

ATTACHMENT E.

- USER MANUAL -

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GS Teletech Inc.

Version 0.1 • April 2010

Contents of Box

Contents	Picture	Quantity	Contents	Picture	Quantity
Repeater		1EA	Ground Cable 6.6ft (2m)		1EA
Mounting Bracket		1EA	Ground Sems Screw M4 x 8mm		4EA
Installation Guide CD		1EA	Bracket Sems Screw M6 x 16mm		4EA
Ethernet Cable 6.6ft (2m)		1EA	Lag Screw 1/2" x 2"		4EA
Power Cord 6.6ft (2m)		1EA	Anchor Bolt Set 1/2" x 2"		4EA
Registration Form		1EA			

This publication provides instruction for installing Verizon 24dBm Dual Band Inbuilding RF repeater.

The images for the User Interface in this publication may vary from the repeater's depending on its S/W Version.

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Revision History

Date	Version	Changes
04/2010	0.1	Draft

Certification

UL/FCC: This equipment complies with UL and FCC

Warnings and Hazards

WARNING! ELECTRIC SHOCK

Opening the BDA (bi-directional amplifier) could result in electric shock and may cause severe injury.

WARNING! EXPOSURE TO RF

Working with the repeater while in operation, may expose the technician to RF electromagnetic fields that exceed FCC rules for human exposure. Visit the FCC website at <http://www.fcc.gov/oet/rfsafety> to learn more about the effects of exposure to RF electromagnetic fields.

WARNING! DAMAGE TO EQUIPMENT

Operating the BDA with antennas in very close proximity facing each other could lead to severe damage to the repeater.

RF EXPOSURE & ANTENNA PLACEMENT

Actual separation distance is determined upon gain of antenna used.
Please maintain a minimum safe distance of at least 8 inch while operating near the donor and the server antennas.
Also, the donor antenna needs to be mounted outdoors on a permanent structure.

WARRANTY

Unauthorized opening or tampering the BDA will void all warranties.
One-year Warranty will start when the ownership of CoverCell25KN Repeater is transferring.



CAUTION: REPEATER SHOULD BE INSTALLED AS CLOSE AS POSSIBLE TO POWER SOURCE.

CAUTION: THIS REPEATER IS FOR INDOOR USE ONLY AND SHOULD BE LOCATED INSIDE OF BUILDING.

CAUTION: RISK OF EXPLOSION IF BATTERY ON CONTROLLER BOARD IS REPLACED WITH AN INCORRECT TYPE.

System Specification

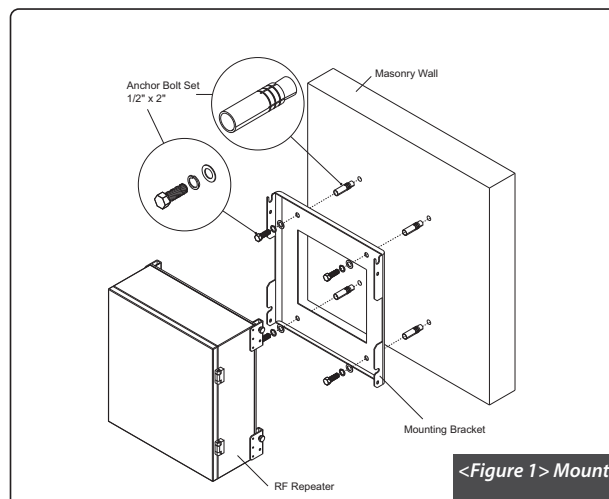
Item		Downlink	Uplink	Remark
Cellular Frequency (MHz)	A1	869 ~ 880	824 ~ 835	
	A2	890 ~ 891.5	845 ~ 846.5	
	B1	880 ~ 890	835 ~ 845	
	B2	891.5 ~ 894	846.5 ~ 849	
PCS Frequency (MHz)		1930 ~ 1990	1850 ~ 1910	
Sub Band Filtering		A1+A2 or B1+B2 or A1+B1+A2+B2 5, 10, 15, 20MHz BW (tunable)		
Gain	Cellular	80dB	80dB	
	PCS	80dB	80dB	
Flatness		5dB peak to peak		Channel power
Input Range	Cellular	-56dBm ~ -86dBm	Max -56dBm	
	PCS	-56dBm ~ -86dBm	Max -56dBm	
Output Power	Cellular	24dBm	24dBm	EIRP
	PCS	24dBm	24dBm	EIRP
AGC Range	Cellular	30dB		
	PCS	30dB		
Roll off	Cellular	$\geq 45\text{dBc} @ \pm 2\text{MHz}$		
	PCS	$\geq 30\text{dBc} @ \pm 0.25\text{MHz}$ (B1+B2 Inside Edge) $\geq 30\text{dBc} @ \pm 1.5\text{MHz}$		
Group Delay		$\leq 6\mu\text{s}$		
Single & 2-tone	Cellular	\leq Not to exceed maximum output power@-30dBm		
	PCS	\leq Not to exceed maximum output power@-40dBm		
Noise Figure		$\leq 7\text{dB}$		
Input Inter-modulation		$\leq 10\text{dB}$		
Adjacent Channel Power	Cellular	$\geq 45\text{dBc} @ 750\text{kHz}$		
		$\geq 45\text{dBc} @ 1.98\text{MHz}$		
	PCS	$\geq 45\text{dBc} @ 885\text{kHz}$ $\geq 45\text{dBc} @ 1.98\text{MHz}$		
Radiated Spurious Emissions		$\leq -13\text{dBm}$		
Frequency Error		$\pm 300\text{Hz} @ \text{cellular}, \pm 150\text{Hz} @ \text{PCS}$		
Signal Quality		Rho > 0.98		

* type of modulation : F9W

Mounting Repeater

Masonry Wall

- Using a pencil, mark the location of each of the mounting bracket's four mounting holes on the wall.
- Drill holes in the wall at the locations marked in step 1.
- Set the anchors in the wall using a hammer.
- Locate the four mounting bolts and place a lock washer and flat washer on each bolt.
- Place the mounting bracket over the four holes with anchors, making sure that the washers are on the repeater side of the mounting bracket. Tighten bolts until secure.

