User's Manual

of

Advanced MINI 30

Contents

1. Overview

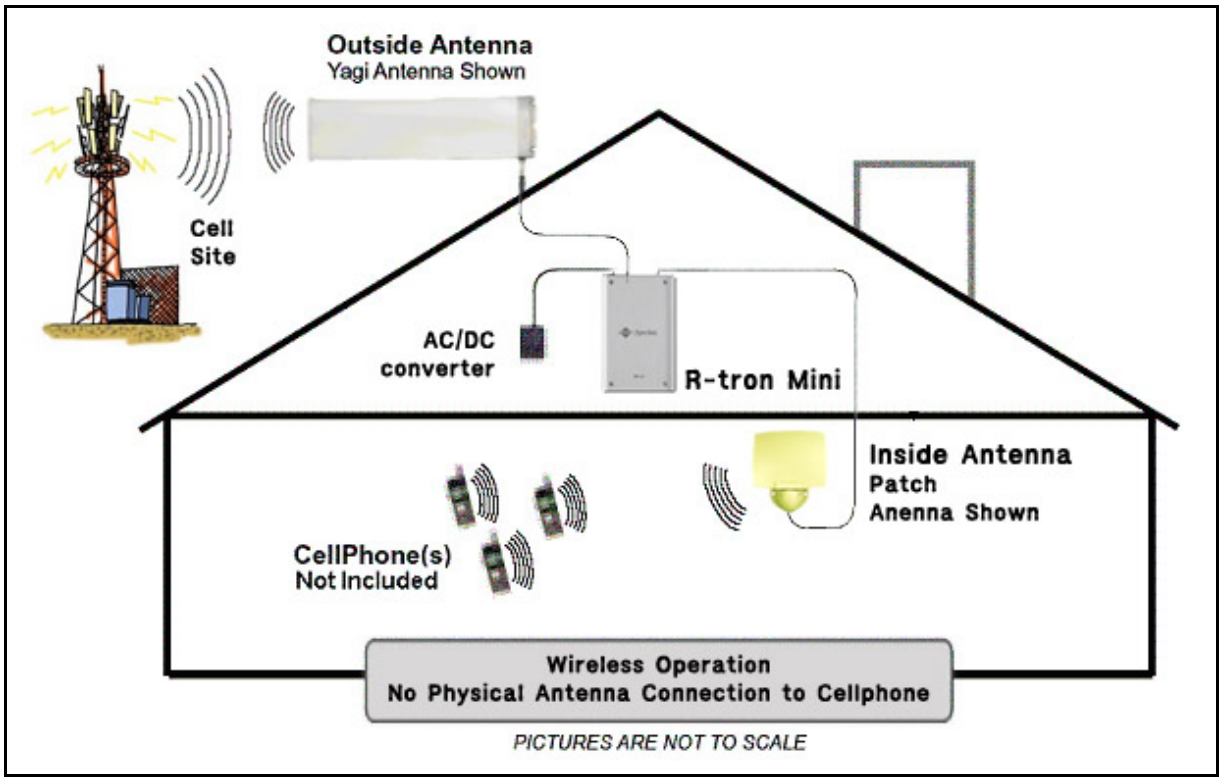


Figure 1.1 RSP-APE-030M Repeater

R-tron RSP-APE-030M Repeater can be used in CDMA service hole spots like in-buildings, underground and tunnels to cover its service area. This repeater system designed for dual and simultaneous service, namely, it receives signals from the base station through donor antenna, amplifies the signals and re-transmits it to one or other mobile terminals. Also, it amplifies the signals which comes from mobile terminals through distributor antenna and re-amplifies it to base station.

Using local OMT(Operation and Maintenance Terminal) which is connected between repeater control board and personal or laptop computer, it is possible to check or to control repeater status.

