

3) Remote Optic(R OPTIC)

Remote Optic converts optical signals into RF signals and performs vice versa. With an FSK modem in it, the unit communicates with upper devices.

It also has internal ATT for optical compensation to compensate for optical cable loss, if any.

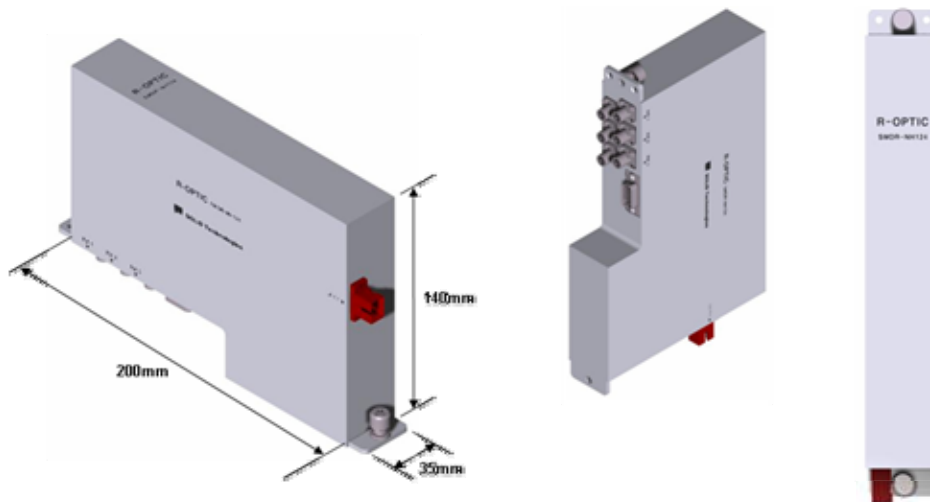


Figure 4.28 – R OPTIC Outer Look

4) Remote Central Processor Unit (RCPU)

RCPU can monitor and control each module of ROU. This unit receives and analyzes upper communication data from Remote Optic and reports the unit's own value to upper devices. At the front of the module, it has LED indicator to show system status, letting you check any abnormalities at a time. At the same front, it also has communication LED Indicators to show communication status with upper devices. Through RS-232C Serial Port, the unit enables you to

check and control device status through PC and laptop. This equipment is indoor use and all the communication wirings are limited to inside of the building.

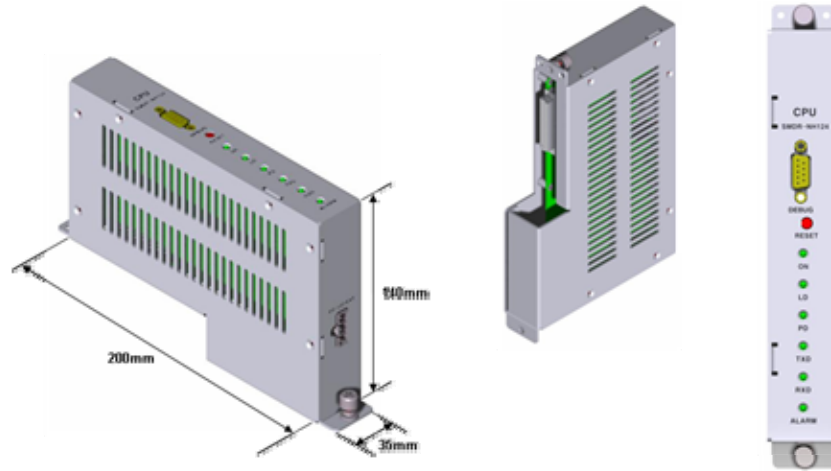


Figure 4.29 – RCPU Outer Look

5) Multiplexer

Multiplexer works as a module to combine or distribute multiple signals into one antenna.

This device has a port to combine multiple signals. You need to connect input and output ports of RDU through a corresponding port.