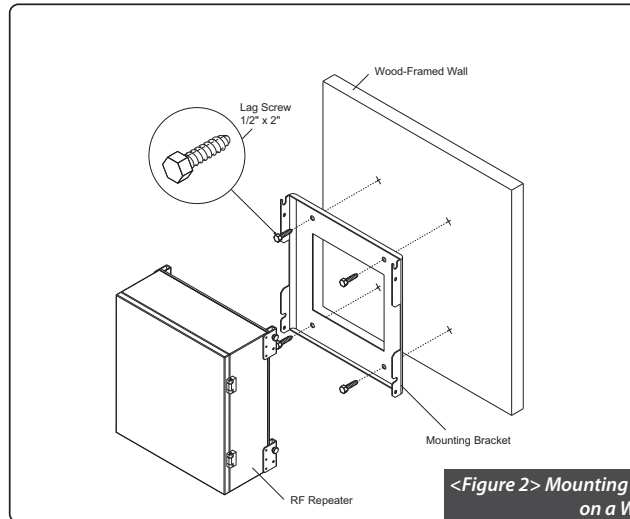


<Figure 1> Mounting the Repeater on a Masonry Wall

Mounting Repeater

Wood-Framed Wall

1. It is recommended to first attach a sheet of plywood to the wall. The sheet of plywood should be anchored to the studs in the wall.
2. Using a pencil, mark the location for each of the mounting bracket's four mounting holes on the plywood.
3. Place the mounting bracket over the four lag screws heads.
4. Thread a lag screw at the positions marked in step 2.

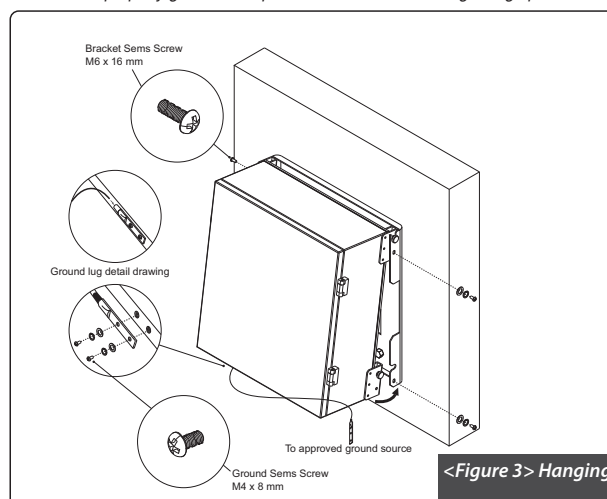


<Figure 2> Mounting the Repeater on a Wood-Framed Wall

Hanging and Grounding

1. Hang the Repeater from the mounting bracket.
2. Locate the four Bracket Sems Screws with installed washers. Tighten bolts until secure.
3. Locate the ground lug on the underside (or side) of the repeater.
4. Crimp the ground cable to the ground lug.
5. Route the free end of the ground cable to an approved (per local code or practice) ground source.

CAUTION
 Ground cable must be properly grounded to provide both EMI and voltage surge protection for the repeater.



<Figure 3> Hanging and Grounding the Repeater

Position Antenna

- Customer specifications should be followed for positioning the antennas properly.

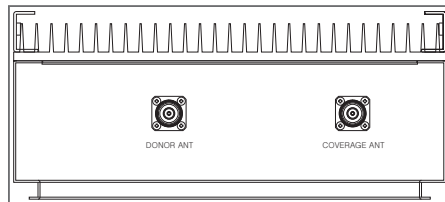


<Figure 4> An installer is directing Donor Antenna to nearby BTS to receive strong input signal.

Cable Connections

- Connect Donor and Coverage Antenna

CAUTION
Do not connect or disconnect cable from ANT port when power is ON



<Figure 5> ANT Ports



<Figure 6> DONOR ANT Port Connection



<Figure 7> Coverage ANT Port Connection

Connecting Power Cable and LED Light Verification

- Connect Power Cable



<Figure 9> AC Power Port Connection

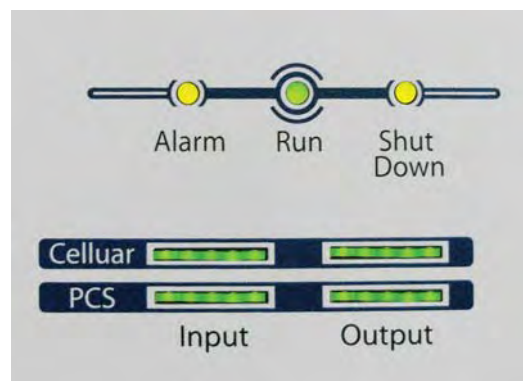


<Figure 10> Verification of LED Lights

- When turning on the repeater, AGS (Auto Gain Setup) is automatically activated, which shows LED indicators are turned on one by one.
- After all the LEDs are on, AGS is complete.
- Please verify that all the LEDs are indicating proper input and output levels.

LED Indicators

- RUN LED : Green light ON
- ALARM LED : Yellow light is alarm status
- SHUT DOWN LED : Yellow light is shutdown status



<Figure 11> Front LED Display

Input Power Signal

- Please note the number of LED bars indicates the RSSI signal strength level at the Donor ANT port.
The tables below indicate the levels.

Common

Less than -85dBm	LED 1bar
-84dBm ~ -67dBm	LED 2 bars
-66dBm ~ -49dBm	LED 3 bars
-48dBm ~ -31dBm	LED 4 bars
More than -30dBm	LED 5 bars

Output Power Signal

- Please note the number of LED bars indicates the downlink signal strength level at the Server ANT port.
The tables below indicate the levels.