2. Specifications

2.1 System specifications

Parameter		Specifications	Remark
Frequency Band	Down Link	1930 ~ 1995 MHz	65MHz Bandwidth
	Up Link	1850 ~ 1915 MHz	
Maximum Transmit Power	Down Link	+15 dBm	Max. 7 channels
	Up Link		
Operating Bandwidth		5 or 10 or 15 MHz	
Gain		70dB	
Gain Adjustment Range		30dB in steps of 1dB	1 dB Step
Spurious Emissions	±885 kHz	≤ -45 dBc	RBW = 30 kHz
	±1.98 MHz	≤ -50 dBc	
	± 2.25 MHz	≤ -13 dBm	RBW = 1 MHz
Ripple		≤ 3.5dB	Within operating bandwidth
Freq. Selectivity	-40dB	≤ 16.0MHz	
Delay		< 5 μs	
VSWR		≤ 1.5	
Waveform Quality Factor		> 0.912	
Noise Figure		≤ 5.0dB	

Table 2.1 Repeater Specification

Figure 2.1 A body of the RSP-APE-030M

2.2 Antenna Specifications

Parameter		Specification		
		Donor	Service	
		Yagi	Patch	Omni
Frequency range		1850 - 1995MHz		
Frequency bandwidth		145MHz		
Antenna gain		12dBi	8dBi	2dBi
Beam width	Horizontal	40°	70°	360°
	Vertical	37°	65°	70°
Polarization		Vertical		
VSWR		Max. 1: 1.5	Max. 1 : 1.5	Max. 1 : 1.5
Power Capability		10Watts	5Watts	10Watts
Weight		700g	250g	270g
RF Connector		1 x N-Female		
Mounting		Pole	Wall	Ceiling
Dimension (W x H x D)		417 x 110 x 82 mm	138x108x26 mm	Φ114x47 mm
Impedance		50Ω		

Table 2.2 Antenna Features

RF EXPOSURE INFORMATION

The antenna used for this transmitter must not exceed 20dBi and must be installed to provide a minimum separation distance of 20cm from all persons.

