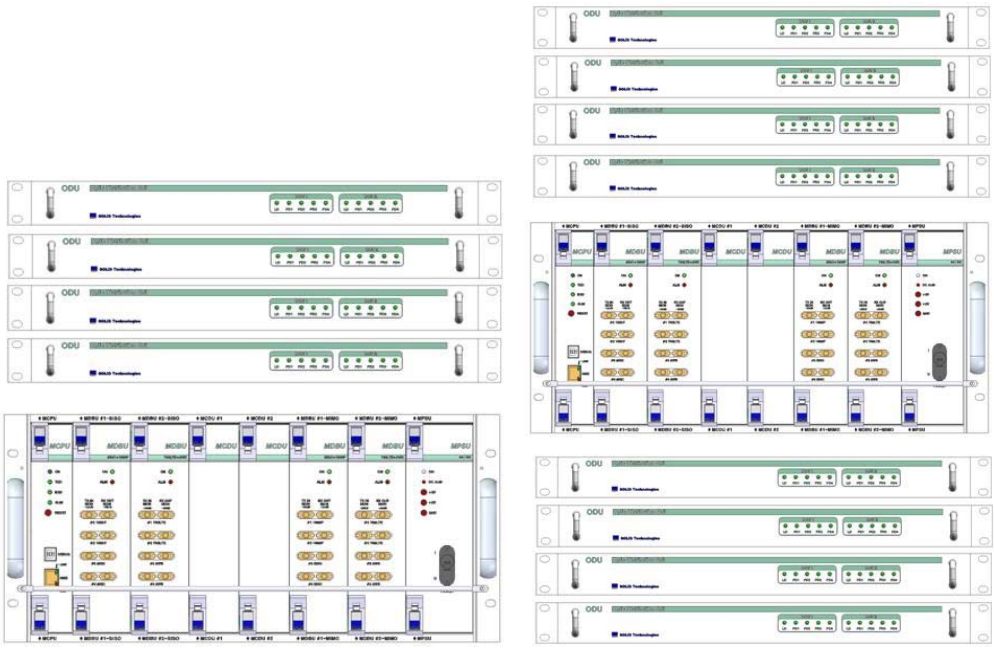
4.2.6 ODU Interface with BIU



SISO Configuration **MIMO Configuration**

Figure 4.17 BIU/ODU interface

For SISO configuration, up to four ODUs can be stacked. above the top of the BIU.

For MIMO configuaration, up to eight ODUs can be stacked above/below the BIU.

In this case, it is recommended to leave a 1RU space between BIU and the ODUs otherwise heat from BIU may degrade the performance of the ODUs,

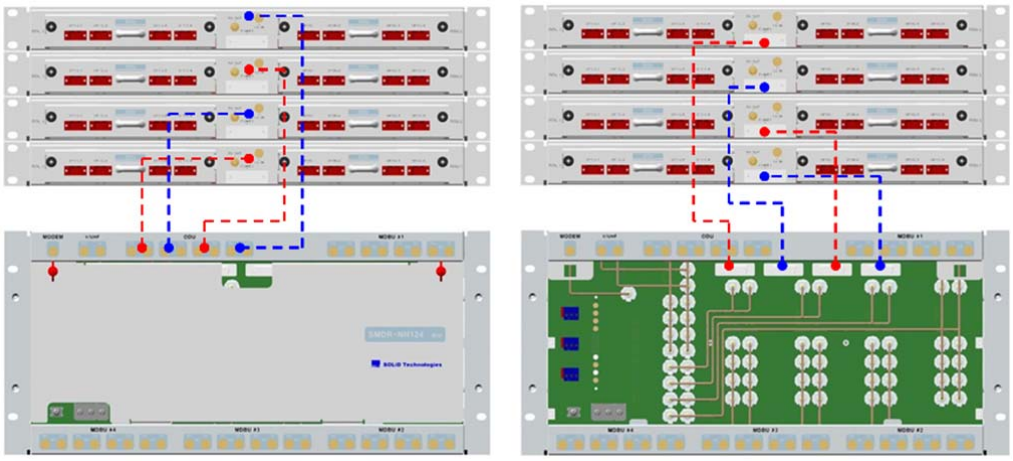


Figure 4.18 – BIU/ODU Interface rear view

As shown in the figure below, connect one coaxial cable for TX and another coaxial cable for RX with corresponding ports at the rear of BIU. For power supply and communication, connect 25Pin D-Sub Connector cable to the corresponding port.

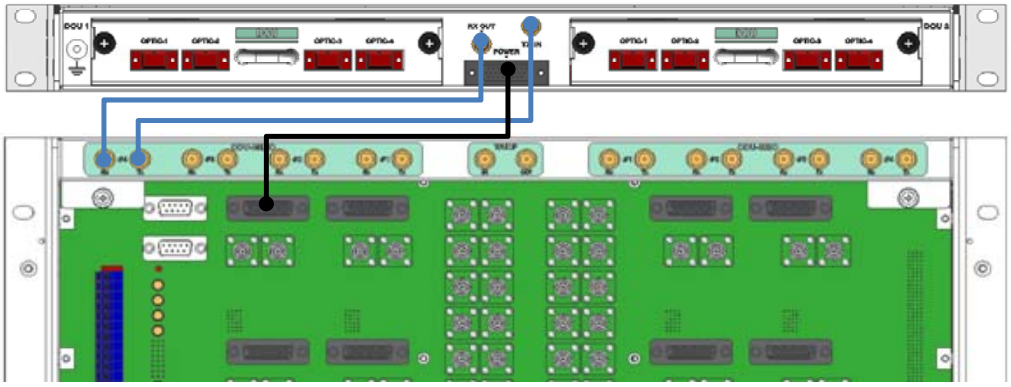


Figure 4.19 – BIU/ODU interface details

4.3 OEU (Optic Expansion Unit)

OEU is mainly used to remotely deliver signals for Campus clusters. At the upper part, this unit combines with ODU and receives TX optical signals to convert them into RF signals. Then, it regenerates the signals to secure SNR and converts them into optical signals. The signals are sent to ROU through optical cables. When it receives RX optical signals from ROU, the unit converts them into RF signals to regenerate the signals and then converts them into optical signals to send them to ODU.

In OEU, one shelf can be equipped with up to two DOUs. The DOU is the same as the module used for ODU. Up to four OEUs can be connected with ODU.

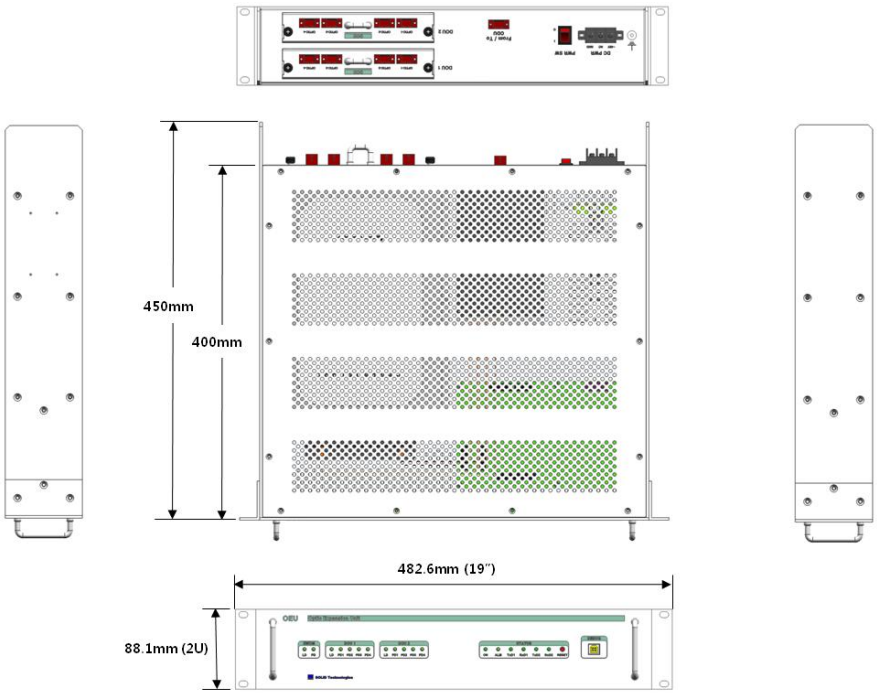


Figure 4.20 – OEU at a glance

4.3.1 Specifications of OEU

Item	Spec.	Remark
Size	482.6(19") x 88.1(2RU) x 450	mm
Weight	9.5 kg	Full Load
Power consumption	40 W	