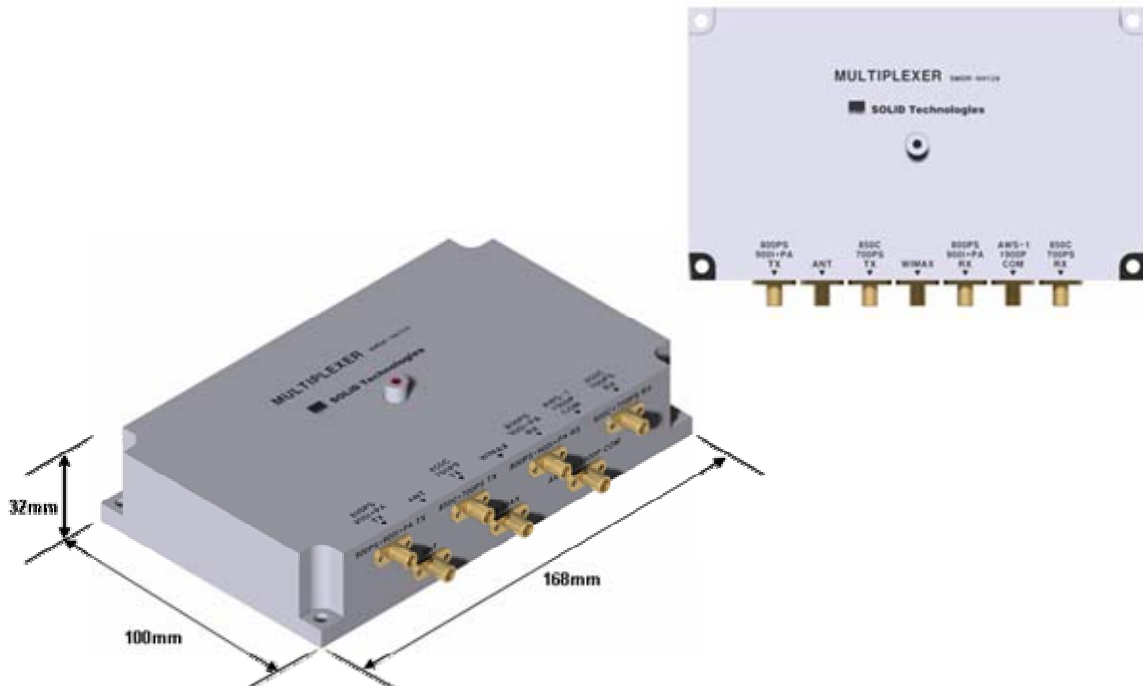
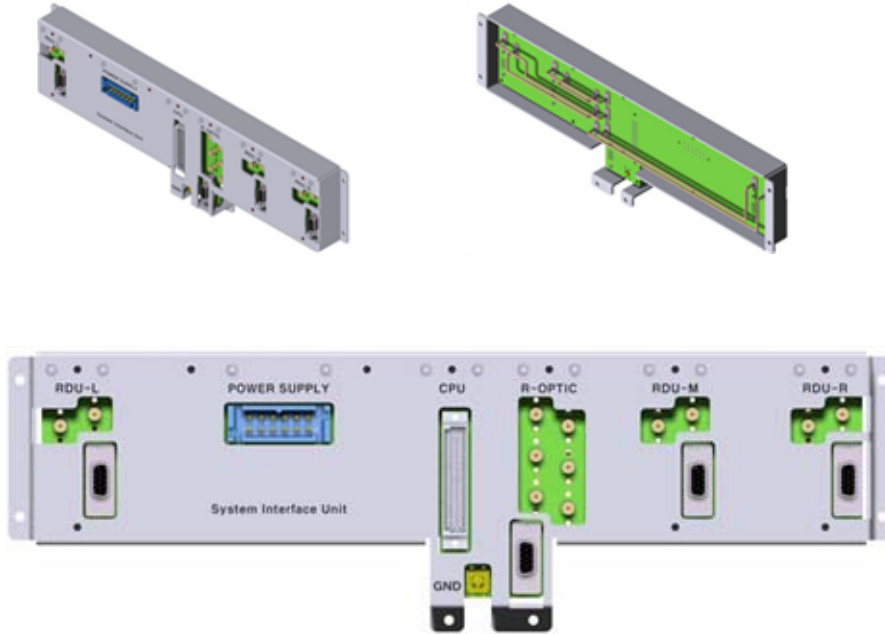


Figure 4.30 – Multiplexer Outer Look

6) System Interface Unit(SIU)

SIU distributes power and signals to each module.



