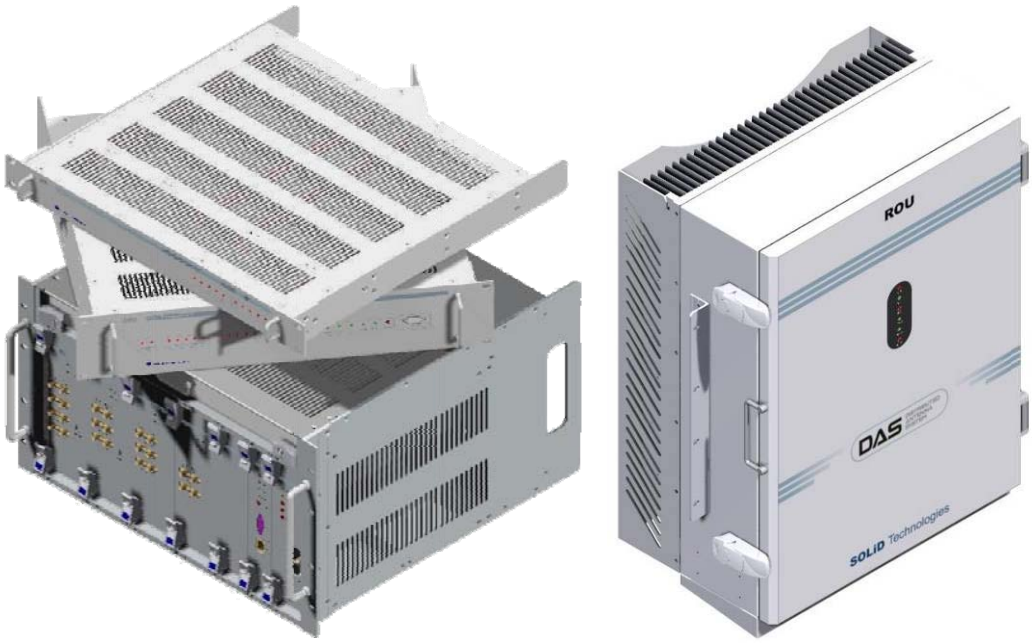
SMDR-NH124

Installation and Operation Manual



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V 3.0	Feb. 04. 2010			Add ADD ON V/UHF ROU
V 4.0	Nov. 24. 2010			Add RDU E-VHF+UHF
V 5.0	Feb. 21, 2011			LTE FULL BAND
V 6.0	May. 22, 2012			Add 700LTEF+850C

Technical Support

SOLiD serial numbers must be available to authorize technical support and/or to establish a return authorization for defective units. The serial numbers are located on the back of the unit, as well as on the box in which they were delivered. Additional support information may be obtained by accessing the SOLiD Tehcnology, Inc. website at www.st.co.kr or send email at sjkim@st.co.kr

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Section1

Safety & Certification Notice

“Only qualified personnel are allowed to handle this unit. Read and obey all the warning labels attached in this user manual”

Any personnel involved in installation, operation or service of the SOLiD Technology repeaters must understand and obey the following:

- Obey all general and regional installation and safety regulations relating to work on high voltage installations, as well as regulations covering correct use of tools and personal protective equipment.

- The power supply unit in repeaters contains dangerous voltage level, which can cause electric shock. Switch the mains off prior to any work in such a repeater. Any local regulations are to be followed when servicing repeaters.

- The repeater cover should be (door) securely fastened in open position, e.g. by tying it up, at outdoor work in order to prevent door from slamming due to wind causing bodily harm or damage.

- Use this unit only for the purpose specified by the manufacturer. Do not carry out any modifications or fit any spare parts which are not sold or recommended by the manufacturer. This could cause fires, electric shock or other injuries.

- Any repeater, including this repeater, will generate radio signals and thereby give rise to electromagnetic fields that may be hazardous to the health of any person who is extensively exposed to the signals at the immediate proximity of the repeater and the repeater antennas.

- Due to power dissipation, repeater may reach a very high temperature. Do not operate this unit on or close to flammable materials.

- Do not use any solvents, chemicals, or cleaning solutions containing alcohol, ammonia, or abrasives.