4.3.2 OEU block diagram

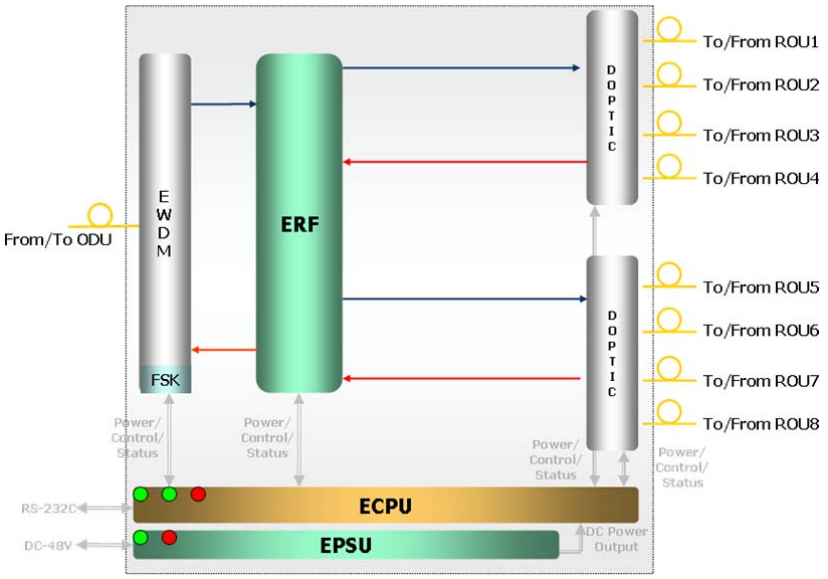


Figure 4.21 – OEU block diagram

4.3.3 OEU assemblies

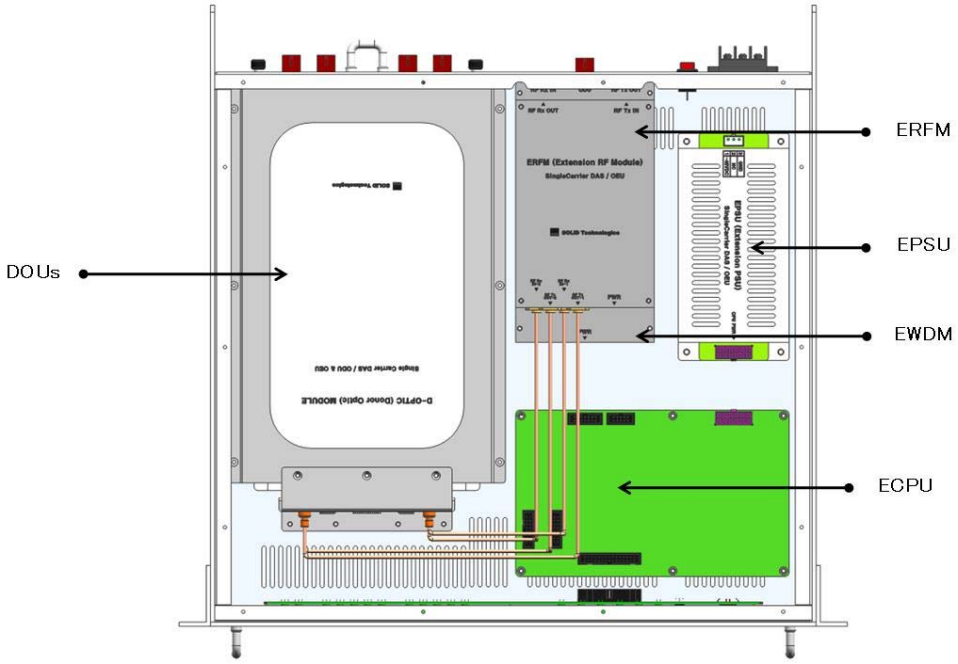


Figure 4.22 – OEU internal view

No.	Unit	Description	Remark
1	DOU	**Donor Optic Unit** Convert TX RF signals into optical signals; Convert RX optical signals into RF signals; Provide up to four optical ports per DOU	Max 2 ea.
2	EWDM	**Expansion Wavelength Division Multiplexer** Convert TX optical signals into RF signals; Convert RX RF signals into optical signals; Compensates for optical cable loss with ODU	
3	ECPU	**Expansion Central Processor Unit** Control and monitoring system status Control and monitoring with RS232 Relays state values of ROU to BIU	
4	EPSU	**Expansion Power Supply Unit** Input power: DC -48V, Output power: 9V, 6V	
5	ERFM	**Expansion Radio Frequency Module** Regenerate TX signals and transmit FSK modem signals; Regenerate RX signals and receive FSK modem signals	
6	Shelf	19" rack, 2RU	

4.3.4 Sub Assembly description

1) Donor Optic Unit (DOU)

The DOU is the same as the module used for the ODU.

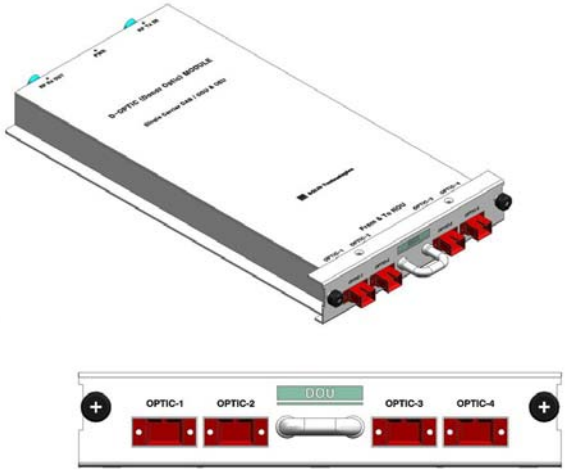


Figure 4.23 – DOU at a glance

2) Expansion Wavelength Division Multiplexer(EWDM)

EWDM module handles the optical to RF conversion of TX signals as well as the RF to optical conversion of RX signals. This multiplexer communicates with the BIU using the built in FSK modem. It also has an ATT to compensate for optical cable loss between ODUs.

Finally , it has internal WDM so it needs only one optical cable to work with an ROU.

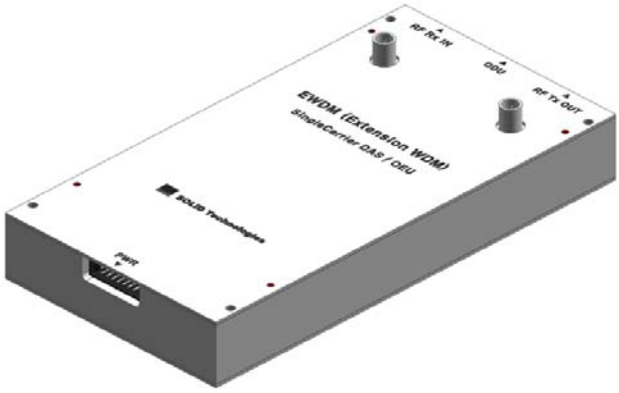


Figure 4.24 – EWDM at a glance

3) Expansion Central Processor Unit(ECPU)

ECPU can query and control the state of modules installed into the OEU. This unit simultaneoulsy communicates with the BIU and the ROUas well as acting as communication bridge between BIU and ROU.

In addition, the unit has a USB port for local communication which enables query and control of devices thorugh a PC. At the front panel, communication LED indicator indicates communication with upper BIU and lower ROU. It also has an ALM LED indicator to show fault.

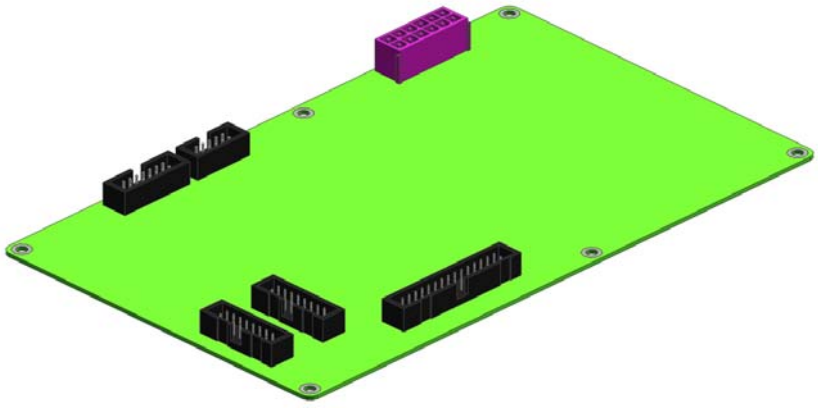


Figure 4.25 – ECPU at a glance

4) Expansion Radio Frequency Module(ERFM)

ERFM repairs Signal to Noise degraded by optical modules.

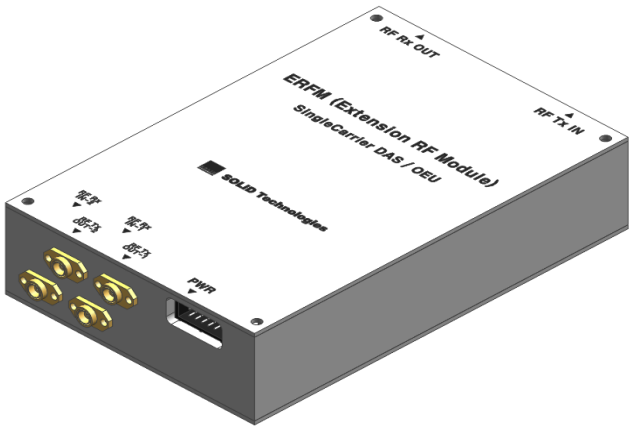


Figure 4.26 – ERFM at a glance

5) Expansion Power Supply Unit(EPSU)

As DC/DC Converter, the EPSU receives -48VDC input and provides +9V and +6V of DC power required for OEU.

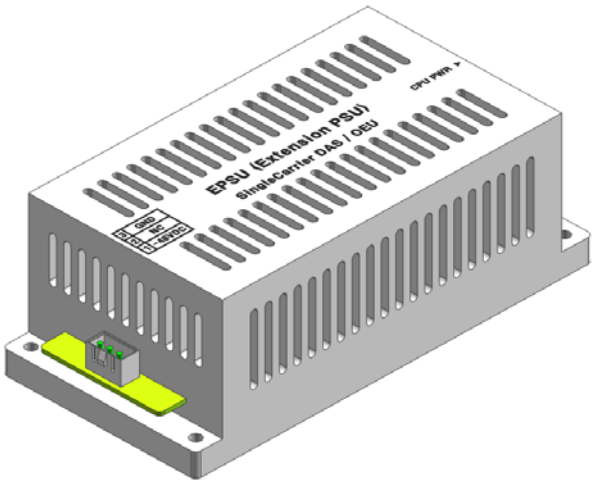


Figure 4.27 – EPSU at a glance

4.3.5 OEU front/rear panel overview

1) **Front panel**

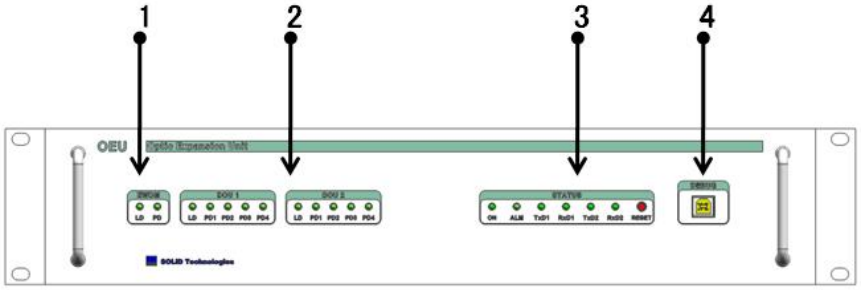


Figure 4.28 – OEU front panel view

Item	Description
1.EWDM LED	LED indicator to check EWDM state to see if it is abnormal
2.DOU LED	LED indicator to check DOU module state to see if it is abnormal
3.System LED and Reset	Communication state with devices, alarm status of the system and reset switch
4. NMS(USB Port)	USB port for communication and diagnosis of devices through PC/laptop. This equipment isfor indoor use only and all the communication wirings are limited to indoor use as well.

2) Rear panel

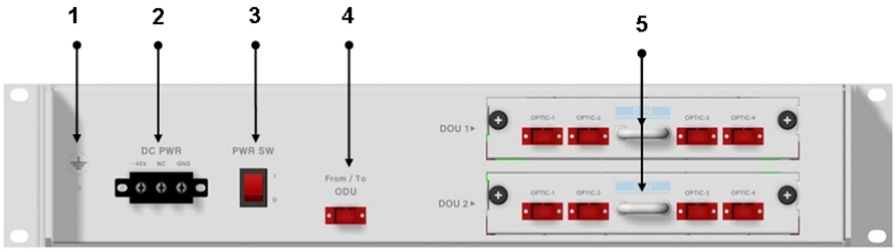


Figure 4.29 – Rear panel view

Item	Description
1. GND Port	Terminal for system ground
2. DC Input Port	Input terminal for DC -48V
3.power switch	Power ON/OFF switch
4. To/From ODU Optic Port	SC/APC optical connector terminal
5. To/From ROU Optic Port	SC/APC optical connector terminal; use one optical cable per ROU.

