



# Universal Distribution Antenna System RAM2241 User Manual



Issue V0.2

Date 2012-March-2

## Copy Right

©Telestone Technologies Co., Ltd, 2012.

All right reversed.

Printed in the P.R.C.

## About This Manual

This publication provides a description of the WFDS™ Universal Distribution Antenna System (U-DAS) plus instructions for installing the main components. An overview of U-DAS and a complete description of the Main Unit (MU) are provided in the U-DAS system RS2200 User Manual. The description includes installation, operation, maintenance, and trouble shooting of the RS2200 MU.

- Note: The information in this publication is subject to change without notice. Every effort has been made in the preparation of this document to ensure accuracy of the contents. But all statement, information, and recommendation in this document do not constitute the warranty of any kind, express or implied.

## Intended Audience

This documents is intended for

- site maintenance
- opened debugging
- system maintenance
- scheme design

## Organization






Chapter	Content
1 Overview	DAS2200 system characteristic, product positioning
2 RAM2241 Remote Unit	RU specification appearance
3 Installation Guide	
4 Open debugging	

5 Trouble shooting	
6 Specification	
7 appendix	

## Conventions

### Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
 <b>DANGER</b>	Indicates a hazard with a high level of risk, which if not avoided, will result in death or serious injury.
 <b>WARNING</b>	Indicates a hazard with a medium or low level of risk, which if not avoided, could result in minor or moderate injury.
 <b>CAUTION</b>	Indicates a potentially hazardous situation, which if not avoided, could result in equipment damage, data loss, performance degradation, or unexpected results.
	Be careful laser
 <b>Note</b>	Provides additional information to emphasize or supplement important points of the main text.

## Change history

Version	Reason for Change
<b>Version 0.1 (2012-04-12)</b>	

Version 0.2 (2012-06-18)	

## General safety precautions

### All safety attention to realize

As the guarantee person and equipment safety, once operating the installation, operation and maintenance of the equipment, please follow the equipment identification and manual that all of the safety precautions.

In the manual, "note", "warning" and "dangerous" matters, doesn't mean that all security matters should abide by, just as all safety precautions supplement.

### Local rules and regulations

Operating equipment, should comply with local regulations and standard. Manual of security precautions only as a local security standard added.

### Basic installation requirements

The persons who are responsible for the installation and operation of the equipments, must first by training to understand all kinds of safety and operation method, and then just can install, operate and maintain the equipments.

### Grounding requirement

The following requirements for requires grounding equipment:

- When installing the equipments, must first grounding; when removing the equipments, to open the ground line at the end.
- Banned damage grounding conductor.
- Banned operating equipment in the condition that there is no grounding conductor.
- Equipment should be permanent grounding. Before operating equipment, should check the electrical connection of the equipment, to ensure that equipment has reliable grounding

## Personal safety

- Banned in the thunderstorm weather to operate the equipment and cables.
- Open hole look straight into the optical fiber, in order to prevent the laser burn eyes.
- If fire, should be evacuated from the building or equipment area, and press the fire alarm, or dial the fire alarm call. In any case, it is strictly prohibited to once again into the burning building.

## Equipment safety

- Before operation, should first fix the equipment on the floor or other solid object, such as the wall or mounts.
- When Installation panel, if need to tighten the screw, must use tools to operate.
- When finish installing equipment, please clean the packing material area.

## Electrical safety

Introduce high voltage, the thunderstorm, big leakage current, and the power cord safety precautions.

### High voltage



**DANGER** The operation of equipment is powered by high voltage power supply, direct contact or through the wet object indirect contact with high voltage power supply, would bring deadly.

Un-standard and un-correct high voltage operation can cause fires or electric shock accidents.

### Thunderstorm weather



**DANGER** Banned in the thunderstorm weather to do high voltage,

---

alternating current operation, and equipment installation , or you will have life risks.

---

## Big leakage current



**WARNING** Before turn on the power, the equipment must grounding, otherwise you will endanger personal and equipment safety.

---

## Power supply cord



**DANGER** Banned connected, disconnected the power cord when charging the equipment. The power cord in the moment of contact with conductor core will produce electric arc or edm, may lead to fire or eye injuries.

---

- Before connect or disconnect the power cord, turn off the power switch.
- Before connect the power cord, confirm that the power cord's label to correct connection.

## Laser

Introduces laser security precautions.

---



**For optical fiber operation, open or close to look straight into ban optical fiber exports.**

---

Equipment laser port, bare optical fiber or connector port will emit invisible laser to the eyes, power density is very high. The laser will burn eyes by look straight into it.

## Laser security guidance

- Please keep the following operation requirement to prevent laser radiation hazard:
- Completes related training personnel to operate
- Before disconnect the optical fiber connectors to ensure shut down the light source.

- Before the light source has been shut down, banned to look directly into the end of any optical fiber.
- An optical power meter should be used to verify active fibers.
- A protective cap hood must be immediately placed over any fiber connector to avoid the potential of dangerous amounts of radiation exposure.

## Fiber operation

Please follow the optical fiber operation requirements:

- Only properly trained personnel to do cutting and welding optical fiber operation.
- Before shear or welding optical fiber, ensure that optical fiber and light are off. After disconnect the optical fiber, using fiber optic caps to protect all of the optical fiber connectors.

## Equipment operation caution

### Optical fiber bending radius



**CAUTION** The smallest bending radius of fiber cable is 20 times of the cable's diameter. Bending over the limit will damage the fiber .

For fiber optic cable construction, not pulling force and bending optical cable; when the optical cable is in the dress and fixed, can't firm too tight, meet the fixed requirements of the optical fiber is ok.

## Optical fiber connectors is clean



**CAUTION** Keep the optical fiber connectors, optical fiber connectors clean. In fiber distribution process, don't open the protective cap of the connectors, can't touch the fiber core. If you find that there is some dirt or oily on fiber core, wipe by alcohol sponge to clean.

## Fiber link logo



**CAUTION** When equipment installation, please clearly marked the number and name of fiber link to avoid the fiber connection error. Fiber link error will lead to U-DAS2200 system does not work normally.

---

In U-DAS2200 system, up link and down link are independent optical transmissions.

Wrong connection for UL and DL, or wrong connections for different ports from higher level can cause equipments do not work normally. In the construction, please be clear the labels of fibers in order to maintenance easily.

## Input power of System



**CAUTION** More than 10 dBm power input will cause permanent damage to the device.

---

U-DAS2200 system input power is -5 dBm ~ 5 dBm, 0 dBm input power design is the best value. In extreme conditions may need to adjust the input power according to the actual devices operation.

## Equipment undesired sound



**CAUTION** Part of the equipment is working by sending out undesired sound. Engineering design need to consider the installation environment

---

The cooling fan equipment is operating by sending out undesired sound, such as PSU.

## Power supply for Equipments



**CAUTION** When MU, EU adopt AC power supply only, there is no export power of MU, EU to the lower level equipments. Only when the MU or EU has DC power supply, the export power of MU or EU to lower level equipments are working.

---



Inside MU and EU, lower power supply of AC/DC is assembled, MU and EU cannot offer of lower equipments remote power supply by themselves. But MU and EU both have the spreader plate which divides into 8 roads input DC power supply for RUs.

## Reboot equipment

---



The ship type switch of MU front panel is for AC power input and backup battery high switch. No DC power switches for MU. DC power high control is controlled by PSU. If need to reboot MU, there are three options.

- 1 Shut down AC, DC, power, and then open PSU, AC power.
- 2.Reset button on the panel.( only reboot the monitor module)
- 3.By OMT software to reboot.

The ship type switch of EU front panel is for AC power input. No DC power switches for EU. DC power high control is controlled by PSU. If need to reboot EU, there are three options same as MU.

---

## Back up battery for equipments

---



MU equipped with backup battery, when MU lost power, the battery maintain MU monitoring module running about 30 minutes, and report the power fault alarm to the management net.

Power switch on MU panel also control the battery back-up switches. The power fault alarm report is on, when the power switch is opened.