4.4.5 Bottom of ROU

1) Functions

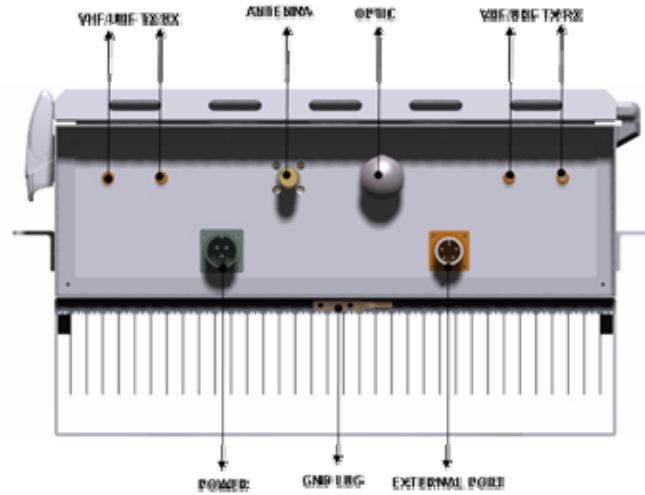
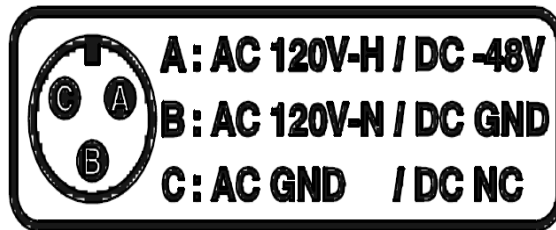


Figure 4.31 – ROU Bottom Look

Item	Description	Remark
1. VHF/UHF TX/RX Port	Terminal for TX and RX antenna ports of VHF and UHF	
2. Antenna Port	System Antenna Port, N-type female	
3. Power Port	AC 120V input port or DC-48V input port	
4. Optic Port	Optical input port	
5. External Port	Port for external devices	
6. GND LUG PORT	Terminal for system ground	

POWER PORT

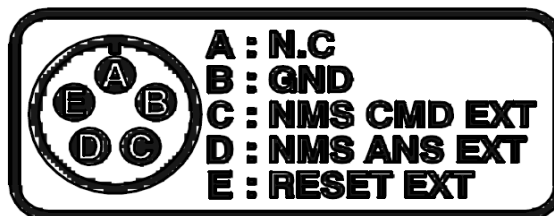
Power ports are used for power-supplying of -48V DC or 120V AC, and specific power cable should be applied to each different types of ROU power supply (AC/DC or DC/DC). Below figure is naming of the power supply by type.



External PORT

External ports are reserved ports for external equipments for future implementation, and used to monitor the status and control the equipments.

Below figure is naming of the external ports.



Section 5

System Installation & Operation

- 5.1 BIU Installation**
- 5.2 ODU Installation**
- 5.3 ROU Installation**
- 5.4 OEU Installation**
- 5.5 System Operation and Alarm Status**

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

In detail, the chapter describes how to install shelves or enclosures of each unit, Power Cabling method and Optic Cabling and RF Interface. Furthermore, by showing power consumption of modules to be installed in each unit, it presents Power Cabling budget in a simple way. Then, it describes the quantity of components of modules to be installed in each unit and expansion method.

5.1 BIU Installation

5.1.1 BIU Shelf Installation

Generally, BIU is inserted into a 19" Standard Rack. As this unit has handles at each side for easy move. With two fixing holes at each side, you can tightly fix the unit into a 19" rack.

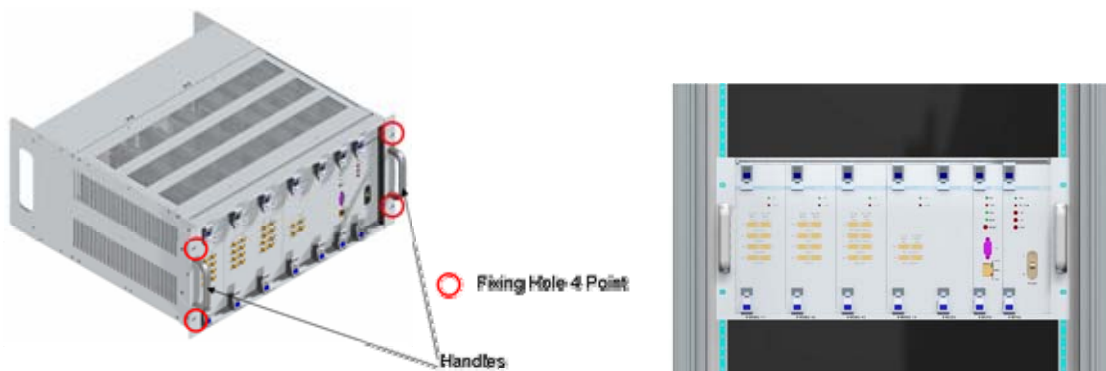


Figure 5.1 – RACK Installation

BIU has the following components:

