

BGAN from Stratos

Application Note

iBoot-G2 AC Power Switch



Satellite Equipment

Revision: 1.0 Oct-11
AuthID: SE.AH

Purpose

The BGAN systems provide vital communication links for a wide variety of mission critical applications. Knowing that the link will be available when it is needed is vital to the success of any organization that relies on BGAN systems for real-time and accurate information. When systems are installed in unmanned, remote locations, the cost of downtime can be critical. The value of the information, manpower, and travel expenses to restore a failed communication link can be costly. With the assistance of the iBoot-G2, delay in restoring the BGAN terminal and the manpower and travel expenses can be avoided.

Summary

The automatic link Verification and Network Enabled Power Switch system is designed to help insure that these critical systems are available when they are needed. The system periodically tests the link status on a pre-defined schedule. With a minimal data load, it can automatically reboot the terminal and peripheral devices if and when the link has gone off line. The system is customizable to allow the user to balance the relative low cost of data traffic required for system verification, with the timeliness of system availability. Both satellite facing and local network facing systems can be tested to insure that no recoverable failure results in critical system downtime.



Description

The system consists of an application-optimized version of Dataprobe's iBoot-G2 Network Enabled Power Switch. The iBoot is designed for automatic and user control of A/C power via network protocols (Web, Telnet, ICMP etc.).

Benefits:

- Web Browser Power Control
- 12 Amps A/C Power Switching
- IEC connectors with NEMA cords
- 10/100 Network Connection
- Telnet control; Command Line interface (CLI)
- Dual AutoPing with Logical and/or set up
- Real time Event Scheduling
- Software Developer Tools
- Wall and DIN Rail Mounting

Requirements

It is designed for worldwide power mains 100 – 240 VAC 50/60 Hz. The standard iBoot-G2 has been optimized for BGAN terminal verification. These modifications allow a minimum of data traffic to be used for link verification and allow scheduling of verification tests to a wider range of time parameters. These changes were designed to minimize the data costs of verifying the link, while still providing timely reboots for restoral when required.

Configuration Settings

iBoot-G2 supports 10/100 Ethernet using the cable supplied, or other suitable unshielded twisted pair (Cat 5) cabling. Link (amber) and Activity (green) LEDs on the network connector indicate when the network connection is properly established.

Stratos Dashboard Set Up

To reach the iBoot device remotely you need to create a User Profile on a Stratos SIM card. The Stratos SIM card's user profile should be configured with a Public Static IP address. A Public Static IP address will provide you with an IP address that is reachable over the internet. Configuring it to a static IP address insures that the IP address does not change when the BGAN terminal creates or starts a new PDP context.

When creating the User Profile, configure the Trench Rule set to **"Open"**. By selecting to open the Trench Rules, you allow the flow of data to and from the user terminal. The Stratos default Trench Rule setting is **"Internet"**. This default Trench Rule setting only allows mobile to internet traffic and blocks internet to mobile traffic.

Note: Please refer to the Trench User Manual for a full in depth explanation of the Trench Rules.

The screenshot shows a configuration panel with the following settings:

- Default:**
- Maximum Streaming Speed Allowed:** Streaming Symmetrical 384+ (BGAN only)
- Trench Rules:** Open (with a "Show Rules" link)
- Subscription:** (empty)
- Current Sessions:** 0
- Accept SIM cards:** Accept any SIM card
- IP Addresses:** n/a
- Actions:** OK, Finish

Custom Trench Rules

If a stricter rule set is required to meet corporate IT policy, the administrator or the user can create a custom rule set in the Trench. To configure the Stratos Trench with a custom Trench Rule set, click on the drop down menu to the right of the **"Trench Rules"**. A drop down box will appear and the option to **"Specify Custom Rules for this User Profile"** is shown. By selecting the custom rules option, you can create your own specific Trench Rules that adhere to your corporate policy.