---

---

# Content

---

<b>1 Overview .....</b>	<b>1-1</b>
1.1 U-DAS2200 system.....	1-1
1.1.1 System structure introduction.....	1-2
1.1.2 Remote distance.....	1-2
1.2 Features .....	1-2
<b>2 RAM2241 Remote Unit.....</b>	<b>2-1</b>
2.1 RAM2241 Remote Unite Exterior.....	2-1
2.2 RAM2241 Remote Unite Function .....	2-1
2.3 RAM2241 Remote Unite Operating principle.....	2-2
2.4 RAM2241 Remote Unite Panels .....	2-3
2.5 Remote Unite Physical interface.....	2-3
<b>3 Remote Unit Installation .....</b>	<b>3-1</b>
3.1 Remote Unit Installation .....	3-1
3.2 Equipment Connection.....	3-3
<b>4 U-DAS2200 Opening .....</b>	<b>4-1</b>
4.1 The preparing work before opening.....	4-1
4.1.1 The matching of the access power of signal .....	4-1
4.1.2 Equipment address configuration.....	4-2
4.2 U-DAS2200 opening flow.....	4-4
4.2.1 Equipment Power up and Debug .....	4-6
4.2.2 Equipment operation status requiry.....	4-11
<b>5 U-DAS2200 Trouble shooting .....</b>	<b>5-1</b>
5.1 MU trouble shooting stage .....	5-1
5.2 Commond trouble shooting method .....	5-4
5.2.1 Equipment can't be booted.....	5-4
5.2.2 Lower level equipments detection .....	5-5
5.2.3 RU Output Power is low .....	5-6
5.2.4 RU UL Link loss is big .....	5-6
<b>6 U-DAS2200 Specifications .....</b>	<b>6-1</b>
6.1 RAM2241 RU Specification.....	6-1
6.1.1 Performance .....	6-1
6.1.2 Port .....	6-2
6.1.3 Mechanical Structure.....	6-2

6.1.4 Environment .....	6-3
6.1.5 Power Consumption .....	6-3
<b>7 Appendix.....</b>	<b>7-1</b>
7.1 Tools .....	7-1
7.2 List of Acronyms and Abbreviations .....	7-4
7.3 RJ45 pins of DC power supply port of MU/EU.....	7-5
7.4 CAT-5 DC power supply cable .....	7-5

# 1 Overview

## 1.1 U-DAS2200 system

U-DAS2200 system is a solution for transmission and distribution of wireless signals solutions, is a kind of intelligent and active integrated antenna distribution system. Working band can cover from 680 MHz to 2200 MHz for all of the cellular mobile communication frequency. Meet from simple to complex all kinds of indoor wireless access network requirements. System has a transparent transmission, not affected by transfer standard, modulation mode, working bandwidth limitations and other characteristics, easy to flexible use and upgrading. Using U-DAS2200 system, can distribute the wireless signal into signal blind Angle of a building, increases the cover depth and improve indoor signal quality, absorb more traffic.

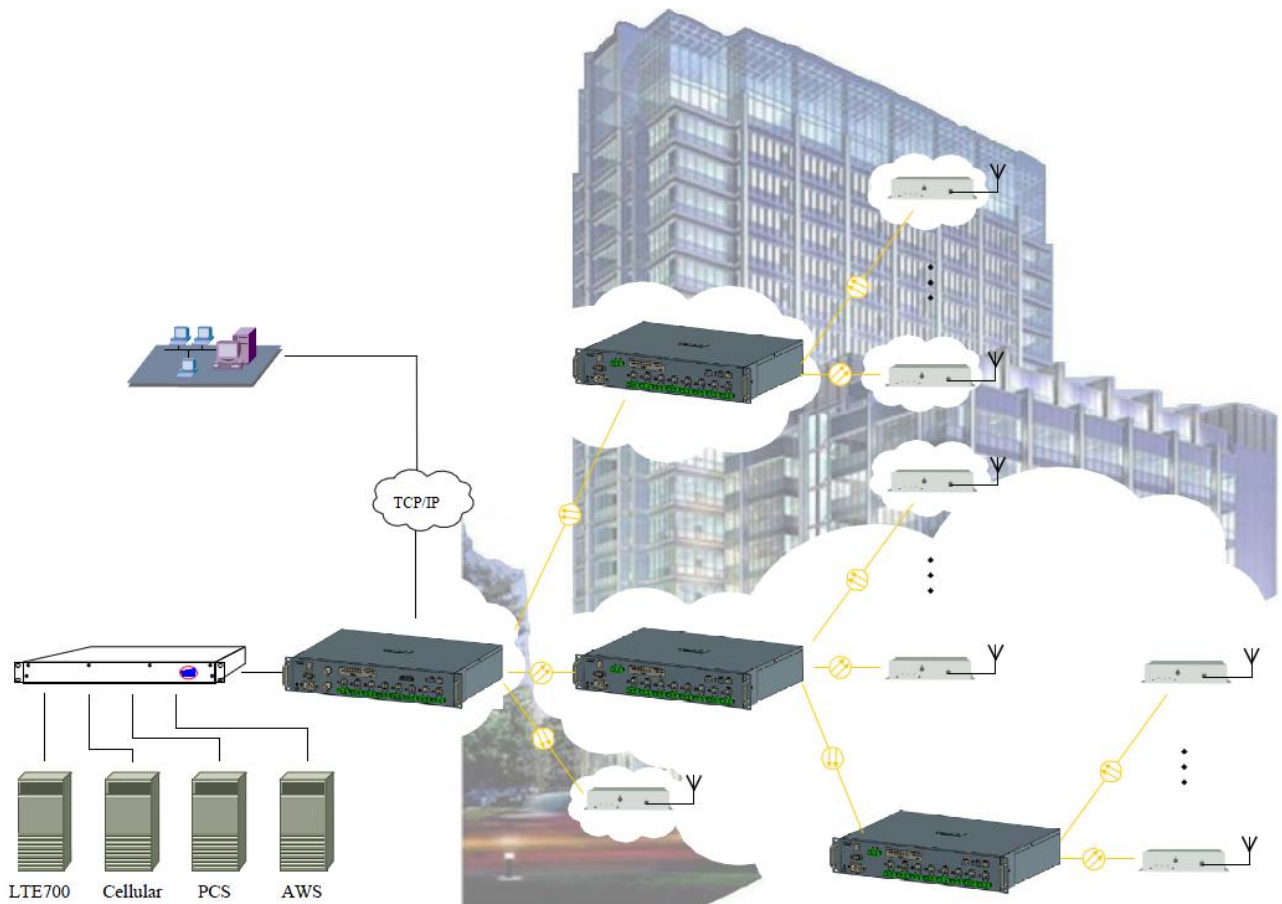


Figure 1-1 Topological structure of the system

As shown in Figure 1-1 shows, U-DAS2200 system the basic equipments: the main unit (MU), expansion unit (EU), remote unit (RU) composition. When the system working in many business state, it needs to increase the wireless access unit (WAU). The wireless access unit (WAU) combines more signals from the base station, and apply the RF signal to master unit (MU). Master unit (MU) will convert the RF signals to light signals, and expanded to 8ways to lower equipment. Expansion unit (EU) can take 1 way optical signals and converted to 8 roads. Remote unit (RU) will convert the optical signal to RF signal, and through the antenna launch out for signal coverage.

### 1.1.1 System structure introduction

U-DAS2200 system support flexible tree network structure, the biggest support 2-level expansion unit. Minimum system is assembly by 1master unit a, 72 expansion unit, 512 a remote unit (RU) composition. Meet the requirement from simple to complex all kinds of indoor wireless access network covering networking requirements.

### 1.1.2 Remote distance

- Fiber Distance of support for U-DAS2200

U-DAS2200 support 10dB optical loss and the maximum distance is 20km for ideal situation, the real distance of fiber is limited on the fiber engineering quality.

- Cable Distance of support for U-DAS2200

In U-DAS2200 system, from EU to RU, we use remote power supply by wire cables, the maximum distance is 150 to 200meters for 4-band RU.

