TR_HMRU_FO_CON	ALLIANCE-TR HMRU Optical Connector
TR_HARU_AC_CA	ALLIANCE-TR HARU AC Power cable ,1.5m
TR_HARU_Tx_CA	ALLIANCE-TR HARU TX RF Cable,1.5m
TR_HARU_Rx_CA	ALLIANCE-TR HARU RX RF Cable,1.5m
TR_HARU_SI_CA	ALLIANCE-TR HARU Signal Interface Cable, 1.5m

External Combiners

Part Name	Order Description
TR_ECU_G90G18U21L23TL26T	ALLIANCE-TR HROU External Combiner Unit (GSM90 & GSM1800 & UMTS2100 + LTE2300TDD & L2600TDD)
TR_ECU_G18L23TL26T	ALLIANCE-TR HROU External Combiner Unit (GSM1800 + LTE2300TDD & L2600TDD)
TR_ECU_C85G90G18U21	ALLIANCE-TR HROU External Combiner Unit (850CEL + GSM900 & GSM1800 & UMTS2100)



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