ALLIANCE Multi-Operator DAS

5W Mid-Power Remote Optic Unit (MROU)

Product Specification / Parts List

ALLIANCE is a multi-operator DAS solution that offers public safety, 2-way radio and commercial wireless services all from a common head end and delivered over a single fiber.

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
- Support for 7 individual bands on a single fiber
- 4G certified, MIMO capable. One system delivers 150MHz to 3GHz
- IP66, NEMA 4 certified / UL labeled
- Quality checked and fully bench tested
- Easy install, commissioning and management
- Wall / pole / rack mounting
- Convection cooled. Optional fan unit available

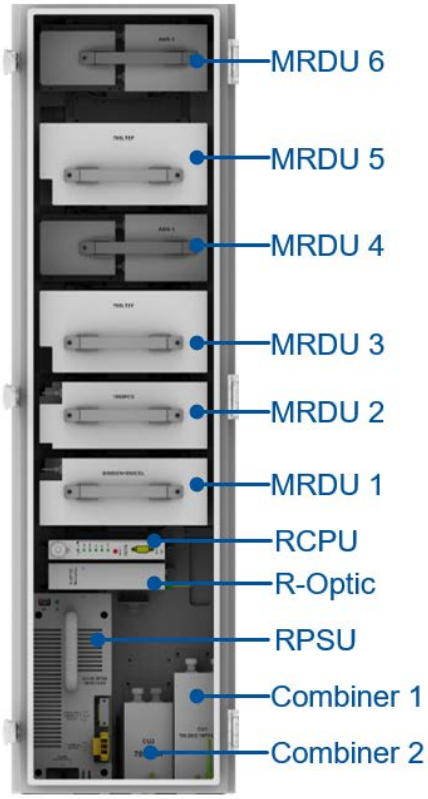
Operation

SOLiD's 5W Mid-Power Remote Optic Unit (MROU) is designed for the ALLIANCE Release 6 DAS and can be mixed with other ALLIANCE remote units (1W, 2W, and 20W) in a single system all driven by a common head end.

The 5W MROU delivers +37 dBm of output power per band at the antenna port for all commercial bands. For VHF/UHF Public Safety bands, output power is +24 dBm.

This highly efficient, small footprint unit can support up to seven bands simultaneously. An Add-on Remote unit (AOR) can also be connected to support VHF/UHF.

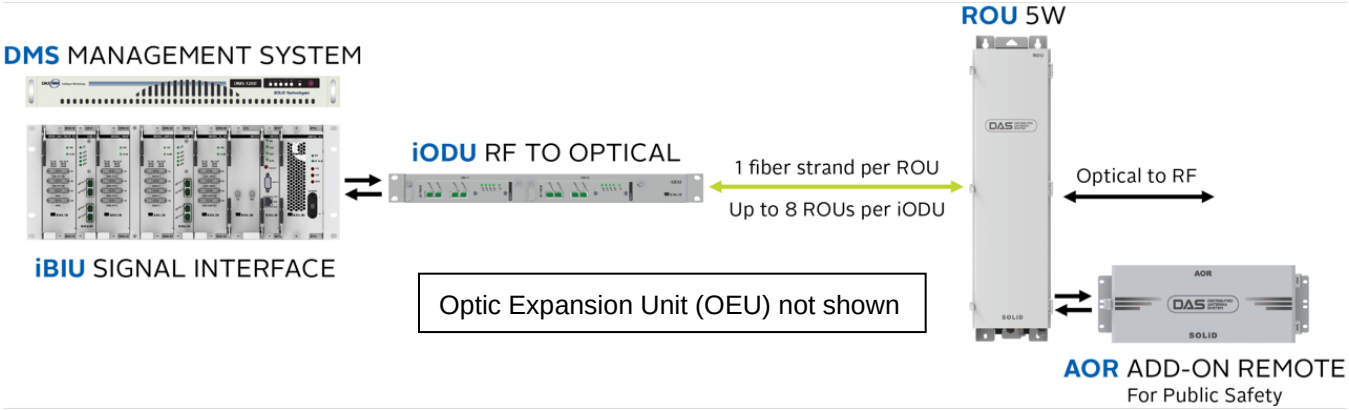
The MROU enclosure incorporates a rugged, but compact NEMA 4 design. The unit can be rack or wall mounted, indoors or outdoors. An external alarm port on the bottom of the enclosure can accept input alarms from connected equipment like battery backup systems.