No.	Unit	Description	Remark
Common Part	Shelf	Including Main Board, 19",5U	1EA
	MCDU	-	1EA
	MCPU	With Ethernet Port and RS-232 Port	1EA
	MPSU	Operate -48Vdc Input	1EA
	Power Cable	-48Vdc Input with two lug terminal	1EA
Optional Part	MDBU	800PS,800PS+900I+Paging,850C,850C+700P S, 1900P, AWS-1 MDBU	Up to 4EA to be inserted

Basically, the common part of BIU should have shelves and it should be equipped with MCDU

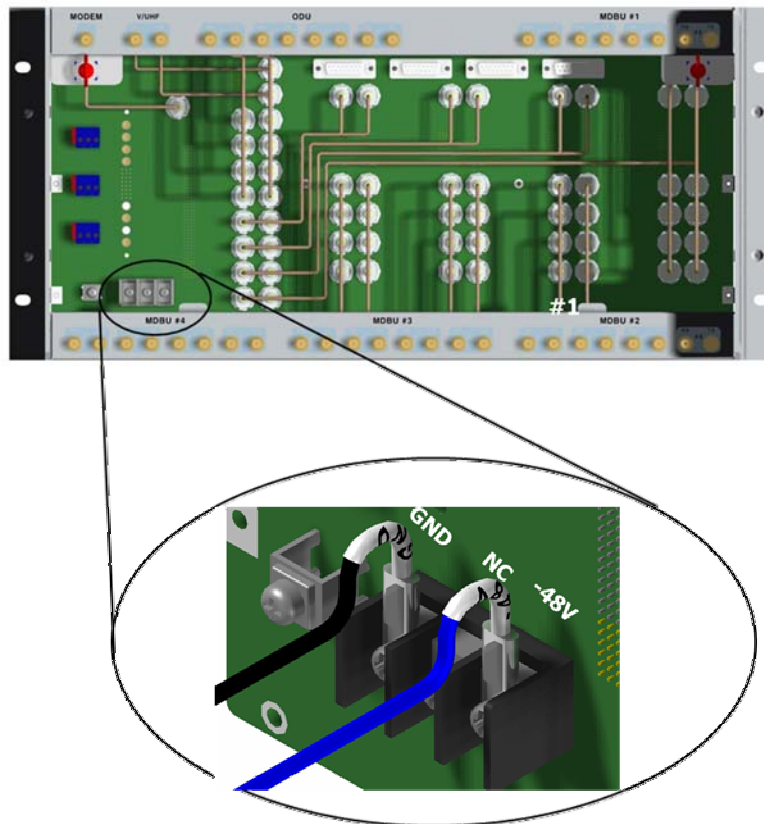
to combine and divide TX/RX signals, MPSU to supply devices with power, MCU to inquire and control state of each module and Power Cable to supply power from external rectifiers. In addition, MDBU can be inserted and removed to provide services for desired band (Optional).


5.1.2 BIU Power Cabling

BIU has -48V of input power. This unit should connect DC cable with the Terminal Block seen at the rear of BIU.

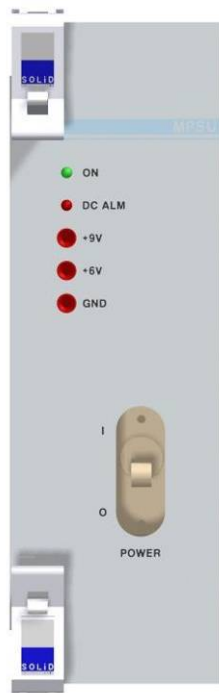
Terminal	Color of cable	Description	Remark
-48V	Blue color	-	
GND	Black color	-	
NC	Not Connected	-	





Before connecting the power terminal, you need to connect "+" terminal of Multi Voltage Meter probe with the GND terminal and then connect "-" terminal with -48V to see if "-48Vdc" voltage is measured. After the check, you need to connect the power terminal with the terminal of the terminal block seen below.



