Sprint
Together with NEXTEL

SpeedCell Repeater

INSTALLATION GUIDE
Ver. 1.0

GMS-2624AMP/DFU-SPR

GS Teletech Inc.

SpeedCell Repeater

GMS-2624AMP/DFU-SPR

Installation Guide Ver. 1.0

Contents of Box

Contents	Picture	Quantity	Contents	Picture	Quantity
SpeedCell Repeater System PSU Unit 4.3”(W) x 16.9”(H) x 10.7”(D) , 15 lbs DFM Unit (1),(2) 2.8”(W) x 16.9”(H) x 10.7”(D), 9.9 lbs 2600 AMP Unit 3.9”(W) x 16.9”(H) x 10.7”(D), 15.2 lbs		1EA	**Ground Cable** 6.6ft (2m)		1EA
			Power Cord 5.9ft (1.8m)		1EA
			Ethernet Cable 6.6ft (2m)		1EA
Mounting Bracket 23.2”(W) x 18.5”(H) x 2.75”(D), 23.5 lbs		1EA	**Lag Screw** 1/2” x 2”		8EA
Extension Mounting Bracket 13.7”(W) x 20.5”(H) x 2.85”(D),15 lbs		1EA	**Data cable** for 2600 AMP and DFM 2		2EA
CD which contains - User Manual - Installation Guide		1EA	**Ground Sems Screw** M4 x 8mm		8EA
RF Cable Set Front RF Cable 3EA, Top RF Cable 6EA, Reference Cable 5EA		1EA	**Mounting Sems Screw** M6 x 10mm		12 EA

This publication provides instruction for installing the SpeedCell repeaters.

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

Copyright

Revision History

Date	Version	Changes
05/2011	Version 1.0	

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 8inch while operating near the donor and the server antennas. Also, the donor antenna needs to be mounted outdoors on a permanent structure.

WARRANTY
Opening or tampering the BDA will void all warranties.

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.

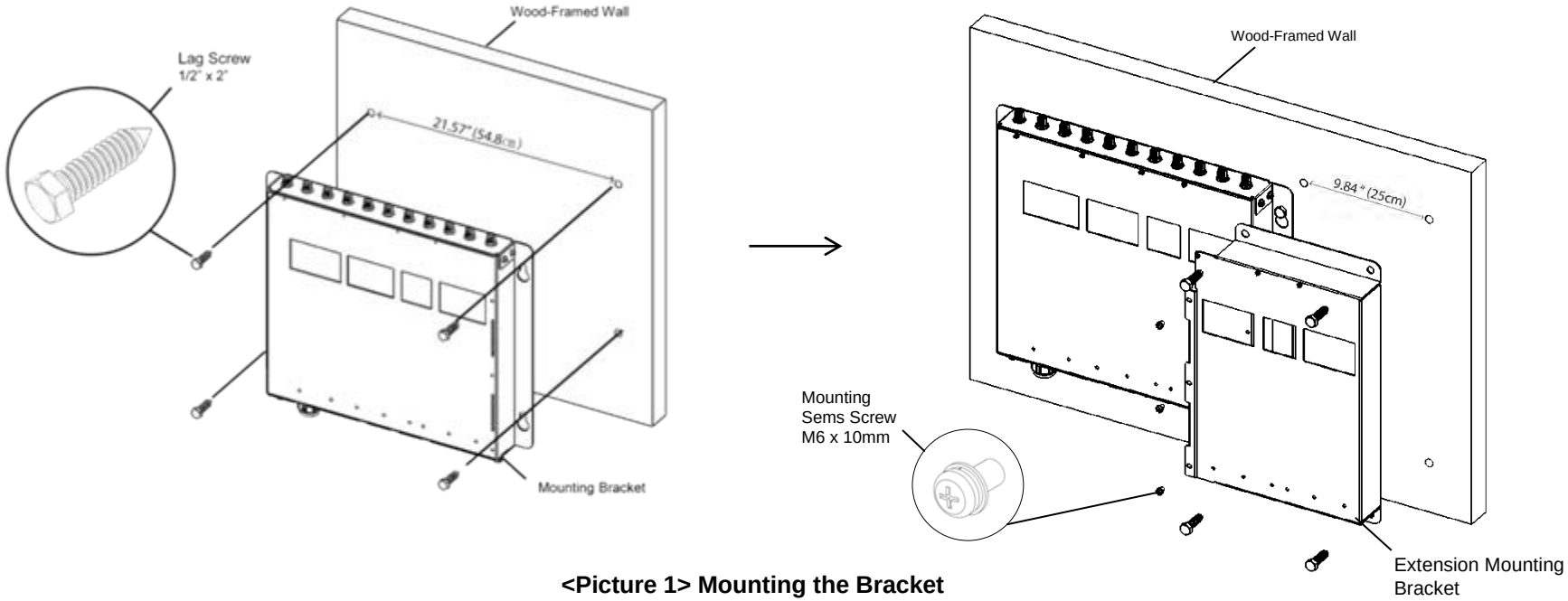
CAUTION: RISK OF EXPLOSION IF BATTERY ON CONTROLLER BOARD IS REPLACED WITH AN INCORRECT TYPE.

CAUTION: DISPOSE OF USED BATTERIES ACCORDING TO THE INSTRUCTIONS

Mounting Repeater

Wood-Framed Wall

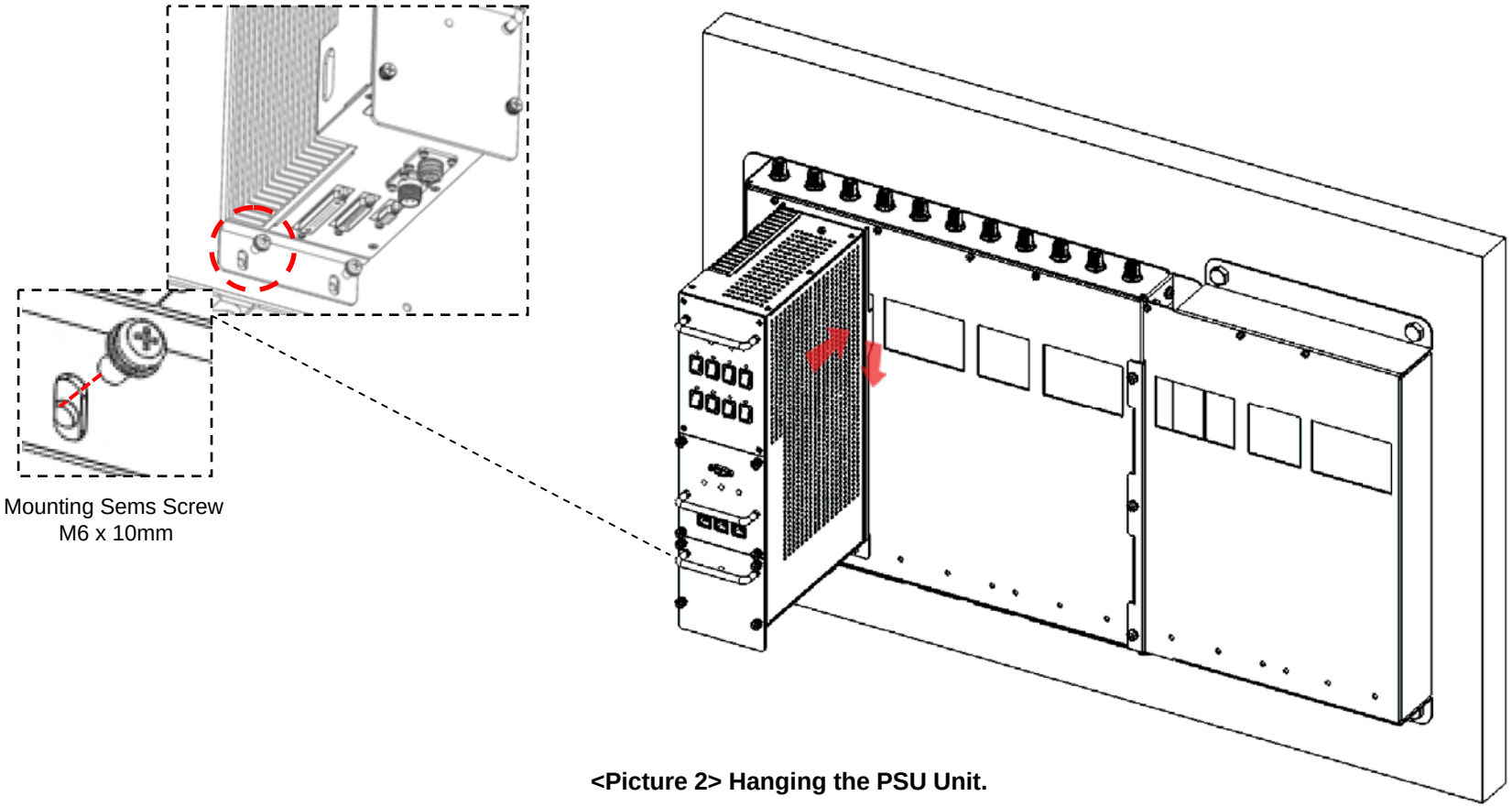
- It is recommended to first attach a sheet of plywood to the wall. The sheet of plywood should be anchored to the studs in the wall.
- Using a pencil, mark the location for each of the mounting bracket's four mounting holes on the plywood.
- Place the mounting bracket over the four lag screws heads.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



<Picture 1> Mounting the Bracket on a Wood-Framed Wall.

Hang and Grounding

- Hang the PSU unit to the mounting bracket.
- Locate the two Mounting Sems Screws (M6 x10mm) underneath the PSU unit. Tighten bolts until secure.



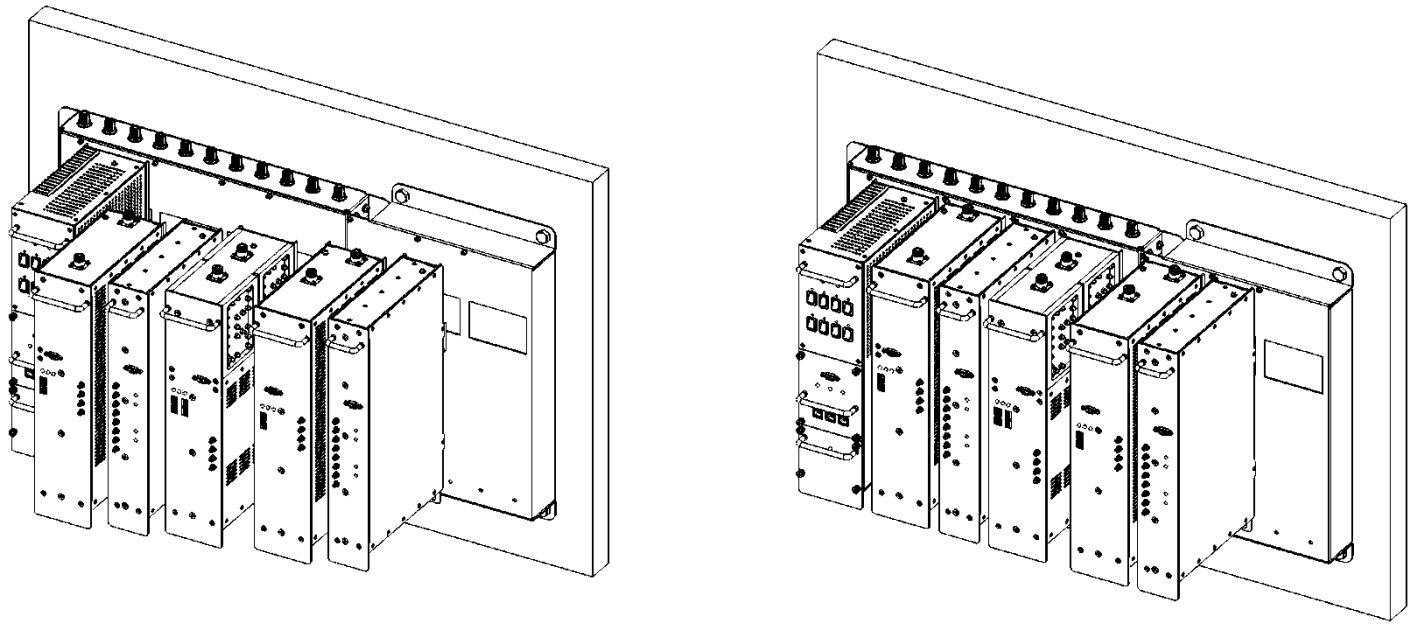
<Picture 2> Hanging the PSU Unit.

Hang and Grounding

- Hang the rest of the units in the following order: 2600AMP, DFM 2.
- Locate the two Mounting Sems Screws (M6 x10mm) underneath each unit. Tighten bolts until secure.

CAUTION

Units must be hung in the following order only: 2600 AMP -> DFM 2



<Picture 3> Hanging the Rest of Units.

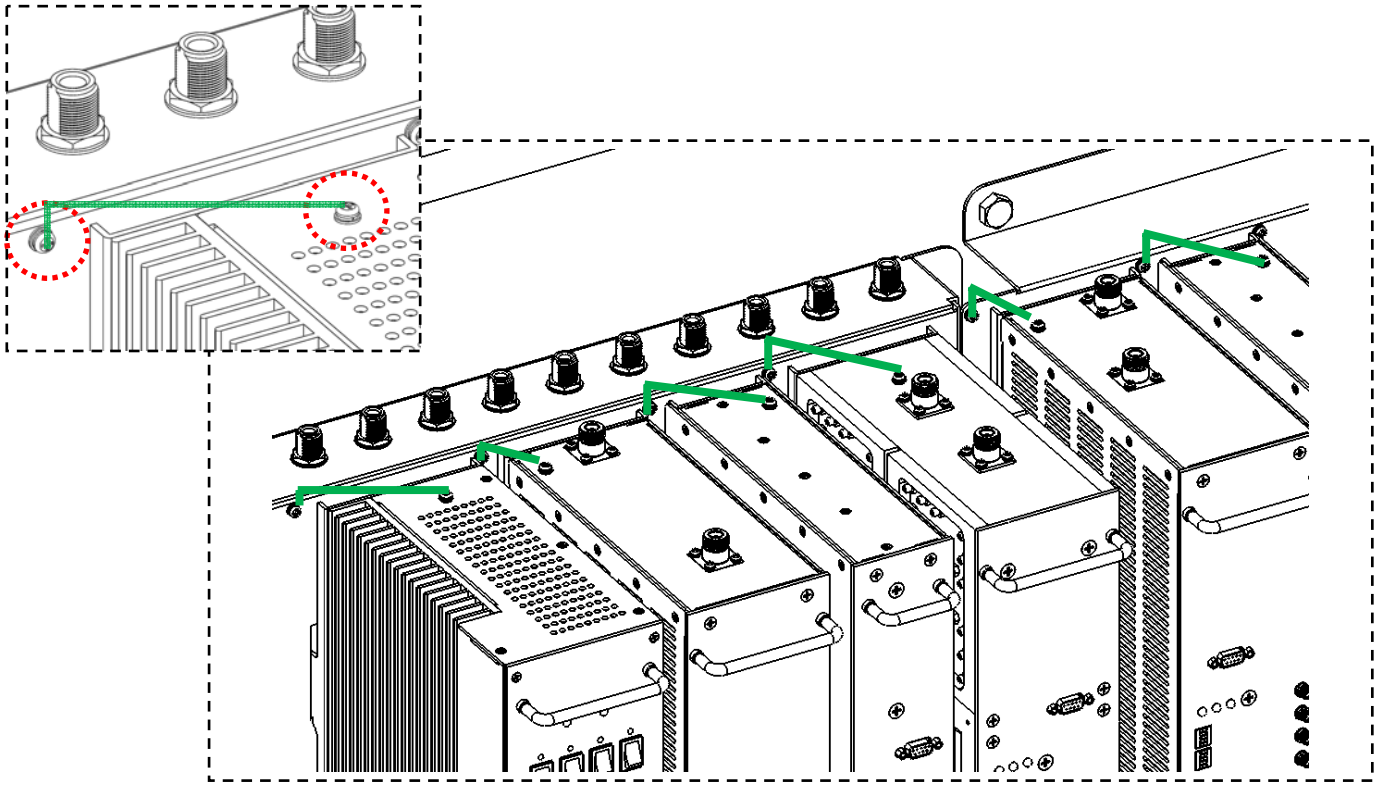
Hang and Grounding

• Connect ground cables of each unit to the bracket using Ground Sems Screws (M4 x 8mm) as displayed at the picture below.

Ground Cable

CAUTION

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



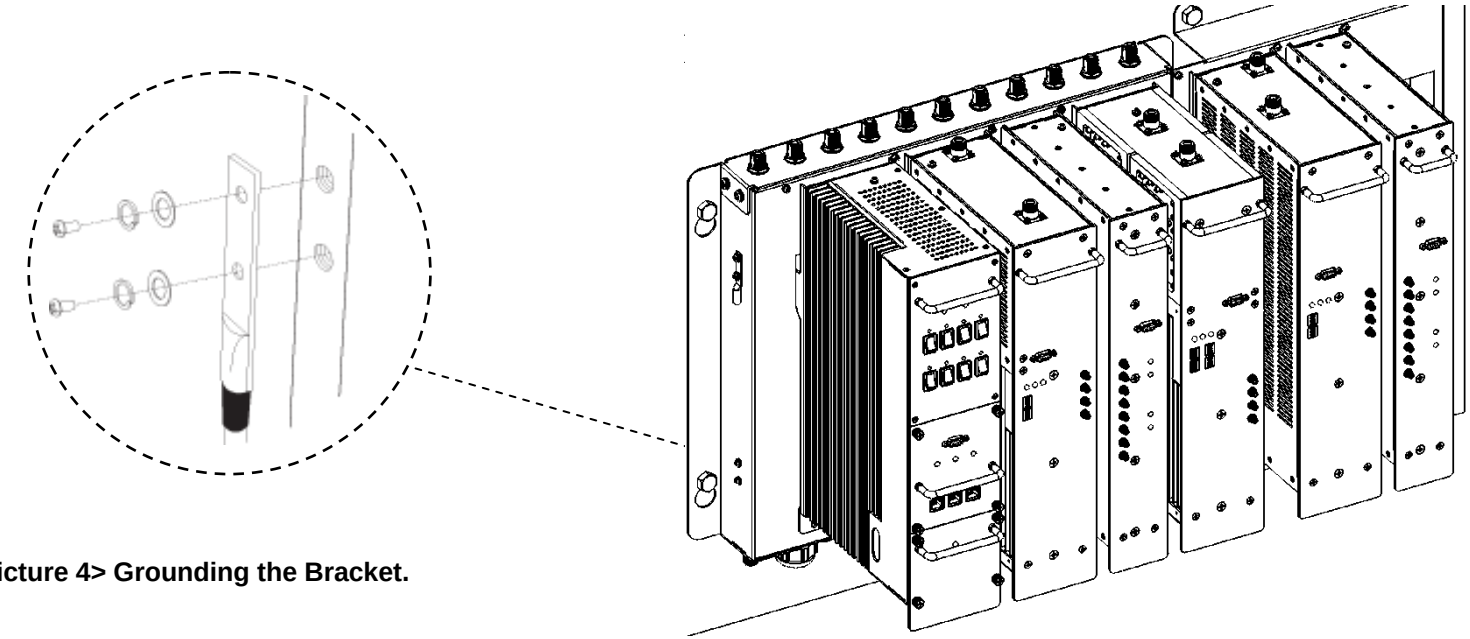
<Picture 3> Grounding of the PSU, 1900 AMP, DFM 1, 800/900 AMP, 2600 AMP, DFM 2 Units.

Hang and Grounding

- Locate the ground lug on the underside (or side) of the bracket.
- Crimp the ground cable to the ground lug.
- 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.



<Picture 4> Grounding the Bracket.

Position Antenna

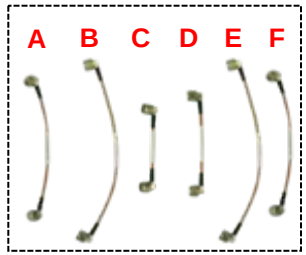
- After installing 2600MHz antennas the installer should make line of site.
- Customer specifications should be followed for positioning the antennas properly

Warning: 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 12 dBi. .

<Picture 5> An installer is directing Donor Antenna to nearby BTS to receive strong input signal.

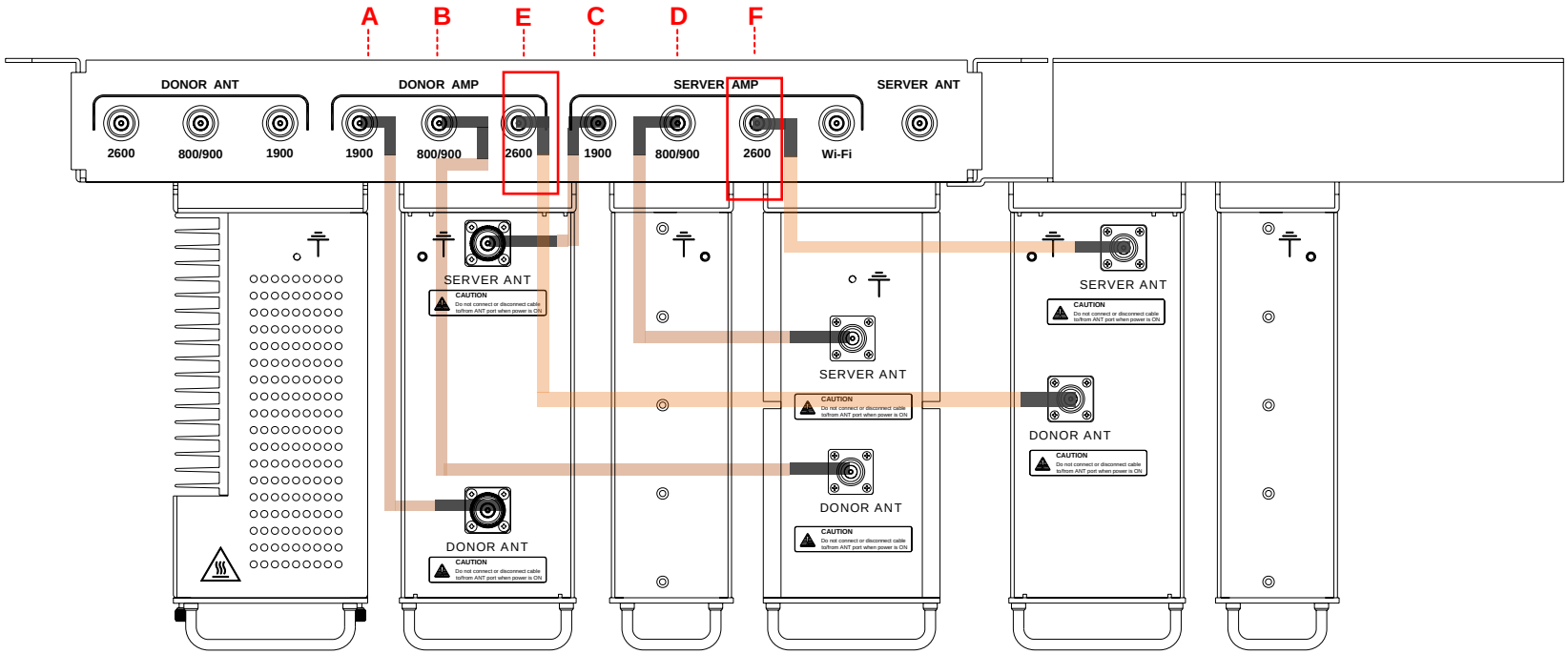
RF Cable Connections: Top of The Repeater

- Connect the 2600 Donor Antennas to their corresponding ports.
- Plug in four N(M) to N(M) type RF cables as demonstrated in the picture below.