## 1.2 Features

- MU, EU can support the bandwidth from 680 to 2200 MHz, support almost all cellular nets mobile communication frequency;
- MU, EU transparent transmission, not affected by agreement, modulation methods, such as bandwidth of limitation, can upgrade by changing RU, WAU way network ;
- support multi- business to build;
- support tree structure topology, flexible network support 2 levels of EU, 512 a RU;
- source can be placed centrally, RUs share capacity;
- Cell cracking is completed by adding more MUs realization, capacity is upgraded convenient;
- optical fiber transmission, micro power distributed network and reduce un-balance of 2G&3G coaxial cable transition
- Intelligent monitoring system, provide the system work state inspection, control, and alarm report; support SNMP

## 2 RAM2241 Remote Unit

### 2.1 RAM2241 Remote Unit Exterior



Figure 2-1 RAM2241 Remote Unit Exterior

### 2.2 RAM2241 Remote Unit Function

- RAM22XX series Remote Unit (RU) to realize the optical signals are converted to RF signal, and then amplify the multiple frequency RF signal and output by the antenna. At the same time, you can accept superior equipment management, to report devices work status information to the superior equipment.

- RAM22XX series Remote Unite (RU) the main Function includes:
- with 1 to superiors equipment connection, to realize the optical signals are converted to RF signal;
- superior equipment can BE MU or EU;
- can accept the equipment's management, in MU place, can through the PC remote the machine working status, query, configuration , set machine work parameters, etc.;
- support from higher level equipment place take electricity;

## 2.3 RAM2241 Remote Unite Operating principle

Remote Unite is modular design, according to each module of the different realization Function is divided into: optical module of transmission, RF modules, power module, handle monitoring module. Remote Unite (RU) system principle is shown in Figure 2 8.

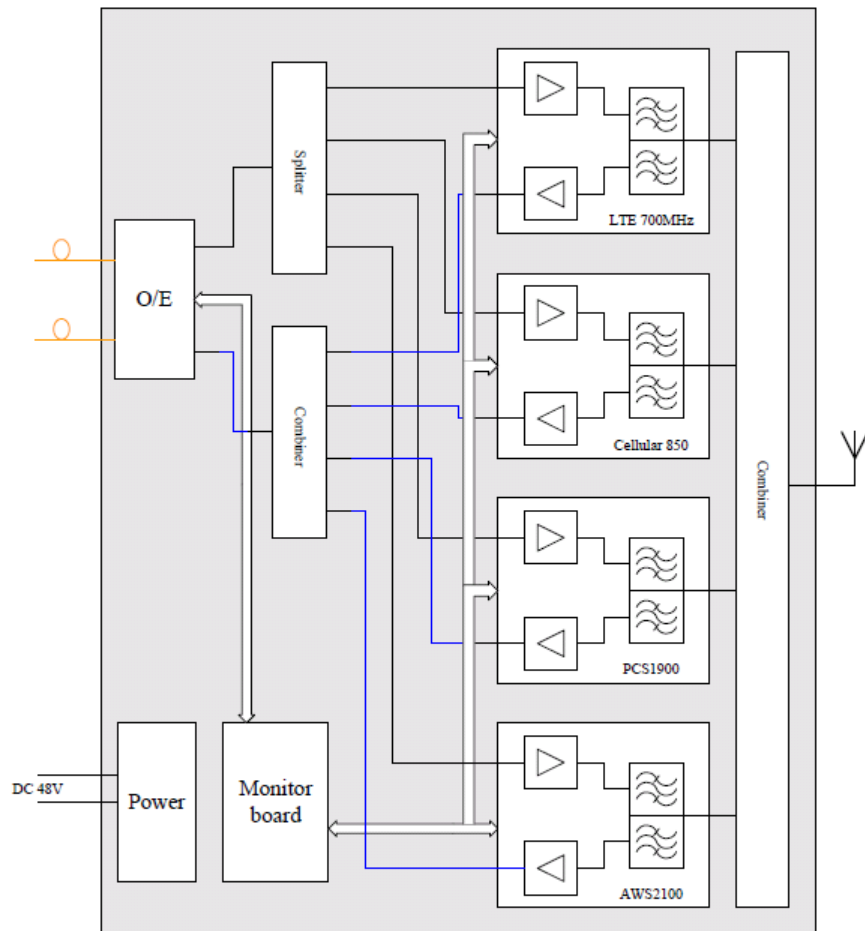


Figure 2-2 RAM2241 Remote Unite system principle Figure

## 2.4 RAM2241 Remote Unite Panels

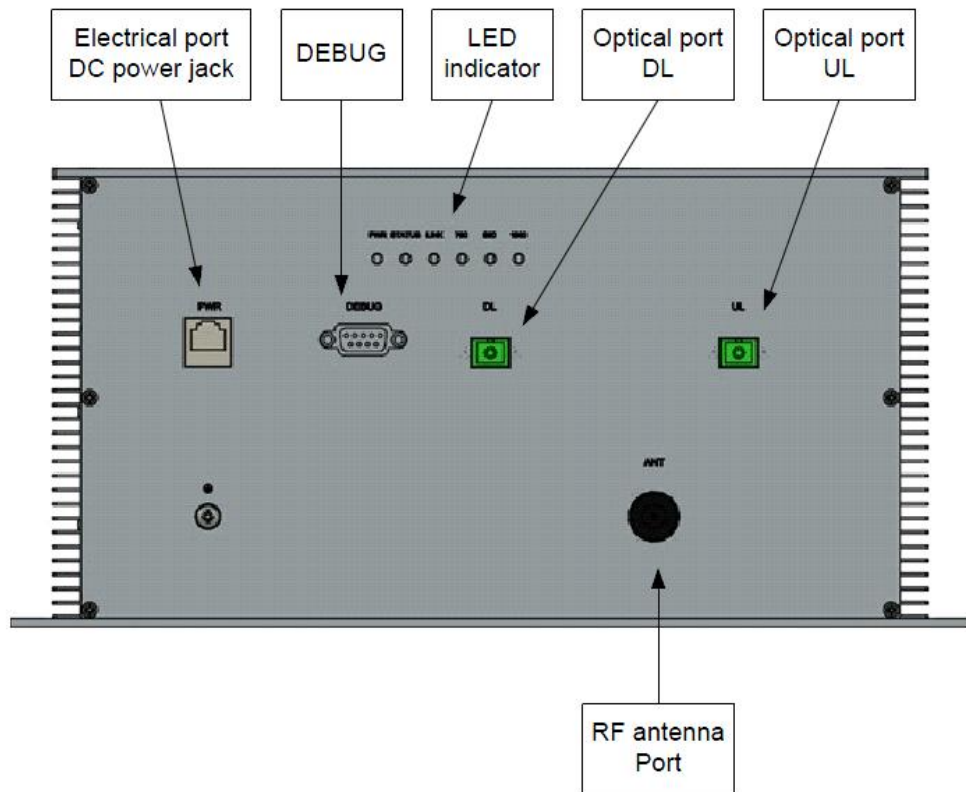


Figure 2-3 RAM2241 Remote Unite Panels

## 2.5 Remote Unite Physical interface

Table 2-1 RAM2241 Remote Unite Physical interface Table

Number	Interface	Quantity	Connector Type	Application
1	DC Power	1	RJ45	RU Power supply port.
2	DEBUG	1	DB9	Connect to pc ,check and upgrade s/w
3	DL Optical port	1	SC-APC	Receive optical signal
4	UL Optical port	1	SC-APC	Transfer optical signal



Number	Interface	Quantity	Connector Type	Application
5	RF antenna port	1	N Type Female	RF output

Note: the lights working status introduction is in Chapter 5

# 3 Remote Unit Installation

## 3.1 Remote Unit Installation

- 1) open the equipment packing, check the packing list;

Check the box of goods and packing list is consistent, check if the equipment have the damage, loss, damage or loss, if has problem, please contact with the local suppliers;

- 2) As Figure 3-1 shows that RU Installation one the wall is with M8 expansion bolt;