4.4 ROU (Remote Optic Unit)

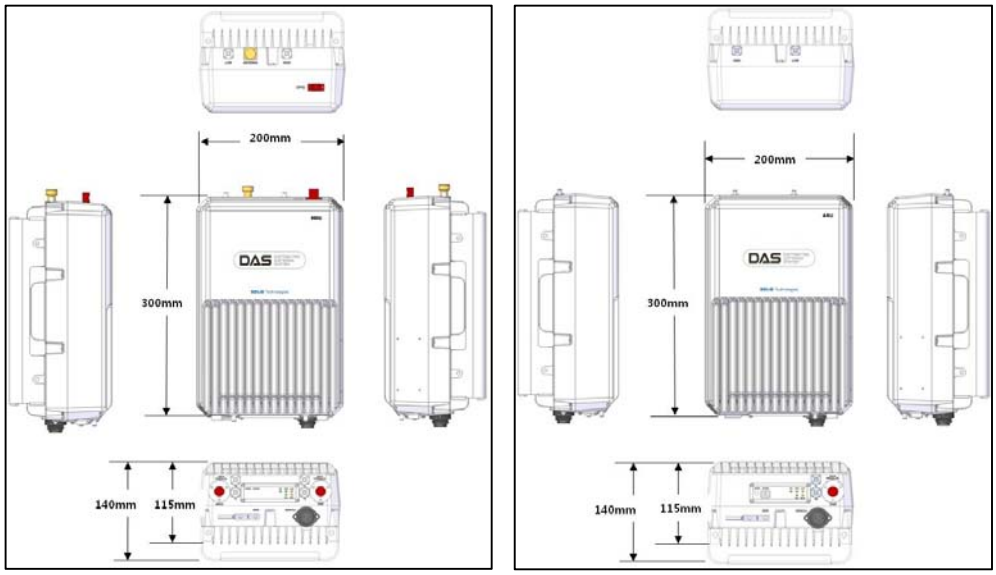
The ROU consists of two units: the MRU(Main Remote Unit) and the ARU(Add on Remote Unit). The ROU is considered the combination of MRU and ARU.

The MRU receives TX optical signals from the ODU or the OEU and converts them into RF signals. The converted RF signals are amplified through a High Power Amp in a corresponding RU, combined with the Multiplexer and transmitted out the antenna port.

The ROU receives RX signals through the antenna port, filters out-of-band signals in a corresponding RU and sends the results to Remote Optic Module to make RF tooptical conversion of them. After converted, the signals are sent to a upper device (theODU or OEU).

The MRU and ARU have a maximum of 2 bands.

The main difference between an MRU an ARU is the presence of an optical module .



(a) MRU **(b) ARU**

Figure 4.30 – ROU at a glance

4.4.1 ROU specifications

Item	Band combination	Size (W x H x D)	Weight	Power consumption	Remark
Band Combination1	MRU 1900P+850C	200 x 300 x 140 mm	6.6kg	50W	Full load
	ARU 700LTE+AWS-1		6.8kg	40W	
Band Combination2	MRU 1900P		6.5kg	45W	
	ARU 900I+800I		6.8kg	44W	
Band Combination3	MRU 700LTE+AWS-1		7.1kg	50W	
Band Combination4	MRU 700PS+800PS		7.1kg	50W	
Band Combination5	To be developed				
	To be developed				

4.4.2 ROU block diagram

4.4.2.1 Combination of MRU 1900PCS+850C/ARU 700LTE+AWS-1

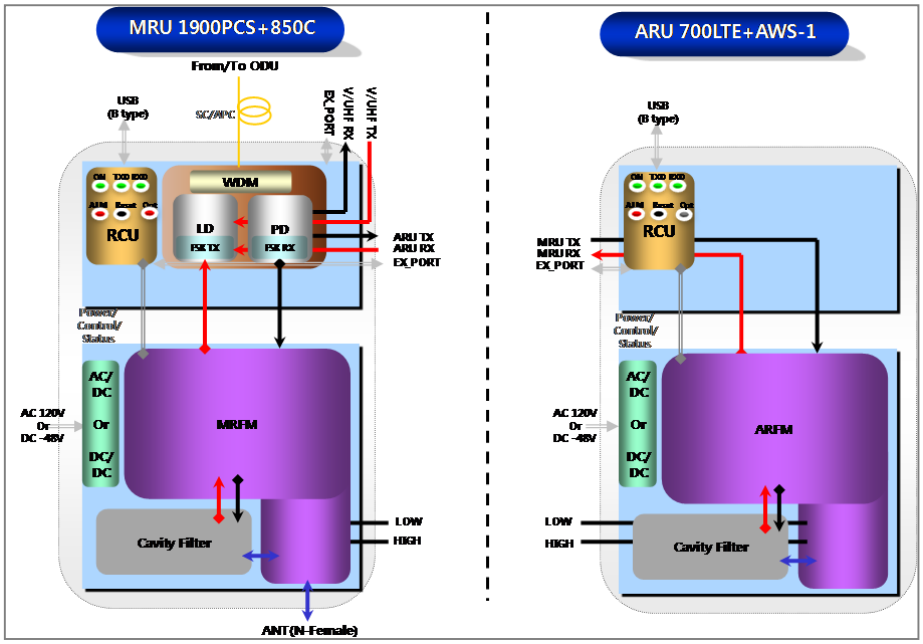


Figure 4.31 – ROU block diagram for MRU 1900PCS+850C and ARU 700LTE+AWS-1

4.4.2.2 Combination of MRU 1900PCS/ARU 900I+800I

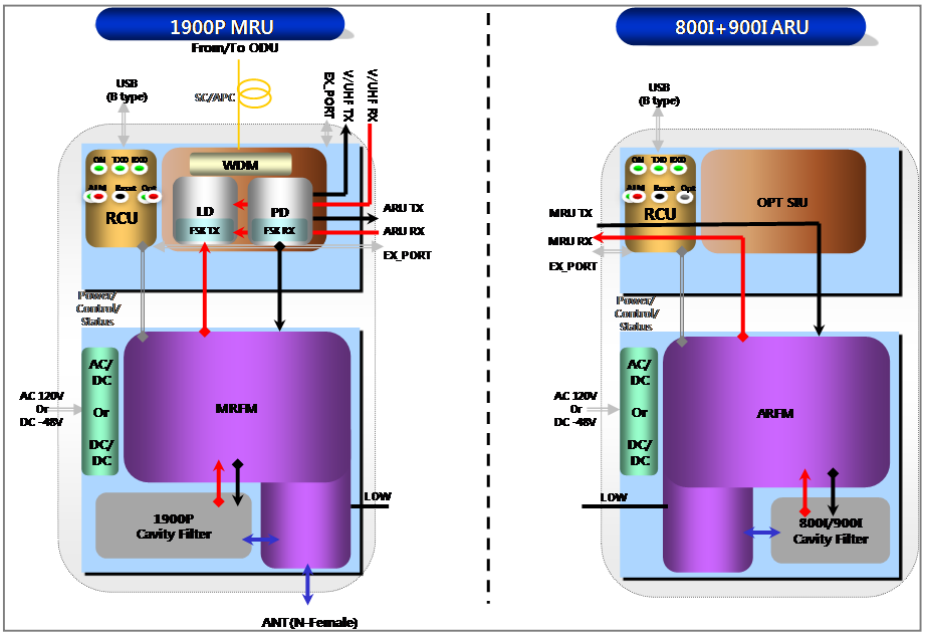


Figure 4.32 – ROU block diagram for MRU 1900PCS and ARU 900I+800I

4.4.2.3 Combination of MRU 700LTE+AWS-1

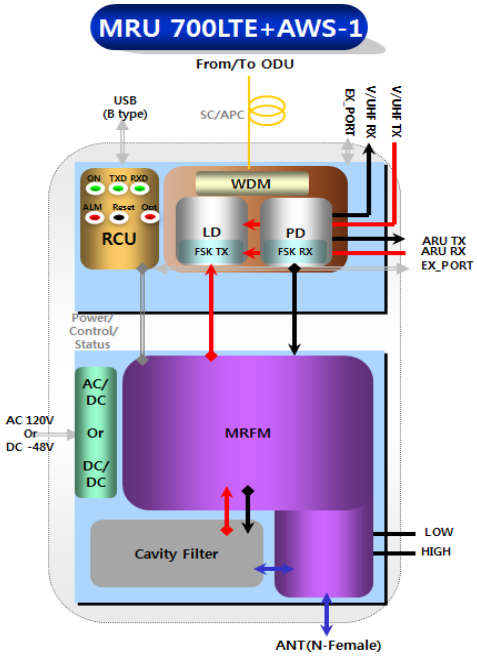


Figure 4.33 – ROU block diagram for MRU 700LTE+AWS-1

4.4.2.4 Combination of MRU 700PS+800PS

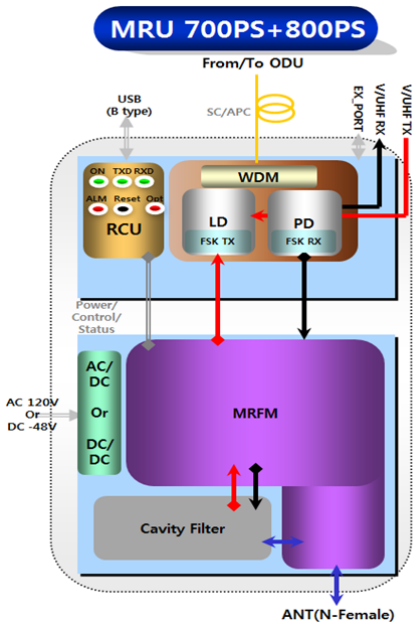
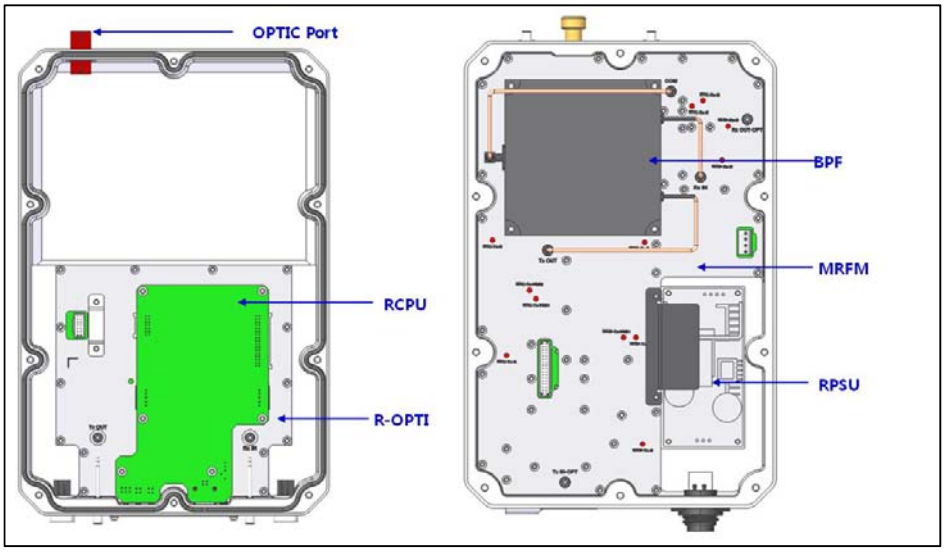
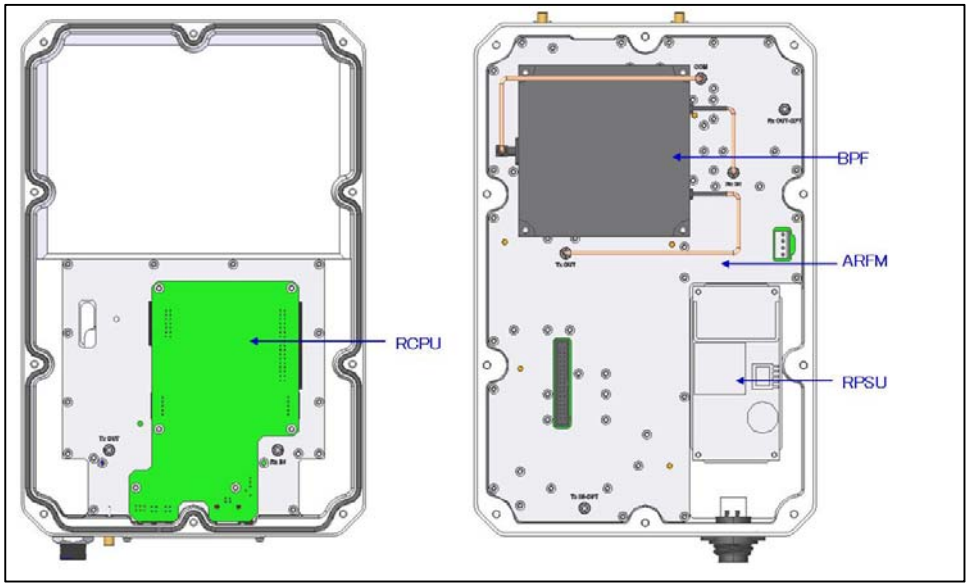


