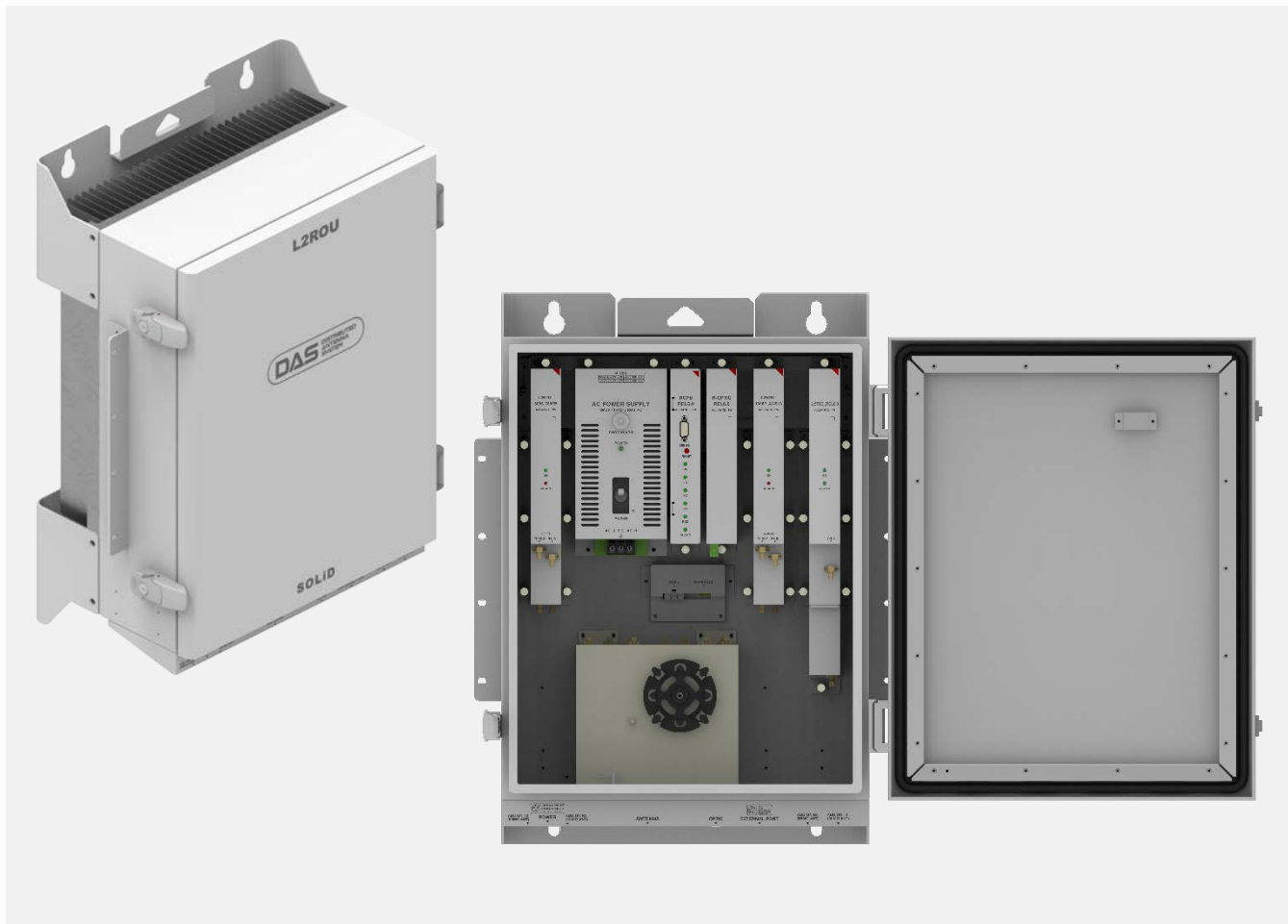


ALLIANCE Multi-Operator DAS
 Low-power 2W Remote Optic Unit (L2ROU)
Product Specification / Parts List



ALLIANCE 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.

Modular design means lower operational costs and unparalleled RF performance, cost efficiency and flexibility.

Rugged construction meets the latest fire codes and requirements for harsh environmental conditions.