Cellular

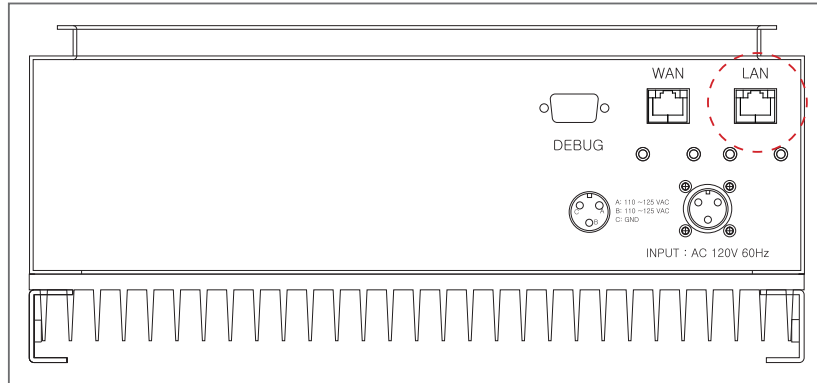
Less than +5dBm	LED 1bar
+6dBm ~ +10dBm	LED 2 bars
+11dBm ~ +15dBm	LED 3 bars
+16dBm ~ +20dBm	LED 4 bars
More than +21dBm	LED 5 bars

PCS

Less than +5dBm	LED 1bar
+6dBm ~ +10dBm	LED 2 bars
+11dBm ~ +15dBm	LED 3 bars
+16dBm ~ +20dBm	LED 4 bars
More than +21dBm	LED 5 bars

Web UI

- Before connecting to repeater, disable wireless networking functions and remove wireless broadband card.
- Connect Ethernet Crossover cable from repeater LAN port to laptop.

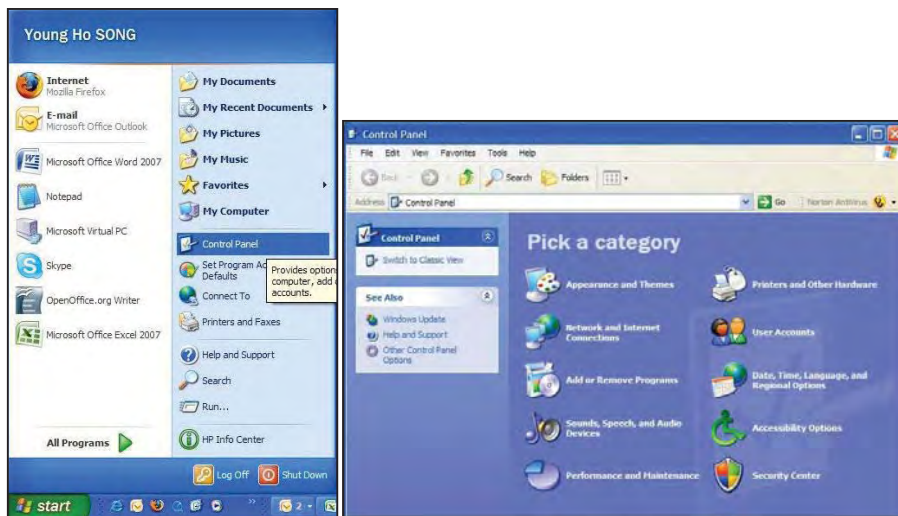


<Figure 12> LAN Port Display

Connecting to Web UI

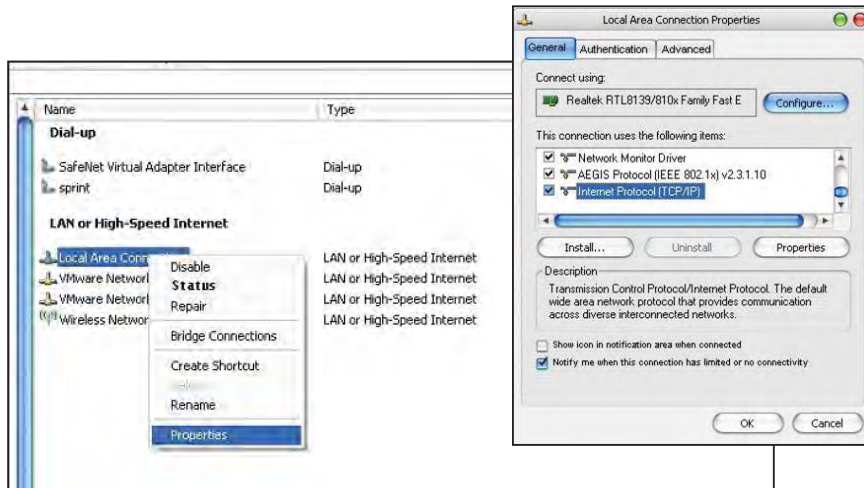
1. Start-> Control Panel-> Network and Internet Connections

CAUTION
Disable wireless connections and remove wireless broadband card.

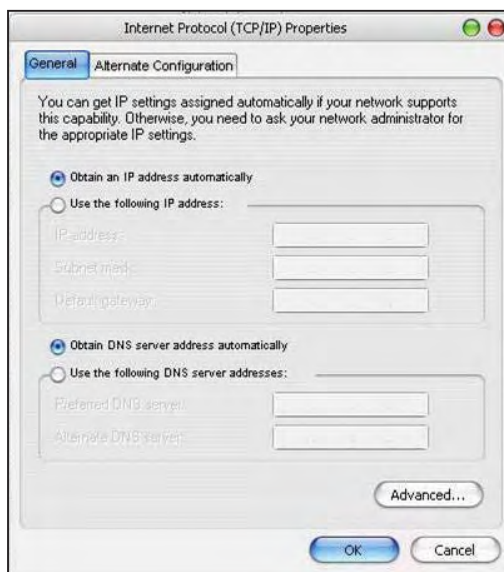


Connecting to Web UI

2. Right click Local Area Connections and choose Properties
 - If your laptop is displaying multiple LAN's, verify which one is used for repeater connection.
3. Click Internet Protocol (TCP/IP) on General Tab and click Properties