 Note that BIU does not operate if the "+" terminal and the "-" terminal of the -48V power are not inserted into the accurate polarity.

When you connect -48V power with BIU, use the ON/OFF switch of 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	

5.1.3 RF Interface at BIU

BIU can be connected with Bi-Directional Amplifier and Base Station Transceiver.

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

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

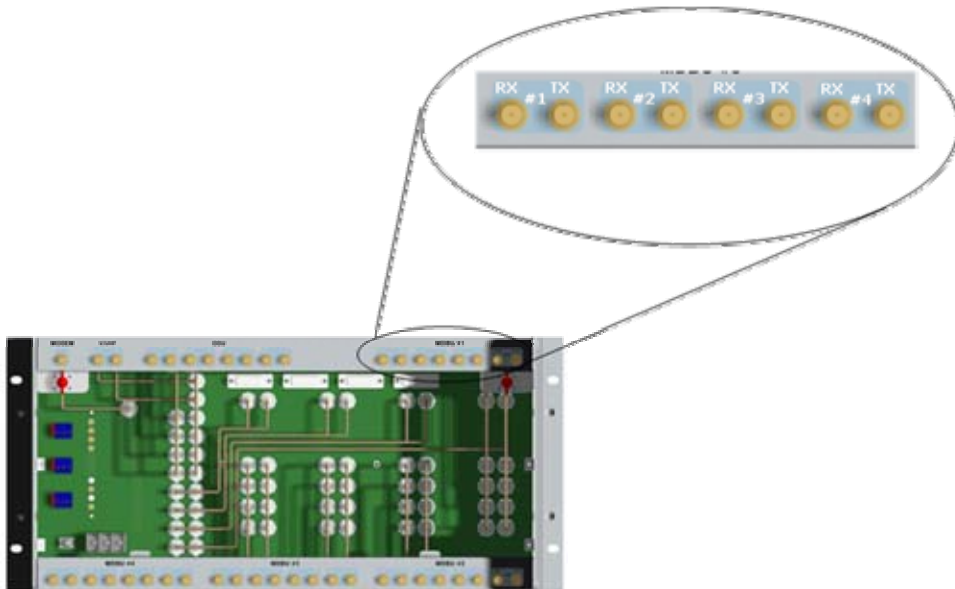
Using MDBU separated from each carrier band, BIU can easily expand and interface with bands. As seen in the table below, MDBU is divided into Single and Dual Bands. The unit can be connected with two to four carrier signals per band. At the rear, #1~4 marks are seen in order per MDBU. The following table shows signals to be fed to corresponding ports:

No	Unit naming	Description	In/out RF Port
----	-------------	-------------	----------------

				TX	RX
1	800PS MDBU	Single Band	Port #1	800PS TX(851~869MHz)	800PS RX(806~824MHz)
			Port#2	800PS TX(851~869MHz)	800PS RX(806~824MHz)
2	850C MDBU	Single Band	Port #3	850C TX(869~894MHz)	850C RX(824~849MHz)
			Port#4	850C TX(869~894MHz)	850C RX(824~849MHz)
3	1900P MDBU	Single Band	Port#1	1900P TX(1930~1995MHz)	1900P RX(1850~1915MHz)
			Port#2	1900P TX(1930~1995MHz)	1900P RX(1850~1915MHz)
			Port#3	1900P TX(1930~1995MHz)	1900P RX(1850~1915MHz)
			Port#4	1900P TX(1930~1995MHz)	1900P RX(1850~1915MHz)
4	AWS-1 MDBU	Single Band	Port#1	AWS-1 TX(2110~2155MHz)	AWS-1 RX(1710~1755MHz)
			Port#2	AWS-1 TX(2110~2155MHz)	AWS-1 RX(1710~1755MHz)
			Port#3	AWS-1 TX(2110~2155MHz)	AWS-1 RX(1710~1755MHz)
			Port#4	AWS-1 TX(2110~2155MHz)	AWS-1 RX(1710~1755MHz)
5	800PS+900I+PA MDBU	Dual Band 800PS:2Port 900I:1Port Paging:1Port	Port#1	800PS TX(851~869MHz)	800PS RX(806~869MHz)
			Port#2	800PS TX(851~869MHz)	800PS RX(806~869MHz)
			Port#3	Paging TX(929~932MHz)	Paging RX(896~902MHz)