- Guaranteed RF power control
- 4G certified
- 7 bands on a single fiber
- IP65 compliant, NEMA 4 certified, UL labeled
- Quality checked and fully bench tested
- Simplified installation, commissioning, management
- Rack or wall, indoor or outdoor mounting
 Convection cooled. Optional fan unit available

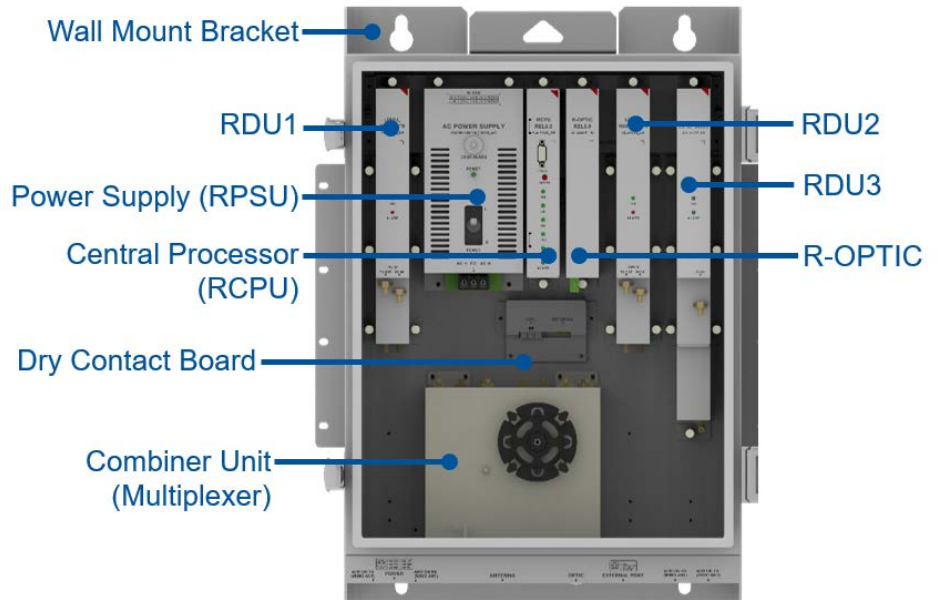
Operation

SOLiD's Low-power 2W Remote Optic Unit (L2ROU) is designed for the ALLIANCE DAS and can be mixed with other ALLIANCE remote units (1W, 5W, and 20W) in a single system all driven by a common head end.

The 2W remote unit delivers 33dBm output power per band at the antenna port for the 700LTE, 800 (Sprint), 850C, 1900P, 2100AWS bands. For 2.5TDD band, output power is 32dBm, and for UHF/VHF bands output power is 24dBm.

This highly efficient, small footprint unit can support up to six bands simultaneously. An Add-on Remote unit (AOR) can also be connected to the L2ROU to support additional RF services, like VHF/UHF.

The L2ROU enclosure incorporates a rugged, yet compact NEMA 4 design. The unit can be rack or wall mounted, indoors or outdoors. A Dry Contact Relay can be used for input alarms from external units, like battery backup systems, which is becoming a requirement for many deployments.