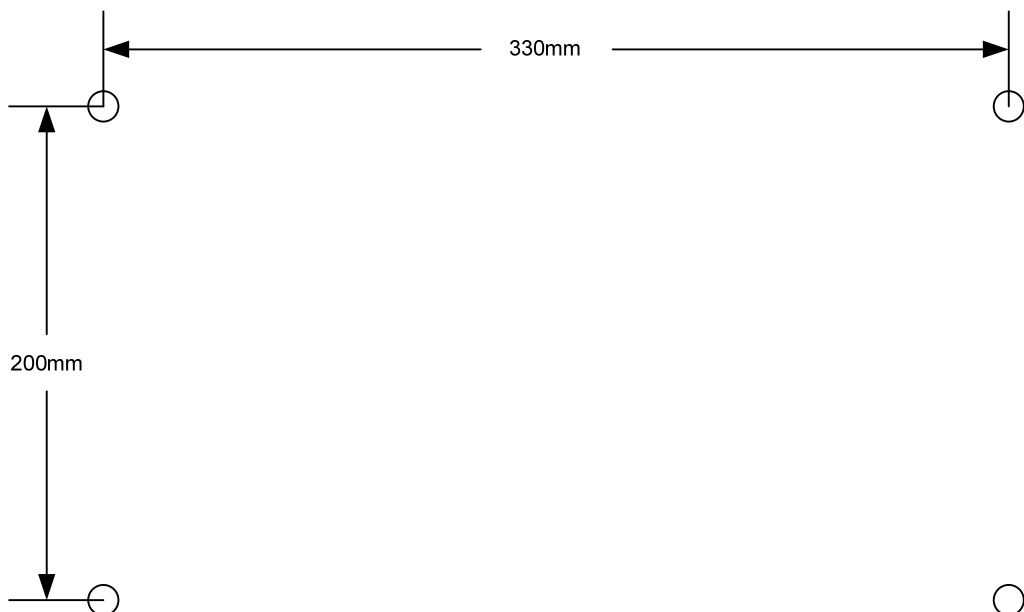


Figure 3-1 RAM2241 RU Installatio

1) Installation M8 Expansion bolt

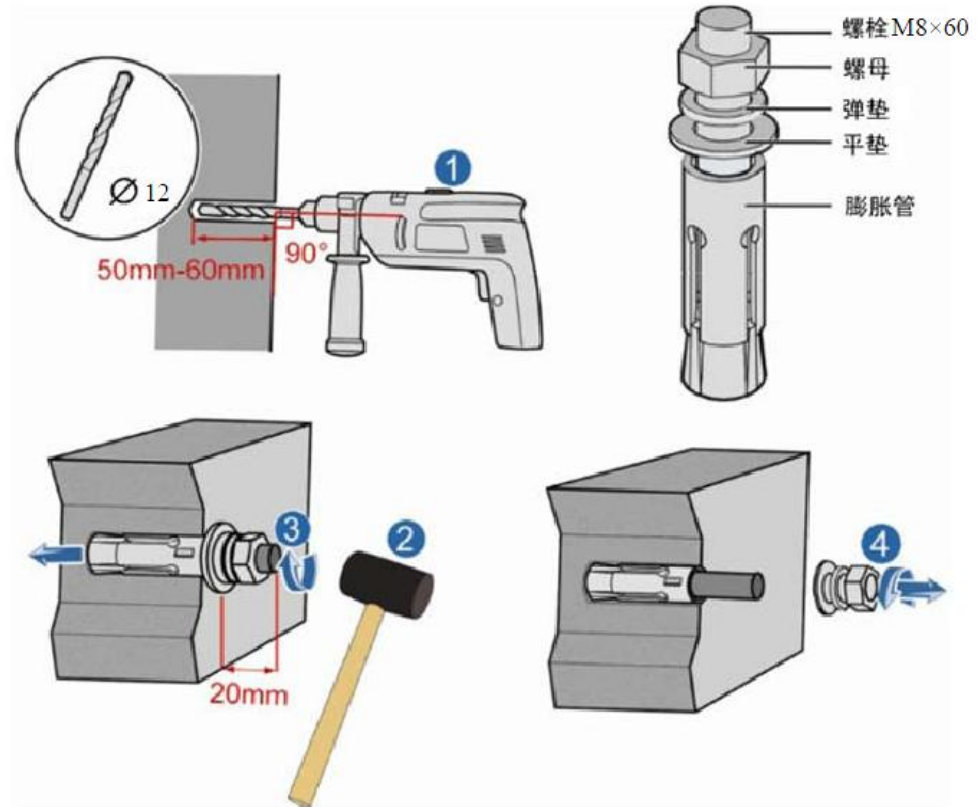


Figure 3-2 Expansion bolt Installation

RU is install LED indicator on the wall

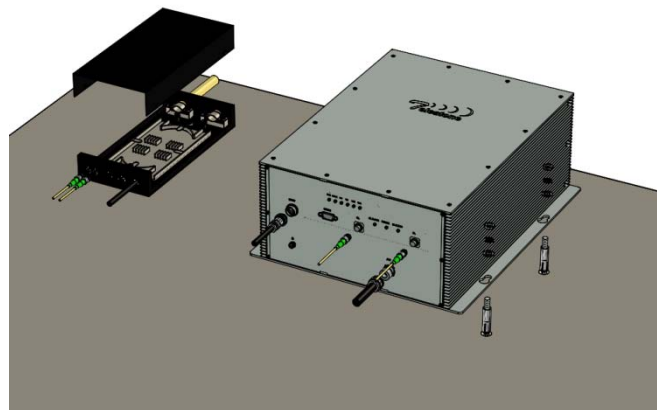


Figure 3-3 RAM2241 RU Installation

2) The terminal box is install LED indicator next to the RU;

## 3.2 Equipment Connection

### 1) RF cable connection



Figure 3-4 RAM2241 RU power supply connection

### 2) Fiber connection

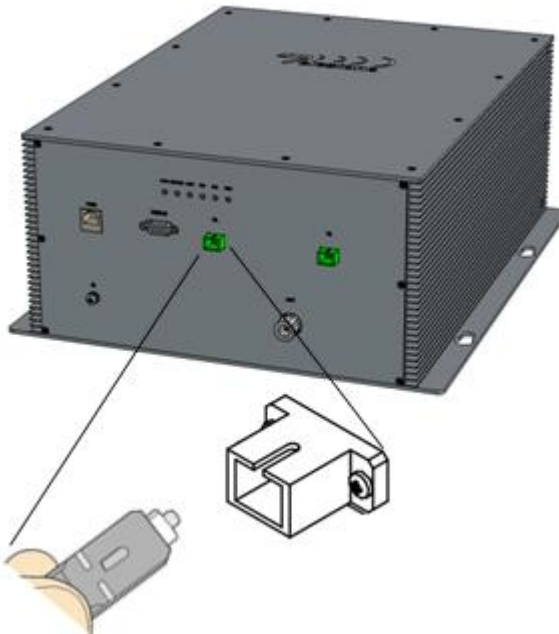


Figure 3-5 RAM2241 RU fiber connection

Take down the dust cap of the equipment, and properly kept, has been used next time. On the positive direction, guarantee the connector center in the same axis, bolt and card slot in the same direction, such as shown in Figure 3-5. Along the axis alignment monitoring, hand knead optical fiber plug shell jog, (note: hold Hand knead shell not the fiber), make the bolt and card slot coordination in place, hear a sound "click" , and can't push, which received has inserted a complete Installation.

### 3) RU power line cable connection



Figure 3-6 RU power line cable connection

Stick the RJ45 connector to the internet socket, the key to the neck such as shown in Figure 3-6, nip the end of the plug and push slightly to the socket. When it clicks, they are connected in place and the RJ45 connector wouldn't get loose. Now, the key ejects and locks the connector, as shown in Figure 3-7

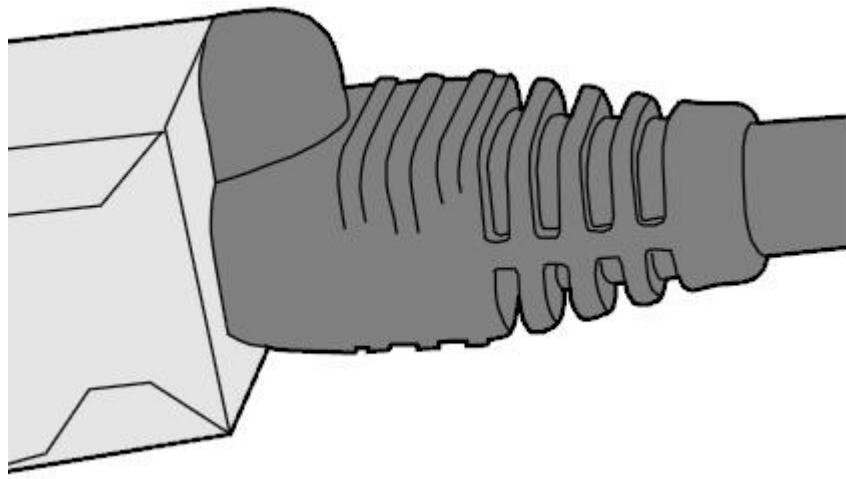


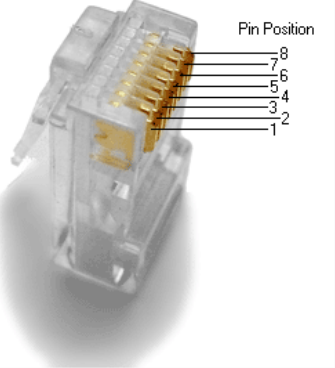















Figure 3-7 RU Power line cable connection

Note, RJ45 joint should adopt standard of T568A or T568B line sequence. If line sequence is wrong then may cause permanent damage to the device.