Figure 4.34 – ROU block diagram for MRU 700PS+800PS

4.4.2.5 Combination of MRU 1900PCS+850C/ARU 700LTE+AWS-1



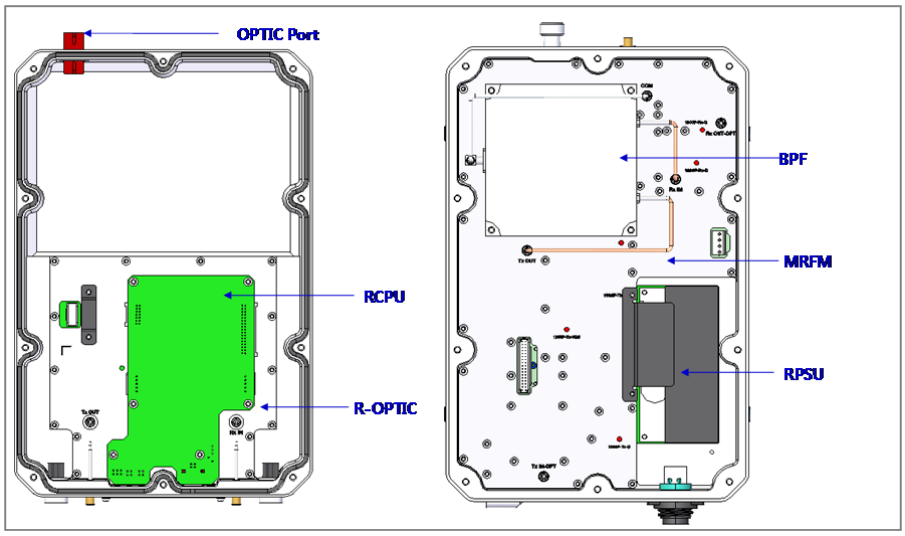
(a) MRU 1900PCS+850C



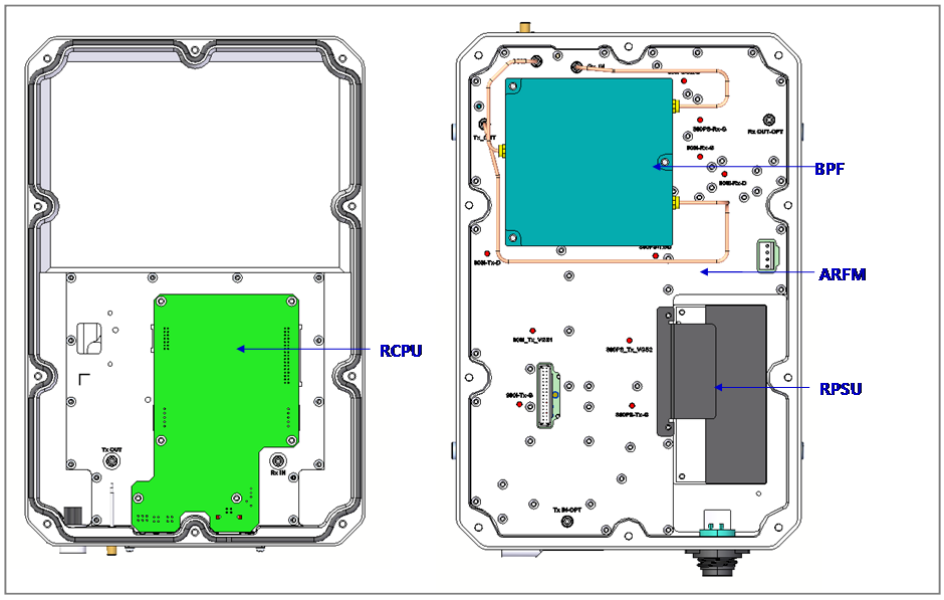
(b) ARU 700LTE+AWS-1

Figure 4.35 – ROU internal view for MRU1900PCS+850C and ARU 700LTE+AWS-1

4.4.2.6 Combination of MRU 1900PCS/ARU 900I+800I



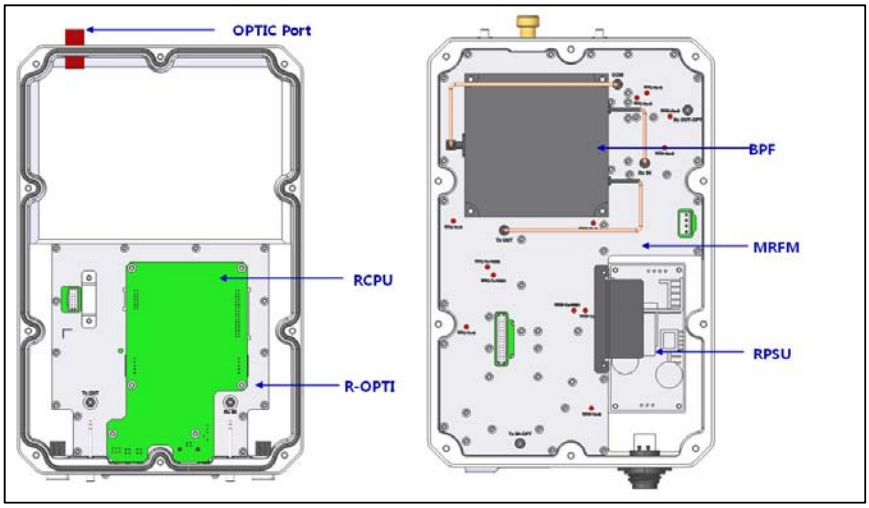
(a) MRU 1900PCS



(b) ARU 900I+800I

Figure 4.36– ROU internal view for MRU 1900PCS and ARU 900I+800I

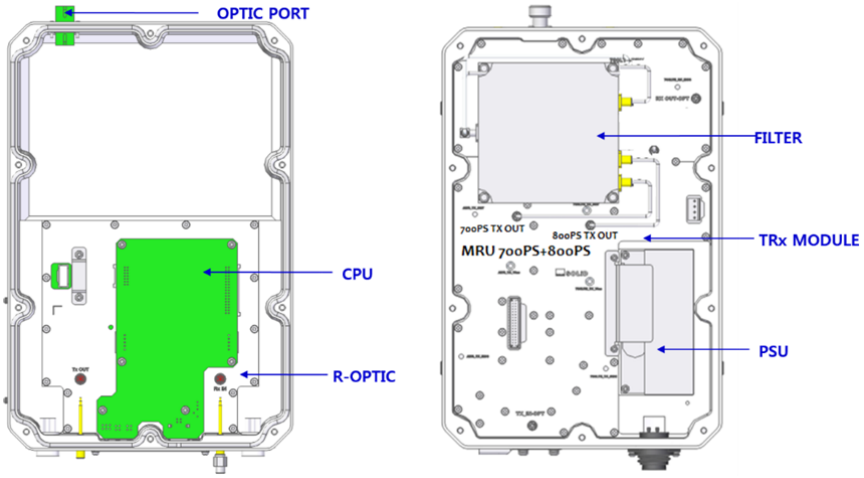
4.4.2.7 Combination of MRU 700LTE+AWS-1



(a) MRU 700LTE+AWS-1

Figure 4.37 – ROU internal view for MRU 700LTE+AWS-1

4.4.2.8 Combination of MRU 700PS+800PS



(a) MRU 700PS+800PS

Figure 4.38 – ROU internal view for 700PS+800PS

No.	Unit	Description	Remark
1	MRFM/ARFM +BPF	**Main/Add on RF Module** Filter and heavy amplification of TX signals; Filter and amplify RX signals; Remove other signals through BPF	
2	RPSU	**Remote Power Supply Unit** Input power: DC -48V or AC120V, Output power: 25V For 120V input of AC/DC; For -48V input of DC/DC	
3	R-OPT	**Remote Optic** Make RF conversion of TX optical signals; Convert RX RF signals into optical signals; Compensates optical loss interval Communicates with BIU or OEU though the FSK modem	
4	RCPU	**Remote Central Processor Unit** Controls signal of each unit Monitors BIU/ODU/OEU status through FSK modem communication	
5	Enclosure	Enable Wall Mount; Check if the system is normal, through the bottom panel LED	

4.4.3 Sub Assembly description

1) Main RF Module/Add on RF Module (MRFM/ARFM)+BPF

When receiving TX signals from each band through R-Opt, MRFM/AFRM filters the signals and amplifies them with the High Power Ampifier. The unit also filters RX signals received through the antenna port and amplifies them as low noise to send the signals to R-Opt.

In the unit, there is an ATT to adjust gain. This device varies for each frequency band, including the following:

No	Combination	Unit naming	Description	BPF	
				Cavity Filter	Ceramic Filter
1	MRU1900P+850C	MRFM 1900P+850C	Dual.	1900PCS	850C
	ARU700LTE+AWS-1	ARFM 700LTE+AWS-1	Dual.	700LTE	AWS-1
2	MRU1900P	MRFM 1900P	Single	1900PCS	-
	ARU900I+800I	ARFM900I+800I	Dual	900IEN/800IDEN	-
3	MRU700LTE+AWS-1	MRU700LTE+AWS-1	Dual.	700LTE	AWS-1
4	MRU700P+800P	MRU700PS+800PS	Dual.	700PS/800PS	
5	To be developed	-	-	-	-

2) Remote Power Supply Unit (RPSU)

RPSU accepts -48VDC input. This unit is configured 2 ways: the DC/DC type outputs +25V of DC power and AC/DC type takes 120V AC input and outputs +25V of DC power.

Please specify which type when ordering. MS Connector, which uses ports to receive inputs, is designed for either AC and DC input configuration. The input cable is different depending on input voltage conditions.