- Certification
  - FCC: This equipment complies with the applicable sections of Title 47 CFR Parts 15,22,24 and 90

  - UL/CUL: This equipment complies with UL and CUL 1950-1 Standard for safety for information technology equipment,including electrical business equipment

  - FDA/CDRH: This equipment uses a Class 1 LASER according to FDA/CDRH Rules.This product conforms to all applicable standards of 21 CFR Chapter 1, Subchaper J, Part 1040

-For PLUGGABLE EQUIPMENT, the socket-outlet shall be installed near the equipment and shall be easily accessible.

Section2

System Overview

2.1 General overview

2.2 System overview

2.1 General overview

SMDR-NH124 is a coverage system for in-building services delivering voice and data in high quality and for seamlessly.

As a distributed antenna system, it provides analog and digital phone systems that are served in multiple bands through one antenna.

The system covers general public institutions and private facilities.

- Shopping malls
- Hotels
- Campus areas
- Airports
- Clinics
- Subways
- Multi-use stadiums, convention centers, etc.

The system helps improve in-building radio environments in poor condition and make better poor RSSI and Ec/Io. By providing communication services at every corner of buildings, the system enables users to make a call at any site of buildings.

The system uses both analog (AMPS) and digital (TDMA, CDMA and WCDMA) methods.

The SMDR-NH124 system supports communication standards and public interface protocols in worldwide use.

- Frequencies: VHF,UHF, 700MHz, 800MHz,850MHz 900MHz,1900MHz,2100MHz, etc.
- Voice protocols: AMPS,TDMA, CDMA,GSM,IDEN, etc.
- Data protocols: EDGE,GPRS,WCDMA,CDMA2000,Paging, etc.

SMDR-NH124 is in modular structure per frequency. To provide desired frequency in a building, all you need to do is to insert a corresponding frequency module into each unit. As it delivers multiple signals with one optical cable, the system, in one-body type, does not require additional facilities whenever new frequency is added.

The system is featured with the following:

- Flexibiltiy & Scalabiltiy
  - Support fiber-optic ports up to 39
  - Clustering multiple-buildings (campus) as one coverage
- Modular structures
  - Modular frequency upgrade
  - Plug-in type module
- Multi-Band, Multi Operator

- Signals with a plurality of service provider transmit simultaneously
- Support multi-operator in a band

- Low OPEX / CAPEX
  - Compact design
  - Upgradable design
  - Easy installation and maintenance
  - Web Based SNMP or GSM Modem or UDP support (Optional)

2.2 System overview

SMDR-NH124 is composed of devices given below.

Basically, the system consists of BIU (BTS Interfcace Unit), ODU (Optic distribution Unit) and ROU (Remote Optic Unit). For addition of more ROUs, it has OEU (Optic Expansion Unit).