2.3 Donor Antenna Diagrams

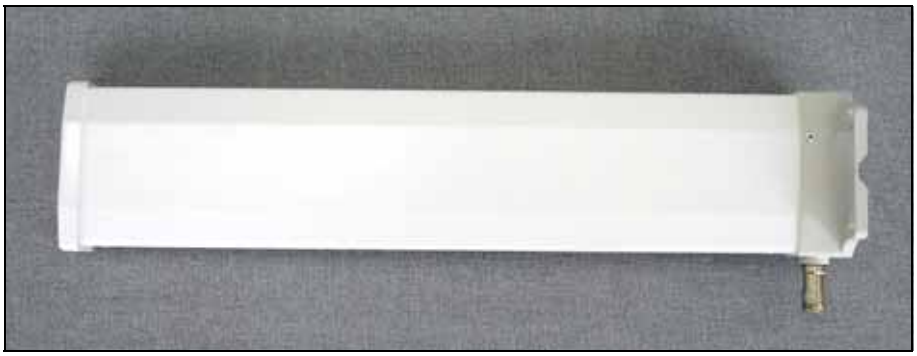


Figure 2.2 Donor Antenna

2.4 Distributor Antenna Diagrams

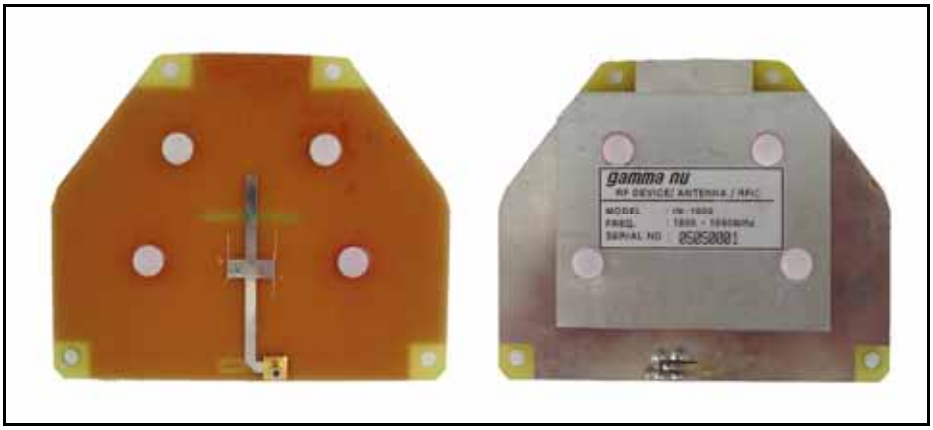


Figure 2.3 Patch Antenna

Figure 2.4 Omni Antenna

3. System Configuration

3.1 Block Diagram

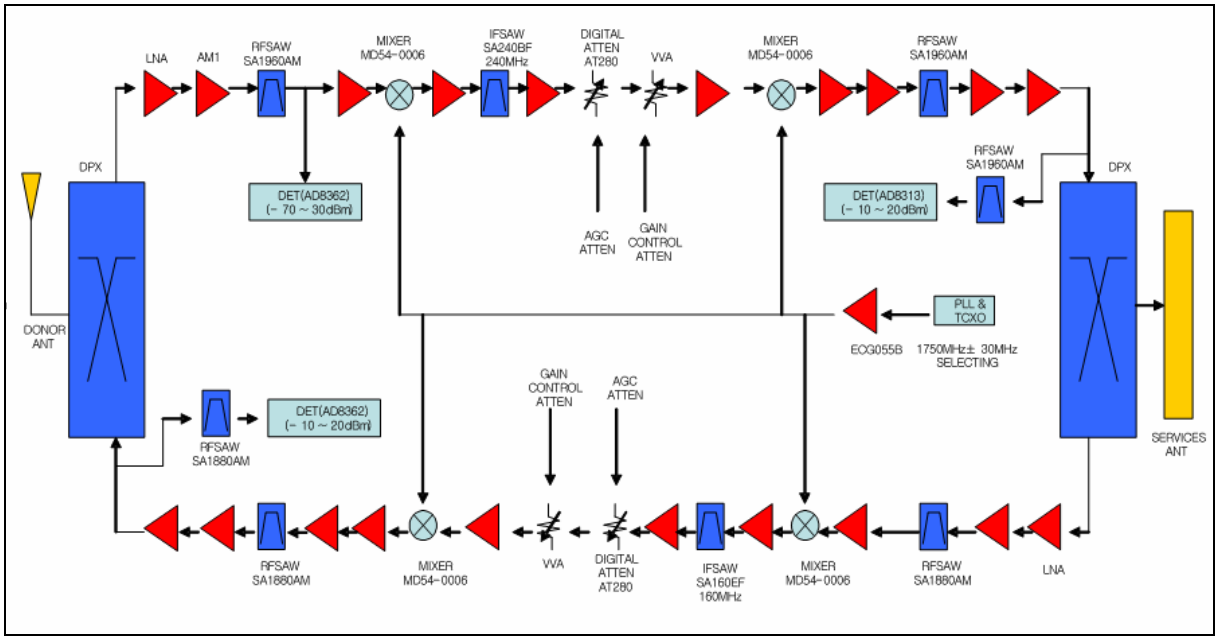


Figure 3.1 shows the block diagram of a band Selective repeater.

This diagram is applicable to repeaters for CDMA systems.

3.1.1 Downlink signal path

DL signal path gives a wireless mobile terminal path after receiving signal from base station, amplifying and noise filtering. Please refer to the following picture 3.1, RSP-APE-030M repeater block diagram.

3.1.2 Uplink signal path

UL signal path gives a path after receiving signal from mobile terminal, amplifying and noise filtering. Please refer to the following picture 3.1, RSP-APE-030M repeater block diagram.

4. Installation

4.1 Installation Overview

The following gives you guide how you can install R-tron repeater properly, considering field situation and installation specific conditions.

4.2 Safety

4.2.1 Purpose

The following information gives you how you can proceed your job correctly and eliminate dangerous condition.

4.2.2 Application Range

Installation supervisor should check and do the proper thing to check preliminary dangerous condition.

4.3 Installation information-1

4.3.1 Right-of-way

- The repeater shall be installed in the location owned or leased by the carrier.
- If the repeater is installed in the building, an appropriate space for the installation must be considered.

4.3.2 Conditions for the Installation space

Repeater should be installed as followings :

In the building

- Avoid certain part which is located something heavy or water tank on the roof, considering weight balance.
- Select certain place which is good for air ventilation.
- There will be enough space to check the repeater.

4.4 Installation Information-2

The installation of the repeater depends on the types of support, location, and the demand of the carrier.

Figure 4.1 Antenna & Repeater Installation

4.4.1 General Condition

- Check whether the repeater status is correctly horizontal angle.
- Check whether there is enough space for maintenance and repair.

4.4.2 Installing Band set

- Repeater main box should be installed 8.2 inches at least, above from the ground.
- When you install the repeater main box, do not impact on its installation to other repeaters maintenance.
- Safety plate should be installed 8.2 inches at least, above from the ground.

4.4.3 Precautions

- Never mount the donor or coverage antenna near a window, where Signal can easily pass through the glass

- Mount the donor antenna as high as physically possible to the exterior of the building, maximizing the vertical separation between antennas and pointing away from the building, toward the base station site.