The RPSU doesn't have a switch to turn the power ON/OFF. Unit is active when power is connected.

Here, you should check for range of input power as follows:

No.	Unit	Range of input power	Remark
1	AC/DC	90 to 264 VAC	
2	DC/DC	-42V to -56VDC	

(a)AC/DC **(b)DC/DC**

Figure 4.39 – PSU at a glance

3) Remote Optic(R-OPT)

The Remote Optic performs the optical to RF signal conversion as well as the RF to optical conversion. With an FSK modem in it, the unit communicates with the other devices.

It also has an internal ATT to compensate for optical cable loss. The optical wavelength for TX path is 1310nmand 1550nm for the RX path. It is transported by a fiber strand using WDM(Wavelength Division Multiplexing) technique

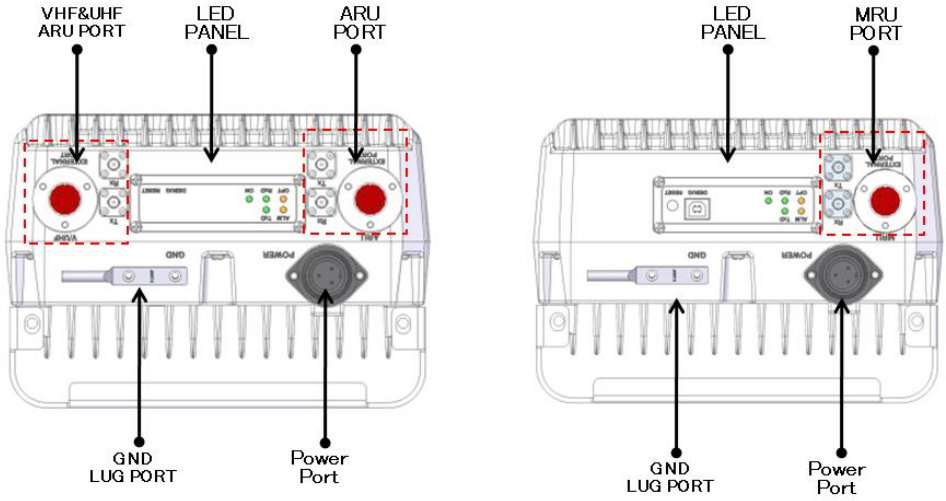
4) Remote Central Processor Unit (RCPU)

The RCPU can monitor and control the RU. This unit receives and analyzes upper communication data from Remote Optic and reports the unit's own value to the upper devices. At the bottom of the module, it has an LED indicator to show system status, letting you check any fault conditions. The same panel also has communication LED Indicators to show communication status with upper devices. Through the USB Port, the unit enables you to check and control device status through a PC or laptop. This equipment is for indoor use only and all the communication wirings are limited to indoor use as well**.**The RCPU of the MRU have two ports to connect exteranl devices (the ARU and the VHF&UHF ARU). Using an external interface cable, the MRU can communicate with the ARU/VHF&UHF ARU.

The MRU collects status information from ARU/VHF&UHF ARU and then communicates with the upper device

4.4.4 Bottom of ROU

1) Functions



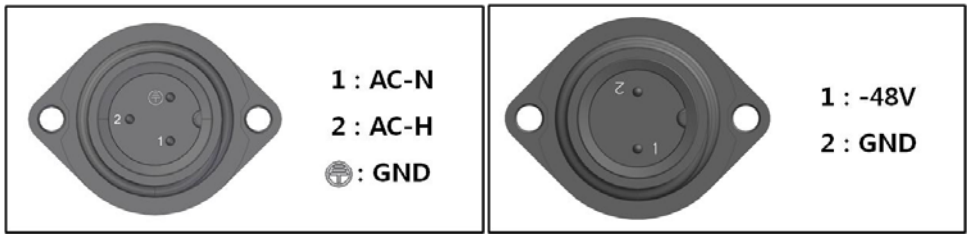
(a) MRU **(b) ARU**

Figure 4.40 – ROU Bottom view

Item	Description	Remark
1. VHF/UHF ARU Port	Terminal for TX and RX RF ports of VHF and UHF Terminal for signal port to interface with VHF and UHF	
2.LED PANEL	Visible LED indicator panel for checking fault status USB Port to check and control device status through PC and laptop	
3. Power Port	AC 120V input port or DC-48V input port	
4.ARU/MRU Port	Terminal for TX and RX RF ports of MRU/ARU Terminal for signal port to interface with MRU/ARU	
5.GND LUG PORT	Terminal for system ground	

Power Port

A different type of power port is used supplying -48V DC or 120V AC, and specific power cable should be applied to each different type of ROU power supply (AC/DC or DC/DC). Below figure shows different power connectors.

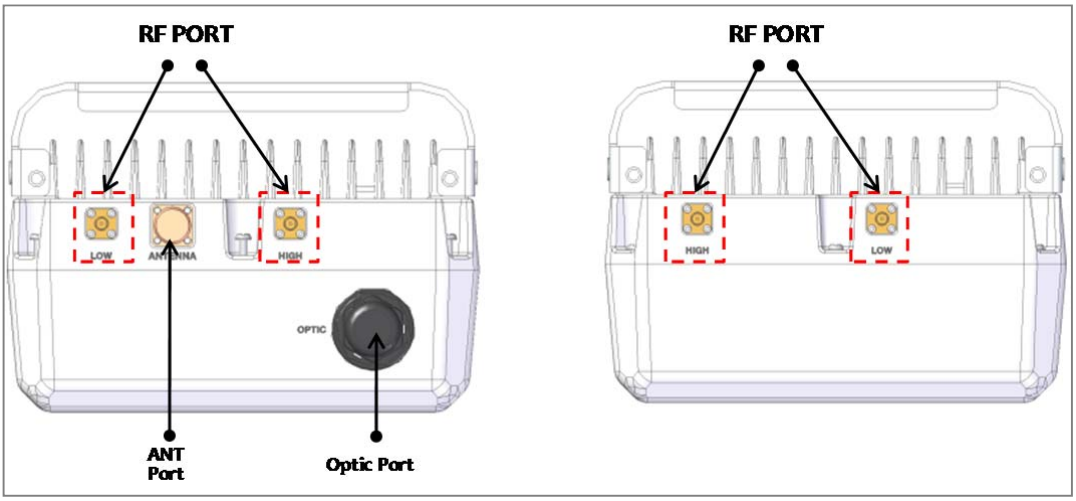


(a)AC/DC **(b)DC/DC**

Figure 4.41 – ROU Power Port View

4.4.5 Top of ROU

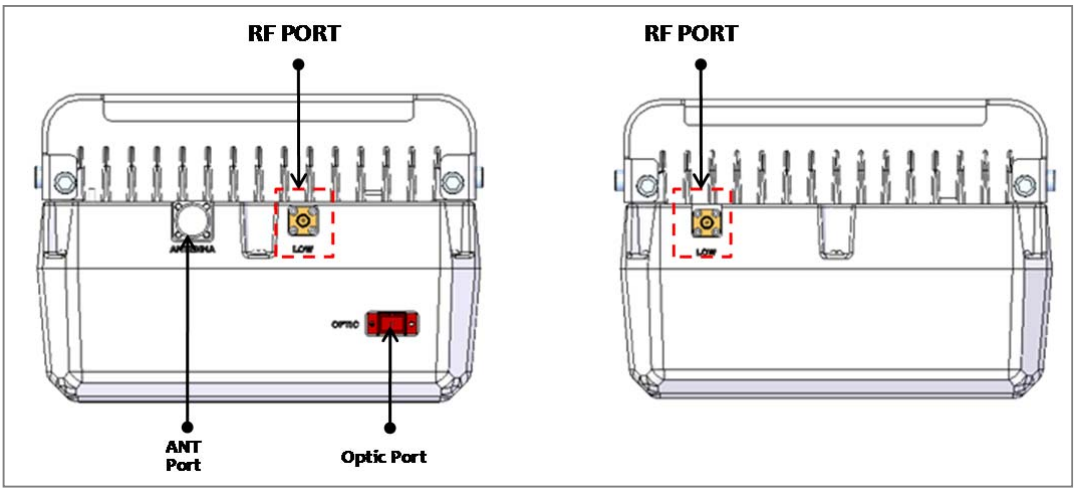
4.4.5.1 Combination of MRU1900PCS+850C/ARU700LTE+AWS-1



(a)MRU (b)ARU

Figure 4.42 – ROU Top View for MRU 1900P+850C and ARU 700LTE+AWS-1

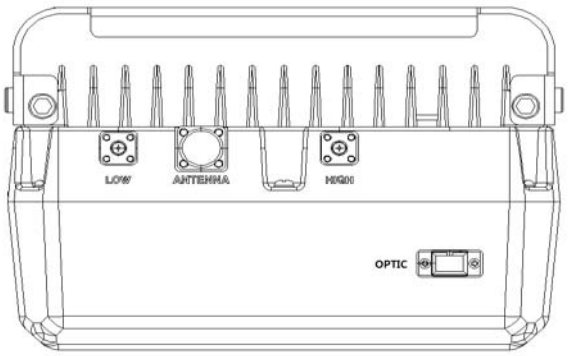
4.4.5.2 Combination of MRU1900PCS/ARU900I+800I



(a)MRU (b)ARU

Figure 4.42 – ROU Top View for MRU 1900P and ARU 900I+800I

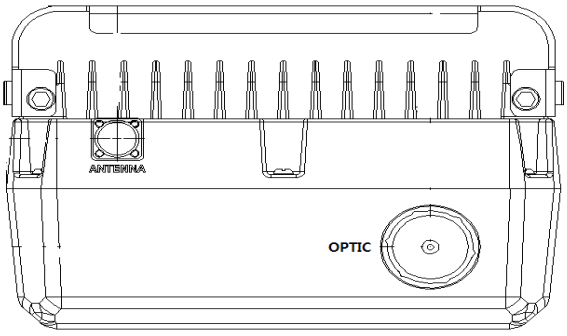
4.4.5.3 Combination of MRU700LTE+AWS-1



(a)MRU

Figure 4.44 – ROU Top View for MRU700LTE+AWS-1

4.4.5.4 Combination of MRU700PS+800PS



(a)MRU

Figure 4.45 – ROU Top View for MRU700PS+800PS

Item	Description	Remark
1. RF Port	Terminal for Low RF port to connect between MRU and ARU RF Terminal for HIGH RF port to connect between MRU and ARU RF	
2. ANT Port	Terminal for RF port to connect to antenna	
3. Optic Port	Termnial for Optical port to connect with fiber cable The fiber connector type is SC/APC	

Section5

System Installation & Operation

This chapter describes how to install each unit and corresponding fiber cables, along with power cabling method.

In detail, the chapter describes how to install shelves or enclosures of each unit, Power Cabling method , Optic Cabling and RF Interface. Furthermore, by showing power consumption of modules installed in each unit, a the Power Cabling budget is easily determined. Last, it describes the quantity of components of modules to be installed in each unit along with an expansion method.

5.1 BIU Installation

5.1.1 BIU Shelf Installation

Generally, the BIU is installed in a 19" standard rack. This unit has handles on each side for easy placement. With two mounting holes on each side, you can firmly fix the unit into a 19" rack.