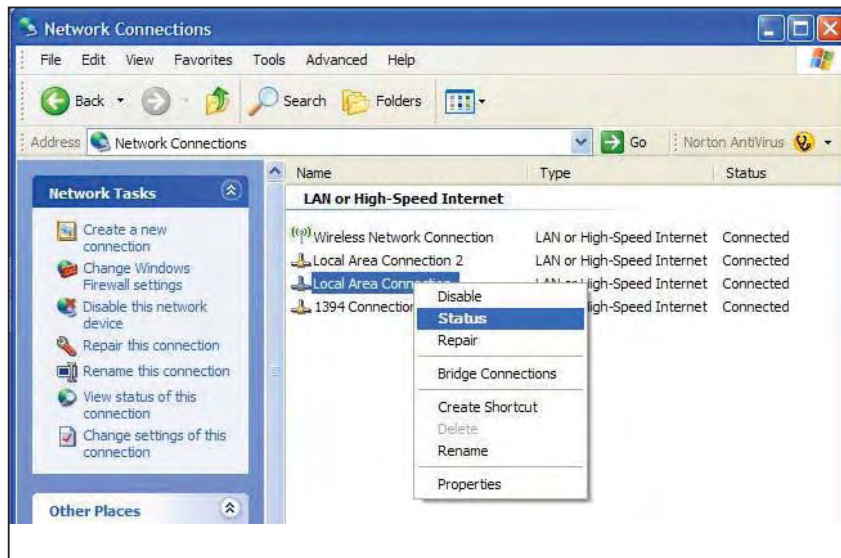
On General Tab



4. Choose "Obtain IP address automatically"
5. Choose "Obtain DNS server address automatically"
6. Click "OK" to close Properties
7. Click "OK" to close Properties

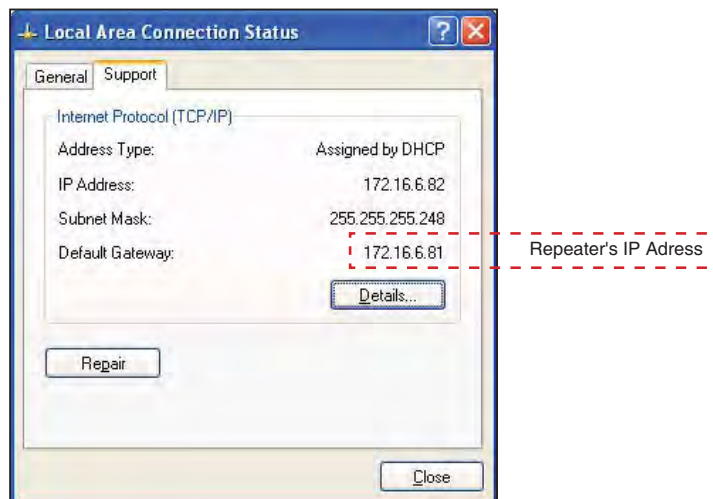
Connecting to Web UI

- Right click Local Area Connections and choose Status



Verify Assigned IP Address

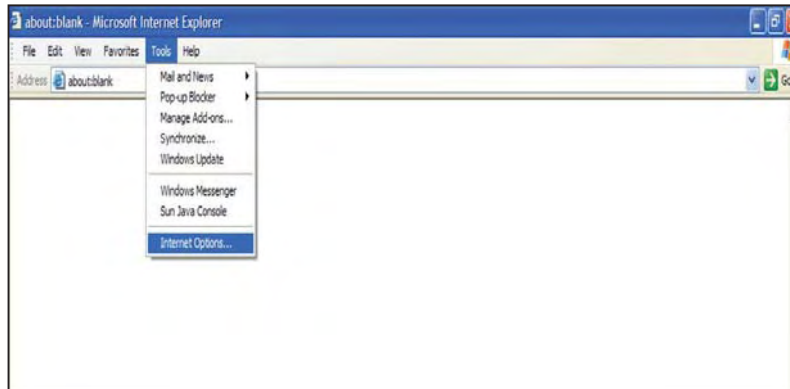
- Click on "Support" tab.
- Verify assigned Default Gateway at local connection. (If IP address is not assigned, please click repair.)
- Close all windows when finished.



Internet Explorer Option Settings

- Proceed step by step as indicated in the following slides to delete all temporary internet files and records.

1. Open Internet Explorer -> Tools -> Internet Options



Browser History Options

On the "General" tab, in the "Temporary Internet files" section:

2. Click "Delete Cookies..."
3. Click "Delete Files..."
4. Click "Apply"
5. Click "OK"



Login Screen

Enter Default Gateway's IP address into address bar as previously described, you will be redirected to Login. Default User Name is 'admin', and default Password is 'admin'. You may need to change password as described in the User Management section. Repeater Location and Contact Information will initially be blank, you can input Repeater Location and Contact Information as described in the Setup Wizard section.

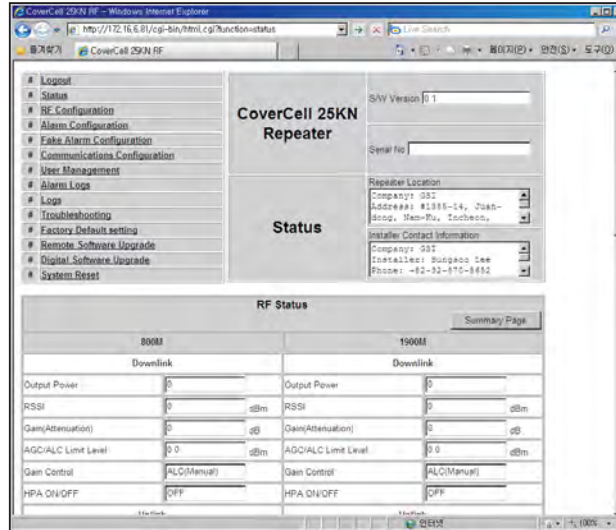
List Menu

- After you log in, you can see various menu page links related to the equipment.