- Install the antennas taking advantage of any existing building structure Such as brick walls, metal roofs, or multiple wall structures to additionally attenuate the path between them.

- When using directional antennas inside the building to cover Corridors and hallways, point the interior antenna away from The donor antenna location .

- In extreme cases, the building configuration may not allow for Such separation and isolation. If additional isolation is required, Coaxial attenuation may be inserted between the donor antenna and the repeater , with the potential compromise to the coverage within the building

5. Graphic User Interface (for maintenance)

5.1. GUI Overview

The following picture is RSP-APE-030M GUI Configuration.

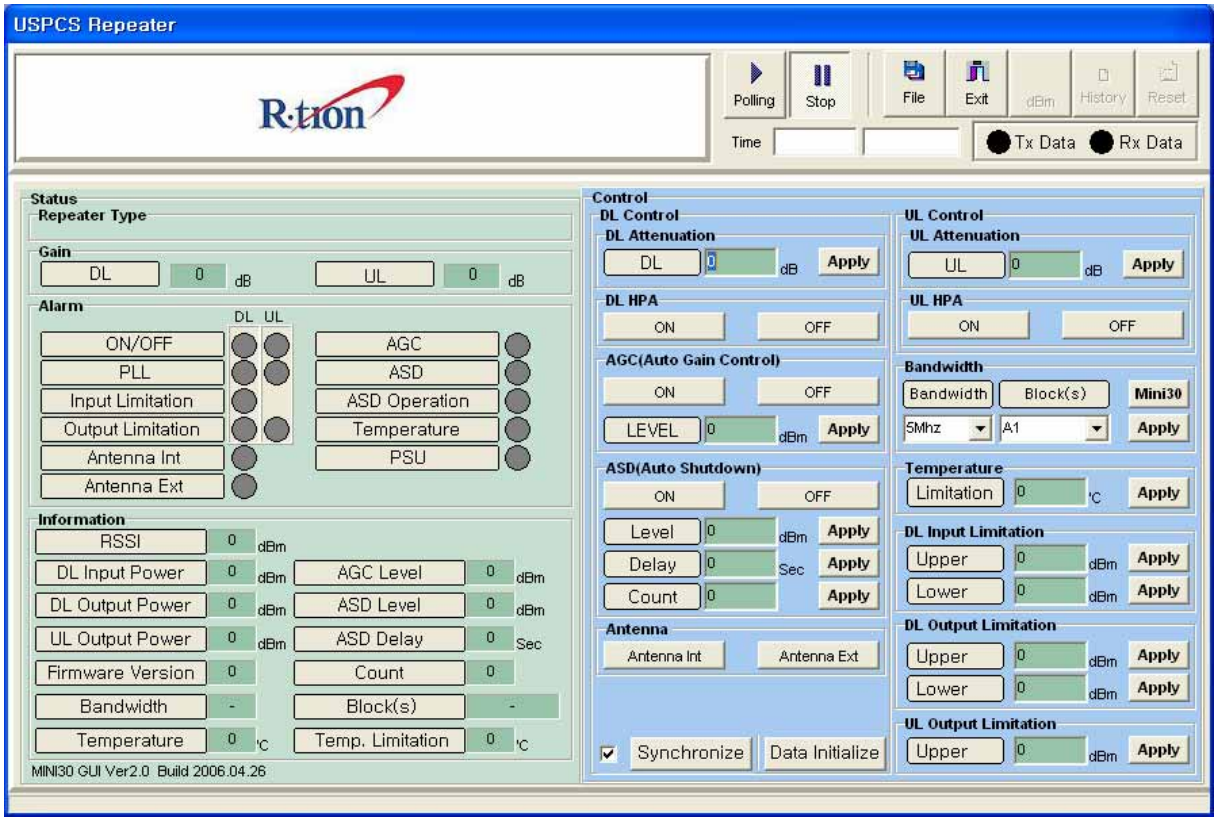


Figure 5.1 Main window

When you first execute main window, you can see the above picture and it show you repeater status.

5.2 Preliminary Steps for GUI Execution & Maintenance

5.2.1 Preliminary Steps before using GUI

a. Check all connection status during the installation.

b. Set the baud rate which you are going to use.