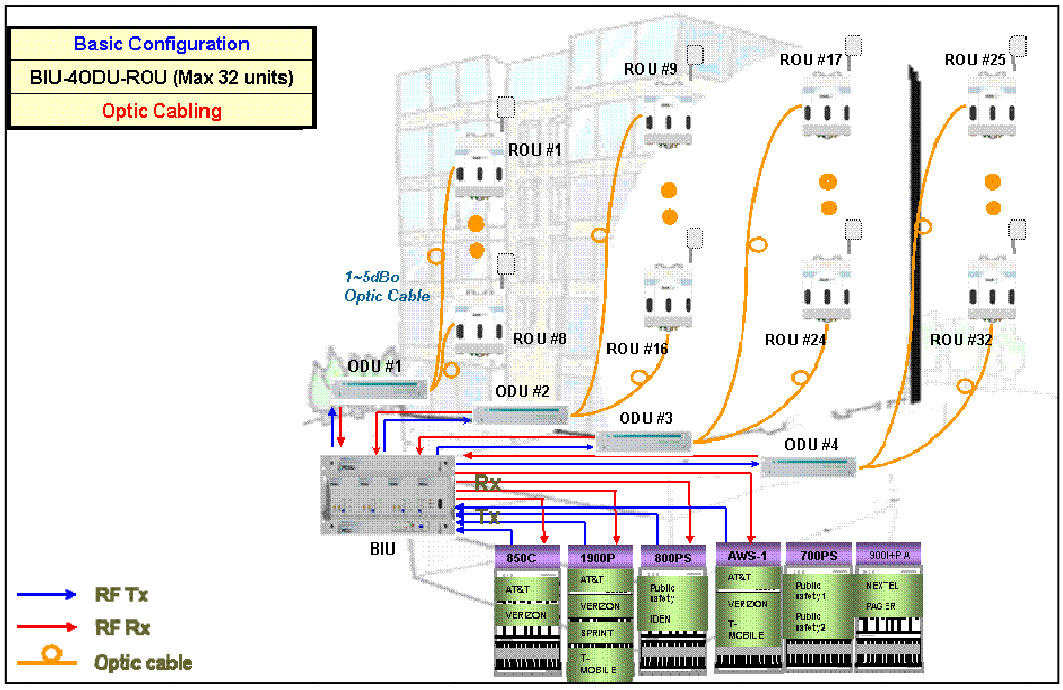


Figure 2.1 – Basic system topology

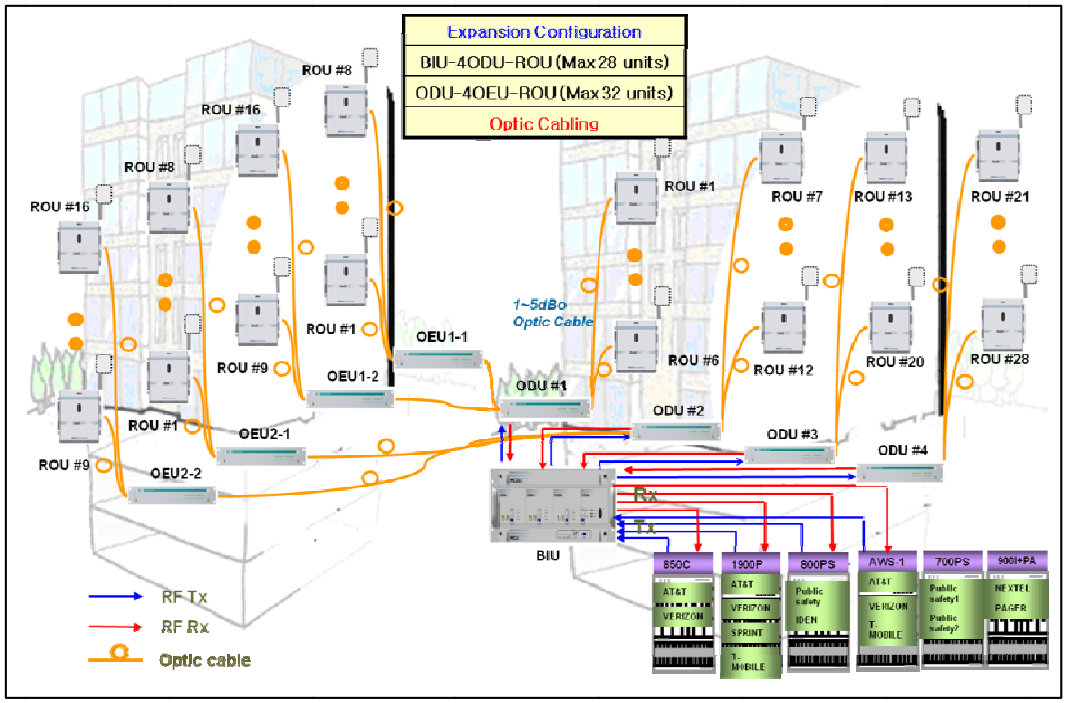


Figure 2.2 – Expansion system topology

Table 3.1 – System topology Charts

System elements	Optical Loss [dBo]	Max. RUs
BIU – ODU(DOUx1) – ROU	1~5dBo	4
BIU – ODU(DOUx2) – ROU	1~5dBo	8
BIU – 4ODU(DOUx2) – ROU	1~5dBo	32
BIU – 4ODU(DOUx2)-4OEU(DOUx2) – ROU	1~5dBo	60