Unit Name	Description
5W Remote Optic Unit (MROU)	Enclosure including RCPU, RPSU_AC or DC, Multiplexer, R-Optic
Add-on Remote (AOR)	An optional add-on enclosure (not shown in figure above), AC or DC power. For the MROU, the AOR is only used to support VHF/UHF.
Remote Power Supply Unit (RPSU)	AC: 100 to 240V. DC: -42 to -56V
Remote Central Processor Unit (RCPU)	Controls and monitors signal of each unit RS-232 port for connecting management PC
Mid-power Remote Drive Unit (MRDU)	Filters and amplifies downlink / uplink signals 5W enclosure supports up to 6 single or dual band RDUs
R-Optic Remote Optic Module (R-Optic)	Converts downlink optical signals to RF and uplink RF signals to optical Compensates for optical loss Communicates with iBIU/OEU via FSK modem Optical link between iODU and ROU: 10dBo for 1-port Donor Optic Unit; 5dBo for 4-port Donor Optic Unit. Fiber Connector: SC/APC Connector. Fiber Type: Single Mode Fiber
Combiner (1 and 2)	Combines TX signals from RDUs and sends to single antenna port Distributes RX signals to RDUs. Second combiner is required for MIMO.
External Fan Unit (Optional)	Turns on/off automatically based on operator-defined temperature settings
Input System Interface Unit (SIU)	Input SIU distributes power and signals to each module
Output System Interface Unit (SIU)	Output SIU interfaces with multiplexer

For the downlink signal path, the MROU 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 (MRDUs) where they are amplified and filtered to remove out-of-band signals. A multiplexer in the remote unit combines RF signals from multiple MRDUs 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 MROU.



Slot Configurations

5W MROU	Recommended Configurations	Notes
MRDU6 (Top most)	AWS_B or 2300 or 900 or 2500	Default cabling for this slot is routed to 2300 port on CU4.
MRDU5	700LTE_B or 700PS/800PS or 2500 or 2300	700PS/800PS and 700 LTE_B limited to slot 5 because of size. Default cabling for this slot is routed to 2500 port on CU4.
MRDU4	AWS_A only	
MRDU3	700LTE_A only	
MRDU2	1900P only	
MRDU1 (Bottom most)	800Sprint/850C only	
Add-on Remote (AOR)	VHF/UHF	For the 5W MROU, the AOR is only used to support VHF/UHF

Integrated Combiners / External Filter Set

The MROU can accept up to two internal combiners. Multiple combiner options are available (see the parts list on the last page of this data sheet). Combiners are installed in the MROU at the SOLiD facility prior to shipping based on the configuration requested by the operator. These can also be changed out in the field as necessary.

SOLiD offers an external filter set engineered specifically to work with its ALLIANCE 5W remote units (MROUs). This filter set provides sufficient noise and carrier rejection to allow both cellular and public safety DAS networks to operate in close proximity without degradation.

See the document *SOLiD Operations Guide - ALLIANCE REL6* for more details on Integrated Combiners and the External Filter Set.

Specifications

Frequency Band	Downlink (TX)		Uplink (RX)	
	Freq (MHz)	BW (MHz)	Freq (MHz)	BW (MHz)
700LTE Full Band	729-756	27	699-716 / 777-787	17 / 10
700LTE Full Band+FirstNet	729-768	39	699-716 / 777-798	17 / 21
700PS (Incl. FirstNet)	758-775	17	788-805	17
800PS	851-860	9	806-815	9
800 Sprint / 850C	862-894	32	817-849	32
900 ISM	923-928	5	902-919	17
900 SMR / Paging	929-941	12	896-902	6
1900PCS	1930-1995	65	1850-1915	65
2300WCS	2350-2360	10	2305-2315	10
AWS 1+3	2110-2180	70	1710-1780	70
2500TDD LTE	2496.8-2690	LB: 71.2 MB: 37.8 UB: 71.2	2496.8-2690	LB: 71.2 MB: 37.8 UB: 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 services require the Add-On Remote (AOR)				

RF Parameters		VHF/UHF	700LTEF	700PS/800PS	800Sprint/850C	900SMR/Paging
Input Power	TX	LPOI: 10 to +20 dBm	LPOI: -10 to +20 dBm. HPOI: +15 to +43 dBm each port			
	RX	AOR: ≤ -54 dBm	MROU: -50 dBm max			
Output Power	TX	24 dBm24dBm	37 dBm			
	RX	-4 dBm	-3 dBm			
System Gain	TX	39 dB	57dB max		60 dB max	57 dB max
	RX	34 to 50dB	30 to 50 dB			
Gain Control	TX	Gain Control Range: For the remote unit TX: 30 dB/step 0.5 dB				
System Delay	TX	< 2 µs	< 8 µs			
	RX	< 2 µs	< 8 µs			
EVM	(TX %)	NA	1.5%	1.3%	1.5%	1.3%
Noise Figure	RX	7.0 dB max	4.2 dB max	6 dB max	3.4 max	6 dB max
VSWR		1.8:1 max at each band In / Out ports				
Spurious	TX	Spurious Emissions: ≤ -13 dBm @ 9kHz to 5GHz				
Nominal Impedance		50 ohm				