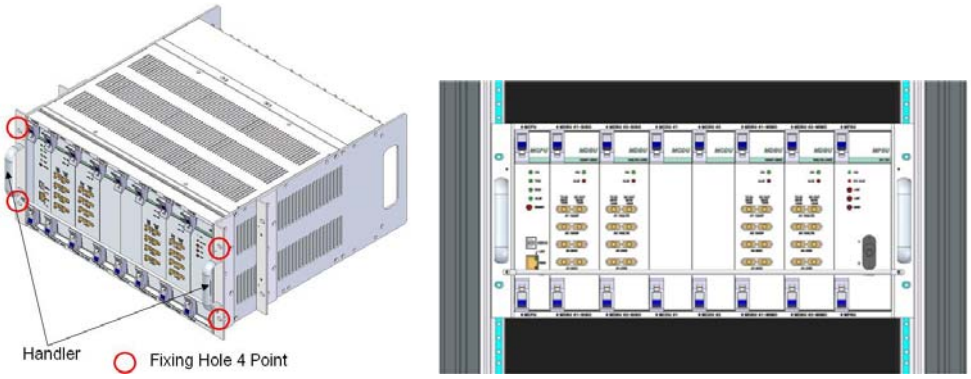


Figure 5.1 – RACK Installation

BIU has the following components:

No.	Unit	Description	Remark
Common Part	Shelf	Including Main Board, 19",5U	1EA
	MPSU	Operate -48Vdc Input	1EA
	MCPU	With Ethernet Port and USB Port	1EA
	Power Cable	-48Vdc Input with two lug terminal	1EA
SISO Slot	MCDU	-	1EA
	MDBU	Two among MDBU	Up to 2EA
MIMO Slot	MCDU	-	1EA
	MDBU	Two among MDBU	Up to 2EA

Basically, the frame of the BIU has slots equipped with an MPSU to supply devices with poweran MCPU to query and control state of each module and a Power Cable to supply power from external

rectifiers.

In addition, ther are slots for the MDBUs which provide services for desired band (Optional) and the MCDU to combine and divide TX/RX signals for each SISO and MIMO slots

5.1.2 BIU Power Cabling

BIU requires -48VDC input power. Connect DC cable from the power supply to the Terminal Block seen at the rear of BIU.

Terminal	Color of cable	Description	Remark
-48V	Blue color	-	
GND	Black color	-	
NC	Not Connected	-	

Before connecting the power terminal, you need to connect "+" terminal of the DVM probe with the GND terminal and then connect "–" terminal with -48V to see if "-48Vdc" voltage is present. After confirming this, connect the power terminal with the terminal of the terminal block seen below.

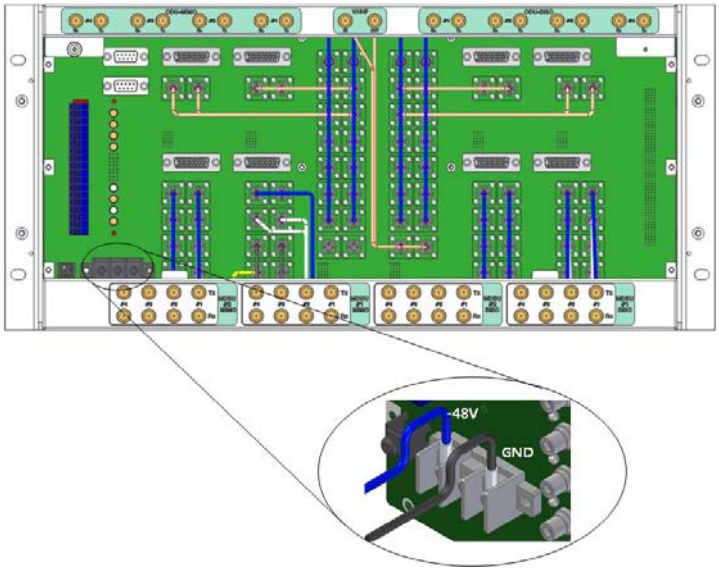
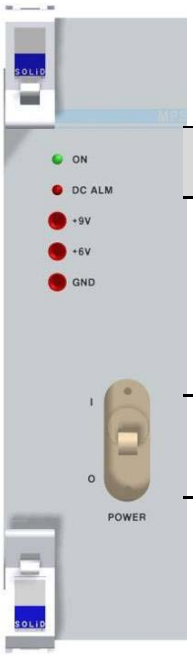


Figure 5.2 – Power interface diagrm

Note that BIU does not operate if the "+" terminal and the "–" terminal of the -48V power are reversed.

When you connect -48V power to the BIU, use the ON/OFF switch of the MPSU located at the front of BIU to check the power.



Power Switch	LED		Description
O	ON	⚪	Abnormal, Not supply Power -48Vdc
		🟢	Normal supply power -48Vdc
	DC ALM	🟢	Normal Status
		🔴	Failure of output Power
I	ON	⚪	Normal Status
	DC ALM	⚪	

Figure 5.3 – PSU LED indicator information

5.1.3 BIU/RF interface

The BIU can be connected with a Bi-Directional Amplifier or Base Station Tranceiver.

To connect the BIU with a BDA, you need to use a duplexer or a circulator to separate TX/RX signals from each other.

The BIU can feed external TX/RX signals from the Back Plane.

Using a dual band MDBU, the BIU can easily accomodate all frequency bands. As seen in the table below, the MDBU is divided into Single and Dual Bandmodules and each unit can be connected with two carrier signals per band. At the rear of the MDBU, 4 ports represent the inputs for the frequency bands. The following table shows signals to be fed to corresponding ports:

No	Unit naming	Description		In/out RF Port	
				TX	RX
1	1900P+850C MDBU	Dual Band 1900P:2Port 850C:2Port	Port#1	1900P TX(1930~1995MHz)	1900P RX(1850~1915MHz)
			Port#2	1900P TX(1930~1995MHz)	1900P RX(1850~1915MHz)
			Port#3	850C TX(869~894MHz)	850C RX(824~849MHz)
			Port#4	850C TX(869~894MHz)	850C RX(824~849MHz)
2	700LTE+AWS-1 MDBU	Dual Band 700LTE:2Port AWS-1:2Port	Port#1	700LTE TX(728~757MHz)	700LTE RX(698~716MHz, 777~787MHz)
			Port#2	700LTE TX(728~757MHz)	700LTE RX(698~716MHz, 777~787MHz)
			Port#3	AWS-1 TX(2110~2155MHz)	AWS-1 RX(1710~1755MHz)
			Port#4	AWS-1 TX(2110~2155MHz)	AWS-1 RX(1710~1755MHz)
3	1900P MDBU	Single Band 1900P:2Port	Port#1	1900P TX(1930~1995MHz)	1900P RX(1850~1915MHz)
			Port#2	1900P TX(1930~1995MHz)	1900P RX(1850~1915MHz)
4	900I+800I MDBU	Dual Band 900I:2Port 800I:2Port	Port#1	900I TX(935~940MHz)	900I RX(896~901MHz)
			Port#2	900I TX(935~940MHz)	900I RX(896~901MHz)
			Port#3	800I TX(851~869MHz)	800I RX(806~824MHz)
			Port#4	800I TX(851~869MHz)	800I RX(806~824MHz)
5	700PS+800PS MDBU	Dual Band 700PS:2Port 800PS:2Port	Port#1	700PS TX(758~775MHz)	700PS RX(788~805MHz)
			Port#2	700PS TX(758~775MHz)	700PS RX(788~805MHz)
			Port#3	800PS TX(851~869MHz)	800PS RX(806~824MHz)
			Port#4	800PS TX(851~869MHz)	800PS RX(806~824MHz)
6	1900P+AWS-1 MDBU	Dual Band 1900P:2P		995MHz)	1900P RX(1850~1915MHz)
				995MHz)	1900P RX(1850~1915MHz)

On the loadmap

		AWS-1:2Port	Port#3	AWS-1 TX(2110~2155MHz)	AWS-1 RX(1710~1755MHz)
			Port#4	AWS-1 TX(2110~2155MHz)	AWS-1 RX(1710~1755MHz)
7	900I MDBU	Single Band 900I:2Port	Port#1	900I TX(935~940MHz)	900I RX(896~901MHz)
			Port#2	900I TX(935~940MHz)	900I RX(896~901MHz)
8	VHF+UHF MCDU	Dual Band VHF+UHF : 1Port	Port#1	VHF Tx(136~174MHz)	VHF Rx(136~174MHz)
				UHF Tx(380~512MHz)	UHF Rx(380~512MHz)

At the rear of BIU, Tx input and Rx output ports are seen for each MDBU. The name of all the ports are silk screened as "#1, #2, #3 and #4." From the table above, you need to feed correct signals tothe input and output ports of the corresponding MDBU.

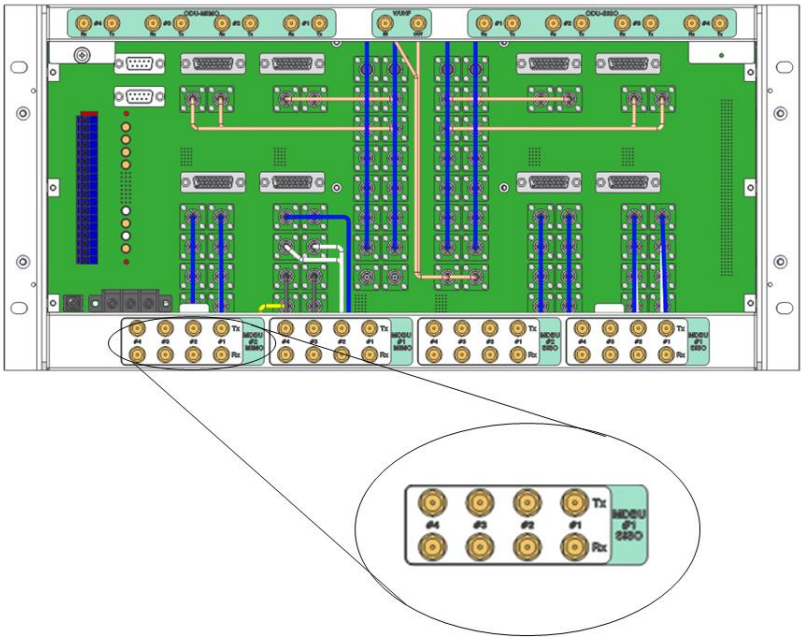


Figure 5.4 – BIU RF interface diagram

For each port, TX and RX signals are separated from each other. It is not necessary to terminate unused ports unless you want to.

BIU interface with Base station Transceiver

Basically, the BIU has separate TX and RX portsso you have only to connect the input and output ports.