Pin	T568A Pair	T568B Pair	Wire	T568A Color	T568B Color	Pins on plug face (socket is reversed)
1	3	2	tip	 white/green stripe	 white/orange stripe	
2	3	2	ring	 green solid	 orange solid	
3	2	3	tip	 white/orange stripe	 white/green stripe	
4	1	1	ring	 blue solid	 blue solid	
5	1	1	tip	 white/blue stripe	 white/blue stripe	
6	2	3	ring	 orange solid	 green solid	
7	4	4	tip	 white/brown stripe	 white/brown stripe	
8	4	4	ring	 brown solid	 brown solid	

# 4 U-DAS2200 Opening

---

## 4.1 The preparing work before opening

### 4.1.1 The matching of the access power of signal

#### **Design principle:**

According to insertion loss of different wireless access unit and the output power of different base stations, we calculated the value of the attenuation, make after combine the all the signal together then the input power into the DL of main unit is 0 dBm.

The scope of MU input power is  $-5 \sim +5$  dBm, If the input power is more than 5 dBm, it may cause light transmission part into the nonlinear state, the output intermodulation becomes poor. MU's Maximum input power is 10 dBm nondestructive, must not more than the Maximum power, otherwise it will cause damage to the equipment.

#### **Calculation steps:**

- 1)Get the source output power, insertion loss of wireless access unit for each business;
- 2)According to U-DAS system should be configured business quantity, and can get fixed decay specifications, every business into the calculation of MU power;
- 3) Addition the input powers of enter the MU, total power is around 0 dBm. Because the attenuator value is not a continuous, so according to actual condition, adjust the ATT into MU to make sure the total power is in  $0 \sim 5$  dBm is ideal.
- 4)When there are two operators and access the same band (such as in CDMA/WCDMA mode, AT&T and T-mobile both access), please first according to configure business situation, the calculation of various business access MU power distribution. Calculation and access to two operators business, each of the injection of carriers need power. According to the calculation principle for the two operators access carrier several proportion computation, the power of distribute the business into the MU.



In the second step, according to the actual configuration business quantity, estimate power of every business need to infuse the MU.

If it is 4-band system, the input power will be forced into each MU adjustment for-6 dBm as far as possible. 3-band system, each power will be forced into MU is adjustment for-5 dBm. 2-band system, each power will be forced into MU adjustment for-3 dBm. So the total power is easy to control requirements in range.

Make the Cellular input signal strength be slightly small, PCS, the AWS strength be slightly big. Because RF components are the higher the frequency, the greater of the insertion loss; the Gain of broadband active device is decreased when the frequency is increased. When the light path loss is big, such adjustment can make the business in the high frequency band get some assurance of Gain.

## 4.1.2 Equipment address configuration

Expansion Unit need to be based on the level itself to connect the higher level equipment, setting Expansion Unit address.

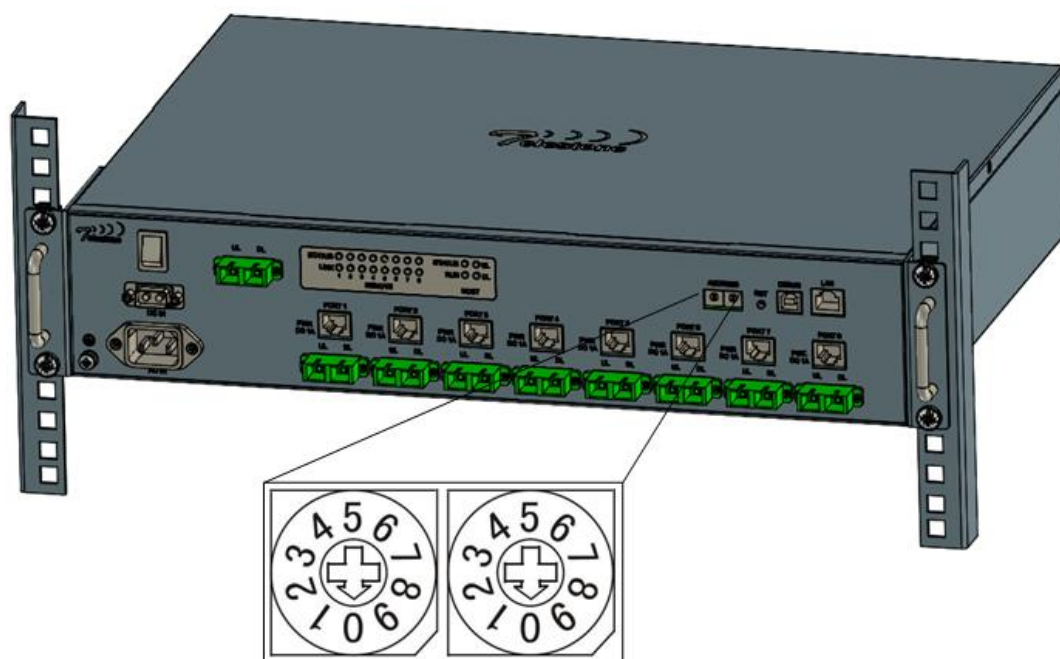


Figure4-1 Expansion Unit address

The first address(left): is the level for Expansion Unit in the U-DAS;

The second address(right): is for port number of higher equipment that this Expansion Unit should be connected.



In U-DAS, MU is in 0 level, no need to configured. The equipment under the MU is level-1 Expansion Unit, so that the first address is “1” for this EU. If a EU is under the level-1 EU, then this EU will be level-2, and the first address is configured to “2”.

### CAUTION

Wrong coding the address of Expansion Unit will cause the higher equipment can not find it, can't do the monitor control.

The follow figures is two examples for the configuration, shows in Figure4-2, Figure4-3

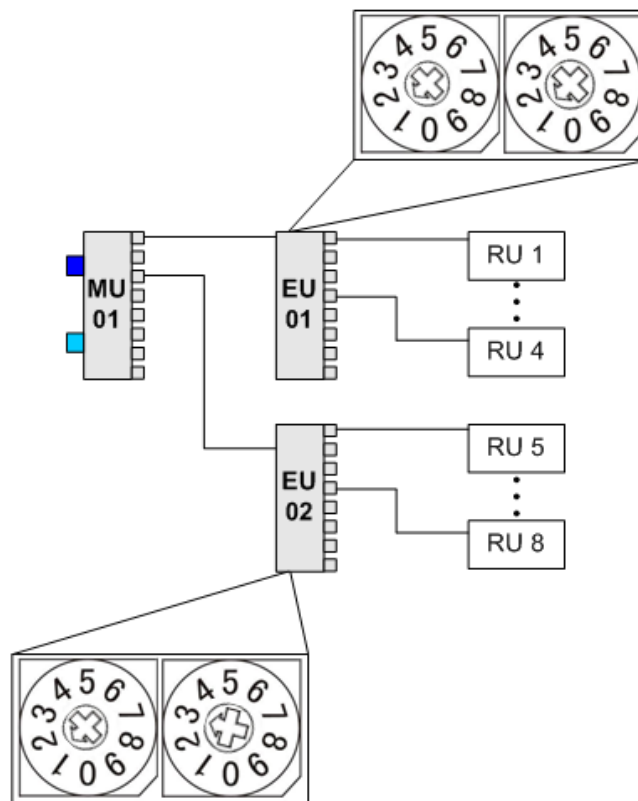


Figure4-2 address configuration

As Figure4-2 shows, EU01 is bellow MU, in level 1, so the left address is “1”, E01 is connected to the port1 of Main Unit, so the right address of EU01 is “1”. EU02 is bellow MU, in level 1, so the left address is “1”, EU02 is connected to the port3 of Main Unit, then the address on EU02 is “1”, “3”.