Logout
Status
RF Configuration
Alarm Configuration
Fake Alarm Configuration
Communications Configuration
User Management
Alarm Logs
Logs
Troubleshooting
Factory Default setting
Remote Software Upgrade
Digital Software Upgrade
System Reset

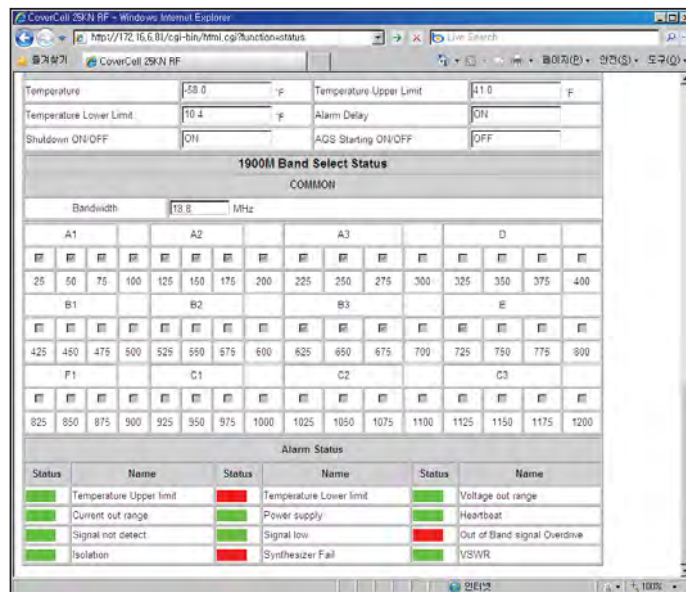
Status Page

- Default D/L and U/L are set at minimum Gain.
- The default values in various fields will differ with different models of Covercell 25KN Repeaters.
- In order to view other pages, you can click the desired menu on the top-left corner of all pages.
- Changes can be made on the Status Page. This page is for checking the repeater's conditions and settings.



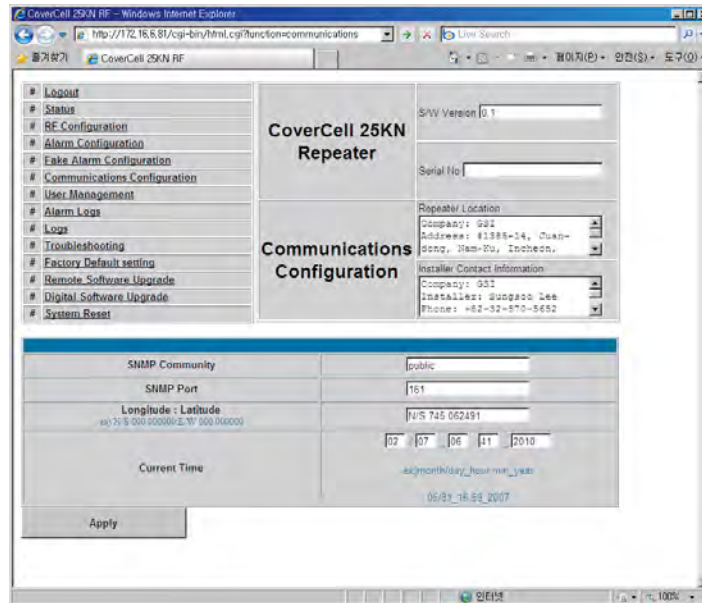
Status Page

- When an alarm occurs, the color of Status turns red.



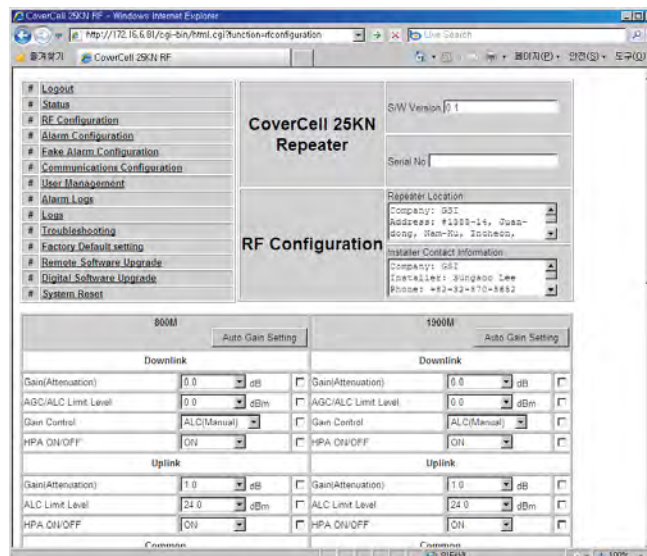
Communications Configuration

- Click on the Communications Configuration link.



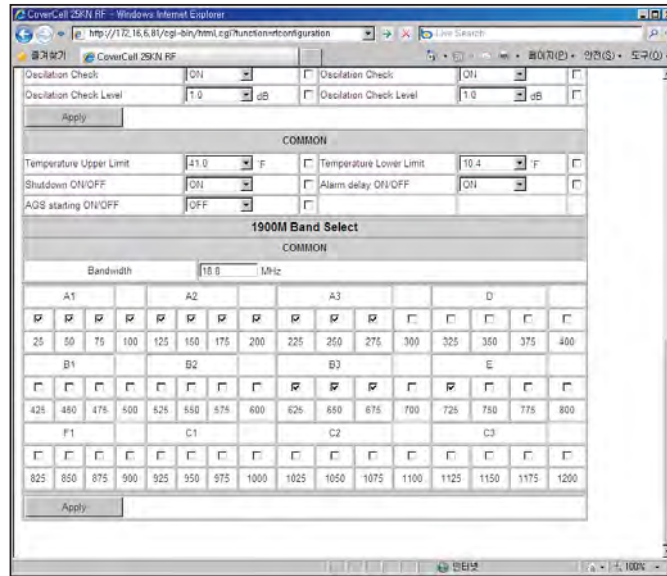
RF Configuration

- Click the RF Configuration link.
- This menu is where installer will actually configure the Repeater.
- You can change various RF values of the equipment on this page.