The screenshot shows the 'Details for User Profile andrew' page with the following settings:

- Access Type:** Public IP Access
- User Name:** (empty)
- Password:** (empty)
- Description:** User Profiles using Public IP Access get one public IP address, Static or Dynamic, that will work globally.
- Update by End-user Allowed:**
- Customer ID:** 5
- SIM Card:** 9011121
- Default:**
- Maximum Streaming Speed Allowed:** Streaming Symmetrical 384+ (BGAN only)
- Billing Profile:** 5252
- Trench Rules:** Open (dropdown menu is open)

The dropdown menu for Trench Rules shows the following options:

- Please Select
- Custom
- Specify Custom Rules for this User Profile (highlighted with a red circle)
- Private Rule Sets:
 - Custom Trench Rule
 - AmosConnect plus 5 IP addresses
 - WeatherMaps
 - Customer TRS
 - IT Manager
 - RH_Commbox
 - Burum WUG
 - Basic access Captain
 - FBB VLA Rule Set - Draft
 - Training
 - FBB Fair Use Policy - DRAFT - MARGO
 - AmosConnect Crew CommCenter
- Public Rule Sets:
 - Internet Access
 - Open
 - Email Only
 - Closed
 - AmosConnect Rule

The IP Address field is set to 216.88.253.192.

Selecting a **"Specify Custom Rules for this User Profile"**.

To create a custom Trench Rule click on the pencil on the right hand side of the screen and the window above will be displayed. Add the information that is needed to configure your specific Trench Rule.

Name	Description
Allow All IP Protocols	Allow traffic from mobile to all IP addresses
Deny all other traffic	

Name	Description
PORT 80	Allow TCP traffic from 10.160.168.23 to ports 80-80 on mobile
Deny all other traffic	

Name	IBOOT
Action	Allow
Direction	From Mobile
To IP Address	10.160.168.23
Start / Single Port	80
End Port	8
Protocol	TCP

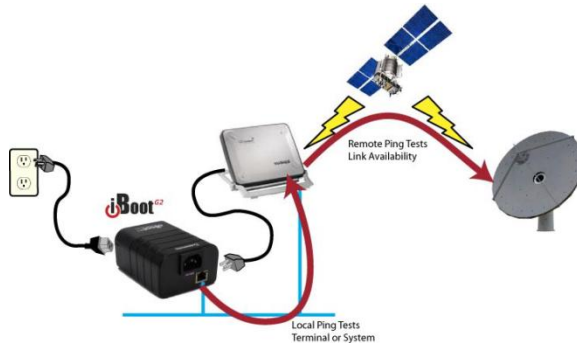
Specify Custom Rules for this User Profile

Name	Description
IBOOT	Allow TCP traffic from mobile to ports 80-80 on 10.160.168.23
Allow All TCP	Allow TCP traffic from mobile to all IP addresses
Deny all other traffic	

Name	Description
PORT 80	Allow TCP traffic from 10.160.168.23 to ports 80-80 on mobile
Deny all other traffic	

The example above is what the Trench rule will look like after you click **"Add"**. The example shows a Trench Rule set that has been configured to only allow traffic on port 80, which is the default port for HTTP traffic as well as the iBoot device.

iBoot – G2 Verification and Network Enabled Power Switch



1. Link Verification and Restoral

The iBoot uses ICMP 'ping' tests for link verification. Two IP addresses can be tested, each with its own parameters as to the frequency of tests. Typically, one IP address would be across the satellite link and another to the local BGAN terminal. Ping testing is the ideal way to provide link verification for satellite systems, as it only requires 74 bytes in each direction.

Ping parameters set both the frequency of the pings from 1 second to 999 hours and the number of tests to perform during each cycle. Any one valid response verifies the link availability to minimize data traffic on good links. Should the local or remote link be determined unavailable, the iBoot will power cycle the terminal, wait for the users preconfigured time, then re-test the system to insure link connectivity.

2. Local BGAN Terminal Verification and Restoral

The second Ping test can be pointed to the local BGAN terminal for service availability. The frequency of this test can be much higher, as there are no data charges associated with this connection.