CAUTION

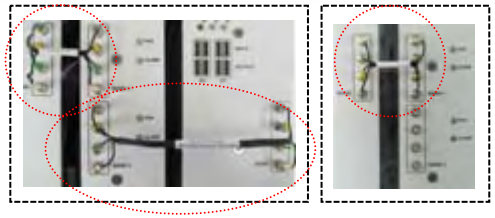
Do not connect or disconnect cable from ANT port when power is ON.

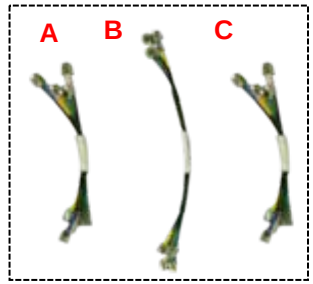


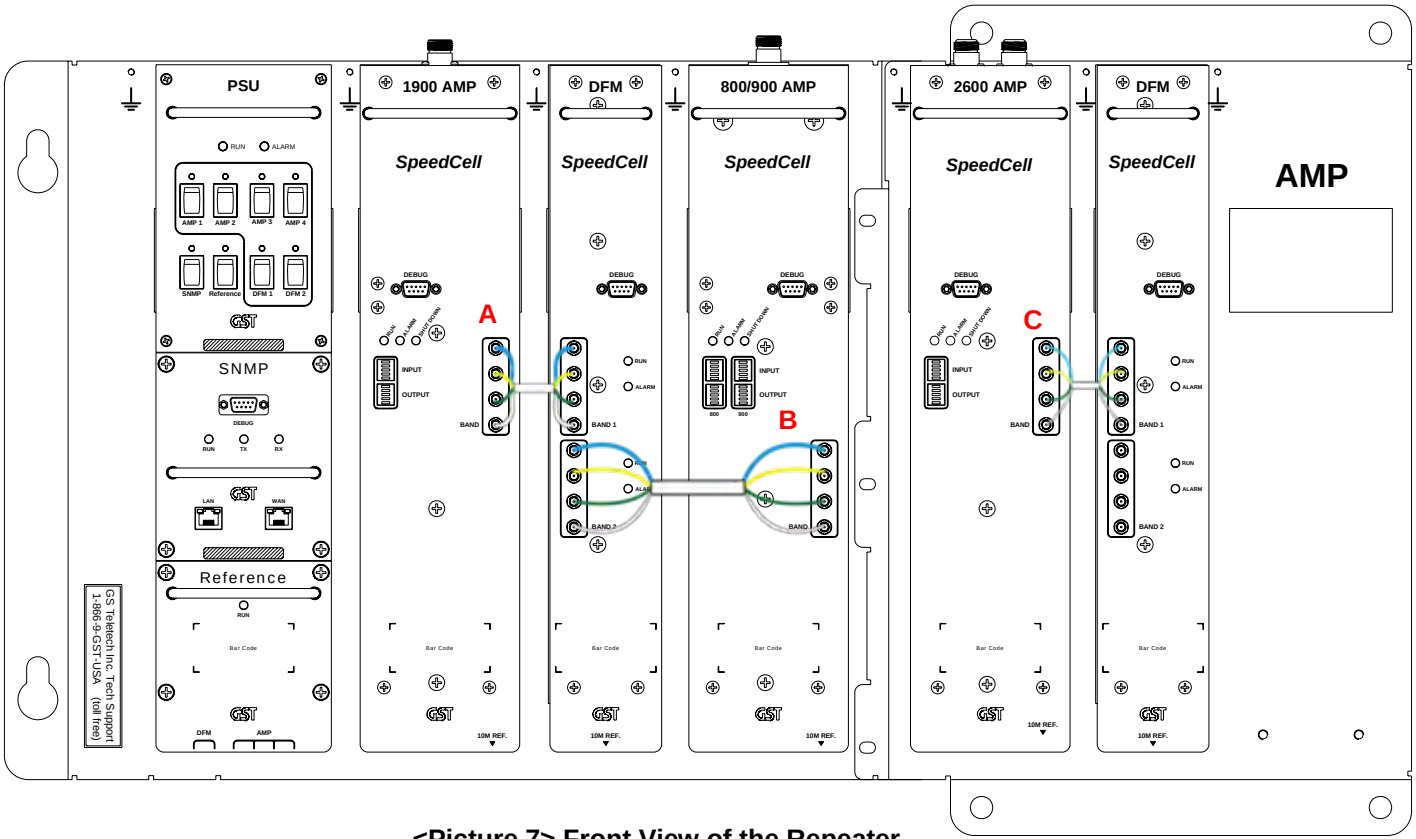
<Picture 6> Top View of the Repeater.

RF Cable Connections: Front Side

- Take out two SMA (M) to SMA (M) type RF cables.
- Please, pay attention to cable's corresponding number and its color while connecting.
- Connect 2600 AMP and DFM 2 via Band 3.







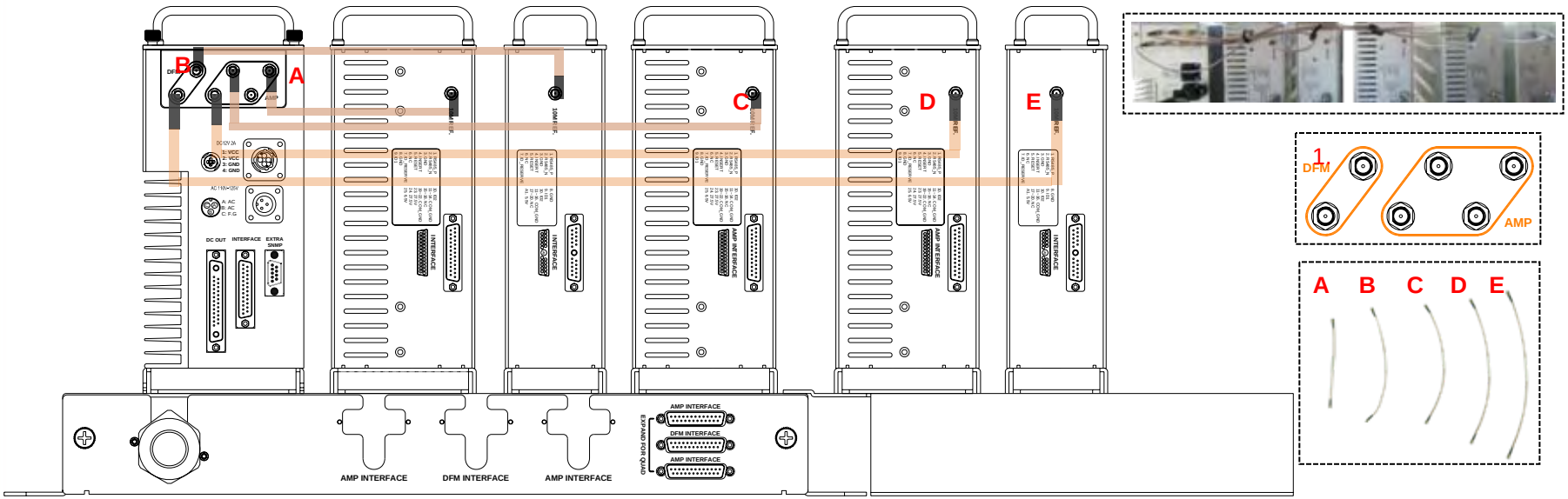
<Picture 7> Front View of the Repeater.

RF Cable Connections: Bottom of The Repeater

- Take out three SMA (M) to SMA (M) type RF cables.
- While connecting the PSU and the DFM units underneath, use referenced cable and pay attention to the labels. Plug them into their corresponding outlets.
- User may choose either of the two SMA ports on the bottom of the PSU to connect to the DFM.
- User may choose any two of the four SMA ports on the bottom of the PSU to connect to amplifiers.

CAUTION

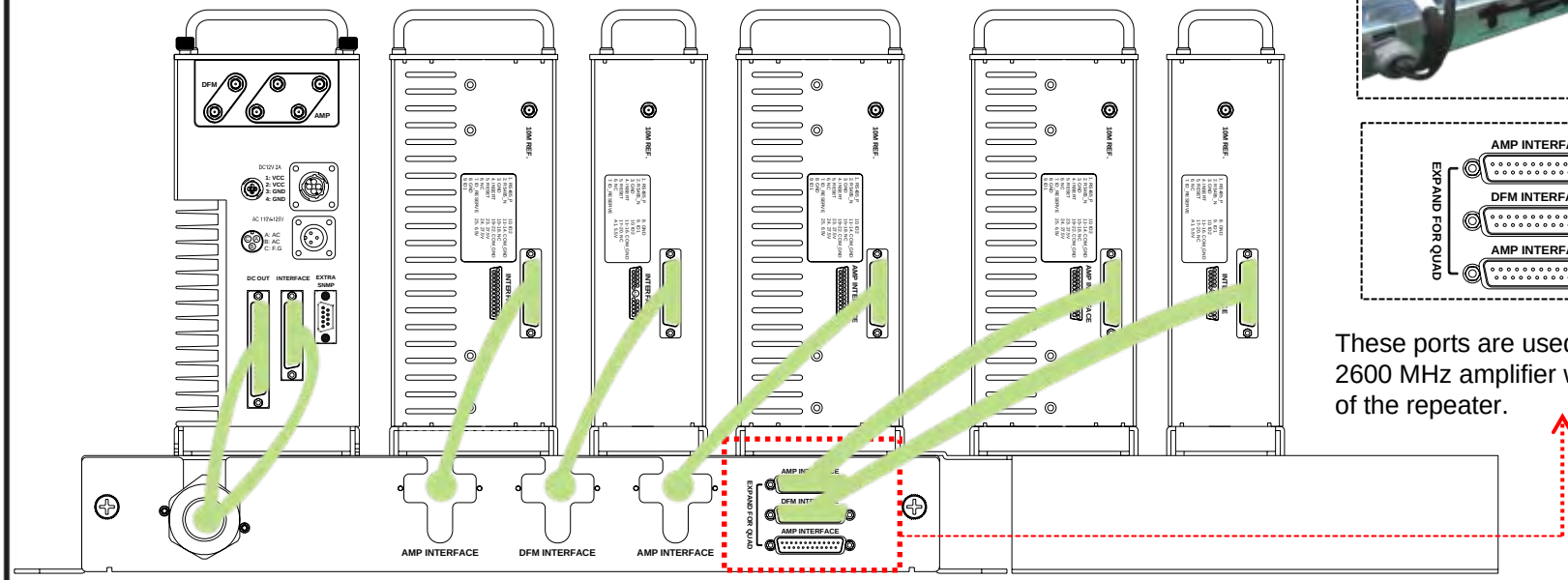
Please, pay attention while connecting PSU and DFM 1, PSU and 2600 AMP units. The repeater will not work if connection is inappropriate.

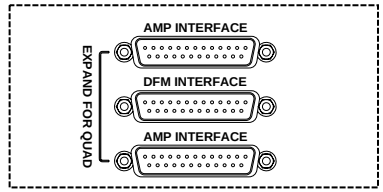


<Picture 8> Bottom View of the Repeater.

Power Cord Connections

• Plug in the cables to PSU, 2600 AMP and DFM 2 as displayed at the picture below.





These ports are used for an added 2600 MHz amplifier while extension of the repeater.

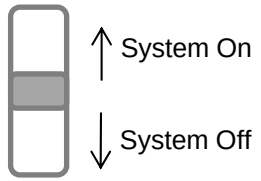
<Picture 9> Bottom View of the Repeater.

Connecting Power Cable and LED Light Verification

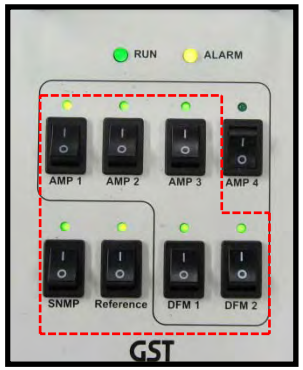
• Connect Power Cable

<Picture 10> AC Power Port Connection.

• Turn the switch “ON” on the left side of PSU.



<Picture 11> ON/OFF Switch of SpeedCell Repeater.



<Picture 12> Verification of LED Lights.

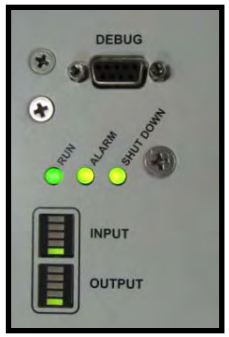
• Turn the switch “ON” on the front side of PSU as displayed at the picture 12.

LED Indicators

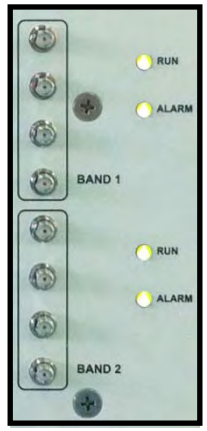
• The LED's on the repeater will light up and should change to green as displayed at the picture below.
Tx and Rx LEDs will be blinking.

RUN LED : Green light ON.
ALARM LED : Green light is normal status, Red light is alarm status.
SHUT DOWN LED : Green light is normal status, Red light is shutdown status.

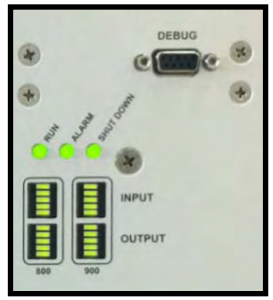
PSU



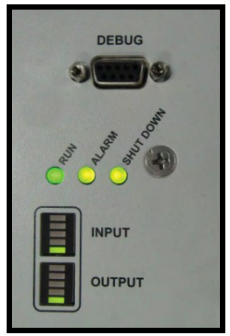
1900 AMP



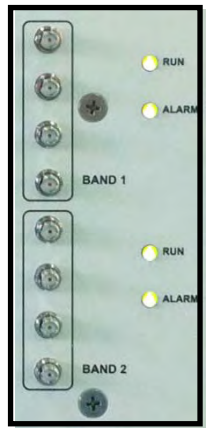
DFM 1



800/900
AMP



2600 AMP



DFM 2

Input Power Signal

• Please note the number of LED bars for input indicates signal strength level.

The tables below indicate the levels.

Number of LED bars on the front side of Repeater will show input signal level:

Less than ~ -86dBm	LED 1bar
-85dBm~-79dBm	LED 2 bars
-78dBm~-72dBm	LED 3 bars
-71dBm~-65dBm	LED 4 bars
More than -64dBm	LED 5 bars

<Table 1> LED Bars Indication.

Output Power Signal

• Please note the number of LED bars for output indicates signal strength level.

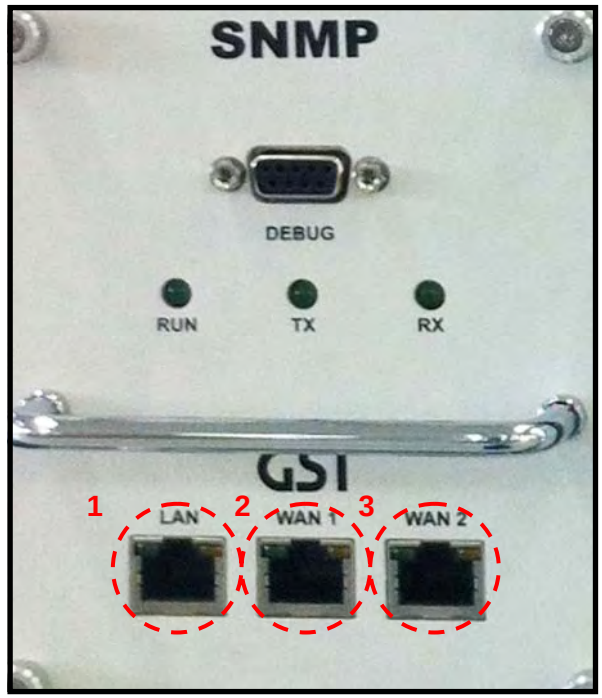
Number of LED bars on the front side of Repeater will show output signal level:

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

<Table 2> LED Bars Indication.

Web UI

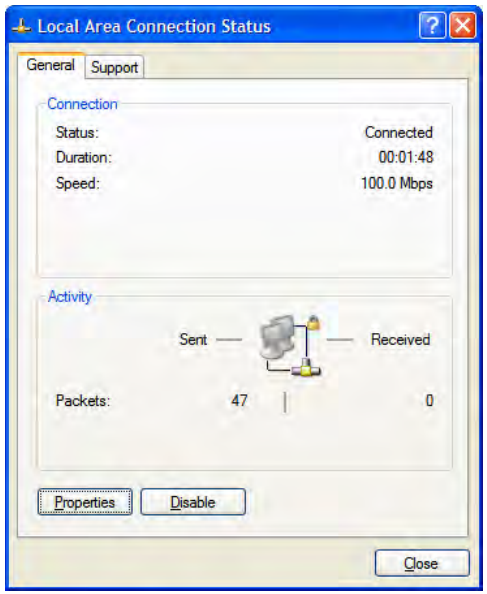
- LAN port is used for connection of laptop and repeater.
- WAN 1 port is used for connection of repeater and wireless modem for remote access.
- WAN 2 port is a redundancy port for remote access.



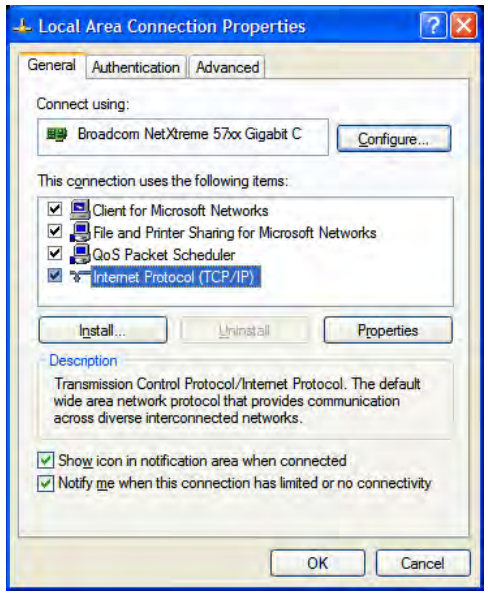
<Picture 12> Ethernet Port.

Configuring Laptop to Connect to Repeater

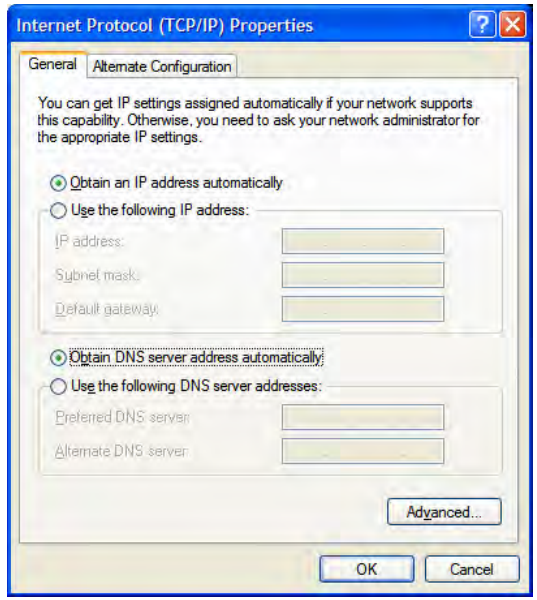
- Connect Ethernet crossover cable from the LAN port of the repeater to laptop.



1. Go to Local area connection.



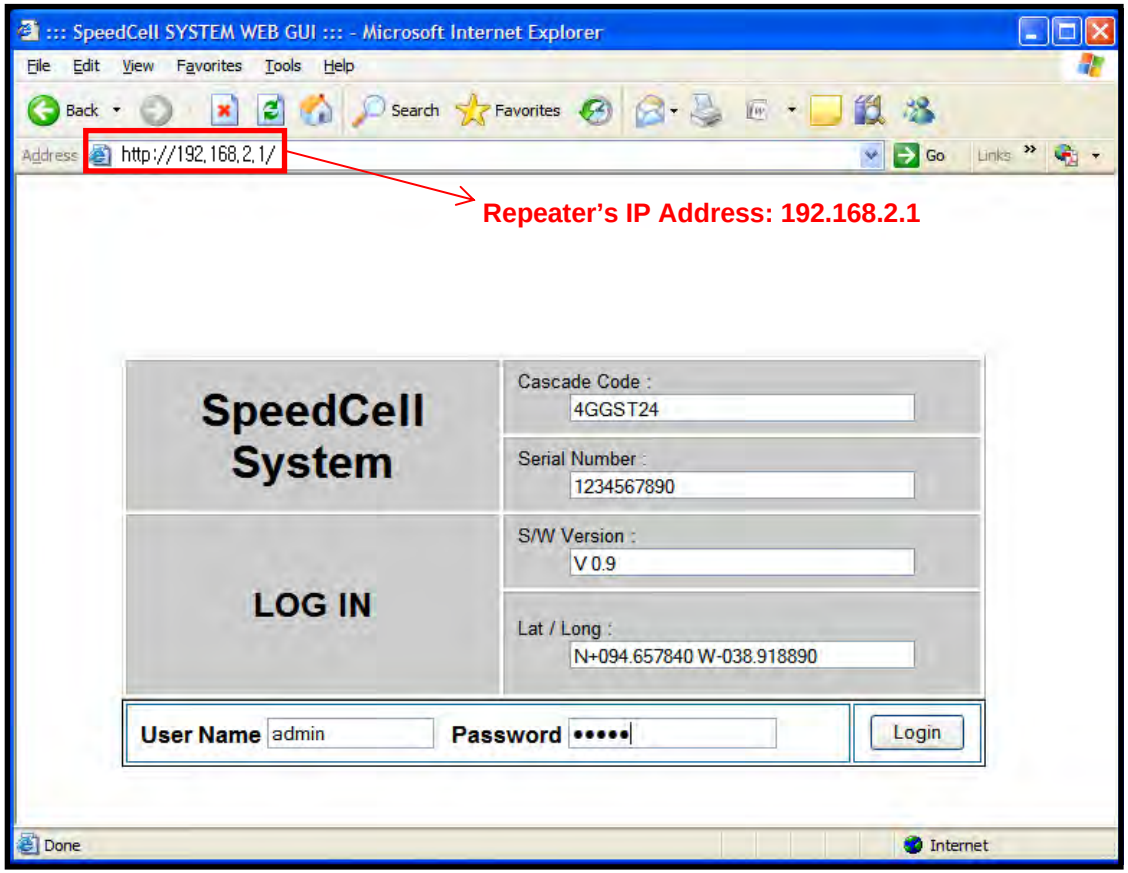
2. Click 'TCP/IP Properties'.