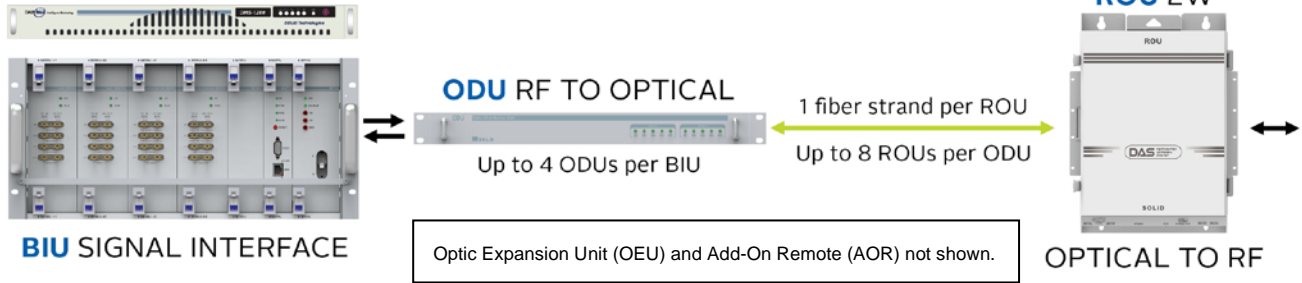


Unit Name	Unit Description
2W Remote Optic Unit (L2ROU)	Enclosure with RCPU, AC or DC power supply, and multiplexer
Add-on Remote (AOR)	Enclosure with AC or DC power (For VHF/UHF or 2300 or 2500. Not pictured.)
Remote Drive Unit (RDU) (up to 3)	Filter and amplify TX and RX signals Remove out-of-band signals through Bandpass Filtering (BPF). (BPF is excluded from VHF+UHF module but external BPF can be connected before antenna.)
R Optic Unit	RF to Optic / Optic to RF conversion
Power Supply (RPSU)	AC: 100 to 240V. DC: -42 to -56V
R-Optic Remote Optic Module (R-Optic)	Converts downlink optical signals to RF. Converts uplink RF signals to optical. Communicates with BIU/eBIU via FSK modem Optical link between eODU and ROU: 10dBo for 1-port optic module; 5dBo for 4-port unit Fiber Connector: SC/APC. Fiber Type: Single Mode Fiber
Central Processor Unit (RCPU)	Monitors and controls each module of the L2ROU Receives and analyzes communication data from the R-Optic modules and reports status to headed devices through FSK modem communication RS-232 port for connecting management PC
Multiplexer	Combine TX signals from 3 RDUs and sends to single antenna port Distributes RX signals to RDUs Connections between Multiplexer / RDU come pre-installed from the SOLiD facility.
Dry Contact Relay Sub Board	Used for input alarms from external units, like battery backup systems
External Fan Unit (Optional)	Provides additional cooling, if required, for high temp installations. The fan unit turns on/off automatically based on operator-defined temperature settings. The power connection for the fan unit is through the AOR port of L2ROU.

For the downlink signal path, the ROU receives optical signals from the optic modules (either iOMs or DOUs) and converts them to RF signals in the Remote Optic (R-Optic) module. The signals move to the Remote Drive Units (RDUs) where they are amplified and filtered to remove out-of-band signals. A multiplexer in the remote unit combines RF signals from multiple RDUs and then delivers them to a single antenna port. The process is reversed for the uplink path.

With the DMS-1200, the technician can monitor and control the operation of each LROU

DMS MANAGEMENT SYSTEM



Slot Configurations

Recommended configurations have been tested for thermal and RF performance.

2W L2RDU	Recommended Configurations
RDU1 (Left most)	1900_AWS13 or 8085_700FB
RDU2 (Middle)	1900_AWS13 or 8085_700FB
RDU3 (Right most)	2500 or 2300 or 1900_AWS13 or 8085_700FB
Add on Remote	VHF/UHF or 2300 or 2500.

Specifications

Frequency Band	Downlink (TX)		Uplink (RX)	
	Frequency (MHz)	Bandwidth (MHz)	Frequency (MHz)	Bandwidth (MHz)
700LTE	729-756	28	699-716 / 777-787	18 / 10
800 Sprint + 850C	862-894	32	817-849	32
1900PCS	1930-1995	65	1850-1915	65
AWS 1+3	2110-2180	70	1710-1780	70
2300 WCS	2350-2360	10	2305-2315	10
2500TDD LTE	2496.8-2690	Lower Band: 71.2 Middle Band: 37.8 Upper Band: 71.2	2496.8-2690	Lower Band: 71.2 Middle Band: 37.8 Upper Band: 71.2
2600 FDD	2620-2690	70	2500-2570MHz	70
VHF	136-174	38	136-174	38
UHF	B1: 380-434 B2: 396-450 B3: 450-512	54 54 62	B1: 380-434 B2: 396-450 B3: 450-512	54 54 62

NOTES: For 2500 services and UHF, the operator sets the sub-band using management software. VHF/UHF may require AOR depending on configuration.

RF Parameters		VHF / UHF	700LTEF	800 Sprint / 850C	1900P
Input Power	TX	LPOI: -10 to +20 dBm		LPOI: -10 to +20 dBm. HPOI: +15 to +43 dBm each port	
	RX	AOR: ≤ -54 dBm		L2ROU: -50 dBm max	
Output Power	TX	24dBm	24dBm	33 dBm	
	RX	-4 dBm		-4 dBm	
System Gain	TX	39 dB		53 dB	
	RX	34 to 50 dB		30 to 50 dB	
Gain Control	TX	Gain Control Range: For the remote unit TX: 30 dB/step 0.5dB			
System Delay	TX	< 2 μs	< 8 μs	< 8 μs	< 8 μs
	RX	< 2 μs	< 8 μs	< 8 μs	< 8 μs
EVM (Max)	(TX %)	NA	2%	1.5%	2.2%
Noise Figure (Max)	RX	7 dB	5.1 dB	5.3 dB	5.3 dB
VSWR		1.7:1 max at each band In / Out ports			
Spurious	TX	Spurious Emissions: ≤ -13 dBm @ 9kHz to 5GHz			
Nominal Impedance		50 ohm			