Section3

System Specifications

3.1 System specifications

3.1.1 Physical Specifications

3.1.2 Optic wavelength and Laser power

3.1.3 Environmental specifications

3.1.4 Operating Frequencies range

3.1.5 Specifications Per band

3.1 System specifications

3.1.1 Physical Specifications

Parameter	BIU	ODU	OEU	ROU	AOR
RF Connectors	4 SMA type, female (Per MDBU)	2 SMA type, female	-	1N-type,female	2 SMA Type female
External Alarm connector (Dry contacts)	Terminal block,3pcs	-	-	-	-
Serial Interface connector	1 RS-232 9-pin D-sub, male		1 RS-232 9-pin D-sub, male	1 RS-232 9-pin D-sub, male	-
Fiber connector	-	8pcs, SC/APC for ROU	1 SC/APC for ODU 8 SC/APC for ROU	1 SC/APC for ODU	-
LED Alarm and Status Indicator	MDBU Status ● Power On status ● ALM status MCPU ● Power On status ● TX Communication ● RX Communication ● ALM status MPSU ● Power On status ● DC ALM status	DOU1 Status ● LD status ● PD1/2/3/4 status DOU2 Status ● LD status ● PD1/2/3/4 status	EWDM Status ● LD status ● PD status DOU1 Status ● LD status ● PD1/2/3/4 status DOU2 Status ● LD status ● PD1/2/3/4 status System status ● Power on status ● TX Communication ● RX Communication	System status ● Power on status ● TX1 Communication ● RX1 Communication ● TX2 Communication ● RX2 Communication ● ALM status	-
AC Power	-	-		Normal Range: 120VAC 50/60Hz Operating range 108~132VAC,50/60Hz	Same left side
DC Power	Normal range: -48 VDC Operating range: -40.8 ~ -57.6VDC	-		Normal: -48 VDC Operating range: -40.8 ~ -57.6VDC	Same to left side
Power consumption	168W (Including ODU 4EA)	-	48W (Including DOU2EA)	265W (Including RDU 3EA)	78W (VHF/UHF RDU)
Enclosure Dimensions	482.6(19”) x 221.5(5U) x 450	482.6(19”) x 43.6(1U) x 450	482.6(19”) x 88.1(2U) x 450	420 x 530 x 258	482.6(19“) x 258 x 177
Weight[Full Load]	22.25Kg	5.7Kg	9.3Kg	35.45Kg	11Kg

3.1.2 Optic wavelength and Laser power

Parameter	ODU	OEU	ROU
Wavelength	TX: 1310nm RX: 1550nm	West optic TX: 1550nm, RX: 1310nm East optic TX: 1310nm, RX: 1550nm	TX: 1550nm RX: 1310nm
Output power	3dBm±1dBm to ROU,OEU	3dBm±1dBm to ROU 7dBm±1dBm to ODU	7dBm±1dBm to ODU

3.1.3 Environmental specifications

Parameter	BIU, ODU, OEU	ROU/AOR
Operating Temperature	-10 to +50°C	-10 to +50°C
Operating Humidity, non condensing	-	5% to 90%

3.1.4 Operating Frequencies range

Standard	Unit naming	Description	Frequency range	
			TX(MHz)	RX(MHz)
iDEN	700P	Public safety	764 to 776	794 to 806
iDEN	800P	Public safety	851 to 869	806 to 824
Cellular	850C	Cellular	869 to 894	824 to 849
Iden	900I+PA	SMR+	929 to 941	896 to 902
Paging	900 PA	Paging	929 to 930	896 to 902
PCS	1900P	PCS	1930 to 1995	1850 to 1915
AWS-1	AWS-1	AWS-1	2110 to 2155	1710 to 1755
-	VHF	Public safety	136 to 174	136 to 174
-	UHF	Public safety(Band1)	396 to 450 450 to 512	396 to 450 450 to 512
		Public safety(Band2)	380 to 434 434 to 496	380 to 434 434 to 496
LTE	700LTE	Long Term Evolution	728 to 757	698 to 716 777 to 787