3. Choose 'Obtain DNS server address automatically'.

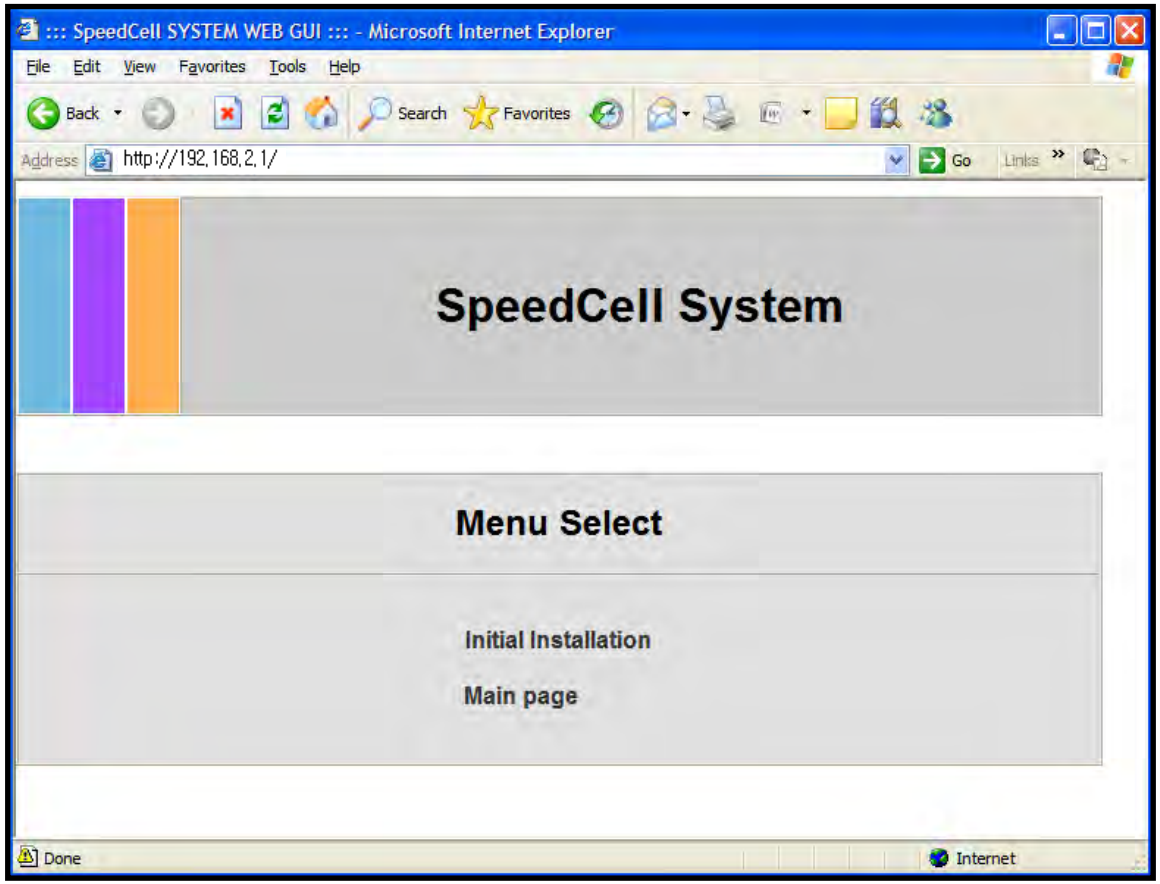
Login Screen

Enter IP address by 192.168.2.1, 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. Engineering Number and Site Name will initially be blank, you can input Engineering Number and Site Name as described in the Communications Configuration section.



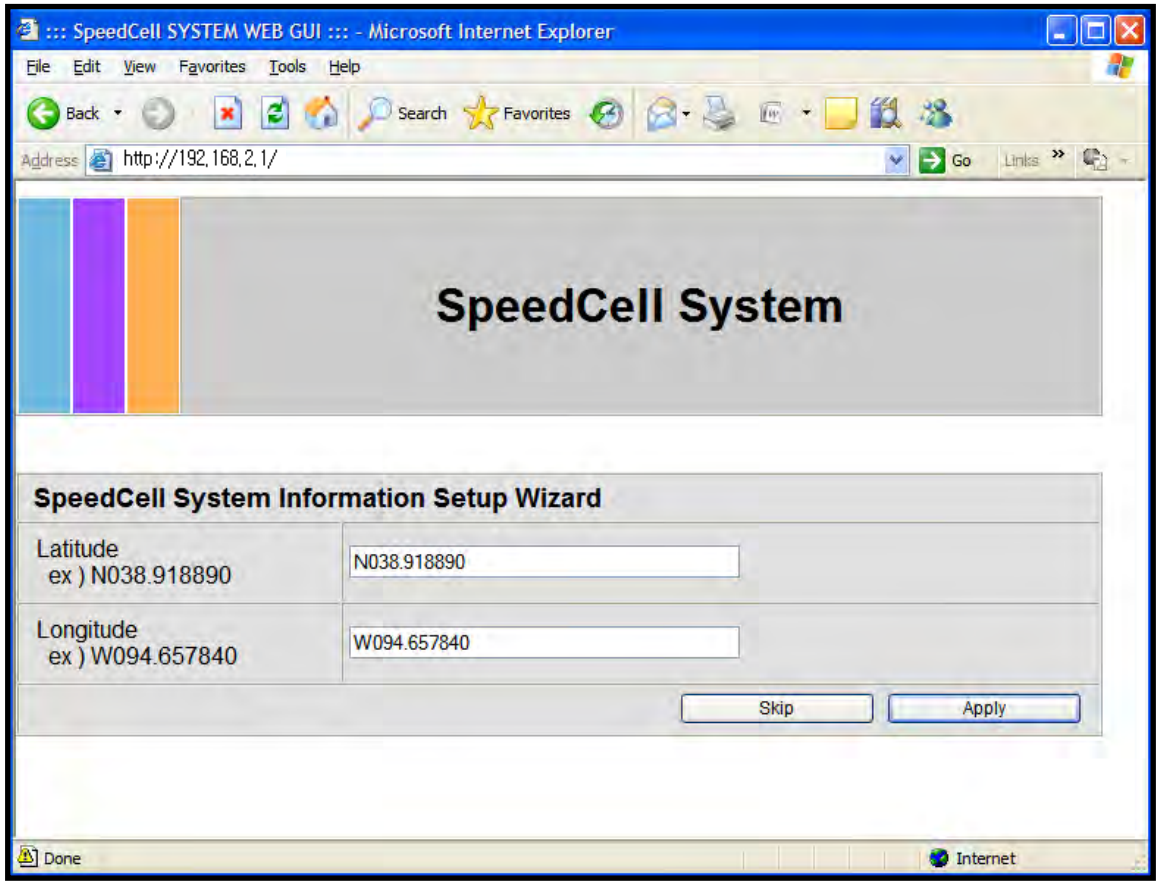
Menu Select

- After you log in, you can see ‘Menu Select’ page.
- To setup the Repeater, click ‘Initial Installation’.
- To go to menu list, click ‘Menu Page’.



Setup Wizard

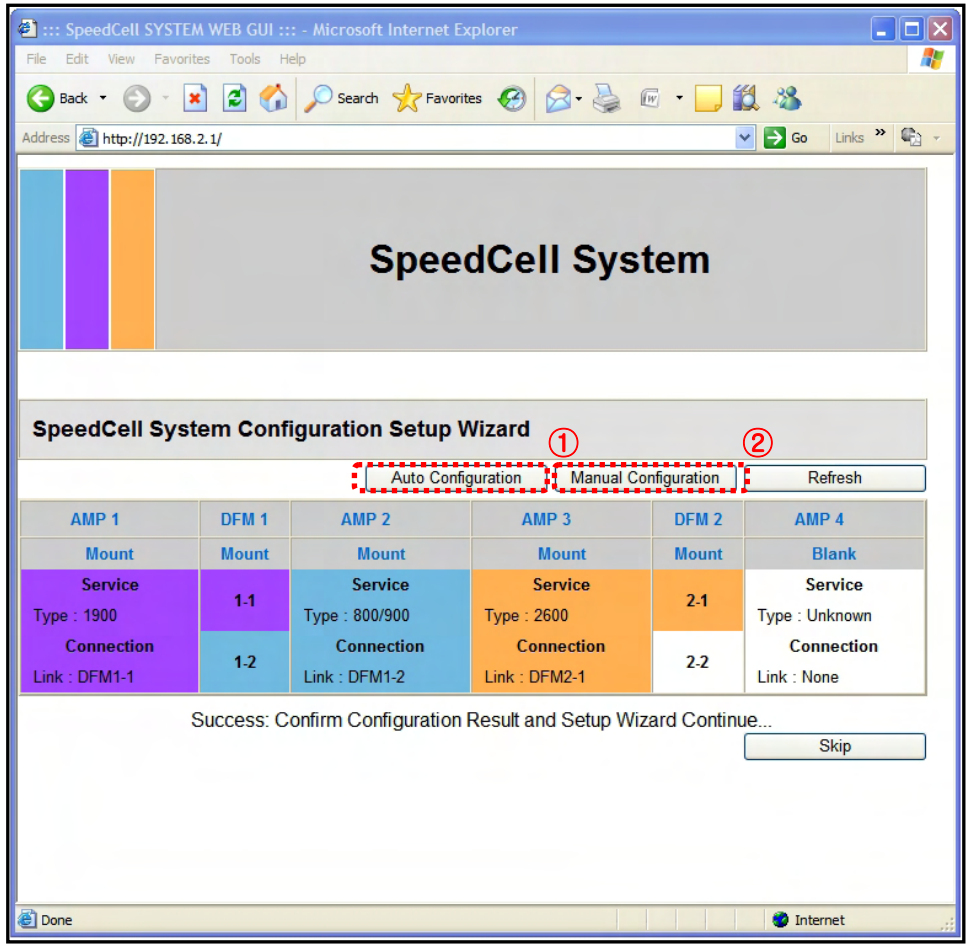
- After you clicking on 'Initial Installation' the following screen will be displayed.
- After typing the Latitude or Longitude numbers, press 'Apply' button.
- User may skip this window if it is unnecessary.



Setup Wizard

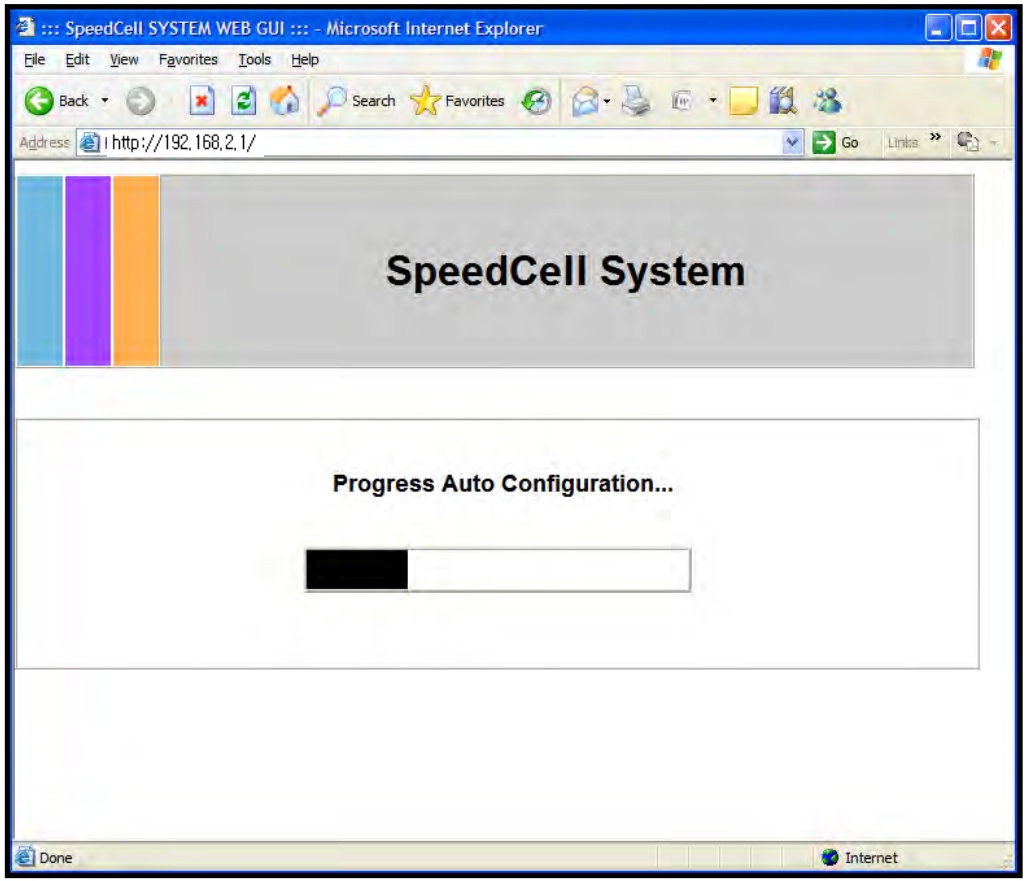
① Auto Configuration matches amplifier and DFM units automatically.

② Manual Configuration matches amplifier and DFM units manually.



Setup Wizard

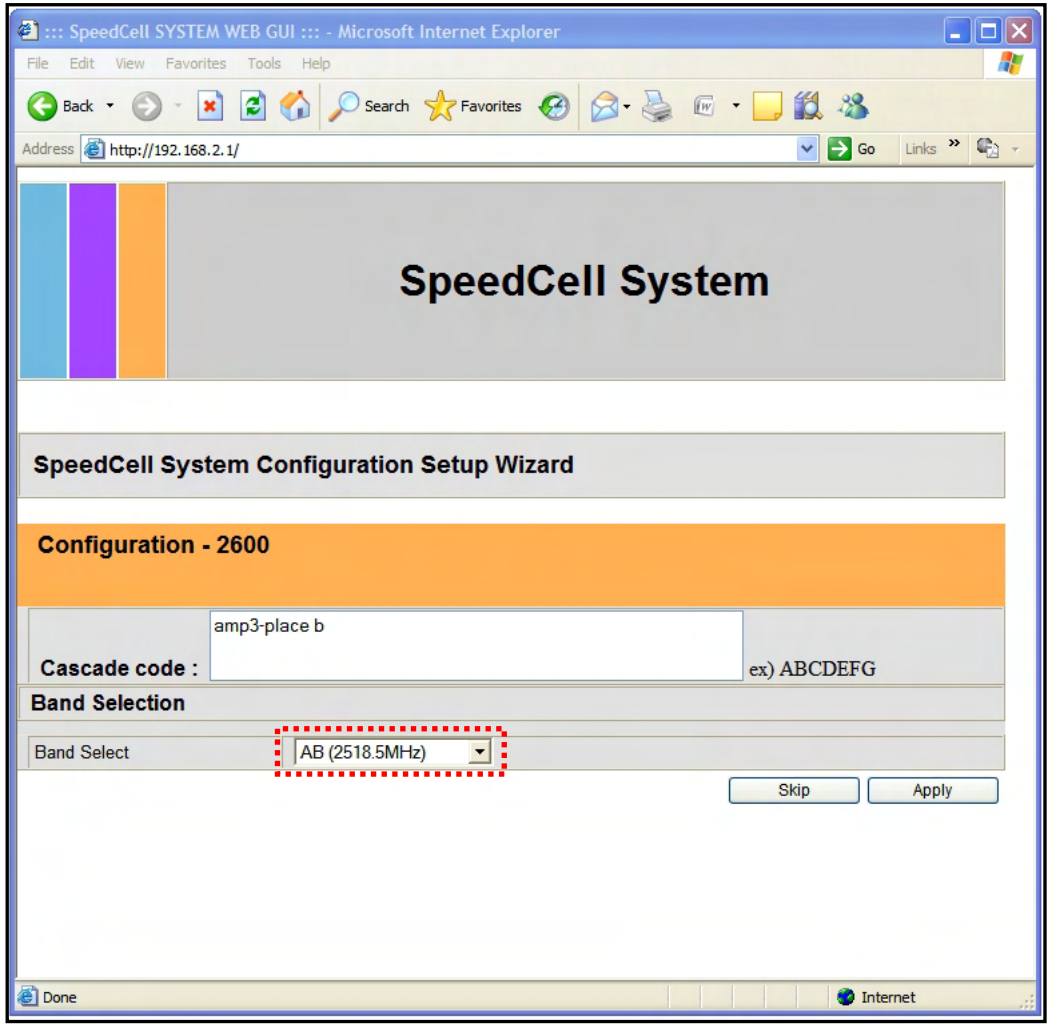
- After clicking Auto Configuration, the screen below will be displayed.
- It will take approximately one minute to finish the process.



Setup Wizard

Manual Setup Wizard for 2600MHz Band

- User may choose bandwidth in this menu. After selecting bandwidth, click 'Apply' button.
- Also User may skip this setting if it is not needed.



Setup Wizard

Manual Setup Wizard for 2600MHz Band (Choosing antenna)

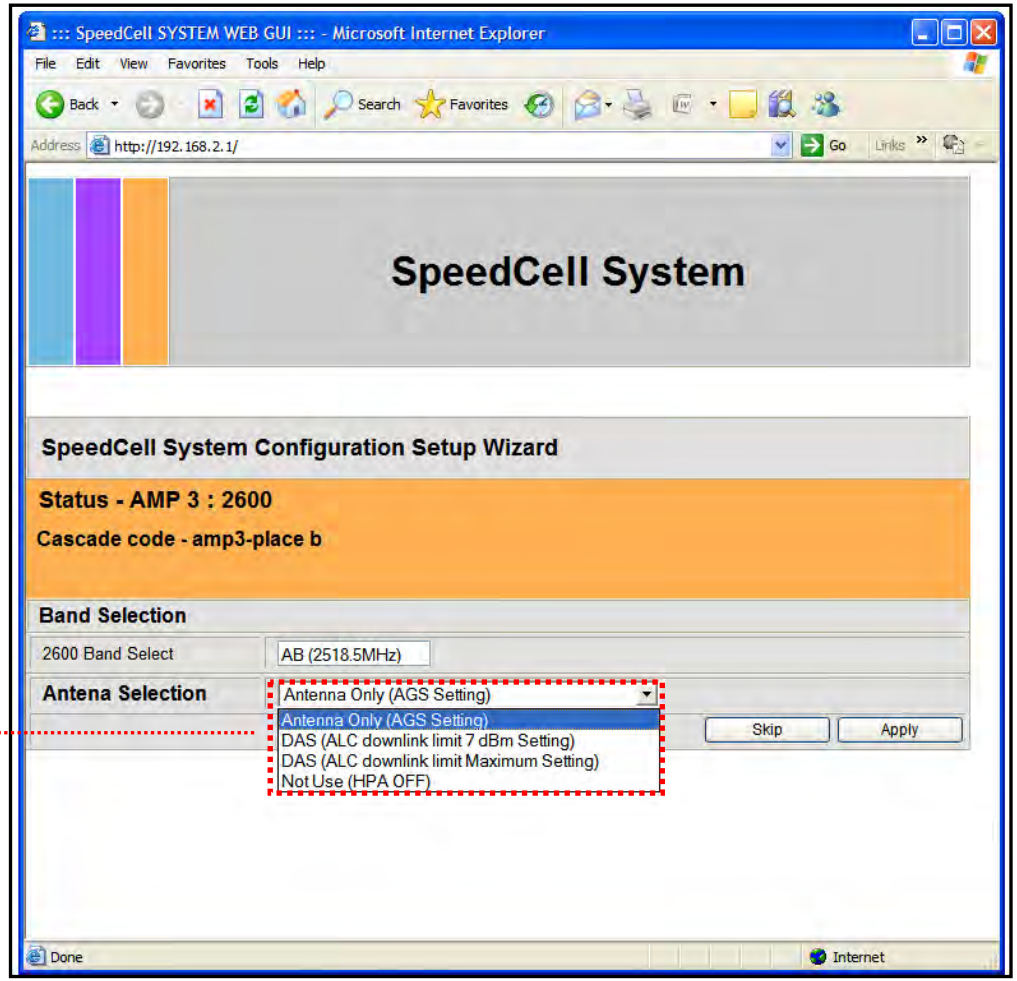
- After selecting an antenna type, click 'Apply' button.
- Also User may skip this setting if it is not needed.