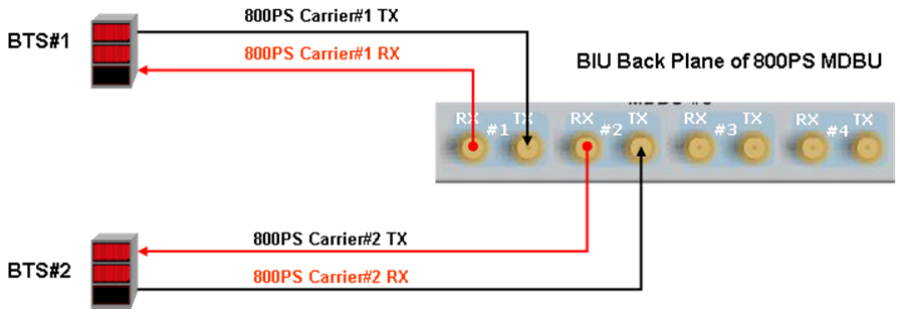


Figure 5.5 – BTS /BIU connections

Using a spectrum analyzer or power meter, you need to check signals sent from BTS TX. If the signals exceed input range (-20dBm~+10dBm), you can connect an attenuator between the BTS and BIU to bring the signal level into range.

BIU interface with Bi-Directional Amplifier

Since the BIU is Simplex format; you need to un-duplex the BDA signal to properly connect it to the BIU.

Using either duplexer or a circulator, you can separate TX/RX signals coming from the BDA

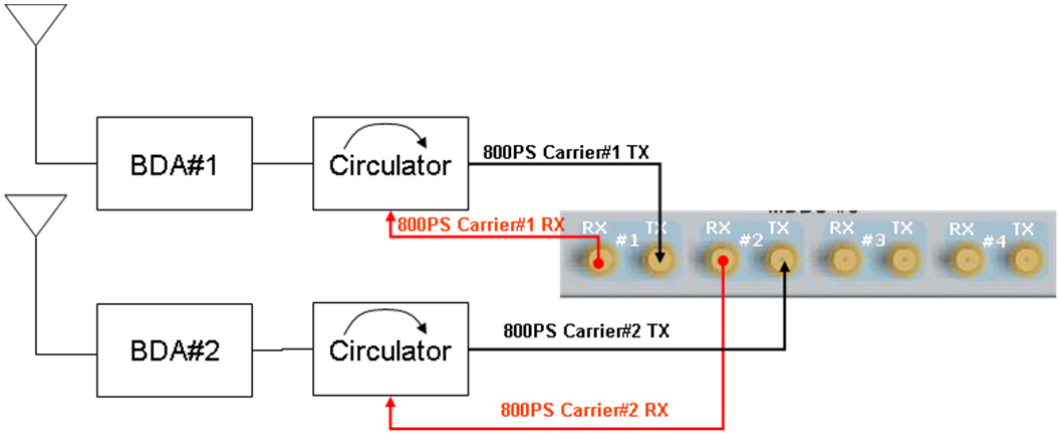


Figure 5.6 –BDA Interface using Circulator

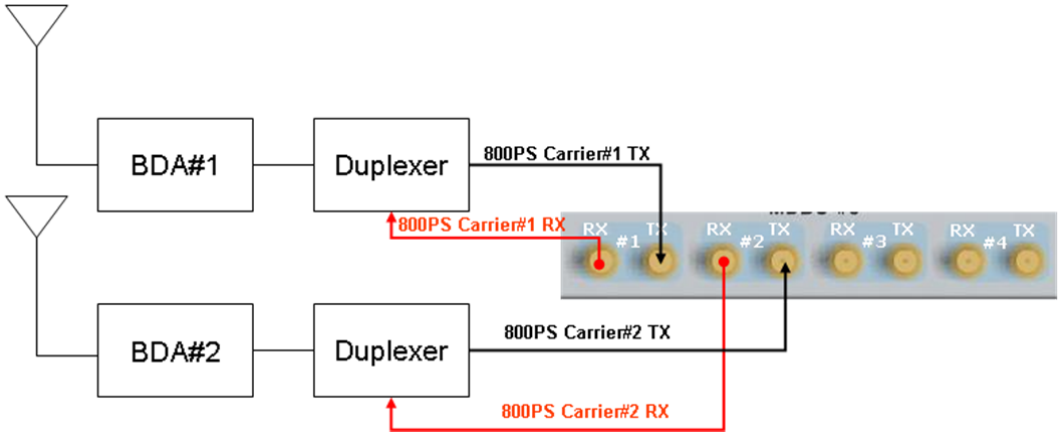


Figure 5.7 –BDA Interface using Duplexer

The BIU will work with the BDA in either of the methods above. TX signal level from the BDA must be verified that it is within range of the BIU.

Given the BIU TX input range (-20dBm~+10dBm/Total per port), verify it is within the input range, before connecting the ports.

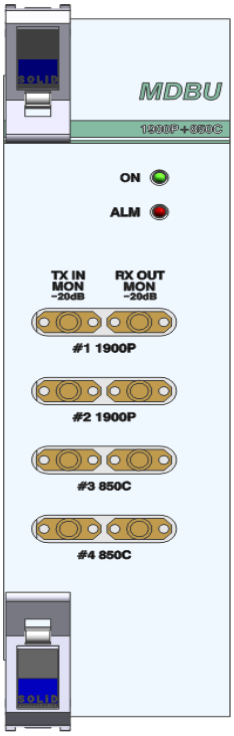
5.1.4 MDBU installation

MDBU is designed to be inserted into any slot.

A BIU can be equipped with a total of four MDBUs. If only one MDBU is inserted, you need to insert BLANK cards into the other slots.

If you do not terminate input and output ports of the MCDU, which combines TX signals and divides RX signals, it will cause out of band spurious signals. Make sure to insert MDBU BLANK cards into the MDBU slots.

When an MDBU is inserted into the BIU, LEDs at the front panel will show the following information:



LED		Description
ON		Power is not supplied.
		Power is supplied.
ALM		Normal Operation
		Abnormal Operation

Figure 5.8 –MDBU LED indicator information

MONITOR SMA port seen at the front panel of the MDBU allows you to check the current level of TX input and RX output signals in service without affecting main signals.
TX MON is -20dB below TX Input power and RX MON is -20dB below RX Output power as well.

5.1.5 ODU Interface

The BIU supports up to four ODUs per platform. At the rear of BIU, eight RF input and output ports for the ODUs as well as four power ports for power supply and communication are provided. As you connect the ODUs, the BIU recognizes the ODU that is connected with BIU automatically

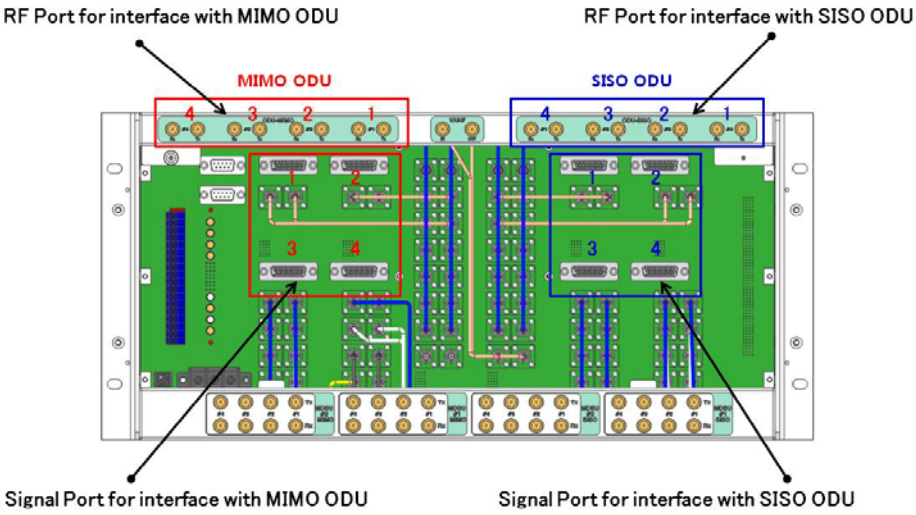


Figure 5.9 –Interface port between BIU and ODU

At the rear part of the ODU, the number of RF Ports and Signal Ports are printed in order. Its a good idea to label these in case additional ODUs are needed.

ODU Numbering		RF Port		Signal Port
		TX	RX	
ODU SISO	ODU 1	#1		SISO_ODU#1
	ODU 2	#2		SISO_ODU#2
	ODU 3	#3		SISO_ODU#3
	ODU 4	#4		SISO_ODU#4
ODU MIMO	ODU 1	#1		MIMO_ODU#1
	ODU 2	#2		MIMO_ODU#2
	ODU 3	#3		MIMO_ODU#3
	ODU 4	#4		MIMO_ODU#4

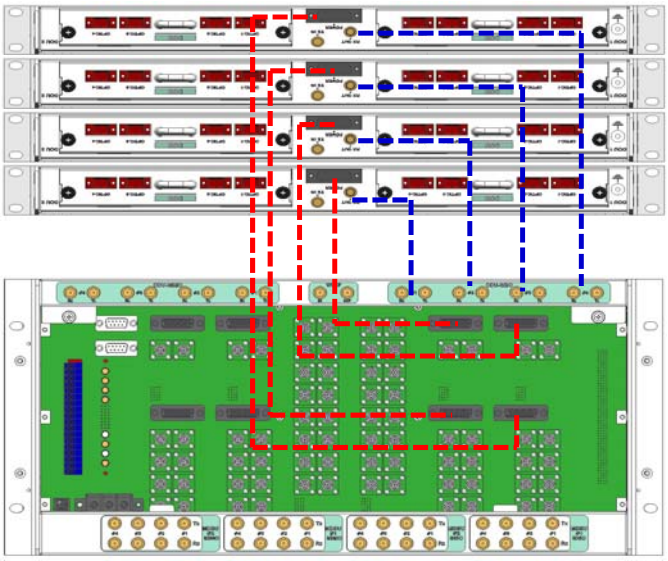


Figure 5.10 –Cabling interface diagram between BIU and ODU

For unused RF Ports for ODU expansion, make sure to terminate them using SMA Term.

When installing an ODU above the BIU, it is recommended to leave at least 1RU of space between the two. Heat from BIU rises and could damage the ODU.

5.1.6 BIU power consumption

The table below shows power consumption of the BIU:

Part	Unit	Consumption Power	Remark
Common Part	Shelf	4.8 W	
	MCPU		
	MPSU		
MCDU	-	2.4W	
MDBU	1900P+850C	16W	
	700LTE+AWS-1	16W	

	1900P	12W	
	900I+800I	16W	
	700PS+800PS	16W	
	1900P+AWS-1	On the loadmap	
	900I		

The BIU supplies power for ODU. When you want to calculate total power consumption of the BIU, you need to add power consumption of the ODU to the total value.
Power consumption of ODU is given in the later paragraph describing ODU.

5.2 ODU Installation

ODU should be, in any case, put on the top of BIU. This unit gets required power and RF signals from BIU. The following table shows components of ODU:

No.	Unit	Description	Remark
Common Part	Shelf	Including Main Board, 19",1U	1EA
	RF Cable	SMA(F) to SMA(F), 400mm	2EA
	Signal Cable	3Row(26P_F) to 3Row(26P_M),650mm	1EA
Optional Part	DOU	Optical Module with 4 Optic Port	Up to 2EA to be inserted

5.2.1 ODU Shelf Installation

The ODU chassis is 1RU in height and 19" wide. It should be inserted into a 19" standard rack and placed above the BIU leaving a 1RU gap between the ODU and the BIU.