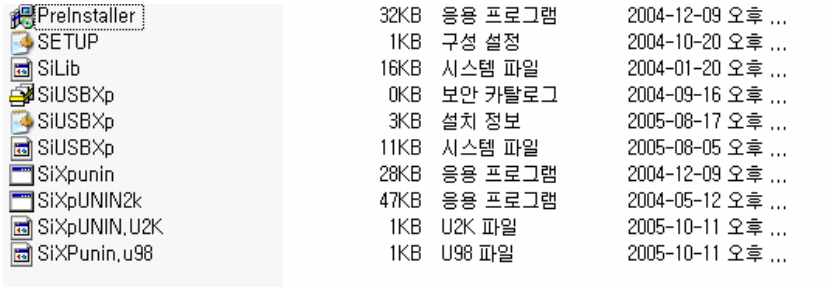
c. Connect the repeater main power cable.

d. Connect RSP-APE-030M "LOCAL OMT" with PC, using RS232 cable.

Figure 5.2 Connection RSP-APE-030M with PC

5.2.2 Executing USB Driver & GUI program

a. Excuting "PreInstaller" and check the USB driver is normal and the port number.



PreInstaller	32KB	응용 프로그램	2004-12-09 오후 ...
SETUP	1KB	구성 설정	2004-10-20 오후 ...
SiLib	16KB	시스템 파일	2004-01-20 오후 ...
SiUSBXp	0KB	보안 카탈로그	2004-09-16 오후 ...
SiUSBXp	3KB	설치 정보	2005-08-17 오후 ...
SiUSBXp	11KB	시스템 파일	2005-08-05 오후 ...
SiXpunin	28KB	응용 프로그램	2004-12-09 오후 ...
SiXpUNIN2k	47KB	응용 프로그램	2004-05-12 오후 ...
SiXpUNIN.U2K	1KB	U2K 파일	2005-10-11 오후 ...
SiXPunin.u98	1KB	U98 파일	2005-10-11 오후 ...

Figure 5.3 USB Driver files

b. Excuting "MINI30_USPCS"

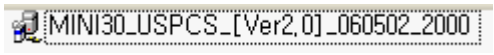


Figure 5.4 GUI files

5.2.3 GUI Communication

When the communication between Personal Computer and Repeater MCU board is OK, Tx/Rx yellow LED which is up-left corner in the GUI screen will be flashed.

Figure 5.5 Communication Verification LED

5.3 How to operate GUI & Functions

Repeater can be controlled in Set-up mode. In Set-up pop-up window, you can input the value and control DL/UL HPA, AGC, Shutdown and attenuation.

When you are going to check repeater status, click "Synchronize" button which is in the bottom side in the screen. After setting output value, you can set AGC/ASD level value, using AGC/ASD button.