Antenna Only (AGS Setting): Repeater sets up automatically (Auto Gain Setting, AGS)

DAS (ALC D/L limit 7dBm Setting): Repeater operates with Active DAS

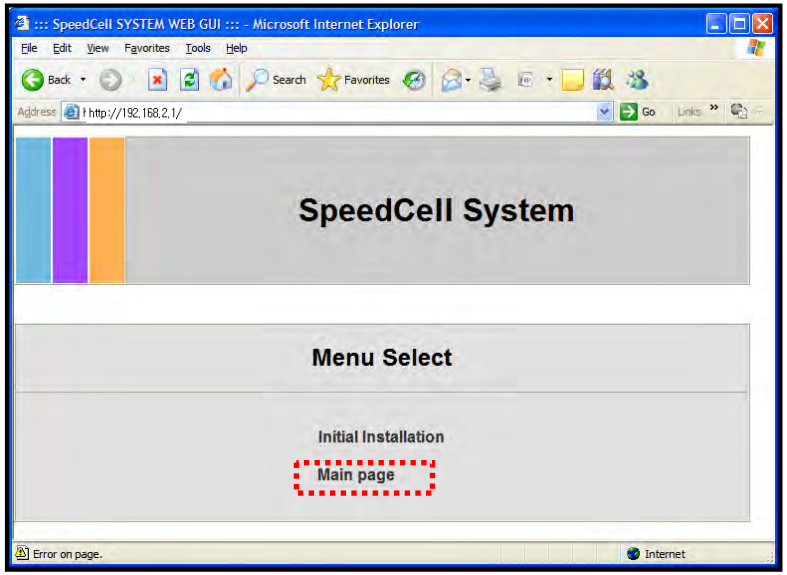
DAS (ALC D/L limit Maximum Setting): Repeater operates with Passive DAS

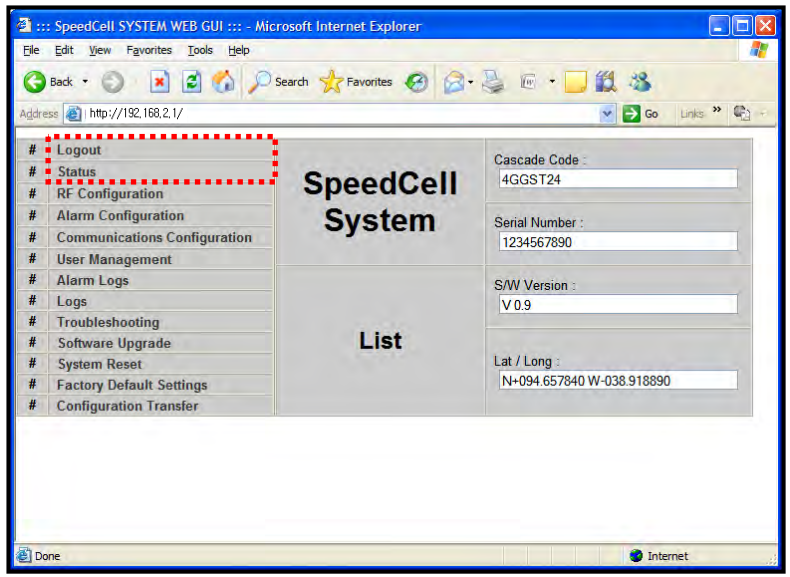
Not Use (HPA OFF): It disables this AMP unit



List Menu

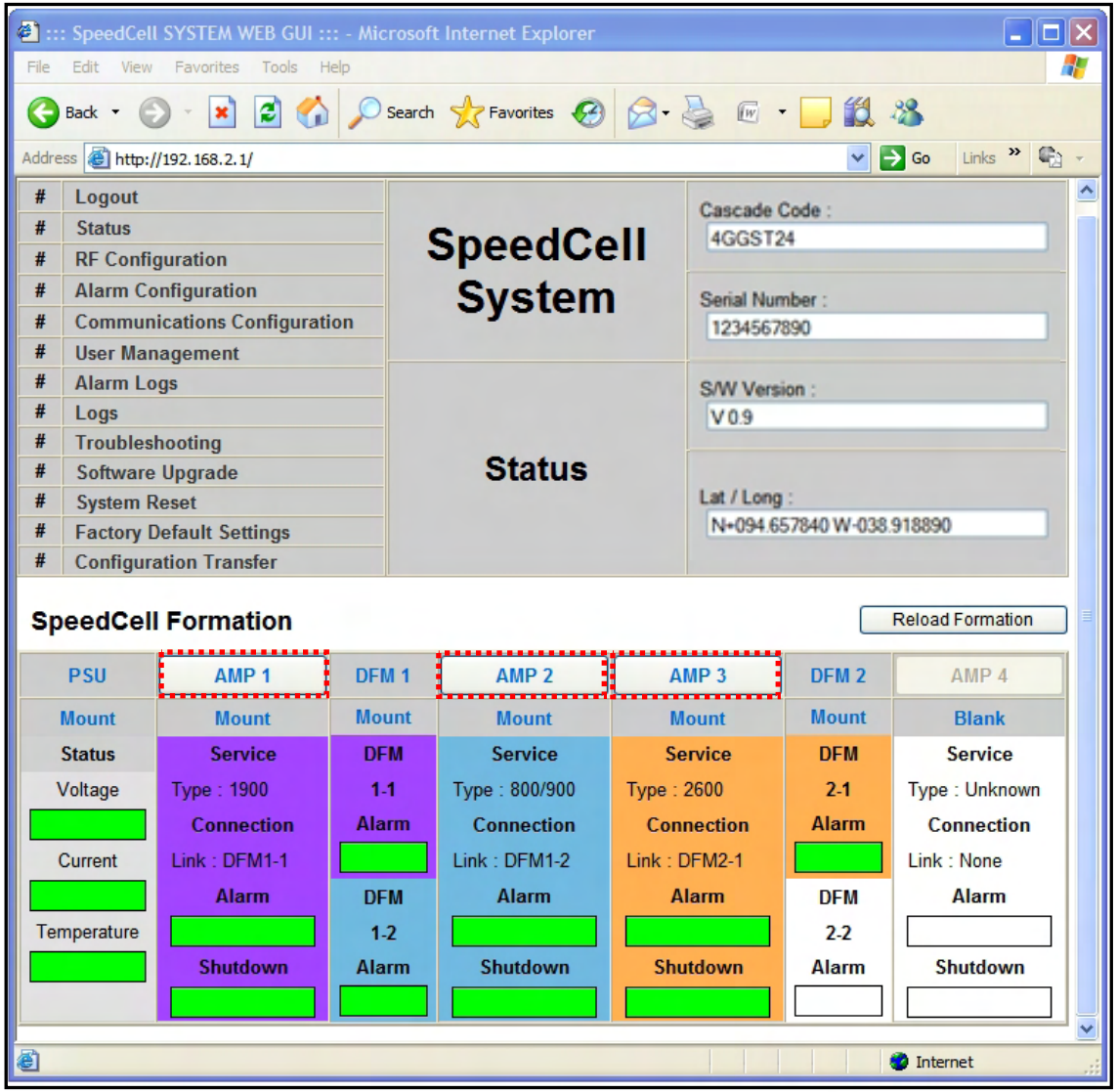
- After clicking on ‘Main Page’, the ‘List Menu’ will be displayed.
- User may check the Repeater status by clicking on ‘Status’.





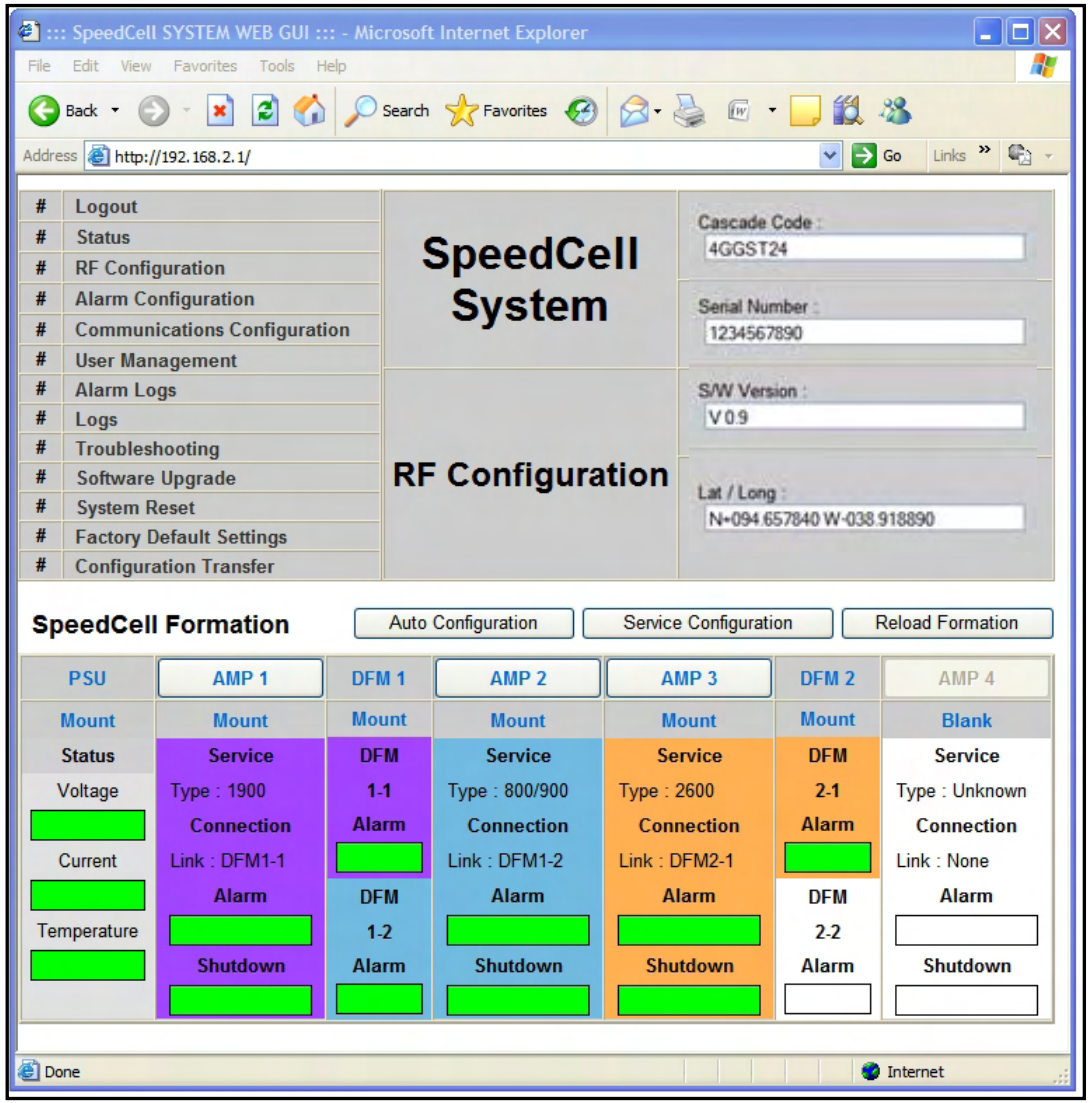
Status Menu

- User may check status of amplifiers by clicking on any of them.



RF Configuration Menu

- Click the RF Configuration link.
- Click AMP 1, AMP 2 or AMP 3 in order to go to the next window and change RF values.



RF Configuration Menu FAQ's

• What is Auto Limit Control (ALC)?

ALC is used for custom installations.
If the repeater is having difficulties with isolation check, or if you want to "power down" the repeater ALC should be manually set. Attenuation may also be added for reducing power levels. ALC also provides optional U/L and D/L settings.
- ALC controls the output power.
- If you want to use the ALC function, Gain Balance Control should be turned off.
- ALC will reduce max gain by the set value even if the input signal decreases.
- ALC should be used if the repeater is connected to a DAS system.

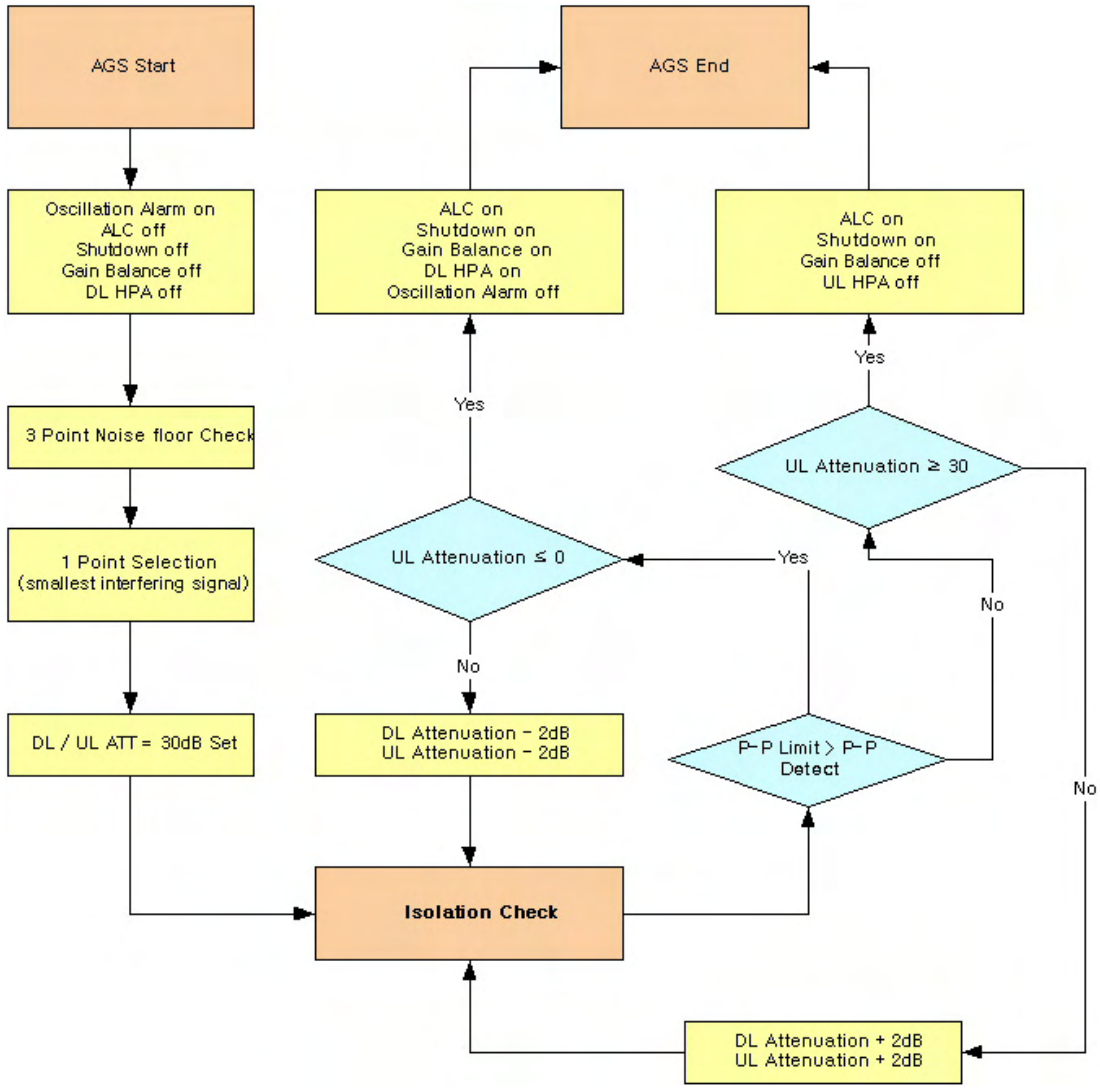
• What does the Shutdown ON/OFF control?

- An internal wave-detection is checking the noise level. If the repeater cannot secure isolation it will go through a process of turning itself off, and turning back on while doing isolation checking.
- If it is impossible for the repeater to secure isolation after 30 minutes, the repeater will shut down and stay shutdown.
The items that may automatically require the repeater to shut down are:
-> VSWR Alarm, Over Power Alarm, Over Input Alarm, and Temperature Alarm.

• What is Gain Balance Control?

- Gain Balance Control will always keep the UL and DL ATT the same while using AGC.
GBC should always be left on to prevent damage to BTS while using AGC.
- This is used for BTS to cell phone power control.

Auto Gain Setting (AGS) Flow Chart



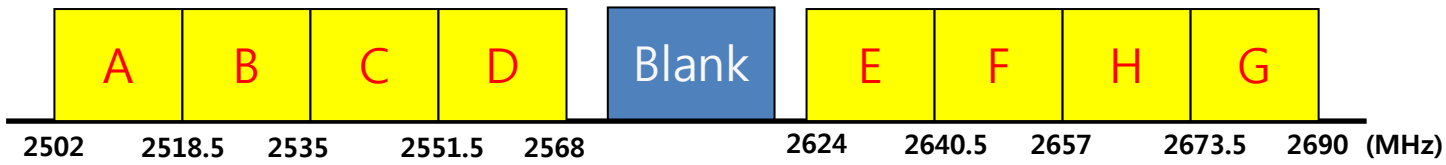
RF Configuration Menu

2600MHz Band Selection

Band Selection Algorithm

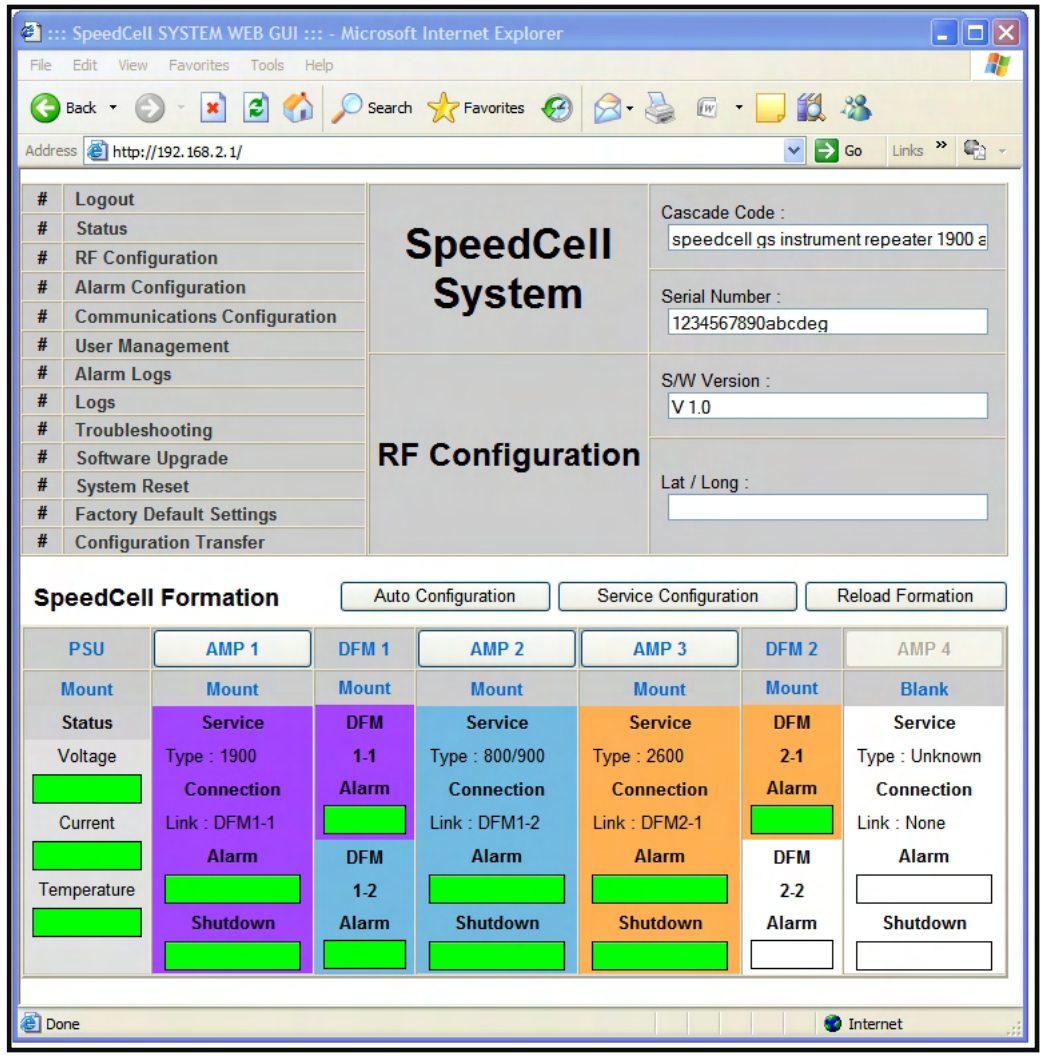
ITEM	BANDWIDTH	NOTE
Band Select	2 contiguous band is selectable	AB , BC, CD, EF, FH, HG are selectable only

Band Structure



RF Configuration Menu

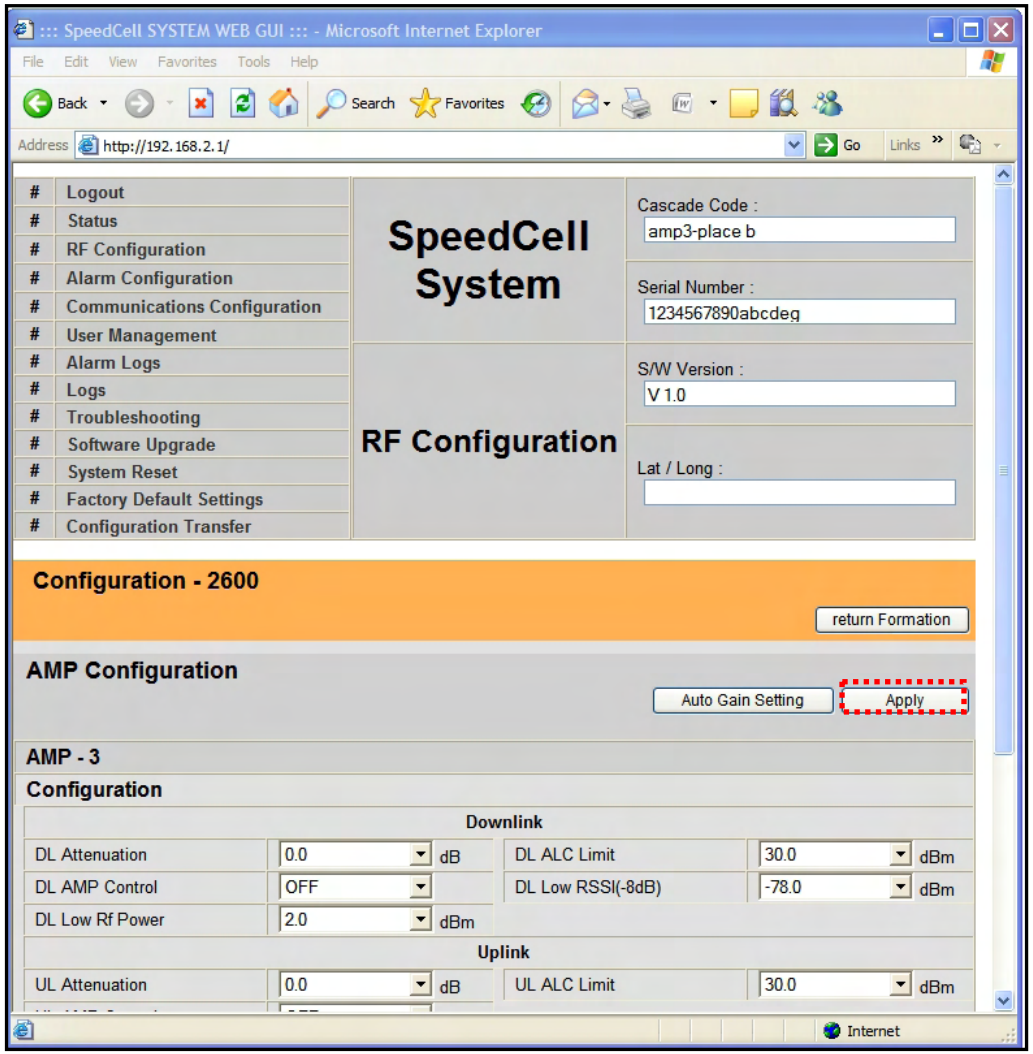
• Click the RF Configuration link.
Click AMP 1, AMP 2 or AMP 3 in order to go to the next window and change RF values.