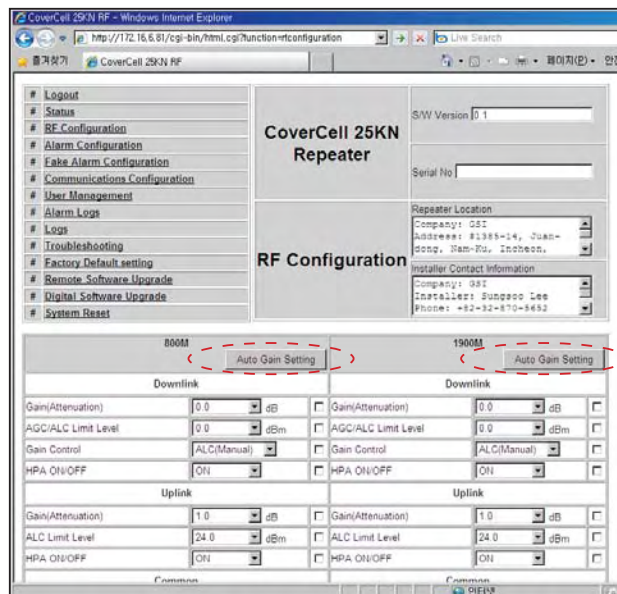
RF Configuration

- In case that screen resolution is 1024 x 768, you may need to use scroll bars to view all.
- Changes will not take effect until you click "Apply" button.
- The default values in various fields will differ with different models of Covercell 25KN Repeaters.



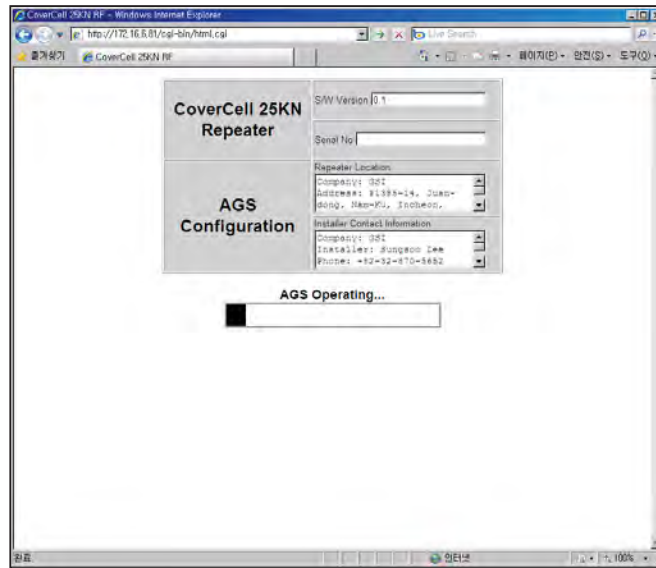
Automatic Setup Using AGS Function

- Set AGS Control to 'ON' and click Apply



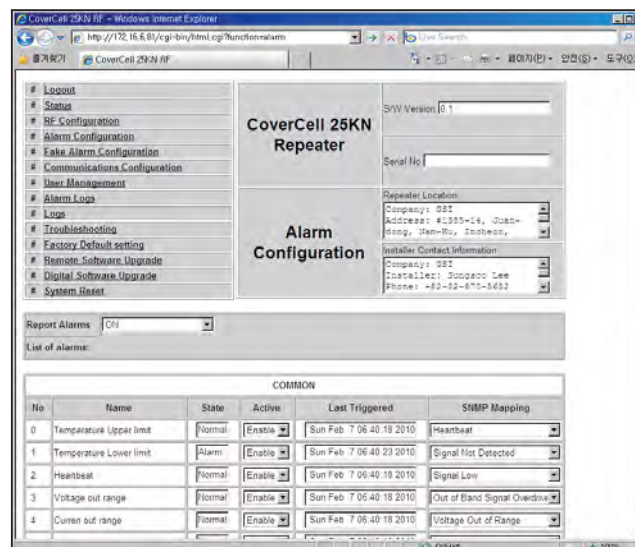
Automatic Setup Using AGS Function

- The screen shown below will be displayed while AGS is initializing.
- After AGS is completed normally, click "Click Result". The equipment will set AGC, Gain Balance and HPA "ON", and then provide normal service. If automatic setup works you will see the Status page. (ALC "Off")



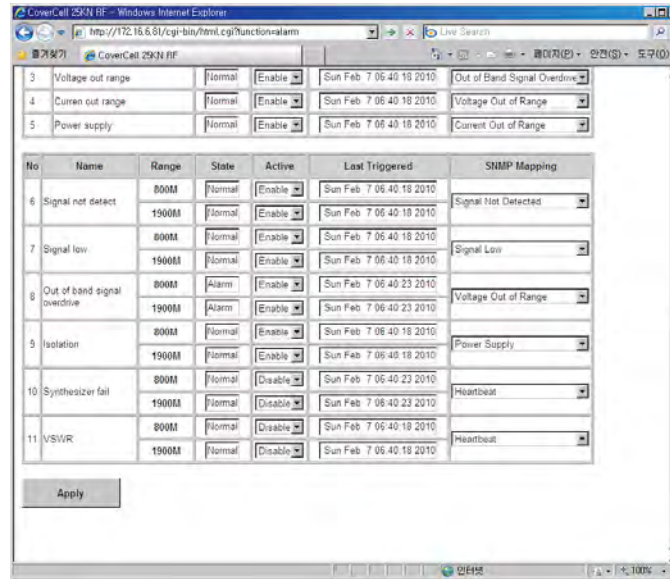
Alarm Configuration

- Click Alarm Configuration link.
- In case that Report Alarms is OFF, all alarms will be disabled. In case that Report Alarm is ON, you can enable and disable individual alarms.