3.1.5 Specifications Per band

700MHz Long Term Evolution

Parameters	Typical		Remarks
	TX	RX	
Bandwidth	29MHz	28MHz	RX(MHz): 698~716 777~787
System ripple	≤5dB	≤5dB	
Input Power level	-20 to +10dBm	≤-50dBm	
Output power	+30dBm	+0dBm	Total
System Gain	43dB	50dB	
Gain Control range	18 to 43dB	30 to 50dB	
IM3	-13dBm	-	
IP3	-	+23dBm	
Noise figure	-	15dB	1ROU

700MHz Public safety

Parameters	Typical		Remarks
	TX	RX	
Bandwidth	12MHz	12MHz	
System ripple	≤5dB	≤5dB	
Input Power level	-20 to +10dBm	≤-50dBm	
Output power	+23dBm	+0dBm	Total
System Gain	43dB	50dB	
Gain Control range	18 to 43dB	30 to 50dB	
IM3	-13dBm	-	
IP3	-	+23dBm	
Noise figure	-	15dB	1ROU

800MHz Public safety

Parameters	Typical		Remarks
	TX	RX	
Bandwidth	18MHz	18MHz	
System ripple	≤5dB	≤5dB	
Input Power level	-20 to +10dBm	≤-50dBm	
Output power	+30dBm	+0dBm	Total
System Gain	43dB	50dB	
Gain Control range	18 to 43dB	30 to 50dB	
IM3	-13dBm	-	
IP3	-	+23dBm	
Noise figure	-	15dB	1ROU

850MHz Cellular

Parameters	Typical		Remarks
	TX	RX	
Bandwidth	25MHz	25MHz	
System ripple	≤5dB	≤5dB	
Input Power level	-20 to +10dBm	≤-50dBm	
Output power	+30dBm	+0dBm	Total
System Gain	43dB	50dB	
Gain Control range	18 to 43dB	30 to 50dB	
IM3	-13dBm	-	
IP3	-	+23dBm	
Noise figure	-	15dB	1ROU

900MHz iDEN & Paging

Parameters	Typical		Remarks
	TX	RX	
Bandwidth	12MHz	6MHz	
System ripple	≤5dB	≤5dB	
Input Power level	-20 to +10dBm	≤-50dBm	
Output power	+30dBm	+0dBm	Total
System Gain	43dB	50dB	
Gain Control range	18 to 43dB	30 to 50dB	
IM3	-13dBm	-	
IP3	-	+23dBm	
Noise figure	-	15dB	1ROU

1900MHz PCS

Parameters	Typical		Remarks
	TX	RX	
Bandwidth	65MHz	65MHz	
System ripple	≤5dB	≤5dB	
Input Power level	-20 to +10dBm	≤-50dBm	
Output power	+30dBm	+0dBm	Total
System Gain	50dB	50dB	
Gain Control range	25 to 50dB	30 to 50dB	
IM3	-13dBm	-	
IP3	-	+23dBm	
Noise figure	-	15dB	1ROU

1700MHz&2100MHz AWS-1

Parameters	Typical		Remarks
	TX	RX	
Bandwidth	45MHz	45MHz	
System ripple	≤5dB	≤5dB	
Input Power level	-20 to +10dBm	≤-50dBm	
Output power	+30dBm	+0dBm	Total
System Gain	50dB	50dB	
Gain Control range	25 to 50dB	30 to 50dB	
IM3	-13dBm	-	
IP3	-	+23dBm	
Noise figure	-	15dB	1ROU

150MHz VHF Public safety

Parameters	Typical		Remarks
	TX	RX	
Bandwidth	38MHz	38MHz	136~174MHz
System ripple	≤5dB	≤5dB	
Input Power level	-15 to +10dBm	≤-54dBm	
Output power	+24dBm	-4dBm	Total
System Gain	39dB	50dB	
Gain Control range	14 to 39dB	30 to 50dB	
IM3	-13dBm	-	
IP3	-	+23dBm	
Noise figure	-	7dB	1ROU