			Port#4	900I TX(929~941MHz)	900I RX(896~902MHz)
6	850C+700PS MDBU	Dual Band 700PS:2Port 850C:2Port	Port#1	700PS TX(764~776MHz)	700PS RX(794~806MHz)
			Port#2	700PS TX(764~776MHz)	700PS RX(794~806MHz)
			Port#3	850C TX(869~894MHz)	850C RX(824~849MHz)
			Port#4	850C TX(869~894MHz)	850C RX(824~849MHz)

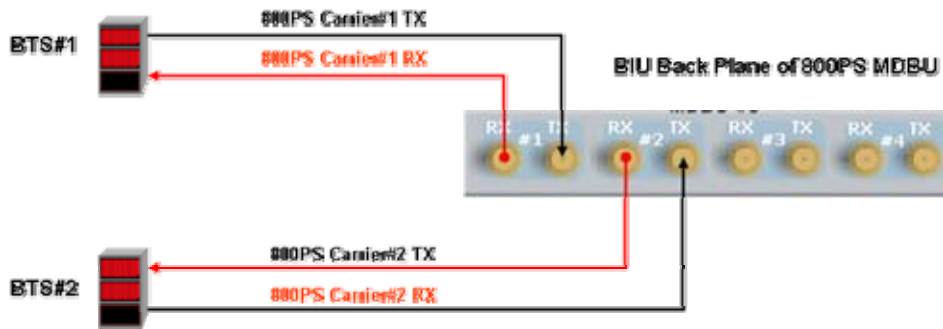
At the rear of BIU, input and output ports are seen for each MDBU. The name of all the ports are silk printed as "#1, #2, #3 and #4." Referring to the table above, you need to feed right signals to input and output ports of corresponding MDBU.



For each port, TX signals and RX signals are separated from each other. You don't have to terminate unused ports unless you want to.

BIU interface with Base station Transceiver

Basically, BIU has different TX and RX ports, and so, you have only to connect input and output ports.



Through spectrum, you need to check signals sent from BTS TX. If the signals exceed input range (-20dBm~+10dBm), you can connect an attenuator ahead of the input port to put the signals in the input range.

BIU interface with Bi-Directional Amplifier

Basically, BIU is in Simplexer type; when you use BDA, you need to separate BDA signals from TX and RX type.

Using a duplexer or a circulator, you can separate TX/RX signals of an external device from each other.