5.2.2 ODU Power Cabling

The ODU gets power from the BIU.
When you connect a 3-Row, 26-pin D-SUB Signal cable from BIU and install DOU, LED on the front panel is lit. Through this LED, you can check state values of LD and PD of DOU.

5.2.3 ODU Optic Cabling

The ODU makes RF-optical conversion of TX signals as well as optical-RF conversion of RX signals. TheODU can be equipped with up to two DOUs. One DOU supports four optical ports and one optical port can be connected with an ROU. Optionally, only optical port 4 can be connected with

OEU for ODU1 and ODU2. ODU3. ODU4 can not connect with OEU.

As WDM is used in the DOU, the unit can concurrently send and receive two different wavelengths (TX:1310nm, RX:1550nm) through one strand of fiber. The DOU has SC/APC fiber connectors.

Figure 5.11 –SC/APC fiber termination

For optical adaptor, SC/APC type should be used. To preventcontamination of the fiber end, it should be covered with a cap when not installed. The SC/APC connectors should be cleaned with alcohol prior to installation.

5.2.4 DOU installation

Up to two DOUs can be installed in an ODU chassis. The DOU module is a Plug in Play type.

When you insert a DOU in the ODU, insert the unit into the left DOU1 slot first. The slot number is silk screened at the left.

The following figure shows installation diagram of the ODU with one DOU inserted in it.

The following figure shows installation diagram of ODU with two DOUs inserted in it.

Figure 5.12 – ODU rear view with DOUs inserted

 When you insert DOU into ODU, insert the unit into the left DOU1 slot first. Insert a BLANK UNIT in the unused slot.

5.2.5 ODU Power consumption

The ODU gets power from the BIU. One ODU can be equipped with up to two DOUs. Depending on how many DOUs are installed, power consumption varies. The table below shows power consumption of the ODU:

Part	Unit	Consumption Power	Remark
ODU_4	DOU 1 EA	14W	
ODU_8	DOU 2 EA	28W	

5.3 ROU Installation

5.3.1 ROU Enclosure installation

The ROU enclosure has two options. One meets NEMA4 standard and the other is not waterproof or dirtproof. The ROU can be mounted on a Wall easily. Rack mounting is also possibleusing special frame. There are 3 different types and they will be explained later in this chapter. The ROU consists of anMRU and anARU. Their dimensions are thesame.

The following shows the dimension of the mounting holes for the Wall Mount Bracket.

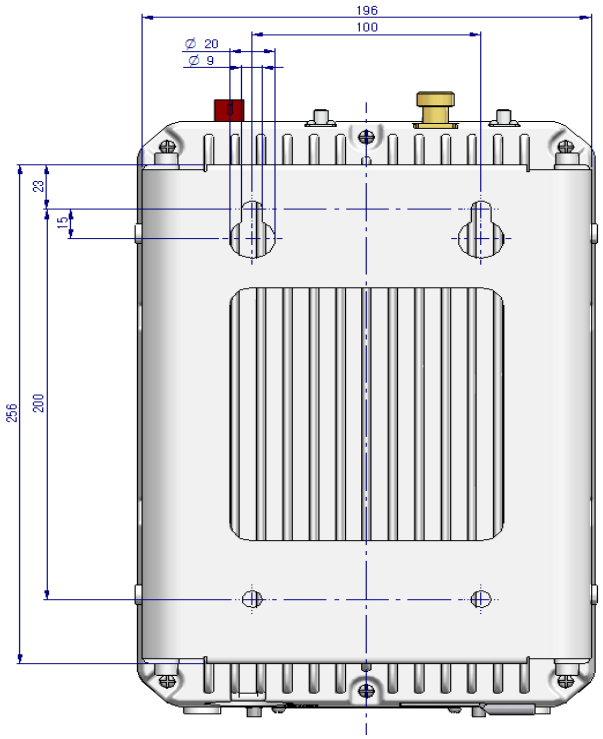


Figure 5.13 – Wall mount dimensions for the ROU

ROU Wall Mount Installation

There are two way to install the ROU on the wall. One is to install ROUs on the wall side by side, the other is stack the ARU above the MRU.

Type1 : Side by Side installation

Install M8 mounting Screws roughly half way in, insert the wall mount bracket over the 2 screws and secure it with the last 2 screws.

For convenience, the Wall Mount Bracket has mounting holes to let you easily mount an enclosure. Screw the M6 Wrench Bolts by half at each side of the Heatsink enclosure.

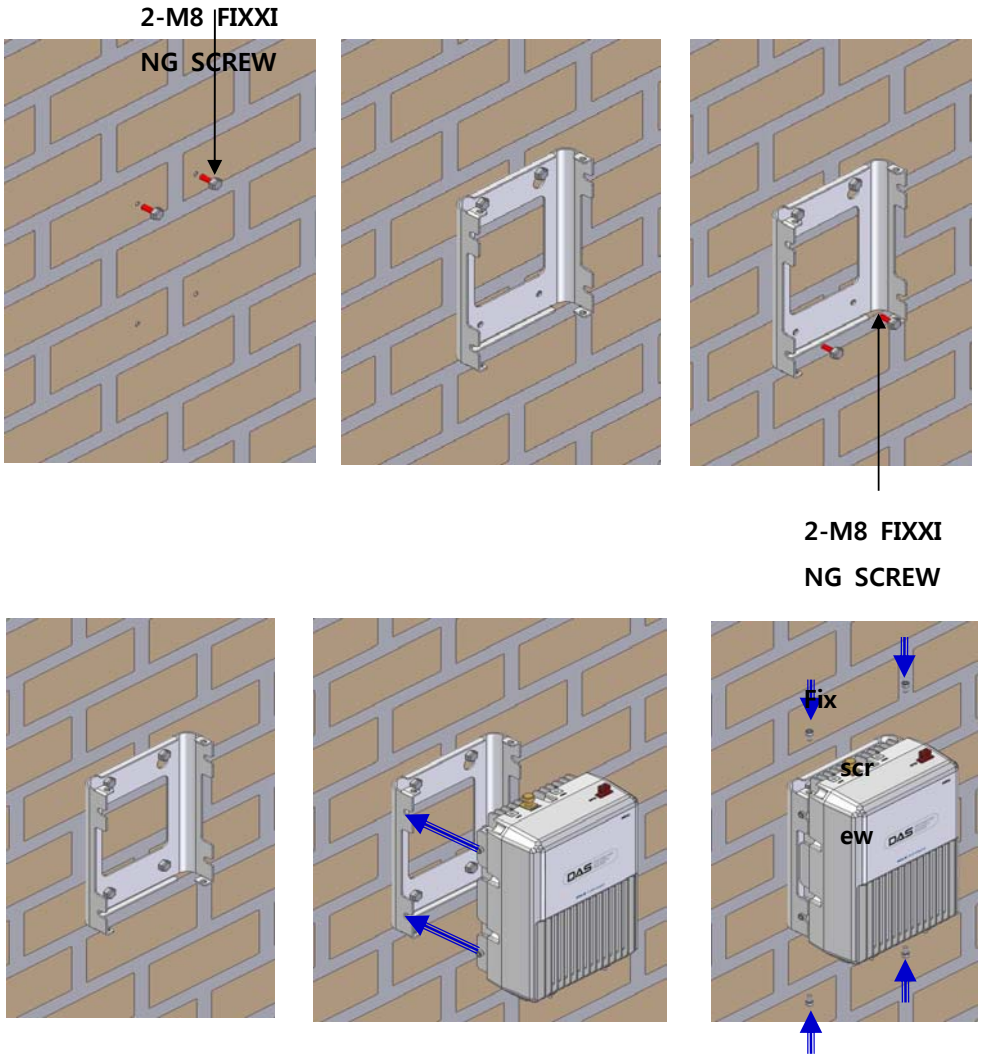


Figure 5.14 – ROU installation procedure side by side

Place the enclosure with the M6 Bolt on the mounting groove and mount the M6 Wrench Bolts into the remaining mounting holes.

In this case, you will use 4 M6 Wrench Bolts.

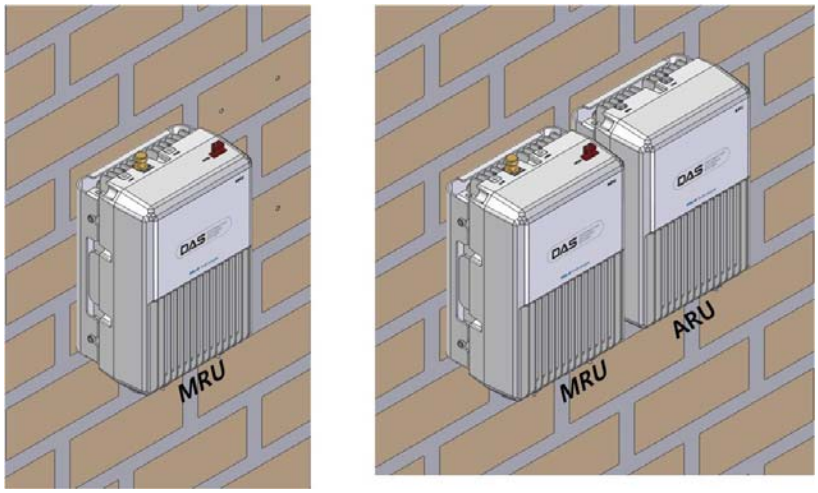


Figure 5.15 – ROU installation diagram side by side

For connecting cables between MRU and ARU easily, the MRU should install on left side of ARU.

Type2 : stacked installation

If space prohibits the MRU and ARU from being mounted side by side, the units can be installed in a stacked configuration.

Stacking the unit requires a special baracket for stacked installation

First, install the MRU on the wall , then install the bracket for stacked installation on the MRU. Finally install the ARU on the bracket.

Completed installation diagram is as follows

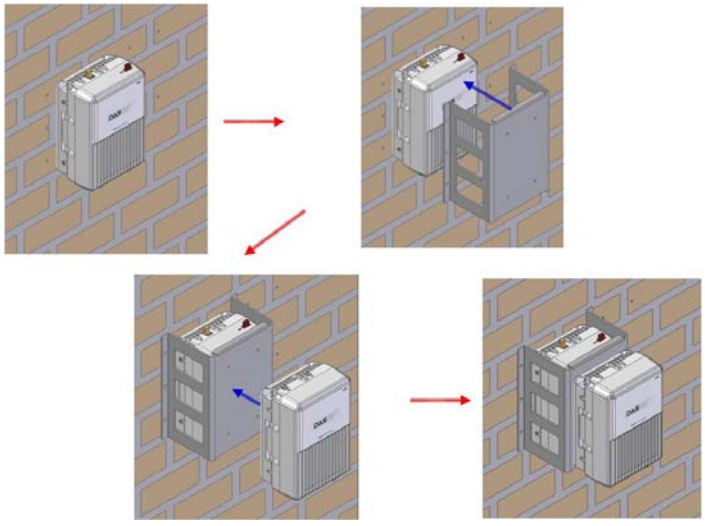


Figure 5.16 – ROU installation procedure for stacked mounting