450MHz UHF Public safety

Parameters	Typical		Remarks
	TX	RX	
Bandwidth(Band1)	116MHz	116MHz	396~450MHz(54MHz) 450~512MHz(62MHz) Band selection
Bandwidth(Band2)	116MHz	116MHz	380~434MHz(54MHz) 434~496MHz(62MHz) Band selection
System ripple	≤5dB	≤5dB	
Input Power level	-15 to +10dBm	≤-54dBm	
Output power	+24dBm	-4dBm	Total
System Gain	39dB	50dB	
Gain Control range	14 to 39dB	30 to 50dB	
IM3	-13dBm	-	
IP3	-	+23dBm	
Noise figure	-	7dB	1ROU

Section4

System Configuration and Functions

4.1 BIU (BTS Interface Unit)

4.2 ODU (Optic distribution Unit)

4.3 OEU (Optic Expansion Unit

4.4 ROU (Remote Optic Unit)

4.5 AOR (Add on V/UHF ROU)

4.1 BIU (BTS Interface Unit)

BIU provides TX signals from BTS or BDA for four ODUs (Optic Distribution Unit). This unit separates RX signals given from ODUs from each other per frequency band.

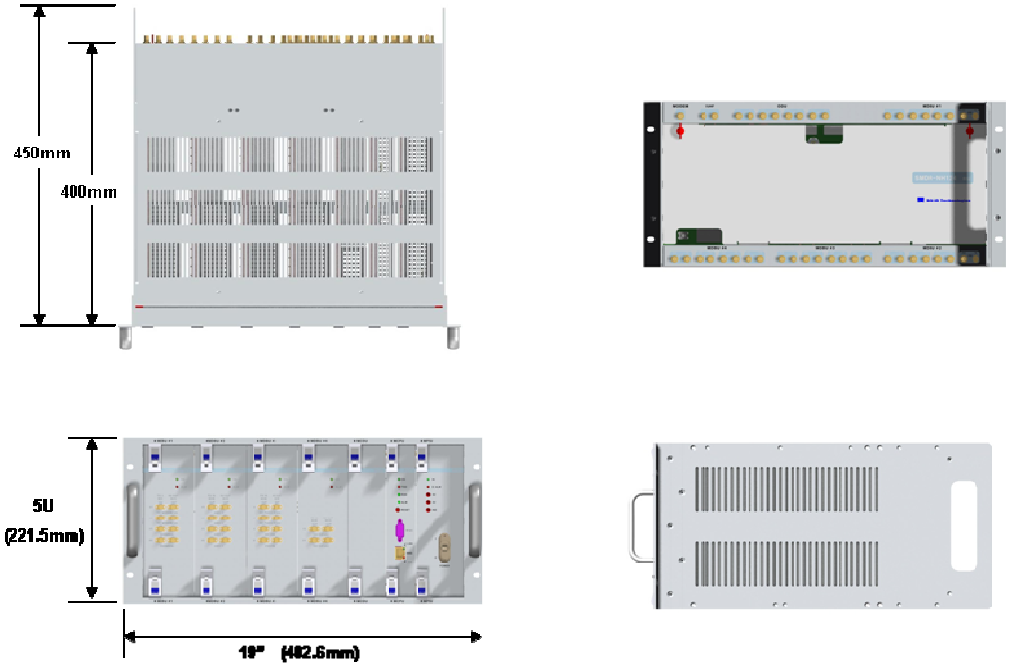
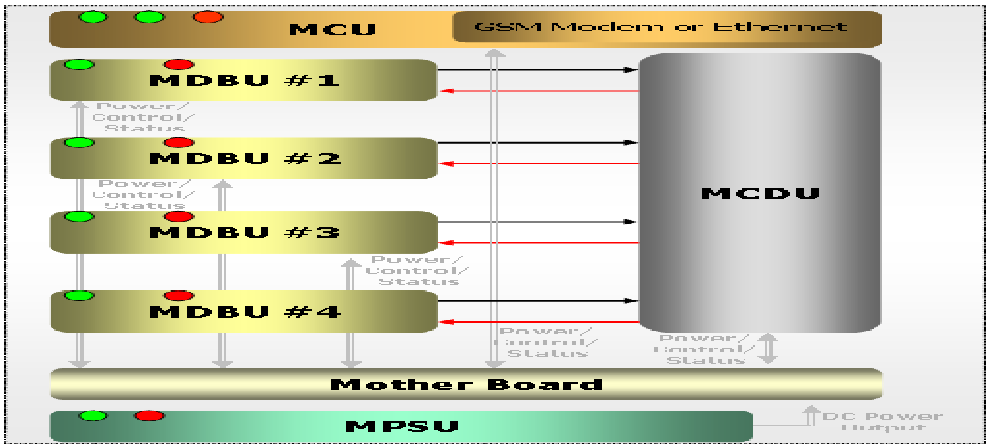