RF Configuration Menu

2600 AMP

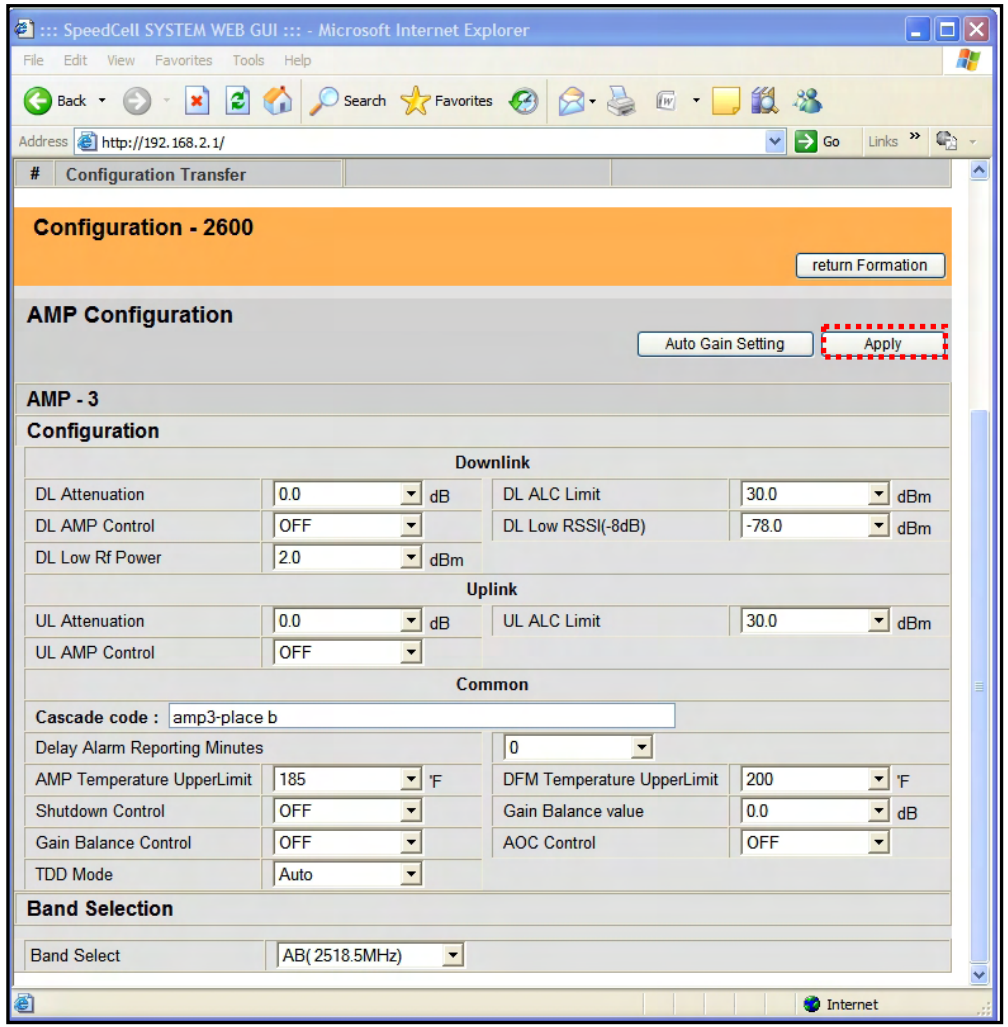
- User may change various RF values of the repeater on this page.
- Changes will not take effect until you click "Apply" button.
- This menu is where the installer will choose references for specific implementation.
- In case that screen resolution is 1024 x 768, you may need to use scroll bar to view all.



RF Configuration Menu

2600 AMP
(continue of the page)

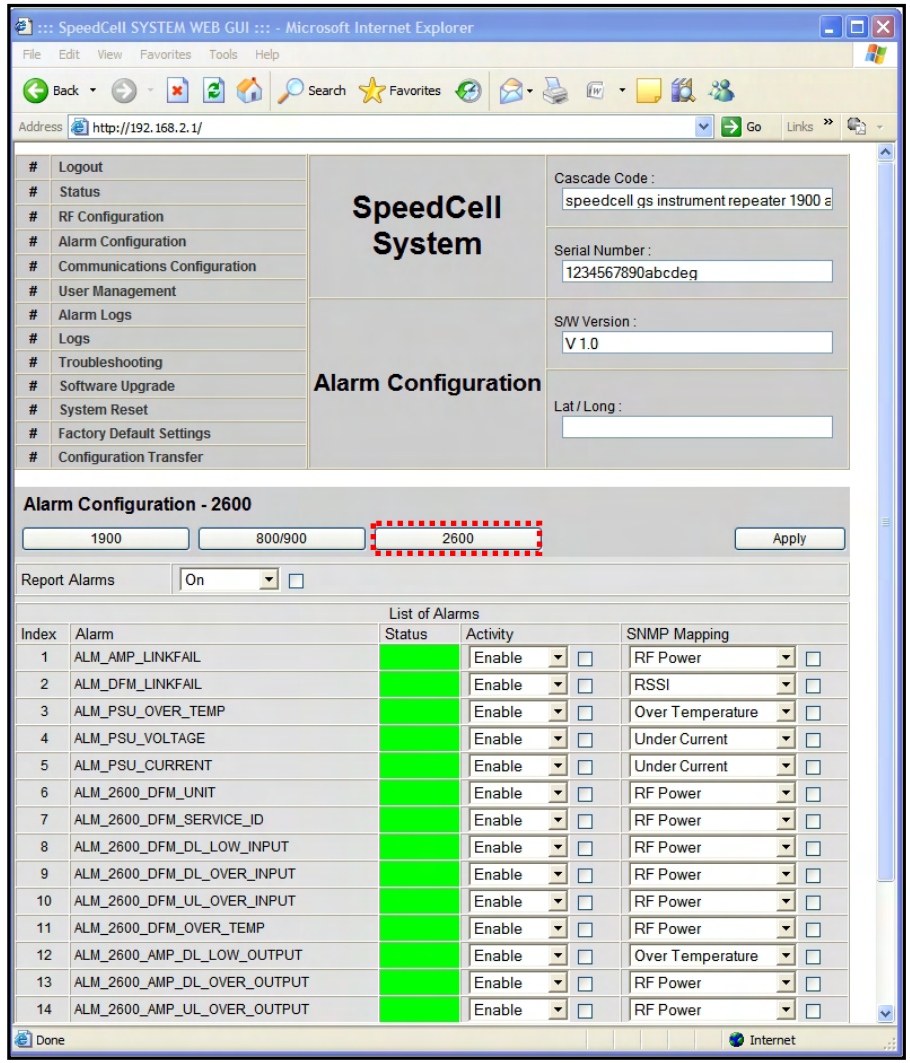
- User may change various RF values of the repeater on this page.
- Changes will not take effect until you click "Apply" button.
- This menu is where the installer will choose references for specific implementation.
- In case that screen resolution is 1024 x 768, you may need to use scroll bar to view all.



Alarm Configuration Menu

• Click ‘2600’ link to check alarm configuration of 2600AMP.

• 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.

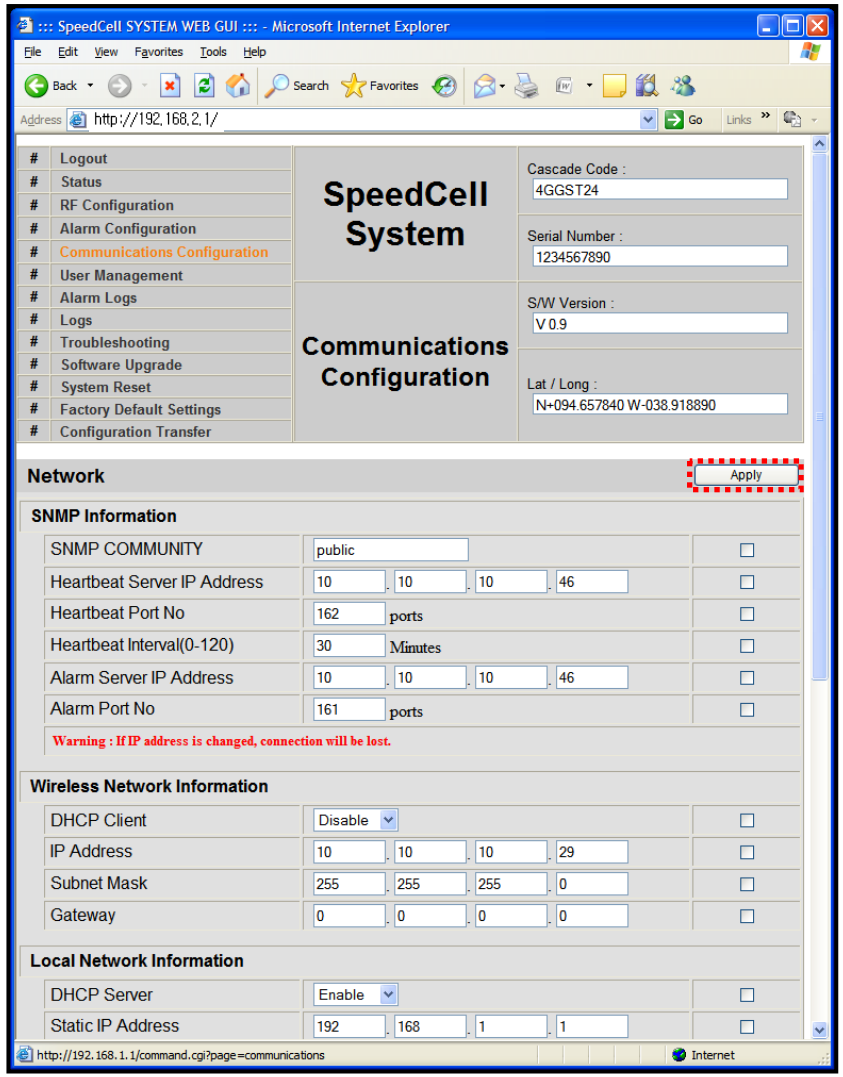


Communication Configuration Menu

- Click on the 'Communications Configuration' link.
- On this page you can change various values related to IP network. Because Web UI is based on IP network, incorrect configuration may make it impossible to connect to Web UI.

In that case, you can troubleshoot as described in the Command Line Interface (CLI) section.

- In case that screen resolution is 1024 x 768, you may need to use scroll bar to view all.



Communication Configuration Menu

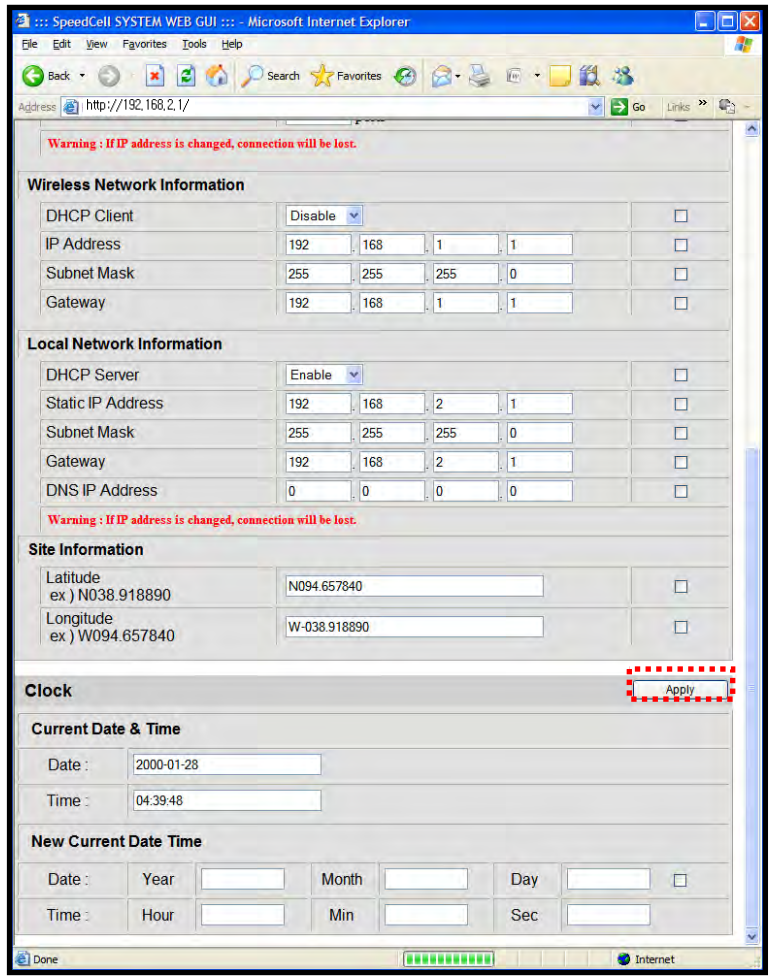
- On this page you can change various values related to IP network.
- Changes will not take effect until you click “Apply” button.
- In case that screen resolution is 1024 x 768, you may need to use scroll bar to view all.

In the line <Obtain IP address automatically> “Static” means connection using a fixed IP.

“DHCP” means connection using DHCP, where
If "DHCP Client" is "ON", then the repeater will run as a DHCP client.

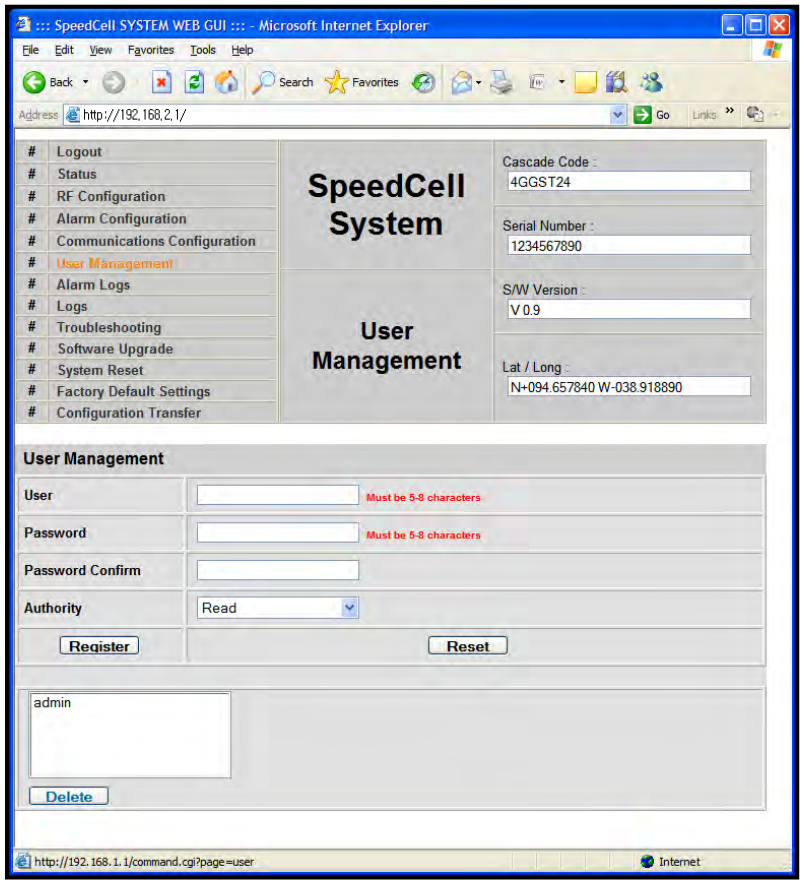
If "DHCP Client" is “OFF", then the repeater will get a Static IP.

“DHCP” means connection using DHCP, where
If "DHCP Server" is "ON", then the repeater will run as a DHCP server.



User Management Menu

- Click on the 'User Management' link.
- On this page you can create and delete users, change passwords, and assign authorities to individual users.
- Read will only all the user to view information on the menu pages, but cannot make any changes.
- Read/Write Authority means that the user can view and change various values.
- Super User is very similar to an Administrator account...



CAUTION

DO NOT DELETE 'admin'.

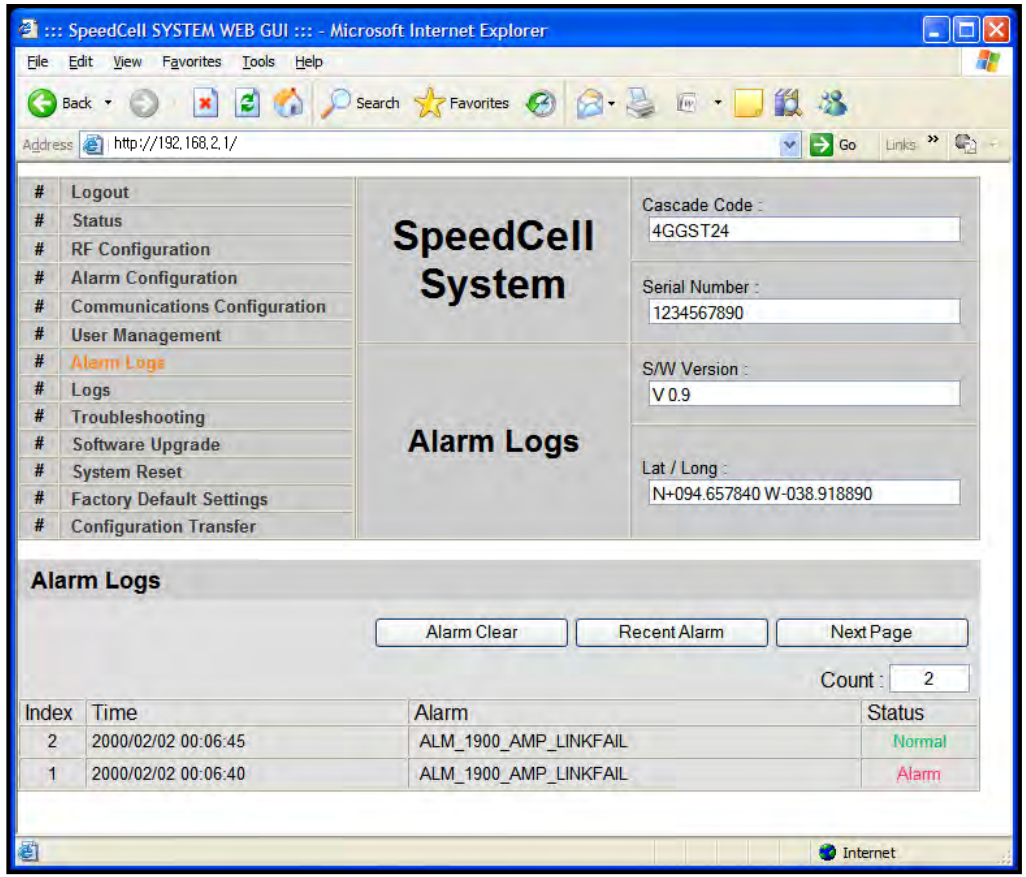
Alarm Logs

• Click on the Alarm Logs link.

• You can see a history of reported and reset Alarms.
When an alarm is reported, the name and time of the alarm is displayed along with it's current status.

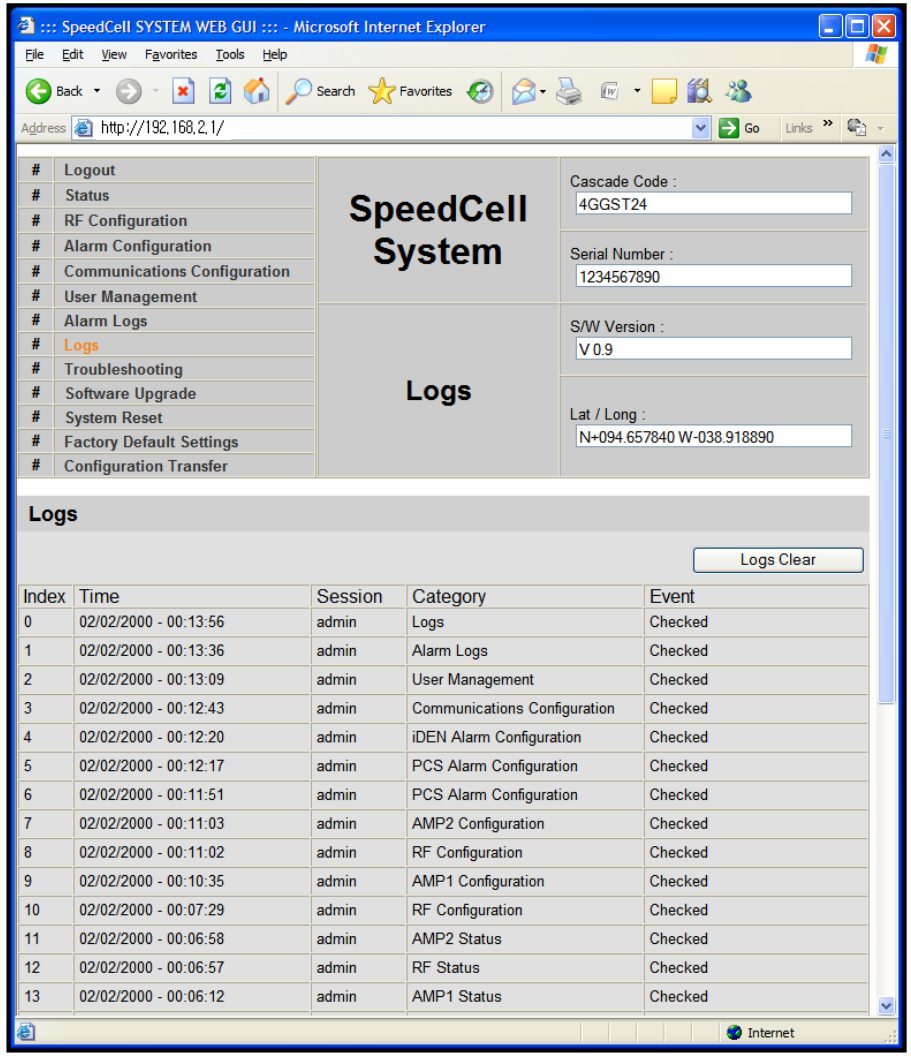
Red color means that the alarm is reported, and green color means that the alarm has returned to normal status.