RF Parameters		2100 AWS 1+3	2300 WCS	2500TDD
Input Power	TX	LPOI: -10 to +20 dBm. HPOI: +15 to +43 dBm each port		
	RX	L2ROU: ≤ -50 dBm max		
Output Power	TX	33 dBm		32 dBm
	RX	-3 dBm		-23 dBm
System Gain	TX	53 dB		52 dB
	RX	30 to 50dB		10 to 30 dB
Gain Control	TX	Gain Control Range: For the remote unit TX: 30 dB/step 0.5 dB		
System Delay	TX	< 8 μs	< 1 μs	< 0.5 μs
	RX	< 8 μs	< 4 μs	< 1.5 μs
EVM	(TX %)	2.2%	1%	2.5%
Noise Figure (Max)	RX	3.6 dB	4.6 dB	5 dB
VSWR		1.7:1 max at each band In / Out ports		
Spurious	TX	Spurious Emissions: ≤ -13 dBm @ 9kHz to 5GHz		
Nominal Impedance		50 ohm		

NOTES

TX Input power refers to the DAS headend.
 TX Output power is measured at the antenna port.
 TX Output power for VHF/UHF module is 24dBm per band.
 TX and RX Output power is ± 0.5dB.
 Noise figure represents system noise and tested with one remote connected.
 Add 2dB to Noise figure when using Optic Expansion Unit (OEU) or 1-port optic modules.
 System delay excludes fiber optic delay.
 Additional gain control available at head end including uplink gain control.
 TX system gain for VHF/UHF is 39dB when input power is -15dBm.

Specifications (continued)

Mechanical	Specification
Mounting Type	Wall or Rack Mounting (fits standard 19" rack. 14U height)
Connectors	Antenna port type: 4.3-10 DIN. Fiber Connectors: SC/APC for connection to eODU or OEU
Craft Port	Serial interface RS-232 9-pin D-sub Male for connecting management PC (on CPU)
In / Output Port Type	N Female for connecting AOR add-on unit
Power Consumption	240W (using these bands: 700LTE, 850IC, 1900P, AWS13 and 2500TDD)
Dimensions	19"W x 24.87"H (14U) x 10.57"D (482.6mm x 630mm x 268.5mm) Includes wall mount bracket, which can be removed as needed.
Weight	~45kg

Optical	Specification	
Connector at R-Optic Module	RF	SMA FEMALE / 50ohm SMA PUSH MALE / 50ohm
	Optic	SC / APC (Step Ferrule)
	Power/Signal	D-SUB 3 row 15PIN MALE
Laser Diode	1550nm (Coaxial Type)	
Photo Diode	1310nm	
Optic Loss	Max 5dBo (4-port optic module); Max 10dBo (1-port optic module)	

Environmental	Specification
Environmental & IP Rating	IP65 Compliant, NEMA 4
Operating Temperature (°C)	-10° to 50°C
Operating Humidity	5 to 90% non-condensing

Regulatory	Specification
Type Approval & Certification	UL (UL60950-1), FCC
EMC	FCC Part15 compliant

Ordering Information / Part Numbers

2W L2ROU, RDU Amplifiers, AOR Add-On Remote	Part Number
2 WATT Remote Optical Unit Chassis - AC Power	L2ROU_C_AC
2 WATT Remote Optical Unit Chassis - DC Power	L2ROU_C_DC
Blank Amplifier Module for 2W MROU	L2ROU_B
2 WATT 1900MHz & 2100/1700Mhz AWS Amplifier Module (AWS 1+3)	L2RDU_1900P_AWS13
2 WATT 800MHz Sprint, 850MHz Cellular & 700MHz Full Band Amp Module	L2RDU_8085_700FB
2 WATT 2300MHz Amplifier Module	L2RDU_2300_WCS
2 WATT 2500 MHz TDD Amplifier module; 60MHz contiguous bandwidth	L2RDU_2500_60TDD
Fan Tray Kit for LROU and L2ROU	FAN_TRAY
1W/2W Alarm Cable ROU-to-AOR cable with external alarm input pigtail	CBL_AOR_ALM
1W/2W Alarm Cable ROU cable with external alarm input pigtail	CBL_ROU_ALM
150MHz VHF & 450MHz UHF Amplifier Module (UHF Sub-band: B2, B3)*	RDU_150_450
380MHz VHF & UHF Amplifier Module (Military Band) (UHF Sub-band: B1, B3)*	RDU_E_VHF_UHF
NOTES: This table only lists parts specific to the LROU and AOR but not all parts available for ALLIANCE DAS. *Refer to Specifications table above for details on UHF sub-band B1, B2, & B3.	



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