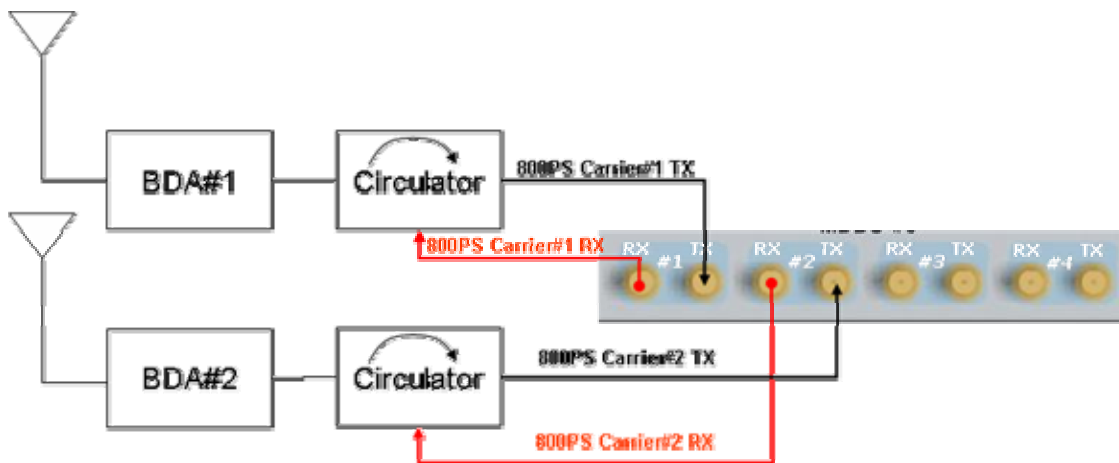


Figure 5.2 – 800PS BDA Interface using Circulator

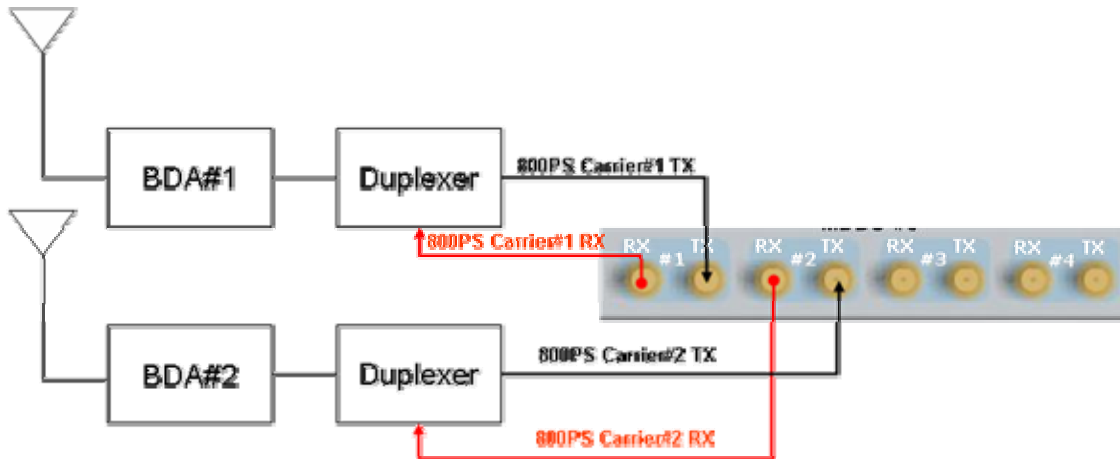


Figure 5.3 – 800PS BDA Interface using Duplexer

BIU interfaces with BDA in either of the methods above. In this case, you need to check TX input range as well.



Given the TX input range (-20dBm~+10dBm/Total per port), make sure to see if the value is in the input range, using Spectrum Analyzer, when you connect input ports.

5.1.4 MDBU insertion

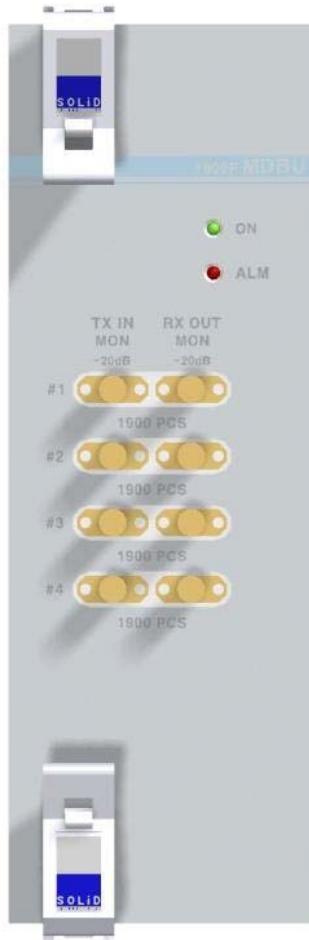
MDBU is designed to let a MDBU inserted into any slot.

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



If you do not terminate input and output ports of MCDU, which combines TX signals and divides RX signals, it will cause loss and generation of spurious signals at the other party's band. Given this, make sure to insert MDBU BLANK into slots of MDBU.

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



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

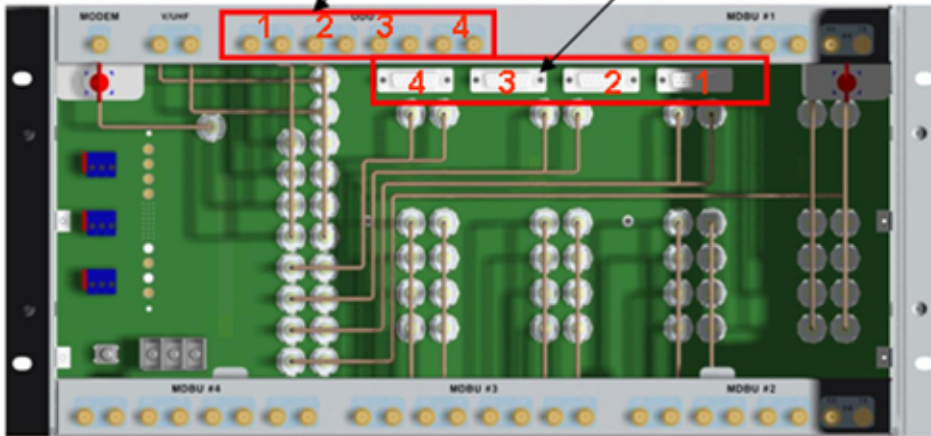
MONITOR SMA port seen at the front panel of MDBU enables you to check current level of TX input and RX output signals in current service without affecting main signals. TX MON is -20dB compared with TX Input power and RX MON is -20dB as well compared with RX Output power.