3. Minimal Data Cost

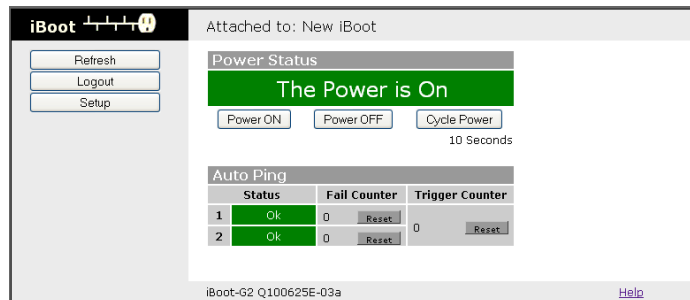
The minimal data cost of the system means that link verification testing is a low cost means to insure high availability. The system requires 74 bytes in each direction to validate connectivity with the target IP address. Below is a network capture of a typical set of four ping verifications. The following chart provides some examples of total data cost for various testing frequency.

Per Day	Per Month	Per Year	
Every Hour	3552 Bytes	105.5 KB	1266 KB
Every 6 Hours	592 Bytes	17.6 KB	210 KB
Every 12 Hours	296 Bytes	8.8 KB	105.5 KB
Every 24 Hours	148 Bytes	4.4 KB	52.8 KB

Based on 74 bytes in each direction per ping.

4. Manual Control via Web & Telnet

In addition to the automatic link verification, the iBoot has an internal Web Server and Telnet Server. By pointing a web browser or Telnet client to the IP address of the iBoot, the administrator can manually power control the unit and manage the device.



5. Scheduled Power Control

The system can also use a real time clock (internal or NTP Server set) to provide scheduled power control. Examples include:

- Keep unused systems powered down until needed. In SCADA or other telemetry applications, reporting may be done on a periodic basis. In this case, the system can be powered down to conserve energy or minimize heat gain and powered up only when needed.
- Reboot on a scheduled basis. For system with known issues, it may be advisable to reboot once a day, perhaps just prior to a daily transmission to insure terminal availability at the critical time.
- **Note:** Up to 8 schedules can be set with varying frequencies as required.

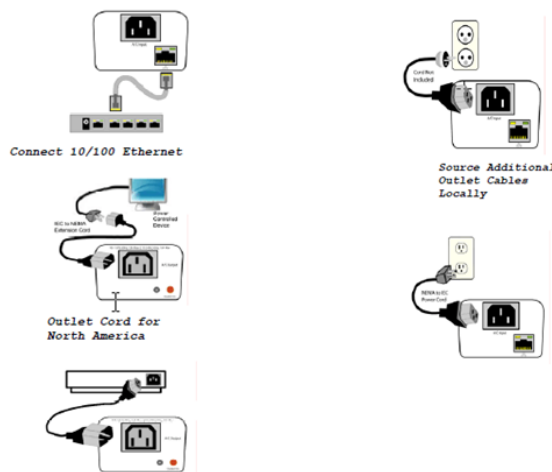
Installation

1. Ethernet Connections

iBoot-G2 supports 10/100 Ethernet using the cable supplied, or other suitable unshielded twisted pair (Cat 5) cabling. Link (amber) and Activity (green) LEDs on the network connector indicate when the network connection is properly established.

2. AC Power Connections

- Connect the device to be powered ON and OFF to the IEC receptacle marked A/C Output. An IEC 320 to North American (NEMA 5-15) power cord is included for connecting the iBoot-G2 outlet to the device to be controlled.
- If a cord with a different terminating receptacle is required, be sure it is properly rated and meets all the required local electrical standards. If the device to be powered uses an IEC320 receptacle and detachable power cord, an IEC to IEC extension cord can be used.
- The iBoot-G2 can be connected to a power strip to allow simultaneous control of multiple devices.
- Make sure that the combined load of all controlled devices does not exceed 12 Amps for 105 125VAC or 10 Amps for 210-240VAC.
- An LED Indicator next to the Switched Outlet will be 'On' to indicate that the power is on at that outlet. This LED will turn 'Off' to indicate that the power is off to the outlet.
- Connect the supplied power cord to the connector labelled A/C Input, and the other end to your AC source. If a power cord with a different terminating plug is required, be sure it is properly rated and meets all the required local electrical standards.
- Connect 10/100 Ethernet outlet cord for North America; source additional outlet cables locally