Figure 4.1 – BIU outer view

4.1.1 Specifications of BIU

Item	Spec.	Remark
Size	**482.6(19”) x 221.5(5U) x 450**	Mm
Weight	22.35 Kg	Full Load
Power consumption	168 W	

4.1.2 Block diagram of BIU



4.1.3 BIU parts

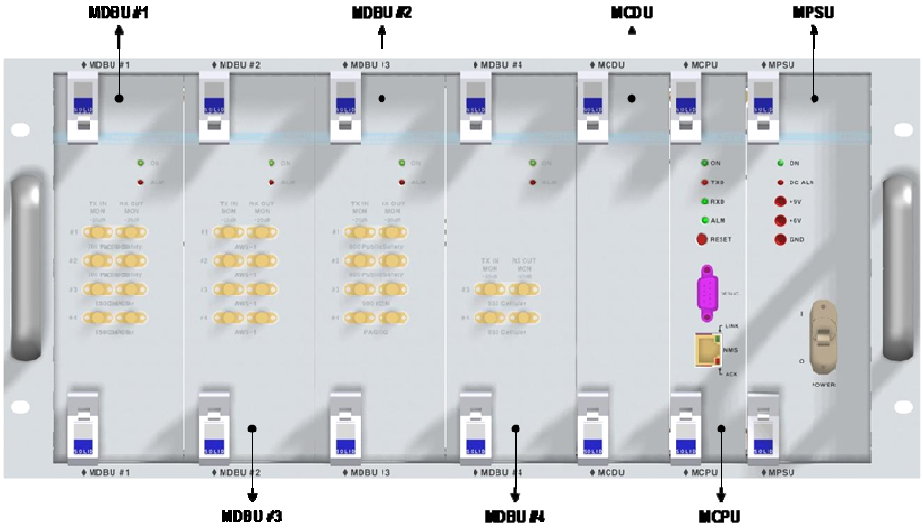


Figure 4.2 – BIU mounting diagram

No.	Unit	Description	Remark
1	MDBU	**Main Drive BTS Unit** Amplify & adjust downlink RF signal Amplify & adjust uplink RF signal	Max 4EA

2	MCDU	**Main Com/Div Unit** Combine 4EA downlink signal and divide 4EA signal to ODU Combine 4EA uplink signal and divide 4EA signal to MDBU Support VHF/UHF interface port	
3	MCPU	**Main Central Processor Unit** Control and monitoring system status Control and monitoring with RS232 Have an access to upper-level network through GSM or Ethernet	
4	MPSU	**Main Power Supply Unit** Input power: DC -48V, Output power: 9V, 6V	
5	M/B	**Mother Board** Provide signal interface and power for each unit Provide three ports for dry contact	
6	Shelf	19 inch, 5U	

4.1.4 Function by unit

4 **Main Drive BTS Unit (MDBU)**

MDBU delivers TX signals of BTS or BDA to related devices and then delivers RX signals of the devices to BTS or BDA. This unit can monitor TX input level. Using input AGC function, it automatically adjusts input ATT. It also has ATT to adjust RX gain. MDBU is varied per frequency band including the following:

No	Unit naming	Description	In/out RF Port	
			TX	RX
1	800PS	Single Band	2 Port	2 Port
2	850C	Single Band	2 Port	2 Port
3	1900P	Single Band	4 Port	4 Port
4	AWS-1	Single Band	4 Port	4 Port
5	800PS+900I+PA	Dual Band	4 Port	4 Port
6	850C+700PS	Dual Band	4 Port	4 Port
7	850C+700LTEC	Dual Band	4 Port	4 Port