RF Parameters		1900P	2100 AWS 1+3	2300 WCS	2500TDD	2600FDD
Input Power	TX	LPOI: -10 to +20 dBm. HPOI: +15 to +43 dBm each port				
	RX	MROU: -50 dBm max				
Output Power	TX	37 dBm	38 dBm	37 dBm		
	RX	-3 dBm			-23 dBm	
System Gain	TX	57 dB max				
	RX	30 to 50 dB			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	< 1.5 µs	< 1 µs
	RX	< 8 µs		< 4 µs	< 1.5 µs	< 3 µs
EVM	(TX %)	1.6%	1.5%	0.9%	1.8%	2.3%
Noise Figure	RX	4.5 dB max	3.9 dB max	5.4 dB max	5.6 dB max	6 dB max
VSWR		1.8:1 max at each band In / Out ports				
Spurious	TX	Spurious Emissions: ≤ -13 dBm @ 9kHz to 5GHz				
Nominal Impedance		50 ohm				

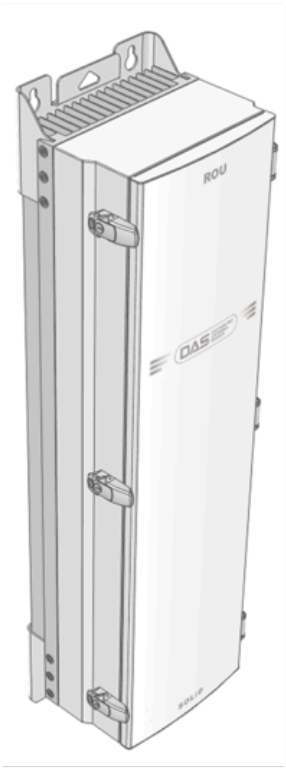
NOTES: When operating both 800 Sprint and 850C, output power is 37dBm each band. When operating only one band, output power is 40dBm.
TX Output power for VHF/UHF module is 24dBm per band.
TX system gain for VHF/UHF is 39dB when input power is -15dBm.TX Input power refers to the DAS headend.
TX Output power is measured at the antenna port.
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.

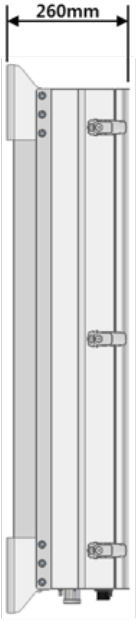
Optical	Specification	
Connector at R-Optic Module	RF	SMA FEMALE / 50ohm SMA PUSH MALE / 50ohm
	Optic	SC / APC (Step Ferrule)
	Power/Signal	D-SUB 3 row 15PIN MALE
Laser Diode / Photo Diode	1550nm (Coaxial Type) / 1310nm	
Optic Loss	Max 5dBo (4-port optic module); Max 10dBo (1-port optic module)	

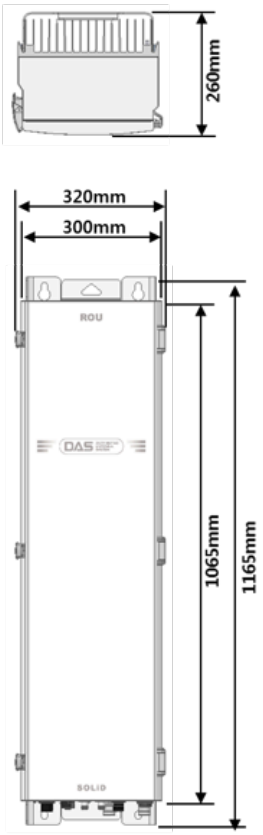
Environmental	Specification
Ingress Protection	IP66 Compliant, NEMA 4
Operating Environment	Temp: -13 to 131°F / -25 to +55°C. Humidity: 0% to 90% Non-condensing