3. Mounting Options

iBoot-G2+ is suitable for desktop or shelf mounting. A mounting kit for wall and DIN rail mounting is also available.

4. Initial Configuration

The Device Management Utility (DMU) is available online at <http://dataprobe.com/support/iboot.html> and provides the easiest means to find and configure your iBoot-G2 for use. It can discover all the iBoot's on your network. It will display the current IP address of each iBoot device and allow individual configuration of any valid IP address.

Other ways to set the IP Address:

1. Automatically from a DHCP Server
2. Web Browser via the Set-up Page
3. CLI (Telnet & USB)

Note: iBoot-G2 comes with factory installed IP address 192.168.1.254.

Operation

1. Web Browser Password Protection

iBoot-G2 uses two username/password credential sets, one for normal power control (User) and one that also provides access to the setup functions (Admin). Default settings are 'admin' for both Username and Password for the Administrator and 'user' for both Username and Password for the User.

Role	Username (fixed)	Password (user set)
Administrator	admin	admin
User	user	user

Open your browser and enter the IP address of iBoot-G2 into the address bar. If you have changed the IP address by any of the methods described, enter that address or use the default IP address 192.168.1.254.

Enter the username and password as prompted. When the correct username/password is entered, the Control and Status Page is displayed.

2. Control and Status Page

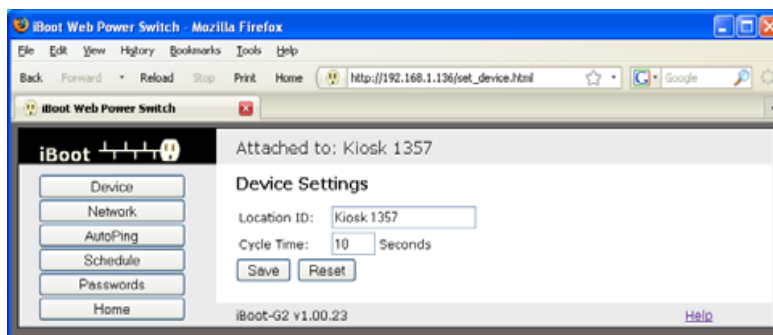
Note: Only one person can be connected to the iBoot-G2 at a single time.

To control the power, click on the appropriate button. During power cycling, the Power Status bar will indicate the temporary status and will have a blue background. Once the cycle is complete, the status bar will revert to its original condition. To abort a power cycle, click on either the **"Power On"** or **"Power Off"** button. iBoot-G2 will assume the status selected.

If the AutoPing features are in use, the page will also display the current status, OK or Failed, for each AutoPing used, with a counter of how many times it failed and how many times the Action was triggered. If connecting with the Admin credentials, the reset buttons for the Fail and Trigger counters are provided.

To access the Setup page, the administrator's credentials must be used for the initial login.

When you are finished with iBoot, click on Logout. A confirmation page will be displayed. If another user is logged into the iBoot-G2, an In Use page will be displayed.



Note: For a command line and DXP Protocol please refer to the user manual

Set Up

The iBoot-G2 setup section consists of several pages. Access any of these pages via the buttons on the left of the page. Please keep in mind that each time a setting is changed, click on the Save button for that page to save the changes before moving to the next page.