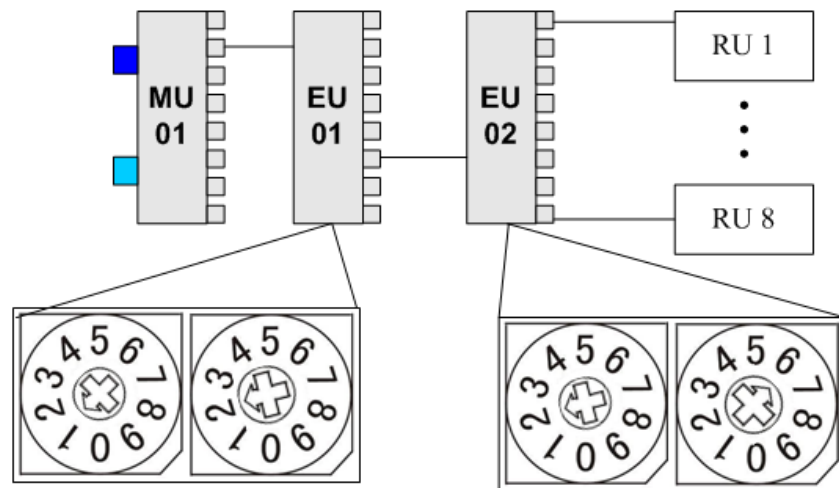


Figure4-3 Address configuration

As Figure4-3 shows EU01 is below MU, in level 1, so the left address is “1”, E01 is connected to the port1 of Main Unit, so the right address of EU01 is “2”. EU02 is below EU01, in level-2, and EU02 is connected to the port 6 of EU01, so the address configure on EU02 is “2”, “6”.



U-DAS2200 support two levels of EU currently.

## 4.2 U-DAS2200 opening flow

U-DAS2200 is a fiber optical communication system by separate UL/DL transmission, fiber link labels and fiber welding quality are very important part in the engineering. If this loss of the fiber link is too big, or wrong link connections would cause big troubles in the opening the system. So that before opening, we need to double check the loss of the fiber link engineering.

Also the power up flow is from lower level of equipments to higher level of equipments.(RU-EU-EU-MU)

Before power up the equipments, we need to check the installation of every equipment, the fiber link labels, and the configuration of EUs by using the Design documents,



The most troubles in the opening U-DAS2200 are wrong connections in the link engineering, wrong address configuration of the equipments and big loss in fiber link engineering.

Check the equipments based on the checking list before power up the equipments.

Table 4-1 Main Unit Check List Table

No.	Check Items	Check Requirement	Note
1	MU Installation environment	See 3.1	
2	Grounding Line	See 3.2	
3	Fiber port connection	See 3.2	
4	CAT-5 Connection	See 3.2	
5	RF Cable Connection	See 3.2	
6	External Alarm Cable Connection	See 3.2	
7	AC Power supply cable connection	See 3.2	
8	DC Power supply cable connection	See 3.2	If no RUs bellow it, then AC power is enough
9	Label on fiber port	fiber port link labels and link port is same as the design document.	
10	CAT-5 Label	CAT5 labels and link port is same as the design document.	
11	Fiber Engineering Check Table	Check if the optical loss is in the range of the link loss level.	

## 4.2.1 Equipment Power up and Debug

The power up flow is from lower level of equipments to higher level of equipments.(RU-EU-EU-MU)

Before power up the equipments, we need to check the installation of every equipment, the fiber link labels, and the configuration of EUs by using the Design documents

The restart the “reset” on MU can refresh the system topology.

Flow chart in Figure4-4.

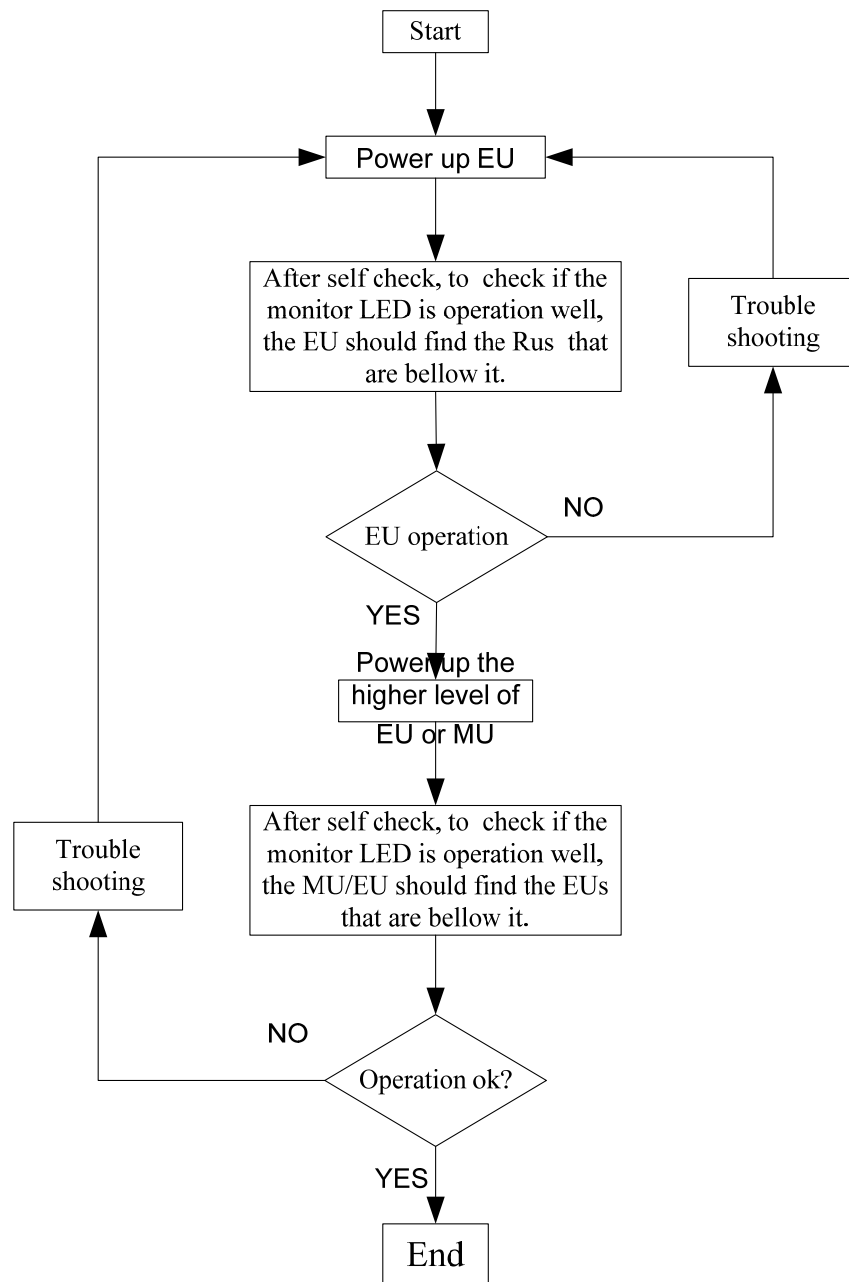


Figure4-4 Flow chart for opening the equipments

## CAUTION

The ship type switch of MU front panel is for AC power input and backup battery hige switch. No DC power switches for MU. DC power hige control is controlled by PSU. If need to reboot MU, there are three options.

- 1 Shut down AC, DC, power, and then open PSU, AC power.
- 2.Reset button on the panel.( only reboot the monitor module)
- 3.By OMT software to reboot.

The ship type switch of EU front panel is for AC power input. No DC power switches for EU. DC power hige control is controlled by PSU. If need to reboot EU, there are three options same as MU.



After reboot power by DC, the spreader current board of the equipment is locked, at this time the MU/EU can not transfer the power supply to lower equipments; after reboot power first by DC, then by AC, the MU/EU can transfer the power to the lower equipments.

After powered up the equipment, check the operation based on the indicator LED

Figure4-5 is MU indicator panel,

**HOST** is for the MU self operation status,

**REMOTE** is for the status of lower level equipments.

ALL the indicator LED has 5 performance: Bright, quick flash, flash, slow flash, out.