• After an Alarm condition lasts for the "Delay Alarm Reporting Minutes" set in RF Configuration page, the Alarm will be reported.



Logs

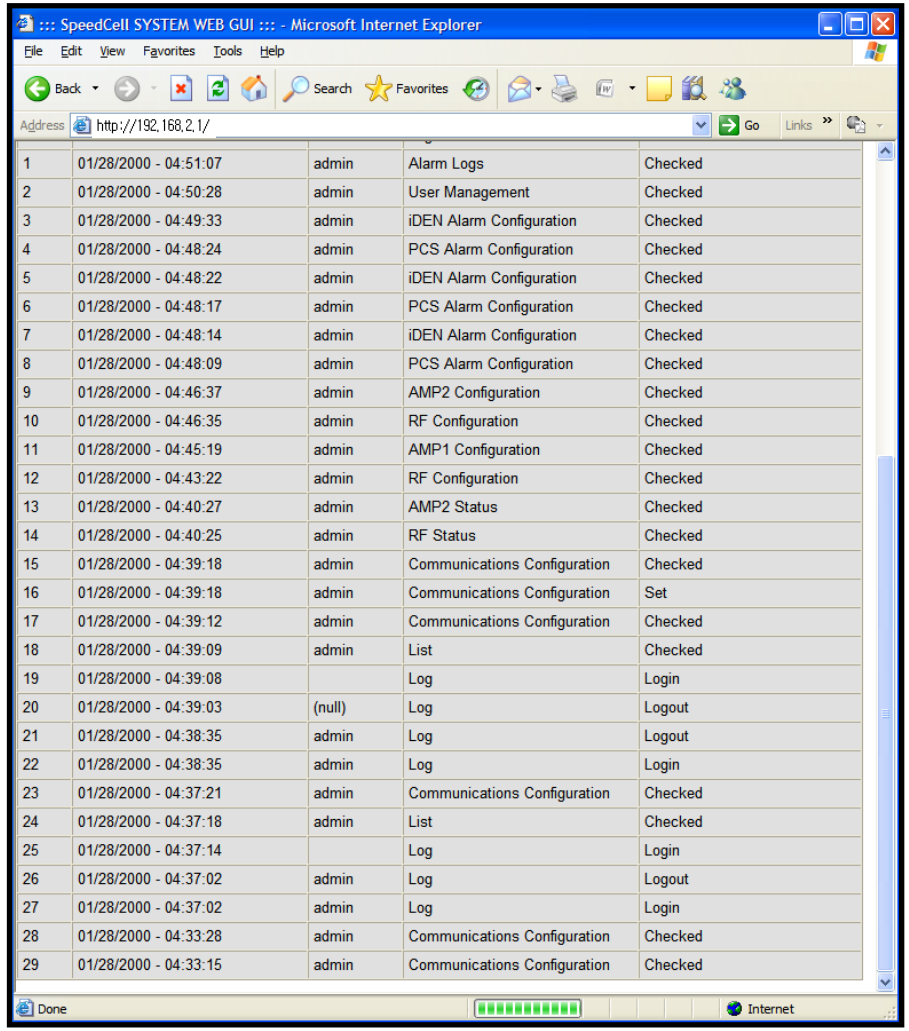
- Click on the Logs link.
- You can see Logs regarding Web UI operation. Logs will maintain a history of up to 30 operations.
- In case that screen resolution is 1024 x 768, you may need to use scroll bar to view all.



Logs

Continue of Logs page.

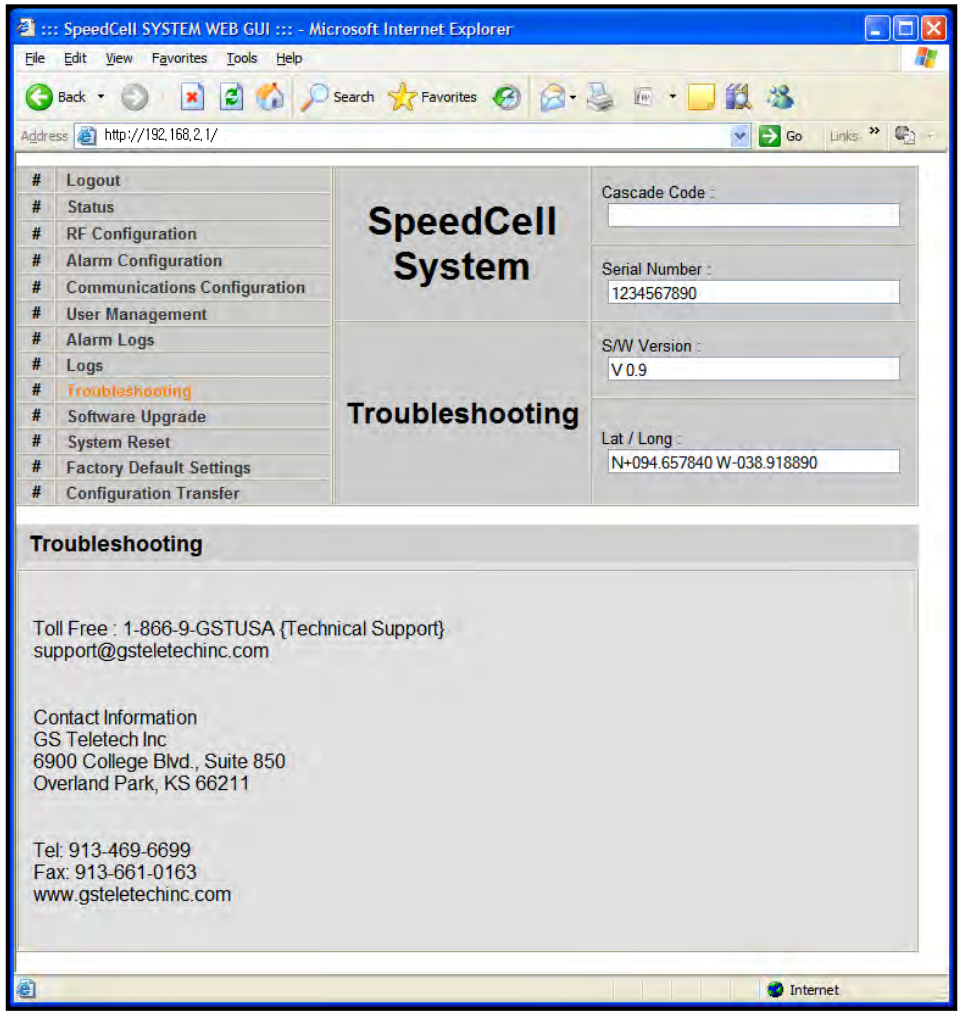
• In case that screen resolution is 1024 x 768, you may need to use scroll bar to view all.



1	01/28/2000 - 04:51:07	admin	Alarm Logs	Checked
2	01/28/2000 - 04:50:28	admin	User Management	Checked
3	01/28/2000 - 04:49:33	admin	iDEN Alarm Configuration	Checked
4	01/28/2000 - 04:48:24	admin	PCS Alarm Configuration	Checked
5	01/28/2000 - 04:48:22	admin	iDEN Alarm Configuration	Checked
6	01/28/2000 - 04:48:17	admin	PCS Alarm Configuration	Checked
7	01/28/2000 - 04:48:14	admin	iDEN Alarm Configuration	Checked
8	01/28/2000 - 04:48:09	admin	PCS Alarm Configuration	Checked
9	01/28/2000 - 04:46:37	admin	AMP2 Configuration	Checked
10	01/28/2000 - 04:46:35	admin	RF Configuration	Checked
11	01/28/2000 - 04:45:19	admin	AMP1 Configuration	Checked
12	01/28/2000 - 04:43:22	admin	RF Configuration	Checked
13	01/28/2000 - 04:40:27	admin	AMP2 Status	Checked
14	01/28/2000 - 04:40:25	admin	RF Status	Checked
15	01/28/2000 - 04:39:18	admin	Communications Configuration	Checked
16	01/28/2000 - 04:39:18	admin	Communications Configuration	Set
17	01/28/2000 - 04:39:12	admin	Communications Configuration	Checked
18	01/28/2000 - 04:39:09	admin	List	Checked
19	01/28/2000 - 04:39:08		Log	Login
20	01/28/2000 - 04:39:03	(null)	Log	Logout
21	01/28/2000 - 04:38:35	admin	Log	Logout
22	01/28/2000 - 04:38:35	admin	Log	Login
23	01/28/2000 - 04:37:21	admin	Communications Configuration	Checked
24	01/28/2000 - 04:37:18	admin	List	Checked
25	01/28/2000 - 04:37:14		Log	Login
26	01/28/2000 - 04:37:02	admin	Log	Logout
27	01/28/2000 - 04:37:02	admin	Log	Login
28	01/28/2000 - 04:33:28	admin	Communications Configuration	Checked
29	01/28/2000 - 04:33:15	admin	Communications Configuration	Checked

Troubleshooting

- Click on the Troubleshooting link.
- You can refer to this page for GST's technical support.



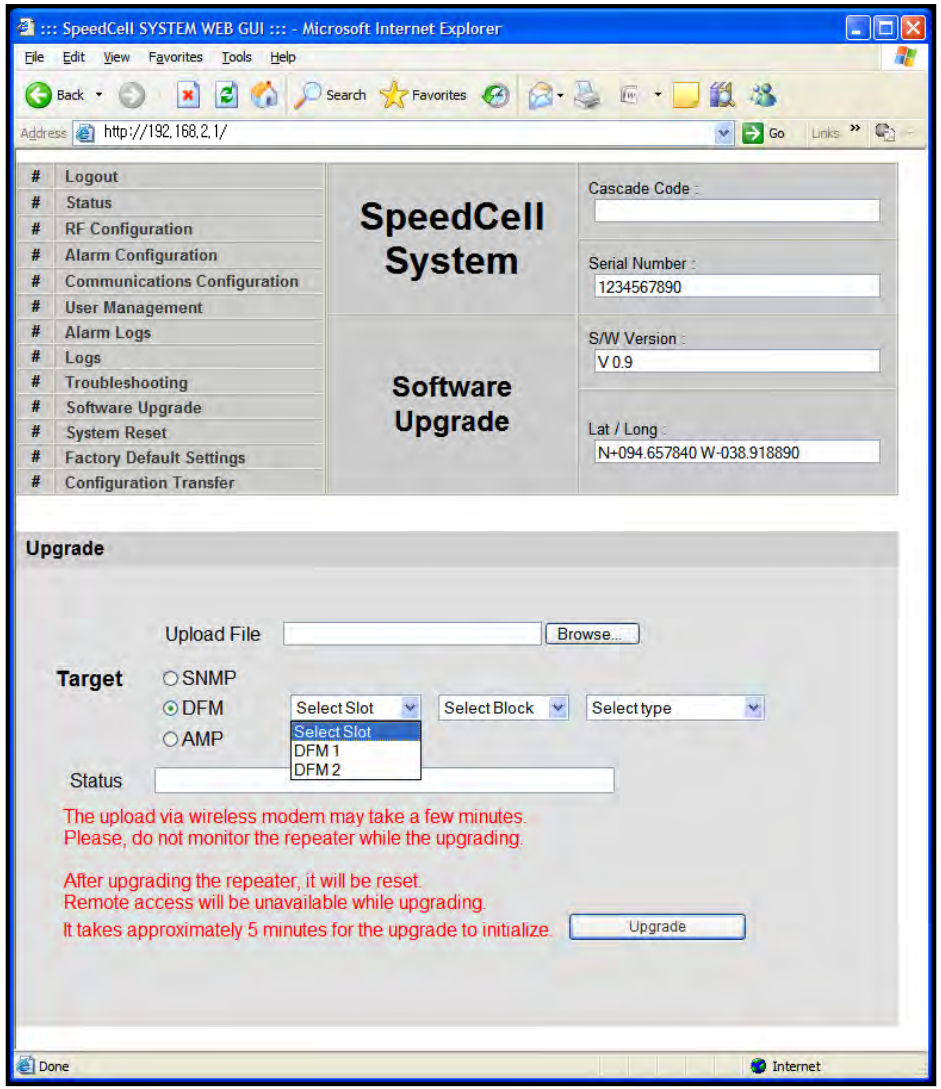
Software Upgrade

• 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.

• 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.
• Provided files are three, need to download each of them.
- The files are,
- ① SC_SNMP.MCU
- ② SC_AMP.AMP
- ③ SC_DFM.SDR
  SC_DFM.SDS

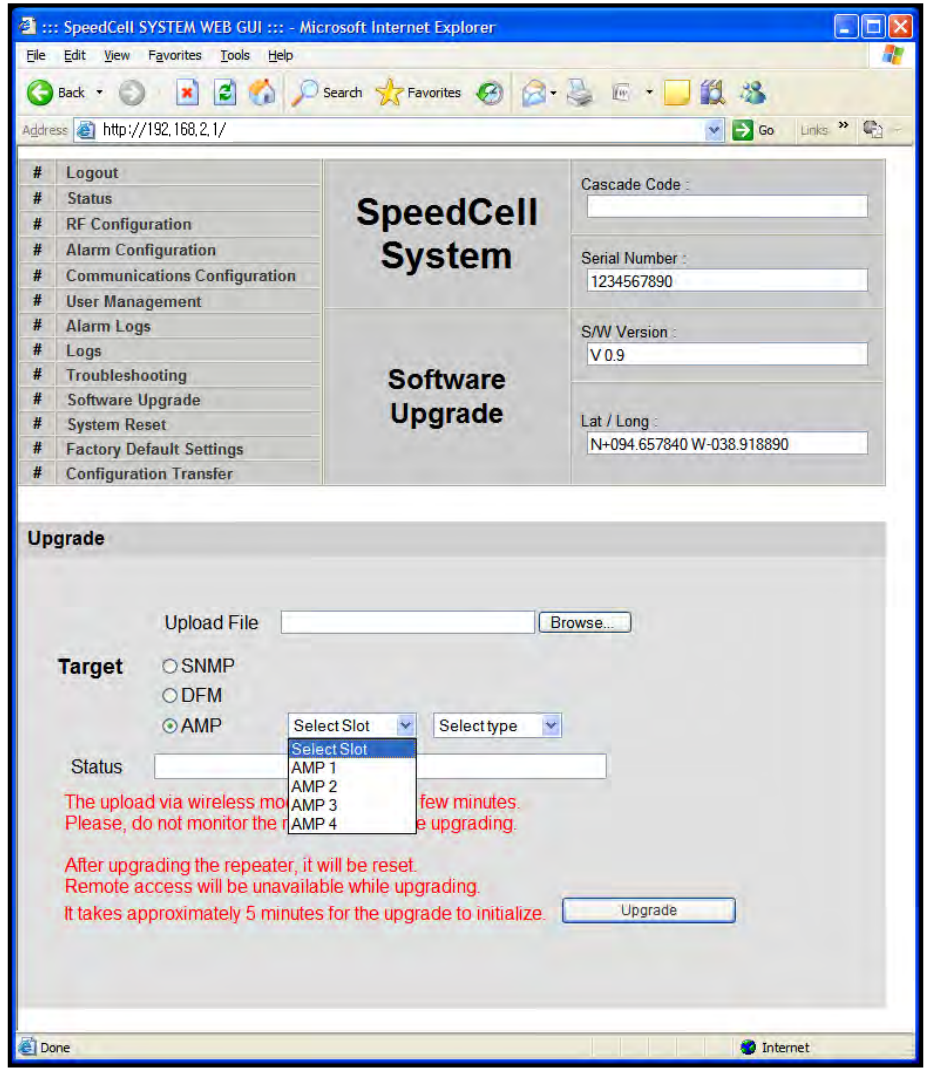
CAUTION

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



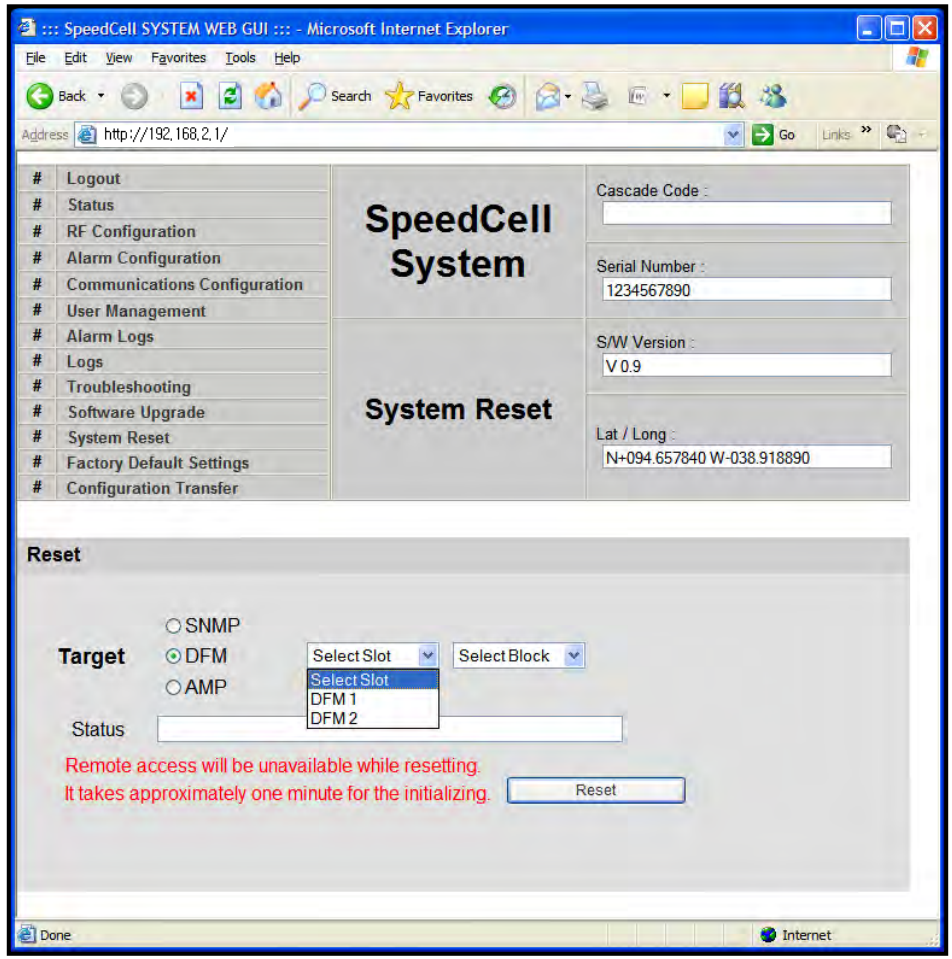
Software Upgrade

• After uploading is finished, verify that the File Name and the File Size is correct, then click 'Upgrade System' button.
The lights on the repeater will be blinking and change color during upgrade which will take about two minutes for the upgrade to initialize.
The lights will go back to normal when upgrade is done.



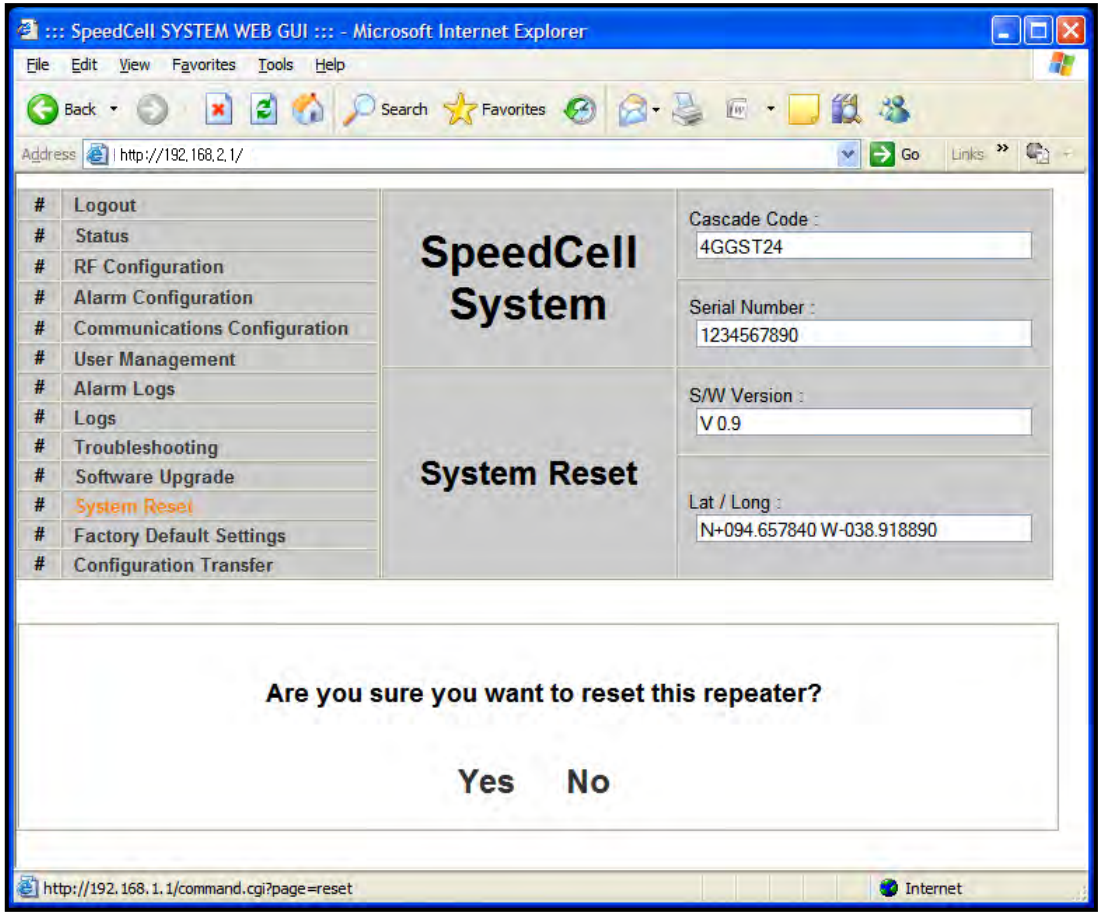
System Reset

- Click 'No' to return to the 'List' menu.
- Click 'Yes' to reset the repeater via a soft-boot. This will not change any of the current settings



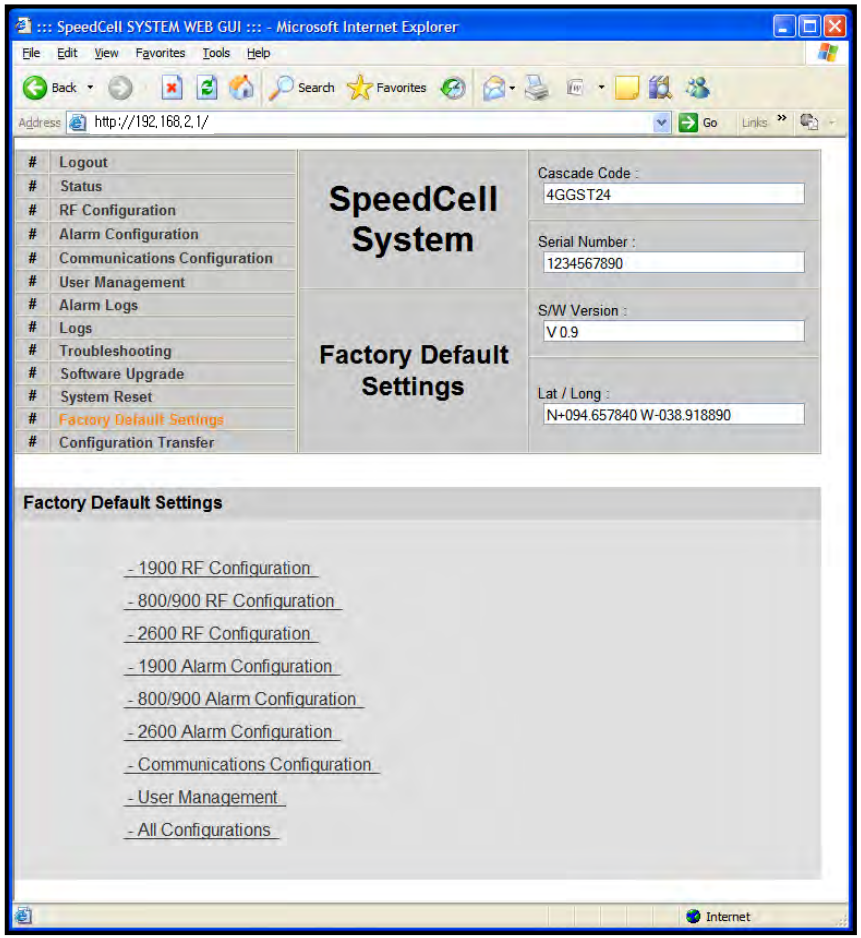
System Reset

- Click 'No' to return to the 'List' menu.
- Click 'Yes' to reset the repeater via a soft-boot. This will not change any of the current settings.