Regulatory	Specification
UL (North America)	UL 60950-1, 2nd Edition CSA C22.2 No. 60950-1-07, 2nd Edition, CSA C22.2 No. 60950-1-03, 1st Edition
FCC (North America)	FCC Part24 Subpart D and Part90 Subpart I FCC Part22 Subpart H and Part 27 Subpart C FCC Part24 Subpart E and Part 27 Subpart C
IC (Canada)	RSS-131 (ISSUE 2), ICES-003
Emissions (North America)	FCC Part15 Subpart B, Class A
MTBF (Telcordia SR-332 Issue 2)	Failure Rate = 11,971 MTBF = 9.54 Years

Mechanical	Specification
Mounting Type	Wall, pole or rack mounting (fits standard 19” rack with optional bracket). Indoor or outdoor mounting
Connectors	Optical Ports: SC-APC (Single Mode Fiber) RF Antenna Port: 7/16 DIN-Female for antenna ports 1 and 2 In / Output Port (to AOR for VHF/UHF): N-Female
Craft Port	Serial interface RS-232 9-pin D-sub Male, to connect management PC (on CPU)
Monitoring Port	-40dB (SMA Female) TX Output Only
Power Consumption	475 W Fully loaded (6 MRDUs) covering bands: 700/800/850/1900/2100/2300/2500. Total power consumption will vary depending on band configuration.
Dimensions (WxHxD)	12.6” x 45.9” x 10.2” (320 x 1165 x 260 mm) includes wall mount bracket
Weight	137 lbs. (62 kg) Fully Loaded







Part Numbers

MROU – MRDUs and Combiners	Part Number
5 WATT Remote Optical Unit Chassis - AC Power	MROU_C_M_AC
5 WATT Remote Optical Unit Chassis - DC Power	MROU_C_M_DC
5 WATT Remote Optical Unit Chassis - AC Power w/ MROU_CU1 combiner for MIMO configs	MROU_C_M_AC_CU1
5 WATT Remote Optical Unit Chassis - DC Power w/ MROU_CU1 combiner for MIMO configs	MROU_C_M_DC_CU1
5 WATT 700MHz Amplifier Module (Includes FirstNet)	MRDU_700LTE_FN
5 WATT 700MHz Amplifier Module	MRDU_700LTEF
5 WATT 700MHz Full Band Amp Module; Channel B for MIMO	MRDU_700LTEF_B
5 WATT 700MHz and 800MHz Amplifier Module (Includes FirstNet)	MRDU_700PS_800PS
5 WATT 800MHz & 850MHz Amplifier Module	MRDU_800I_850C
5 WATT 900MHz Amp Module **Allow 8-12 weeks for delivery	MRDU_900I
5 WATT 1900MHz Amplifier Module	MRDU_1900P
5 WATT 1900MHz Amplifier Module; Channel B for MIMO	MRDU_1900P_M
5 WATT 2100MHz Amplifier Module (AWS1+3)	MRDU_AWS13
5 WATT AWS Amplifier Module; Channel B for MIMO Applications	MRDU_AWS13_M
5 WATT 2500 MHz TDD Amp Module; 60MHz contiguous bandwidth	MRDU_2500_60TDD
5 WATT 2500 MHz TDD Amplifier Module; 60MHz contiguous bandwidth. MIMO	MRDU_2500_60TDD_M
5 WATT 2300MHz WCS Amplifier Module	MRDU_2300_WCS
5 WATT 2600MHz FDD Amplifier Module	MRDU_2600_FDD
Blank Amplifier Module for 5W MROU	MROU_B
5 WATT Combiner Unit 700LTE, 850IC, 1900P, AWS13 and 2500/2600	MROU_CU1
5 WATT Combiner Unit for 700/AWS1, use with MIMO configurations	MROU_CU2
5 WATT Combiner Unit for 700PS, 800PS and 900MHz	MROU_CU3
5 WATT Combiner Unit, 7-band: 700LTE, 850IC, 1900P, 2100(AWS1+3), 2.5TDD, 2.3 WCS	MROU_CU4
5 WATT Combiner Unit, Dual Band 2500/2600 & 1900 PCS, for use with MIMO configs	MROU_CU5
5 WATT Combiner Unit, Tri-Band 700/1900/AWS13, for MIMO configs (replaces MROU_CU2)	MROU_CU6
External Fan-Tray assembly for 5 Watt MROU chassis	MROU_FAN_TRAY
External Cellular Passband, Public Safety Reject Filter for 5W Remotes	MROU_EF1
External Public Safety Passband, Cellular Reject Filter for 5W Remotes	MROU_EF2

SOLiD Gear, Inc.
800 Klein Road, Suite 200
Plano, TX 75074
PHONE: 888.409.9997
EMAIL: sales@solid.com
WEB: www.solid.com

TL9000 H,V: R5.5/R5.0 ISO9001 CERTIFIED ISO14001