The instruction of the indicator is shown in Table 4-2。

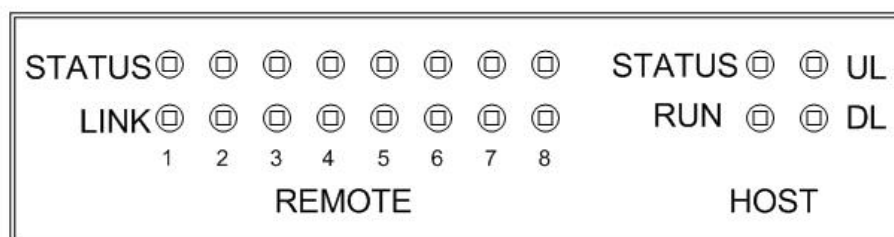


Figure4-5 MU LED indicator panel

Table 4-2 LED INDICATOR on MU Panel definition

No.	Name		Function	
1	MU operation running	RUN	bright/out	The Lord monitoring board crashed or equipment didn't power up
			quick flash	Not pass self-inspection
			flash	The Lord monitoring board is working normally
			slow flash	Doing self-inspection
2	MU operation status running	MU Status	bright	E/O no alarm, Spreader plate without warning, without off electric alarming, without temperature alarming, pass the self-inspection, DL has light
			quick flash	Critical alarming report; Light module failure alarm, optical link failure alarm, monitoring board self-check failure alarm, the power spreader current board failure alarm, drop power alarm.
			flash	warm alarming and temperature alarming
			slow flash	Self-inspection
			out	no power up
3	DL Status LED indicator	DL Status	--Retain	--Retain
4	UL Status LED indicator	UL Status	--Retain	--Retain
5	Lower equipment status LED	Link N (1-8)	bright	MU the Nth port, Receive Power $\geq 1$ dBm, communication with lower equipment is normal

No.	Name		Function	
	indicator		quick flash	MU the Nth port, Receive Power $\geq -15$ dBm, communication with lower equipment is abnormal
			flash	MU the Nth port, Receive Power $\leq 0$ dBm, communication with lower equipment is normal
			out	MU the Nth port, Receive Power $\leq -16$ dBm, communication with lower equipment is abnormal
	Status N (1-8)		bright	MU the Nth port, No alarm report from lower equipments
			quick flash	MU the Nth port, lower equipment has criminal alarm Over current alarm, equipment loss( no light, no communication ,no current at the port)
			flash	MU the Nth port, lower equipment has warning to report Over temperature, less power alarm
			out	MU the Nth port, no lower equipments access
	...	...	...	...
	...	...	...	...
6	RJ45 power port LED indicator ( DC supply)	yellow light N	bright	MU the Nth port, this link has alarm。
			out	MU the Nth port, no alarm。
		green light N	bright	MU the Nth port, work normal and has output
			out	MU the Nth port, no output
	...	...	...	...
7	RJ45 power port	yellow light N	bright	When booting, bright 3Second。

No.	Name		Function	
	LED indicator ( only AC supply )		out	normal operation, light is OFF。
		green light N	bright	When booting, bright 3 Second。
			out	normal operation, light is OFF。
	...	...	...	...

#### Note :

- **Bright:** light is on
- **Quick flash:** each second glitters 5 times
- **Flash :** 1 second bright, 1 second out
- **Slow flash:** 2 seconds bright, 2 seconds out
- **Out:** light is off

#### Tips:

- After power up, if self-check failed, replace the equipment
- After power up, if the lower equipments can't be detected, check the fiber/power ports connection and the link loss; if the lower equipment is EU, check if the address on the front panel of the lower EU is correct.
- After power up, if the indicator shows alarming, then must solve the alarming issue.



When MU is self-checking, the first is hardware detection, the next is to addressing the lower equipments' address, and finally collect alarm information from lower equipments, according to the actual working condition indicates equipment working state.

Equipment is in the normal work, if it appears link alarming, then any information back by OMT requiring is the link status of the lower equipment before this link alarming.



## 4.2.2 Equipment operation status requiry

After opening all equipments, use OMT to check the system status. It is best to check all the alarms, and check if the equipment is abnormal, at least to check if the output power of RU is meet the design.

# 5 U-DAS2200 T rouble shooting

## 5.1 MU trouble shooting stage

Figure5-1 is MU indicator panel,

**HOST** is for the MU self operation status,

**REMOTE** is for the status of lower level equipments.

ALL the indicator LED has 5 performance: Bright, quick flash, flash, slow flash, out.

The instruction of the indicator is shown in Table 5-1。

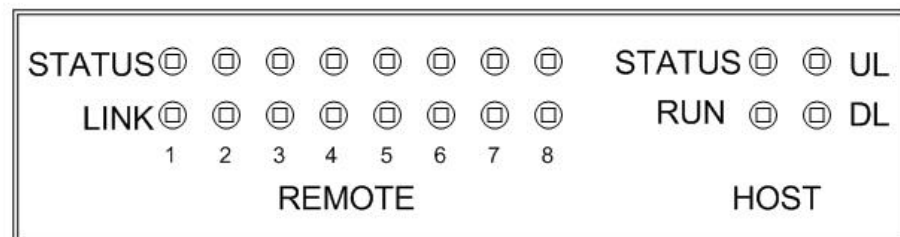


Figure5-1 MU indicator panel,

Table 5-1 MU indicator definition

No.	Name		Function		Note(status)
1	MU operation running	RUN	bright/out	The Lord monitoring board crashed or equipment didn't power up	
			quick flash	Not pass self-inspection	

No.	Name		Function		Note(status)
			flash	The Lord monitoring board is working normally	Normal
			slow flash	Doing self-inspection	
2	MU operation status running	MU Status	bright	E/O no alarm, Spreader plate without warning, without off electric alarming, without temperature alarming, pass the self-inspection, DL has light	Normal
			quick flash	Critical alarming report; Light module failure alarm, optical link failure alarm, monitoring board self-check failure alarm, the power spreader current board failure alarm, drop power alarm.	change MU
			flash	warm alarming and temperature alarming	
			slow flash	Self-inspection	
			out	no power up	Power up
3	DL Status LED indicator	DL Status	--Retain	--Retain	
4	UL Status LED indicator	UL Status	--Retain	--Retain	
5	Lower equipment status LED indicator	Link N (1-8)	bright	MU the Nth port, Receive Power $\geq 1$ dBm, communication with lower equipment is normal	Normal

No.	Name		Function		Note(status)
			quick flash	MU the Nth port, 0 dBm $\geq$ Receive Power $\geq$ -15 dBm, communication with lower equipment is abnormal	check the optical link between the MU and the lower level equipments
			flash	MU the Nth port, Receive Power $\leq$ 0 dBm, communication with lower equipment is normal	
			out	MU the Nth port, Receive Power $\leq$ -16 dBm, communication with lower equipment is abnormal	
		Status N (1-8)	bright	MU the Nth port, No alarm report from lower equipments	Normal
			quick flash	MU the Nth port, lower equipment has criminal alarm Over current alarm, equipment loss( no light, no communication ,no current at the port)	
			flash	MU the Nth port, lower equipment has warming to report Over temperature, less power alarm	
			out	MU the Nth port, no lower equipments access	
	...	...	...	...	
6	RJ45 power	yellow light N	bright	MU the Nth port, this link has alarm.	

No.	Name		Function		Note(status)
	port LED indicator (DC supply)		out	MU the Nth port, no alarm.	Normal
		green light N	bright	MU the Nth port, work normal and has output t	Normal
			out	MU the Nth port, no output	
	...	...	...	...	
7	RJ45 power port LED indicator (only AC supply)	yellow light N	bright	When booting, bright 3 Seconds.	Normal
			out	Normal operation, light is OFF.	
		green light N	bright	When booting, bright 3Second.	
			out	Normal operation, light is OFF.	
	...	...	...	...	



**CAUTION** When MU, EU adopt AC power supply only, there is no export power of MU, EU to the lower level equipments. Only when the MU or EU has DC power supply, the export power of MU or EU to lower level equipments are working.

## 5.2 Commond trouble shooting method

### 5.2.1 Equipment can't be booted.

#### MU can't be booted:

- Check if the DC input connection is right(2W2 port on the front panel)
- Check if AC got power supply.
- Check if the switch bottom is on.