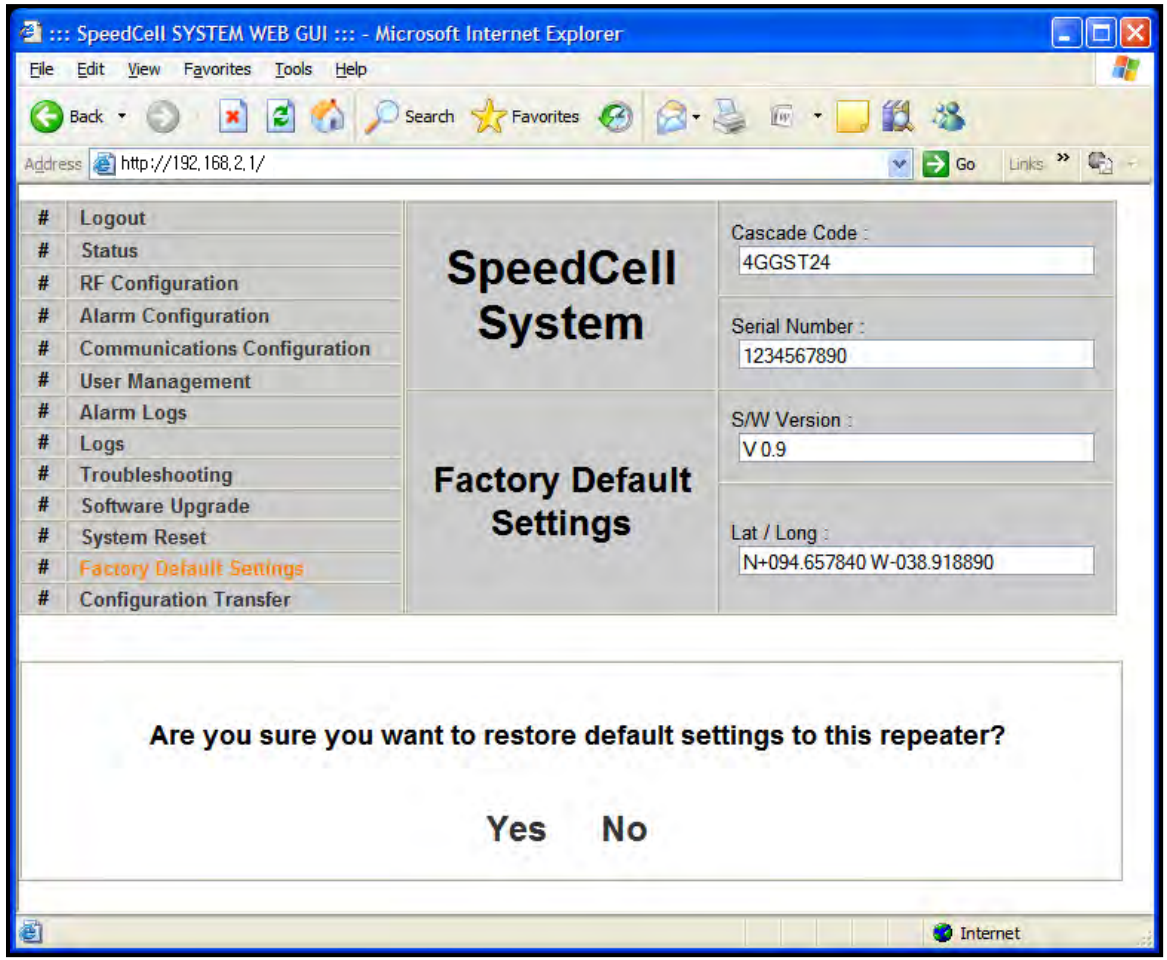
Factory Default Settings

- Choose type of configuration to be restored to factory default settings.



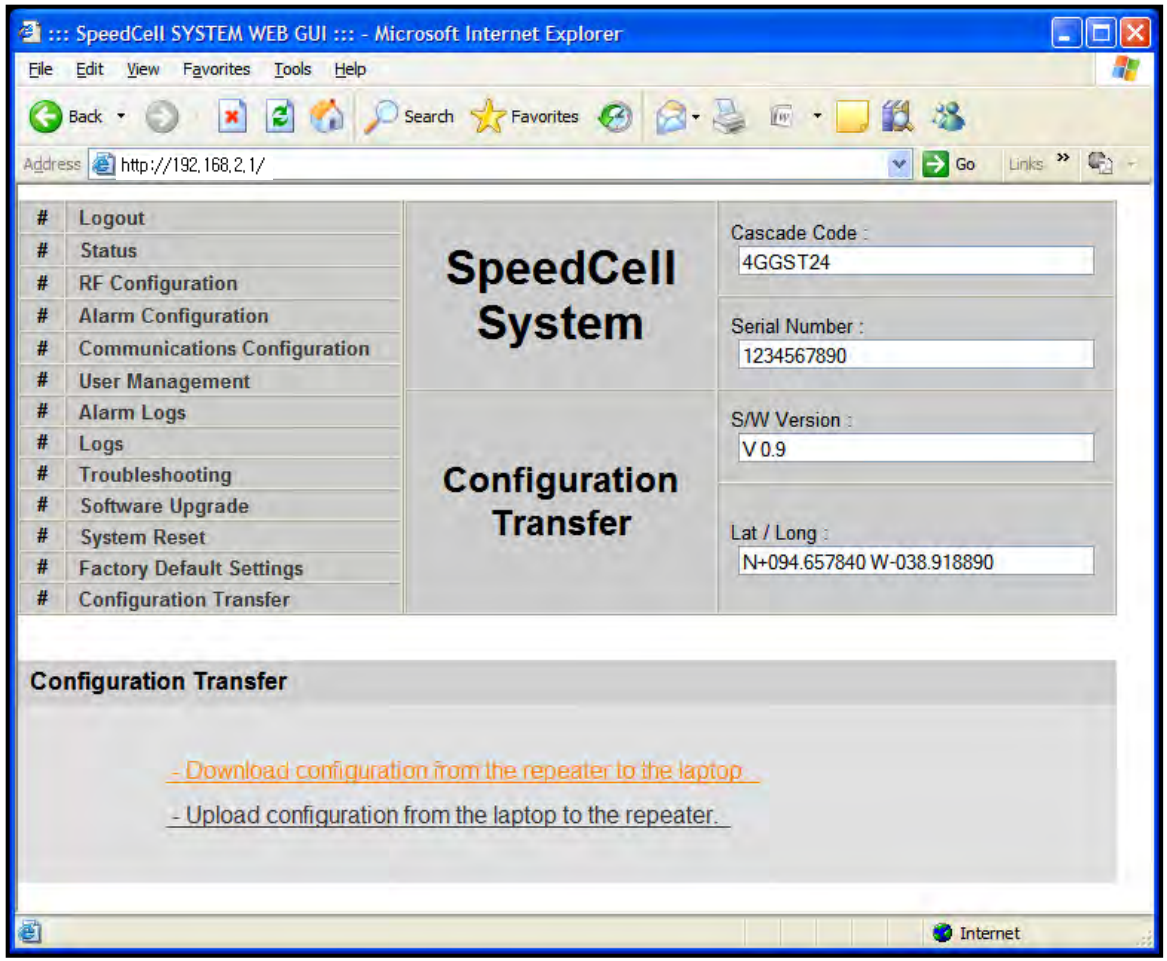
Factory Default Settings

- This function will allow you to roll back to factory default settings.



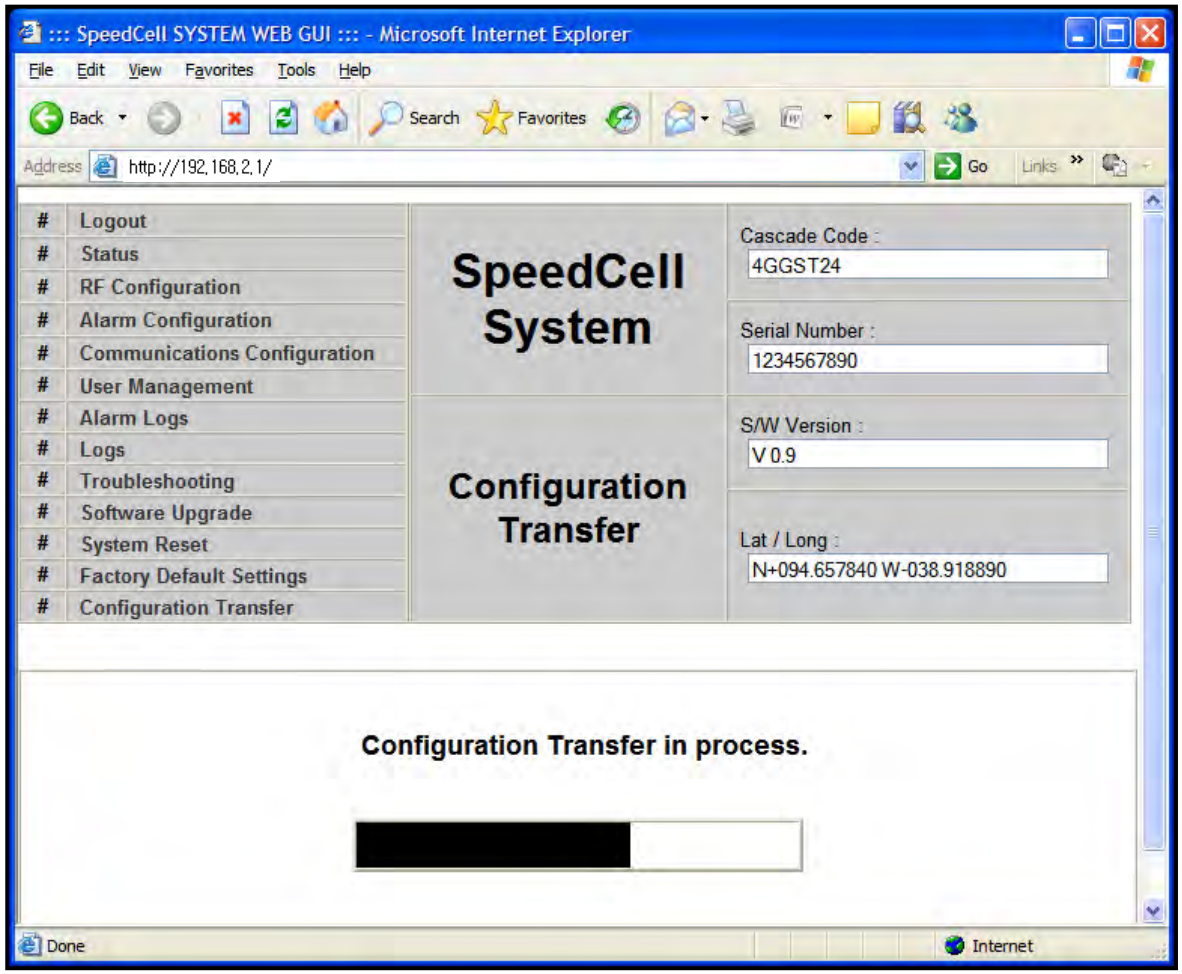
Configuration Transfer

- Configuration Transfer function is for downloading and uploading set values of the repeater.



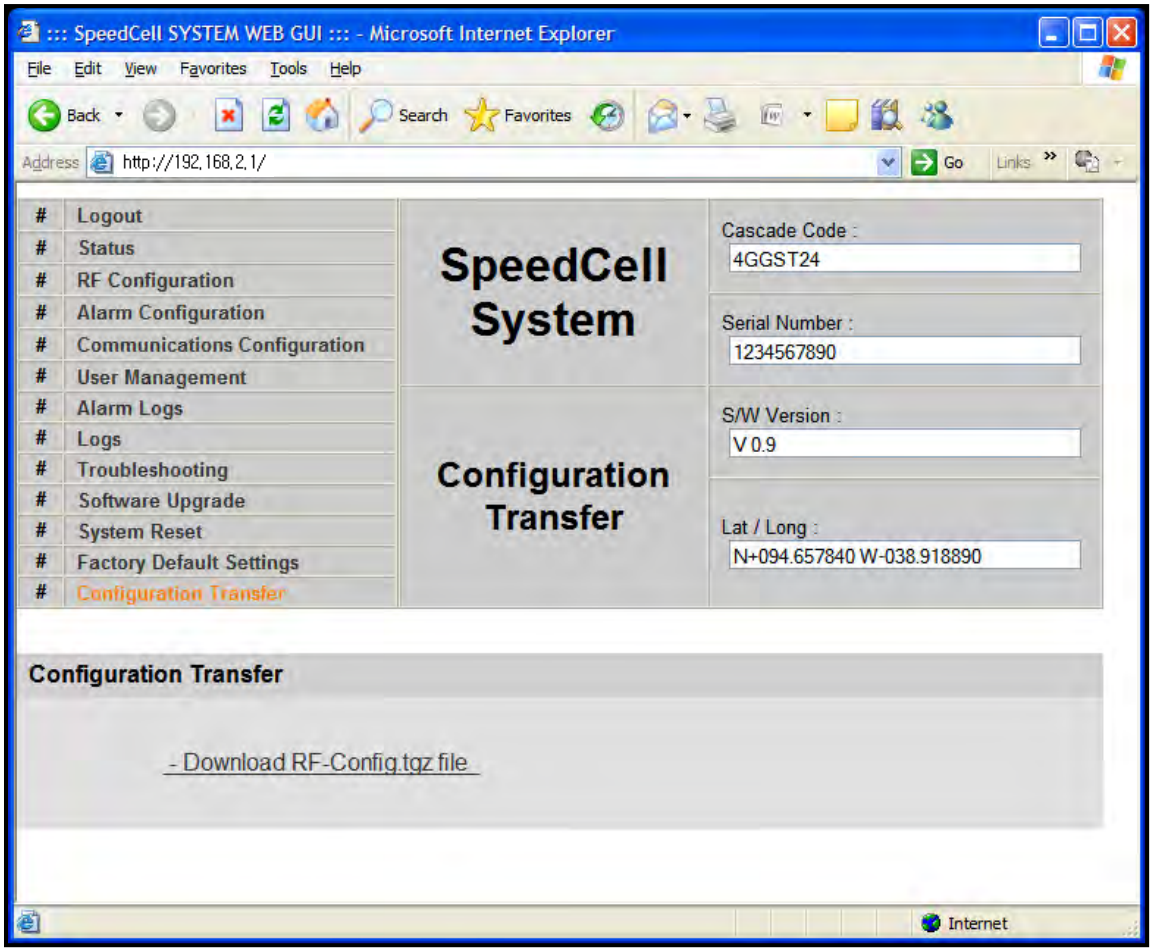
Configuration Transfer: Download

- Configuration Transfer Download Display.



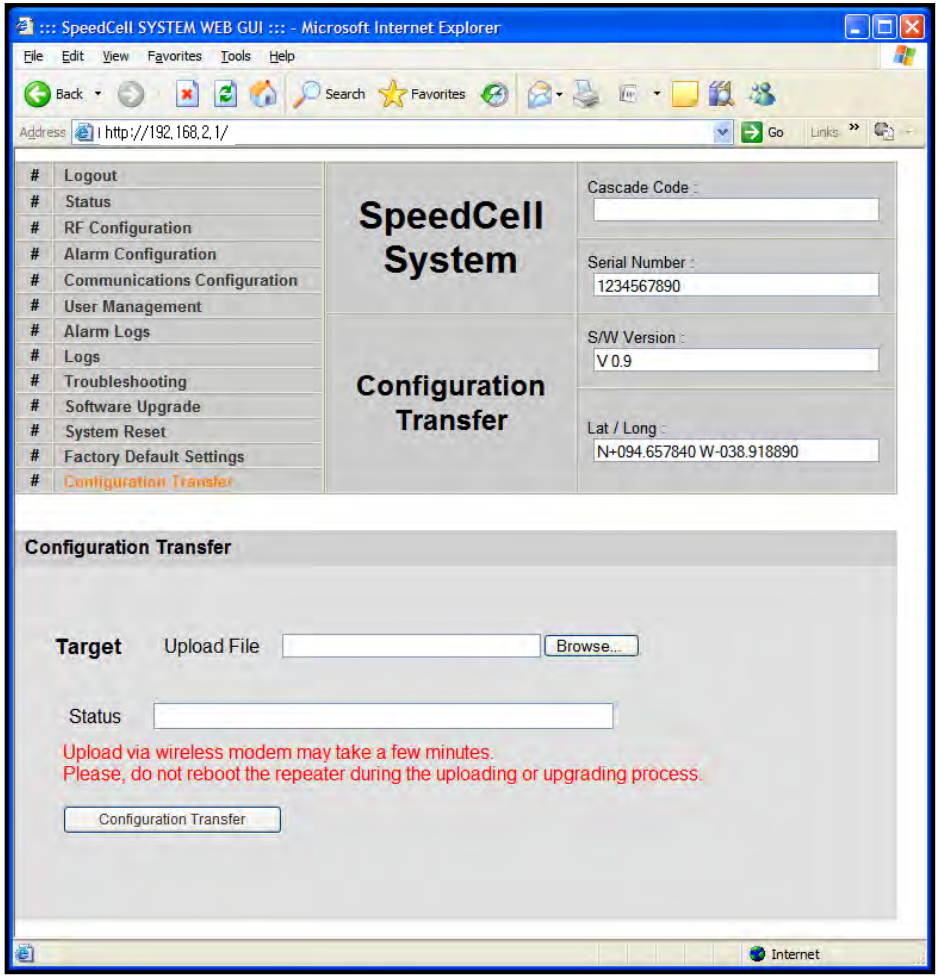
Configuration Transfer

- Downloading process of set values.



Configuration Transfer: Upload

- Uploading process of set values.
- Verify correct file is selected and click ‘Configuration Transfer’.

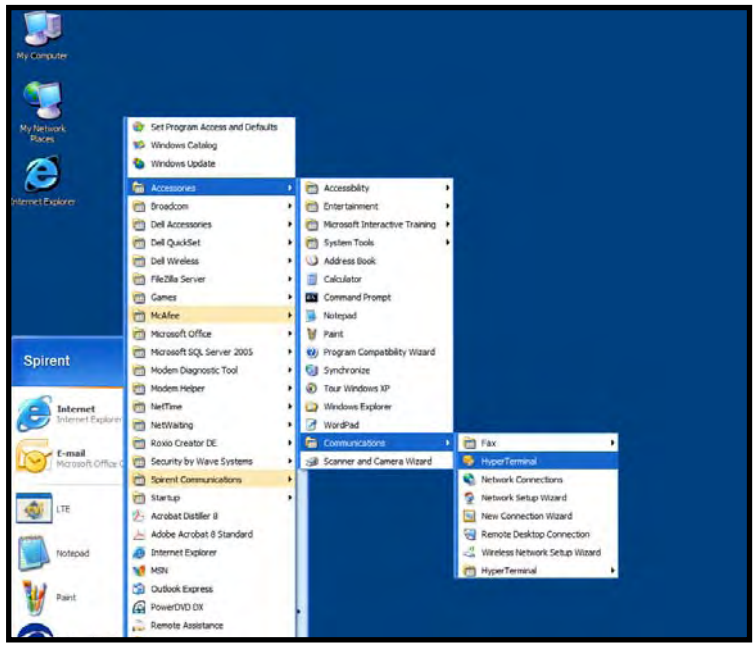


Command Line Interface (CLI)

- In case that you cannot reach Web UI, you should use CLI.
  You should connect the equipment's CLI port to your laptop's serial port using RS-232 cable.
  In case that your laptop does not have a serial port, you may need to use USB to Serial conversion cable.
- To open HyperTerminal, click "Start", then "Accessories", then "Communications", then "HyperTerminal".

CAUTION

RS-232 cable or USB to Serial conversion cable is not provided with the equipment.
After connection, you can access CLI using HyperTerminal.