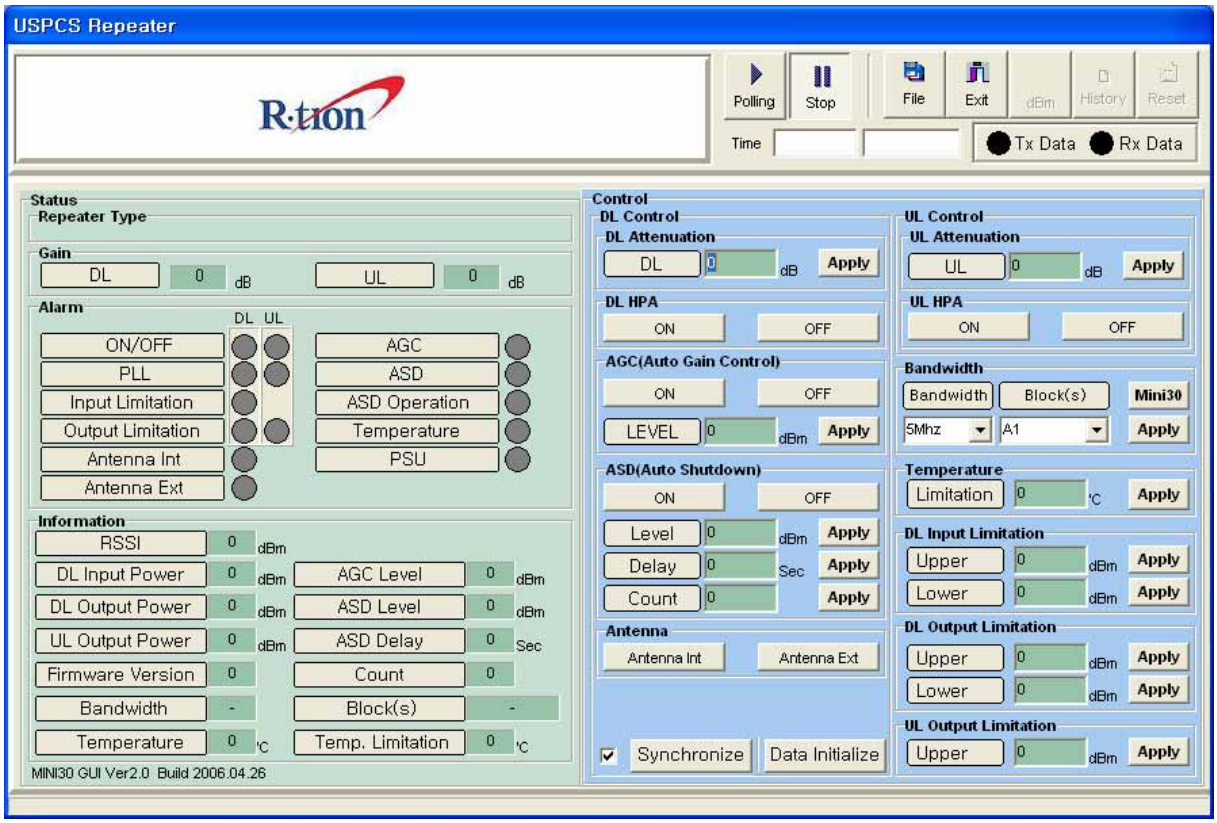


Figure 5.6 Setup mode

5.3.1 Description for icon indication

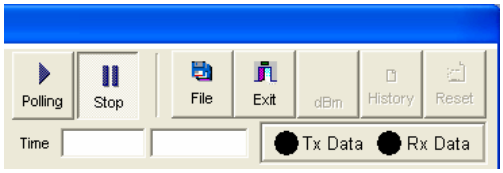


Figure 5.7 Main icons

- ▶ Polling : Communication possible
- ▶ Stop : Stop Communication
- ▶ File : Load the file of downloading
- ▶ Exit : Exit

5.3.2 How to set repeater gain

System gain value can be changed using Down/Up link attenuation value control which is in "ATTN" pop-up window. Available set attenuation value is from 0 to 30 dB, Down/Up Link both.

You can check current system gain in status mode.

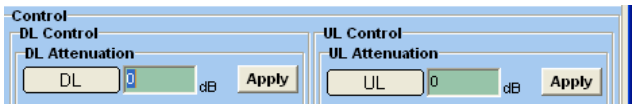


Figure 5.8 Gain Setting

5.3.3 Circumstance Condition Control

This function enables you to set the internal temperature of the system and the upper values of the input/output level. To change the values, you can enter the desired settings and click the **"APPLY"** button at the upper part of the control window.

In the left side, you can see current settings for the internal temperature of the system.

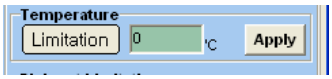


Figure 5.9 Control Window of Environmental Conditions

5.3.4 Controlling power amplifier

On the **"ON/OFF"** window, you can control power amplifiers for each path.

In the left side window, you can see the current path status (ON/OFF) of the system.

Figure 5.10 Control Window of Power Amplifier and Battery

5.3.5 Controlling input/output

You can set the upper/lower values of the current input/output RF power of the up-/down-links. To change the values, you can enter the desired settings and click the **"SET"** button at the upper part of the control window.

In the status mode, you can see the current input/output settings of the up-/down-links.

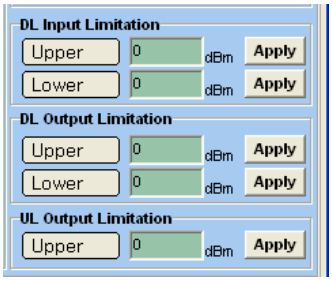


Figure 5.11 Controlling Input/output

5.3.6 AGC(Auto Gain Control) & ASD(Auto Shutdown) Setting

This function lets you control AGC settings and the ON/OFF status. To change a setting, you need to enter a value and click the SET button at the lower part of the Control Window.

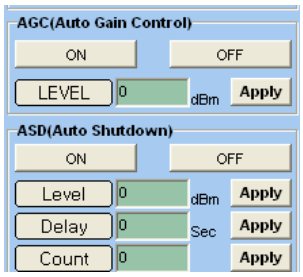


Figure 5.12 AGC/ASD Setting window