Alarm Configuration

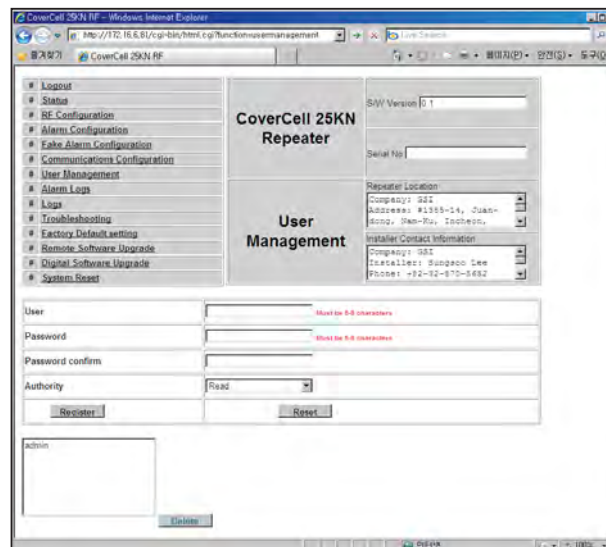
- In case that screen resolution is 1024 x 768, you may need to use scroll bars to view all. Changes will not be made effective until you click "Apply" button.



User Management

- Click on the User Management link.
- On this page you can create and delete users, change passwords, and assign authorities to individual users.
- Read/Write Authority means that the user can change various values.
- Super User is very similar to an Administrator account.

CAUTION
DO NOT DELETE 'admin'



Alarm Logs

- Click on the Alarm Logs link.
- You can see Alarm Logs regarding Web UI operation. Alarm Logs will maintain a history of up to 100 operations.

The screenshot shows the 'Alarm Logs' page for a CoverCell 25KN Repeater. The interface includes a navigation menu on the left, a central header area with 'CoverCell 25KN Repeater' and 'Alarm Logs' labels, and a table of alarm events. The table has four columns: Number, Name, Status, and Last Triggered. The status column uses color coding: red for active alarms and green for cleared alarms.

Number	Name	Status	Last Triggered
1	SHUTDOWN_ALARM	Red	02/07/2010 06:45:04
2	SHUTDOWN_ALARM	Green	02/07/2010 06:48:49
3	SHUTDOWN_ALARM	Red	02/07/2010 06:47:37
4	PCS_SYNTHESIZER_FAIL_ALARM	Red	02/07/2010 06:45:23
5	CELLULAR_SYNTHESIZER_FAIL_ALARM	Red	02/07/2010 06:45:23
6	PCS_OUTBAND_SIGNAL_OVERDRIVE_ALARM	Red	02/07/2010 06:45:23
7	CELLULAR_OUTBAND_SIGNAL_OVERDRIVE_ALARM	Red	02/07/2010 06:45:23
8	TEMPERATURE_DOWNLIMIT_ALARM	Red	02/07/2010 06:45:23
9	SHUTDOWN_ALARM	Green	02/07/2010 06:34:59

Logs

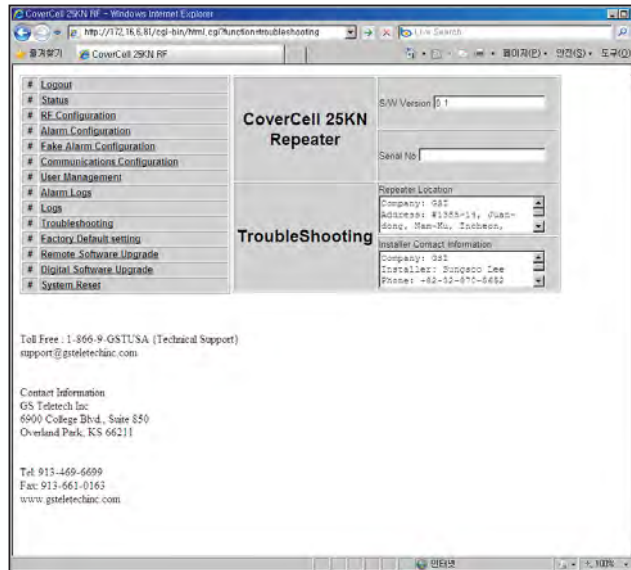
- Click on the Alarm Logs link.
- You can see Alarm Logs regarding Web UI operation. Logs will maintain a history of up to 30 operations.

The screenshot shows the 'Logs' page for a CoverCell 25KN Repeater. The interface includes a navigation menu on the left, a central header area with 'CoverCell 25KN Repeater' and 'Logs' labels, and a table of user operations. The table has four columns: Date & Time, User, Operation, and Description.

Date & Time	User	Operation	Description
02/07/2010 - 06:51:53	admin	Alarm Logs	Checked
02/07/2010 - 06:51:04	admin	User Management	Accessed
02/07/2010 - 06:48:39	admin	Alarm Configuration	Checked
02/07/2010 - 06:48:37	admin	Alarm Logs	Checked
02/07/2010 - 06:42:20	admin	RF Configuration	Checked
02/07/2010 - 06:41:35	admin	Communications	Checked
02/07/2010 - 06:41:28	admin	Login	Login
02/07/2010 - 06:40:00	admin	Communications	Set
02/07/2010 - 06:41:37	admin	Troubleshooting	Checked
02/07/2010 - 06:41:37	admin	Troubleshooting	Checked
02/07/2010 - 06:40:58	admin	Communications	Checked
02/07/2010 - 06:33:55	admin	Login	Login

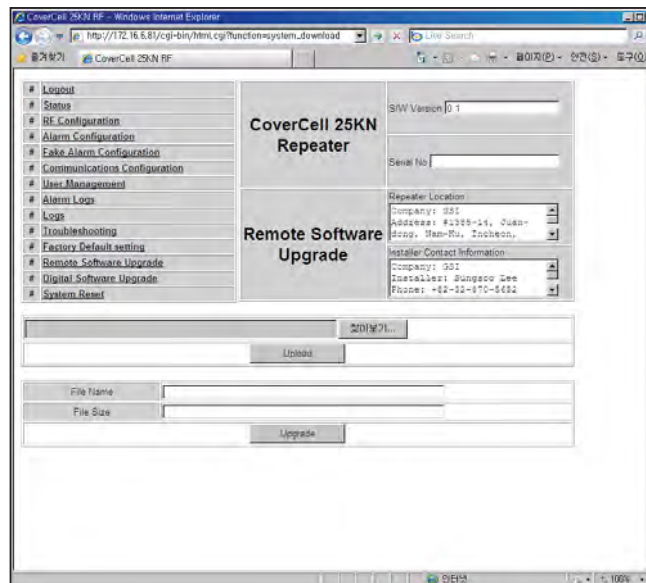
Troubleshooting Guide

- Click on the Troubleshooting link.
- You can refer to this page for a general troubleshooting guide.
- In case that screen resolution is 1024 x 768, you may need to use scroll bars to view all.