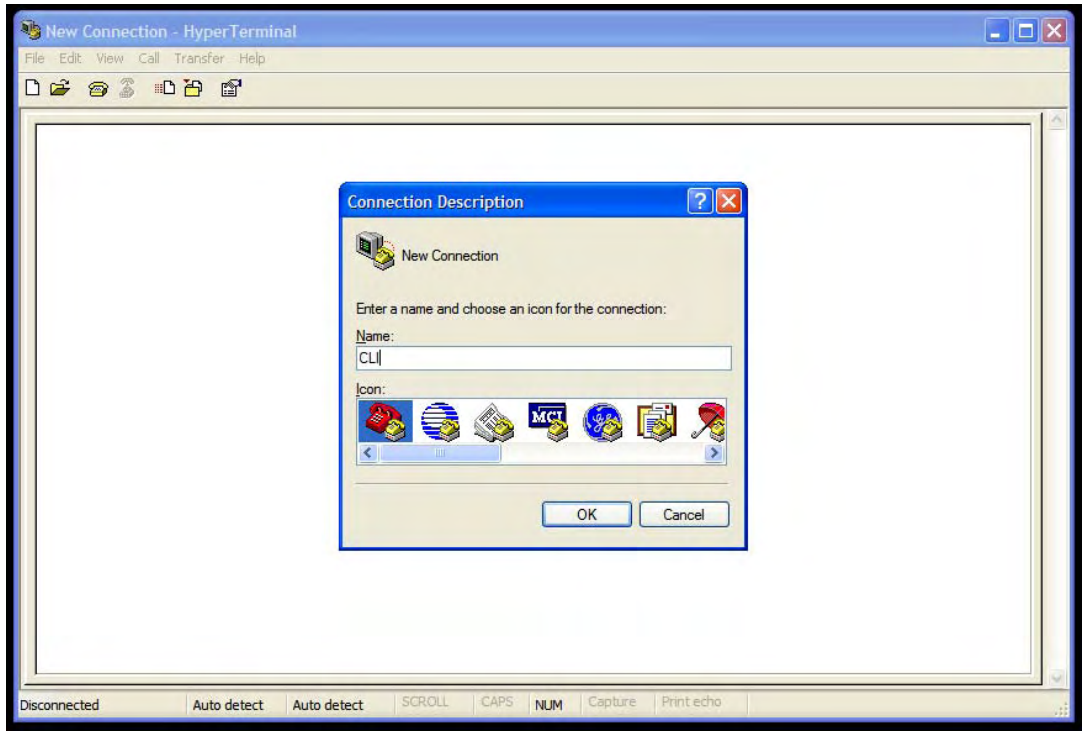
CLI

• To verify and/or change port number, open “Control Panel”, then “System”, then “Hardware Tab”, then “Device Manager”. Double click “Ports”, then double click “Serial Cable” then click “Port Settings” tab, click “Advanced”, in the COM Port drop down menu, select “COM 1”, click “OK”.

• After verification of port number, open HyperTerminal.

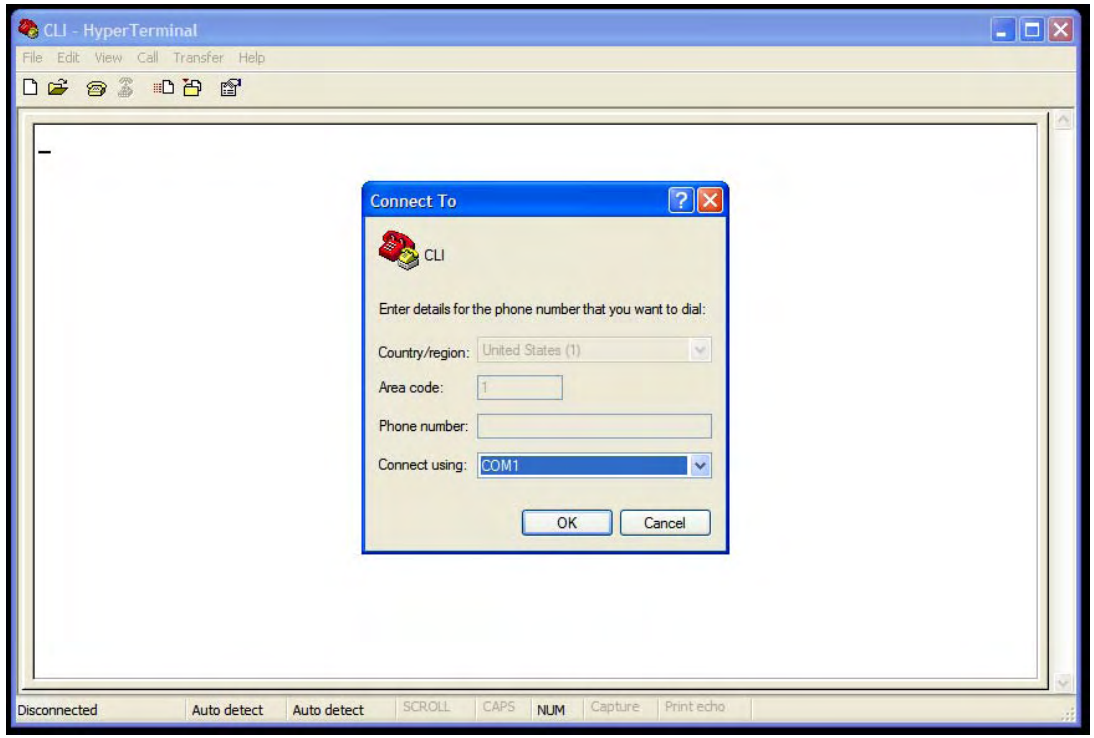
• Enter CLI.

• Click “OK”.



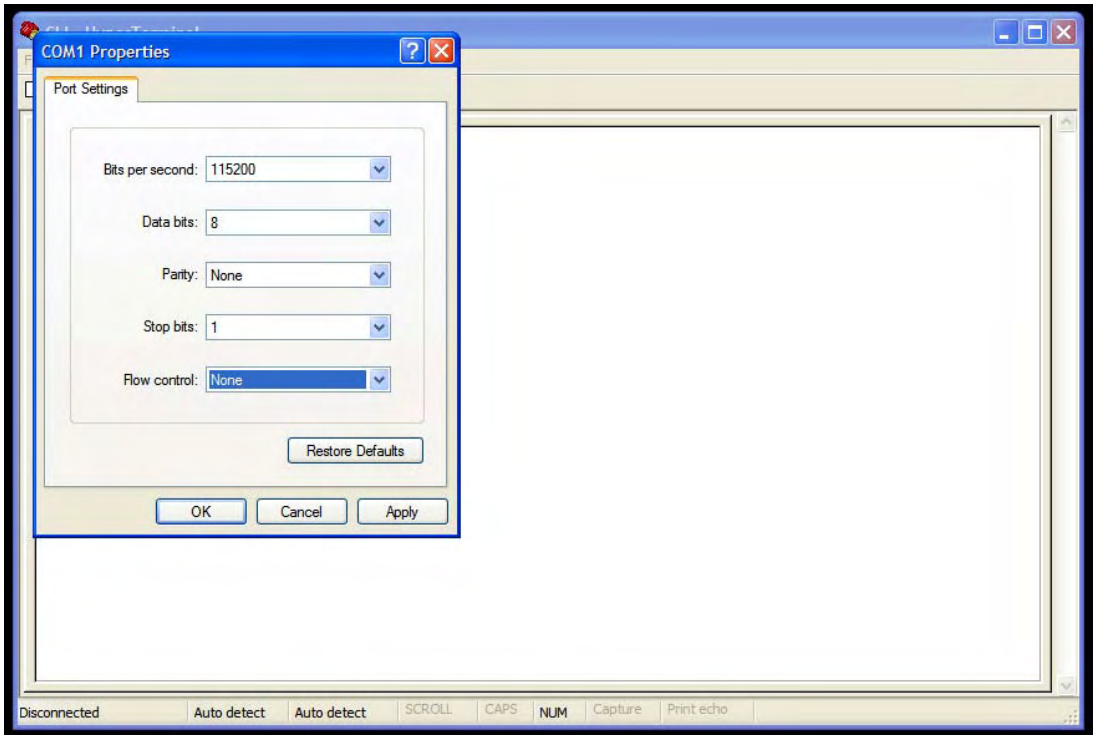
CLI

- In the “Connect using” drop-down menu, select “COM1”.
- Click “OK”.



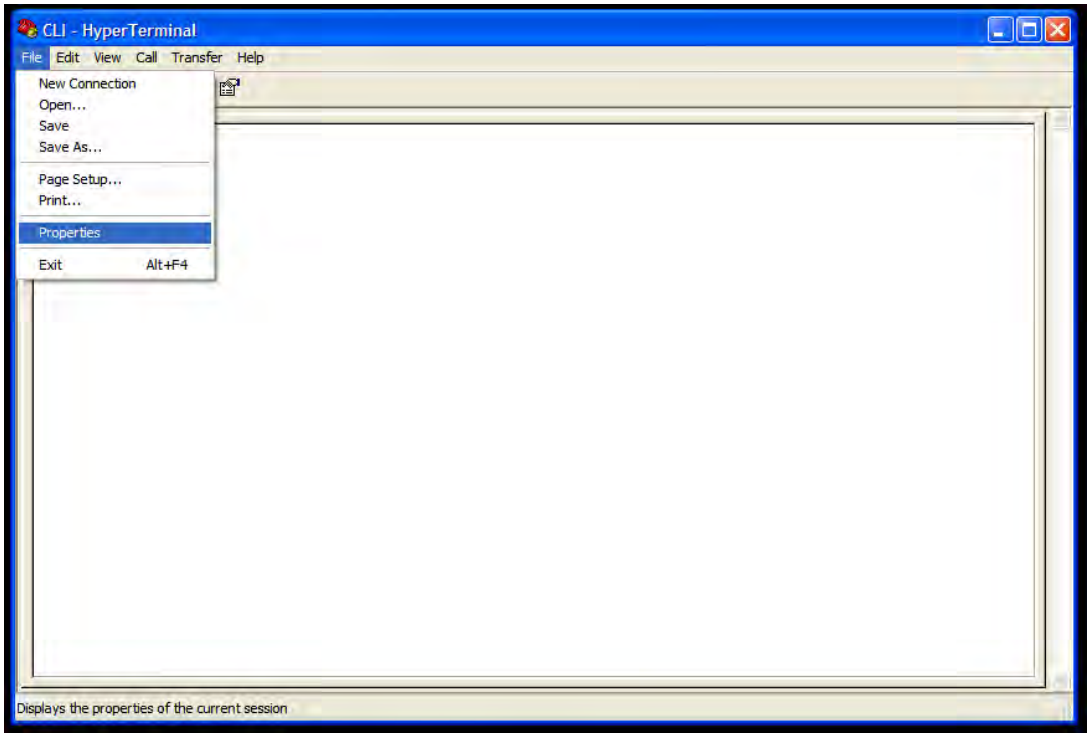
CLI

- “Bit per second” drop down menu, select “115200”.
- “Flow control” drop down menu, select “None”.
- Click “Apply”.
- Click “OK”.



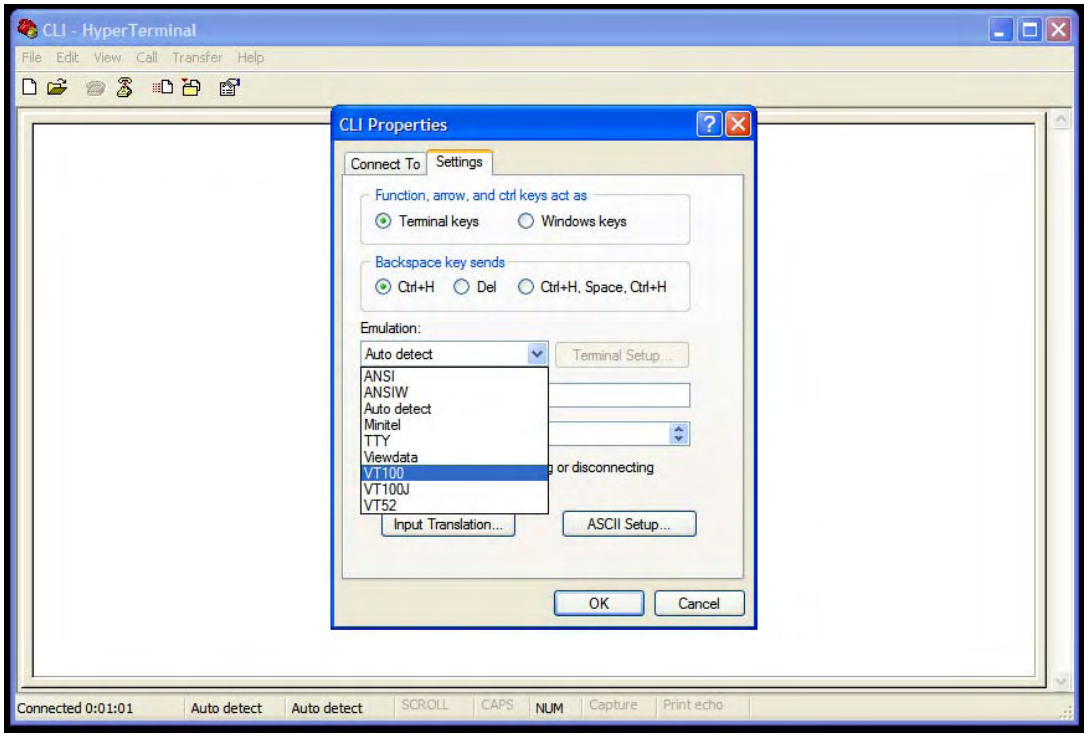
CLI

- Click “File”, choose “Properties”



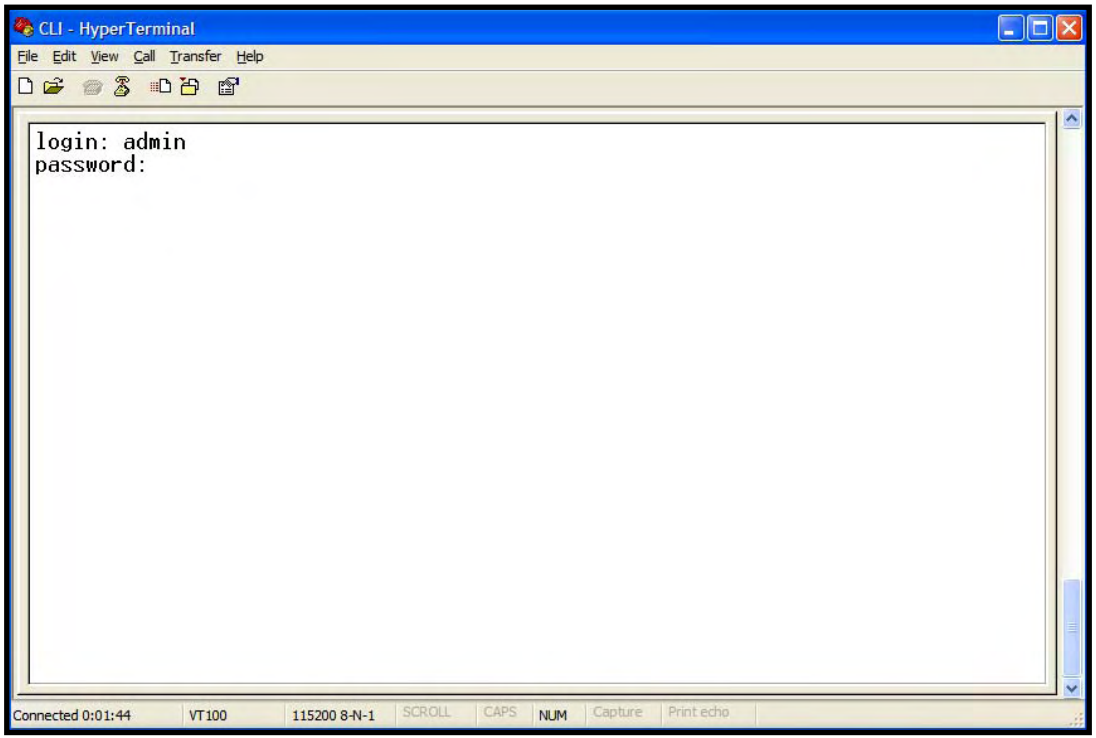
CLI

- On ‘Settings’ tab.
- ‘Emulation’ drop down menu, select ‘VT100’.
- Click ‘OK’.



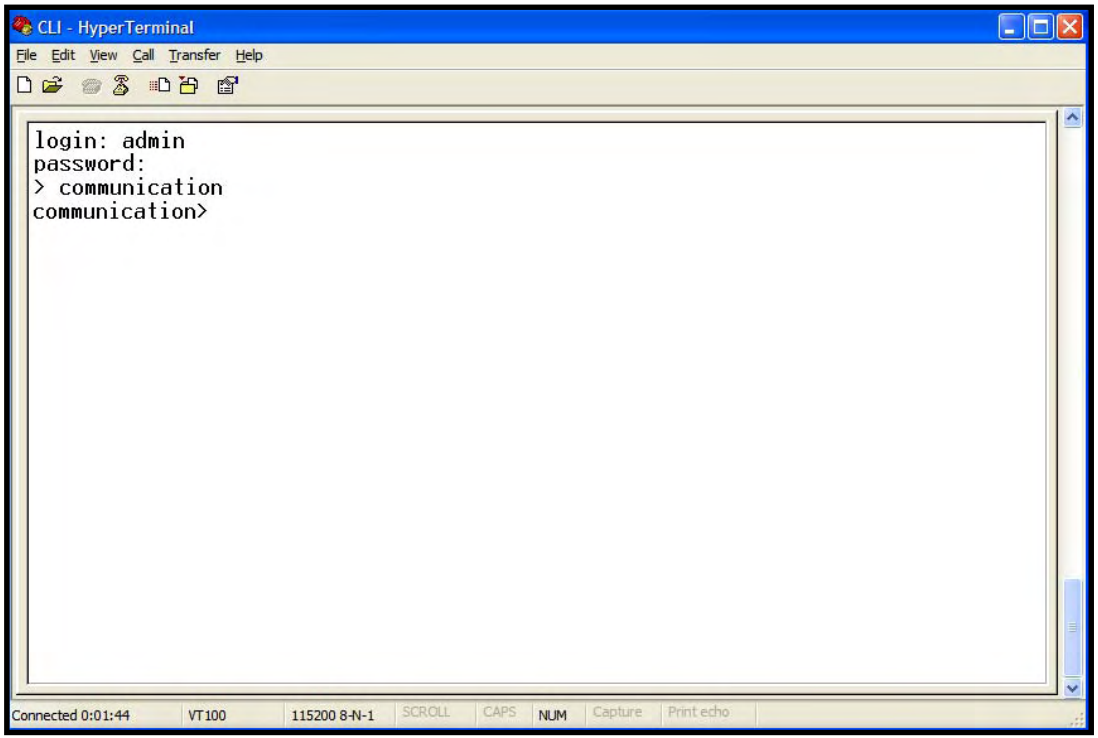
CLI

- In case that you cannot see login prompt, just press enter key several times.
  Login is ‘admin’ and Password is ‘admin’.



CLI

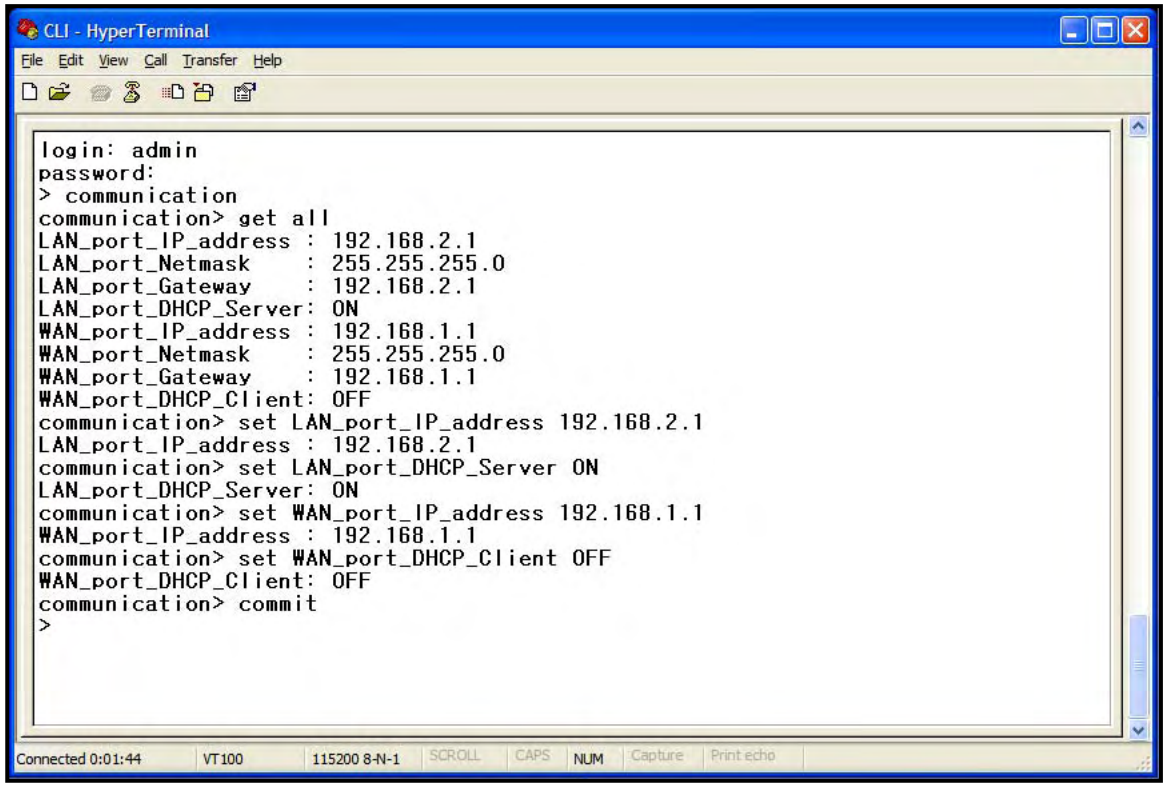
- In order to verify IP network configuration, you should type ‘communication’.
- Press enter-key.



CLI

- In order to see values, you should type “get all”, and then press the enter-key.
- Enter the following text:

“set LAN_port_IP_address 192.168.2.1”, then press the enter-key.
“set LAN_port_DHCP_Server ON”, then press the enter-key.
“set WAN_port_IP_address 192.168.1.1”, then press the enter-key.
“set WAN_port_DHCP_Client OFF”, then press the enter-key.
“commit”, then press the enter-key.



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.

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 12 dBi.

The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.