5.1.5 ODU Interface

BIU supports up to four ODUs. At the rear of BIU, eight RF input and output ports for ODU and four power ports for power supply and communication are provided. At BIU, you can check installation information of ODU.

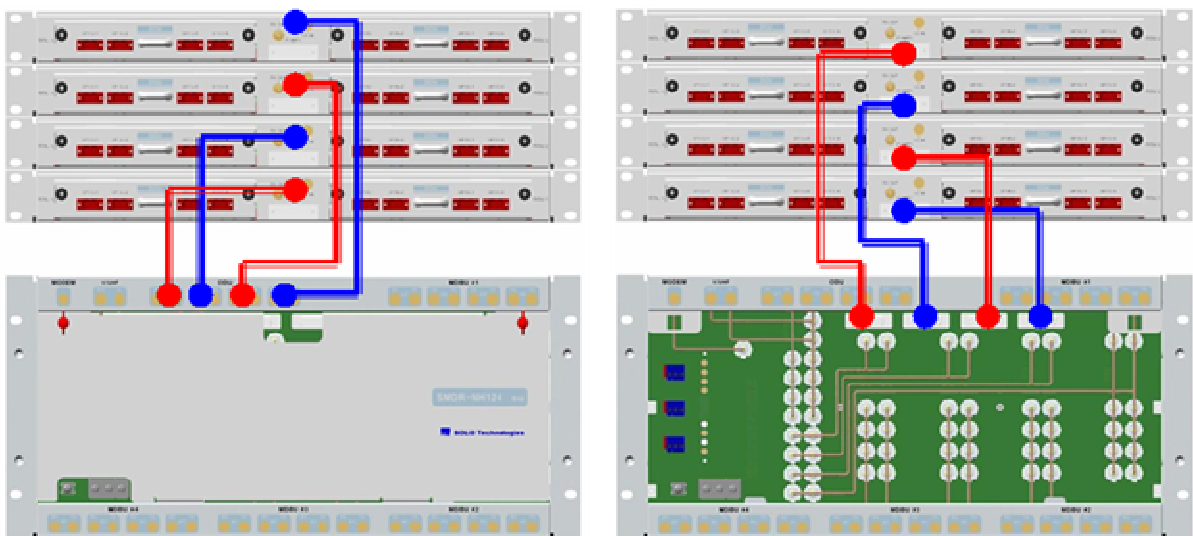
RF Port for interface with ODU

Signal Port for interface with ODU



At the rear part of ODU, the number of RF Ports and Signal Ports are printed in order. Therefore, you need to be careful in case of expansion of ODU.

ODU Numbering	RF Port		Signal Port
	TX	RX	
ODU 1	#1		ODU-1
ODU 2	#2		ODU-2
ODU 3	#3		ODU-3
ODU 4	#4		ODU-4





If ODU is not connected in the right order, related devices may fail to communicate with each other or the unit may read wrong information. Given this, you need to connect the unit with accurate RF Port and Signal Port in a corresponding number.



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



When you put ODU on the top of BIU, it is recommended to install the unit at least 1U apart from BIU. Heat from BIU climbs up to reach ODU.

5.1.6 Consumption Power of BIU

The table below shows power consumption of BIU:

Part	Unit	Consumption Power	Remark
Common Part	Shelf	7.5 W	
	MCDU		
	MCPU		
	MPSU		
MDBU	MDBU 800PS	12W	
	MDBU 800PS+900I+Paging	20W	
	MDBU 850C	12W	
	MDBU 850C+700PS	19W	
	MDBU 1900P	20W	
	MDBU AWS-1	12W	

BIU supplies power for ODU. Therefore, when you want to calculate total power consumption of BIU, you need to add power consumption of ODU to the total value.

Power consumption of ODU is given in the later paragraph describing ODU.