#### EU can't be booted:

- Check if the DC input connection is right(2W2 port on the front panel)

- Check if AC got power supply.
- Check if the switch bottom is on.

**PSU can't be booted:**

- Check the AC power supply connection; make sure the power resource is working.
- Check if the Output have short circuit.
- Check if the start bottom on the panel is pushed
- Check if the DC input connection is right(Positive to DC+, Negative to DC-)  
RED LINE CALE IS FOR POSITIVE; BLACK LINE CABLE IS FOR NEGATIVE;.

## 5.2.2 Lower level equipments detection

**MU cannot detect the lower equipments:**

- Check if MU pass the self-check;
- Check if the optical link is correct;
- Check if the optical link loss is big;
- If the lower equipments is EU, check if the EU address confirmation is correct.(address bottom on the front panel)
- If the lower equipment is RU,
  - 1) Check if the DC power supply for MU is connected.
  - 2) Check if the connection of CAT-5 cable for RU is ok.

Make sure the two connectors on the CAT-5 cable have the same line- sequence.

- 3) If AC and DC both working, when we power up the RU(MU), fist, power up the DC, and then power up AC

**EU cannot detect the lower equipments:**

- Check if EU pass the self-check;
- Check if the optical link is correct;
- Check if the optical link loss is big;
- If the lower equipments is EU, check if the EU address confirmation is correct.(address bottom on the front panel)
- If the lower equipment is RU,

1) Check if the DC power supply for MU is connected.

2) Check if the connection of CAT-5 cable for RU is ok.

Make sure the two connectors on the CAT-5 cable have the same line- sequence.

3) If AC and DC both working, when we power up the RU(MU), fist, power up the DC, and then power up AC

### 5.2.3 RU Output Power is low

- If all the output power of RUs are low, check the input power to MU;
- Check if set DL ATT on the RU;
- Check the loss of optical link;

### 5.2.4 RU UL Link loss is big

- Check if set UL ATT on the RU;
- Check the loss of optical link;

# 6 U-DAS2200 Specifications

## 6.1 RAM2241 RU Specification

### 6.1.1 Performance

Item	Specification	
Band	Received Range (MHz)	Transferred Range (MHz)
	LTE 700MHz: 698-716 / 776-787	LTE 700MHz: 728-746/746-757
	Cellular 850: 824-849	Cellular 850: 869-894
	PCS1900: 1850-1910	PCS1900: 1930-1990
	AWS2100: 1710-1755	AWS2100: 2110-2155
MAX Gain	40 ±2 dB	
Delay Time	500ns	
Noise	7dB (typical)	
Frequency Error	≤ ±0.01ppm	
Modulation	LTE 700MHz: LTE Cellular850MHz: CDMA PCS1900MHZ: UMTS, CDMA AWS2100MHz: UMTS, LTE	
IMD3	UL	DL
	≤ -50dB @ -10 dBm	≤ -45 dB @ 21 dBm



## 6.1.2 Port

Item	Specification
RF Port	N Type Female
Output Power	21 dBm $\pm$ 2 dB
VSWR	$\leq 2$
Optical Port	SC/APC
Operation Wavelength	1310 nm
Transfer Power	4 dBm $\pm$ 1 dB
Receive Power	Receive Power is more than -9 dBm , system is working normally; Receive Power is in -15~-10 dBm, EU can received signal, but increased the UL link loss; Receive Power is less than -16 dBm, system can't work;
Remote Power supply Port	RJ45
Report Power supply Port Voltage	48 VDC
Remote Power supply Port Maximum current	1 A

## 6.1.3 Mechanical Structure

Item	Specification
Dimensions	415 $\times$ 350 $\times$ 162 mm
Weight	13kg
Installation	Wall mounted

## 6.1.4 Environment

Item	Specification
Operation Temperature	-30-50℃
Ambient Temperature	-20℃~70℃
Humidity	RH≤85%
Protection	IP50, Indoor

## 6.1.5 Power Consumption

Item	Specification
Power Consumption	30W (Typical)
DC Power supply Port	RJ45
DC Voltage	40~53 VDC

# 7 Appendix

## 7.1 Tools

- Philips screwdriver  M4,  M6



- Flathead screwdriver  75×2.5 mm



- diagonal pliers



- wire stripper



- RJ45 Ratcheting Crimp Tool



- Optical power meter



- Laser light source



- Oil pen



- Label



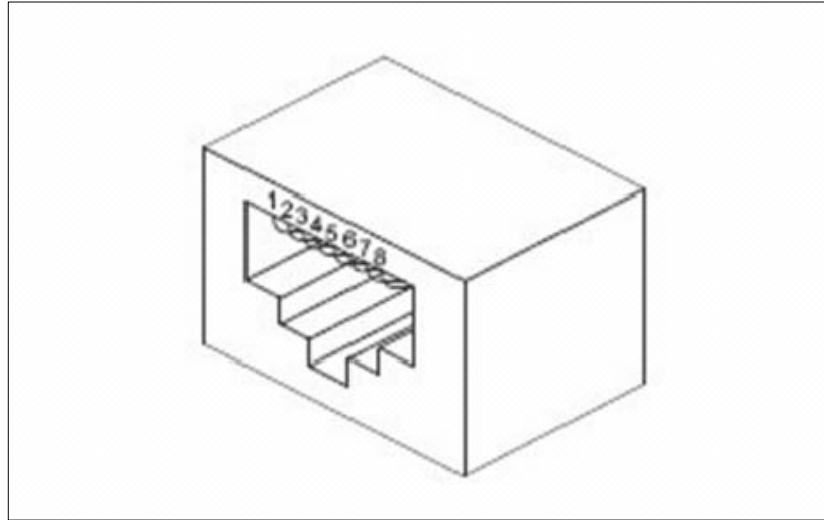
- 

-



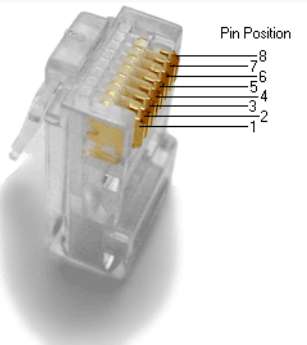














## 7.2 List of Acronyms and Abbreviations

Acronyms	Abbreviations
A	Amperes
AC	Alternating Current
AGC	Automatic Gain Control
ANT	Antenna
BTS	Base Transceiver Station
CDMA	Code Division Multiple Access
DAS	Distributed Antenna System
DC	Direct Current
DL	Downlink
EU	Expansion Unit
LED	Light Emitting Diode
MU	Main Unit
NMS	Network Management System
OMT	Operation and Management Terminal
PSU	Power Supply Unit
PWR	Power
RF	Radio Frequency
RU	Remote Unit
UL	Uplink
U-DAS	Universal Distributed Antenna System
V	Volts
V AC	Volts Alternating Current
V DC	Volts Direct Current
WAU	Wireless Access Unit

## 7.3 RJ45 pins of DC power supply port of MU/EU



RJ45 PIN SEQUENCE

Pin	T568A Pair	T568B Pair	Wire	T568A Color	T568B Color	Pins on plug face (socket is reversed)
1	3	2	tip	 white/green stripe	 white/orange stripe	
2	3	2	ring	 green solid	 orange solid	
3	2	3	tip	 white/orange stripe	 white/green stripe	
4	1	1	ring	 blue solid	 blue solid	
5	1	1	tip	 white/blue stripe	 white/blue stripe	
6	2	3	ring	 orange solid	 green solid	
7	4	4	tip	 white/brown stripe	 white/brown stripe	
8	4	4	ring	 brown solid	 brown solid	

## 7.4 CAT-5 DC power supply cable

PIN 1、2、4、5 is for 48V, 3、6、7、8 is for ground; take T568B cable for example

PIN	Definition	line color of T568B
1	48V +	white orange
2	48V +	orange
3	G	white green

PIN	Definition	line color of T568B
4	48V +	blue
5	48V +	blue white
6	G	green
7	G	white brown
8	G	brown

**Note:** if we need use 2-core DC to do the remote supply,

**For Positive:** white orange, orange, blue, blue white

**For Negative:** white green, green, white brown, brown

**FCC Caution:**

Any Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**FCC Radiation Exposure Statement:**

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment .This equipment should be installed and operated with minimum distance 20cm between the radiator&your body.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.