Software Upgrade

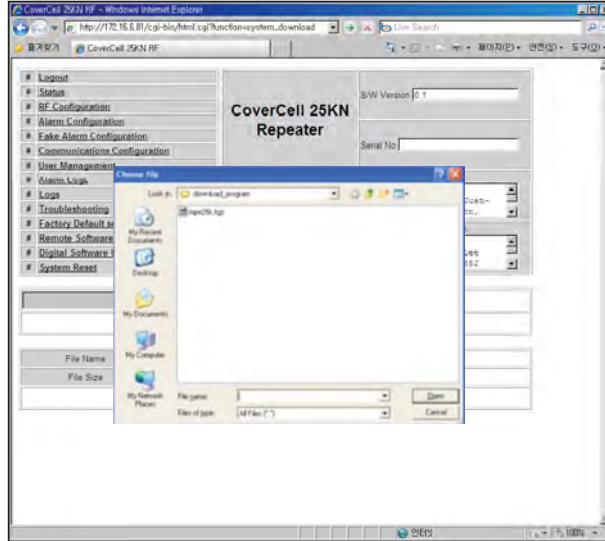
- Click on the Remote Software Upgrade link.
- In case that software upgrade is needed, you should use this page.
- Click Browse button to select the file to upgrade from the laptop.



Software Upgrade

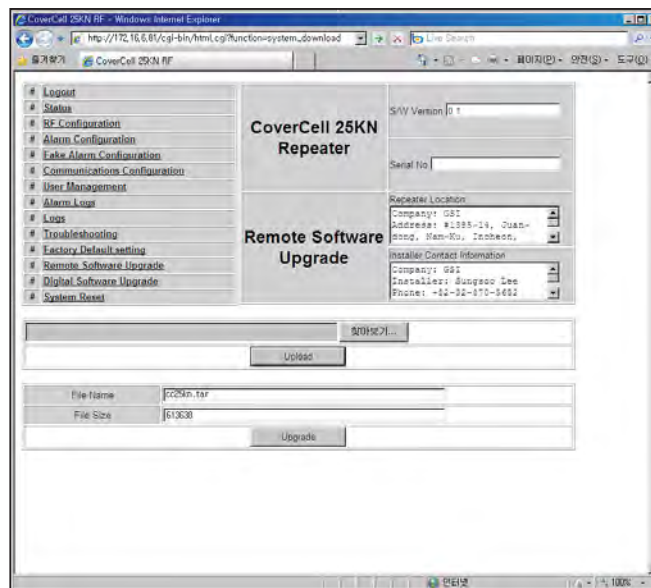
- Choose the file to upgrade provided by GST.
- After you choose the file, you should click "upload" to send the file from your laptop to the repeater.

CAUTION
Be careful not to unplug the crossover Ethernet cable during software upgrade.



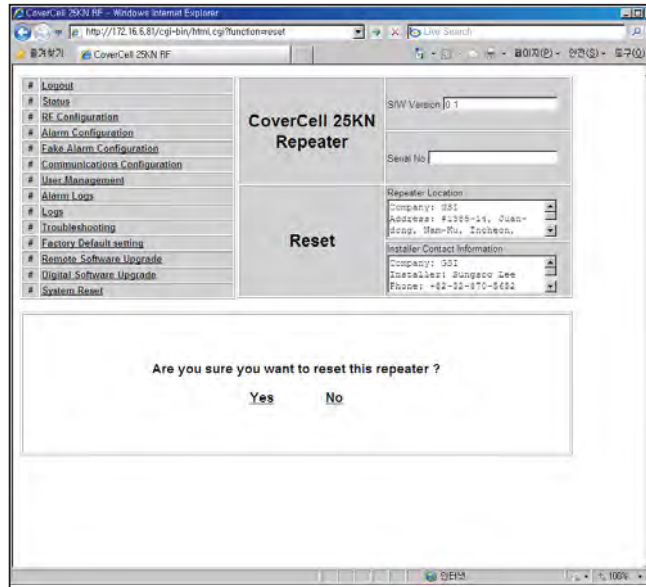
Software Upgrade

- After uploading is finished, verify that the File Name and the File Size is correct, click "Upgrade" button.
- Installer should wait about 2 minutes for upgrade to initialize.
- User may then be prompted to log back into the Repeater.



System Reset

- A software reset is a “soft reboot” of the repeater.
To reset the software, click on ‘Software Reset’ and then click ‘Yes’ to reset the software.
- Resetting the software is a good way to clear current alarms.



GST Technical Support

Phone:
Toll Free: 1-866-9-GST-USA
Phone: 913-469-6699



Write:
GS Teletech Inc.
6900 College Boulevard, Suite 850
Overland Park, KS 66211, USA




Product Information and Technical Assistance:
www.gsteletechinc.com
support@gsteletechinc.com



Specifications and features of this installation guide are subject to change without notice or obligation.

Global IT Leader
GST

MPE Information

	<p>Warning: Exposure to Radio Frequency Radiation The radiated output power of this device is far below the FCC radio frequency exposure limits. Nevertheless, the device should be used in such a manner that the potential for human contact during normal operation is minimized. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna should not be less than 20cm during normal operation. The gain of the antenna is 2 dBi. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.</p>
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