Device Configuration

- Under the **"Device"** radio button, set a device name and set the cycle time. This is the length of time the power will be off during a reboot or on during a power burst. Save changes.
- Under the **"Network"** radio button, enter the IP address information accordingly. You can also change from standard port settings for HTTP, telnet and set the auto log off here. Save changes.
- The **"AutoPing"** feature will ping periodically as configured. Enter the details for the addresses, frequency and number here. Fail counter will determine how many fails are occurred before a cycle.
Note: Pinging addresses over the air interface will result in chargeable data being created.
Note: Changes to **"AutoPing"** settings will only take effect with a reboot.
- Next, set the mode of operation accordingly to the table on the next page. Select from **"And"**, **"Or"** and **"Single"**. With **"And"**, both AutoPings need to exceed their fail count to trigger the Action. With **"Or"**, the action will be triggered if either AutoPing fails. With **"Single"**, only AutoPing 1 is used.

None	AutoPing not used
Power On – Latch	Upon triggering, iBoot-G2 will power on and remain so until changed via the web, telnet, DxP, etc.
Power On – Follow	Upon triggering, iBoot-G2 will power on. When the ping response returns, iBoot-G2 will power off.
Power Off – Latch	Upon triggering, iBoot-G2 will power off and remain so until changed via the web, telnet, DxP, etc.
Power Off – Follow	Upon triggering, iBoot-G2 will power off. When the ping response returns, iBoot-G2 will power on.
Power Cycle	Upon triggering, iBoot-G2 will cycle the power. iBoot-G2 will wait the Ping Frequency x Fail Count; if the response does not return, the power will be recycled again. This will continue until the ping response returns or Auto Ping is turned off. Make sure your Auto Ping frequency is longer than the time required to reboot your device.
Power Cycle Once	Upon triggering, iBoot-G2 will cycle power one time. It will not cycle again automatically until the ping response returns and is lost again.

With the AutoPing operational, the main iBoot-G2 page will display the current status of this feature. The status will be OK to indicate that iBoot-G2 is receiving responses to the ping, or that the fail counter has not yet been exceeded.

If the fail count has been exceeded, the status will change to FAIL. The Fail Counter will indicate the number of times the failure has occurred, and the Trigger Counter indicates the number of times the AutoPing action has been triggered. A counter reset button is provided when logging in with the Admin password.

- Under the **"Scheduling"** radio button, you can set up to 8 different power events. Set the initial date and time, repeat cycle and the action to be taken, i.e. power on, off or power cycle. Press **"Save"**.
- It is recommended that you setup passwords under the **"Password"** menu for access to the IBoot unit. Press **"Save"**.

BGAN Terminal Set Up

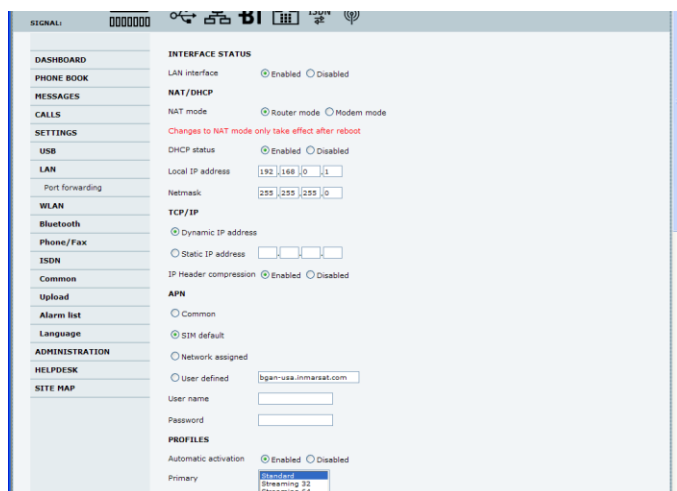
Thrane & Thrane EXPLORER 300/500/700

The terminal needs to be configured to switch on when external power is connected, no pointing is required at power up, and to automatically activate a data connection. The BGAN terminal can be configured from the EXPLORER's built-in web server (via a laptop's web browser).

1. Open your internet web browser and type the following IP address into the address bar:
192.168.0.1

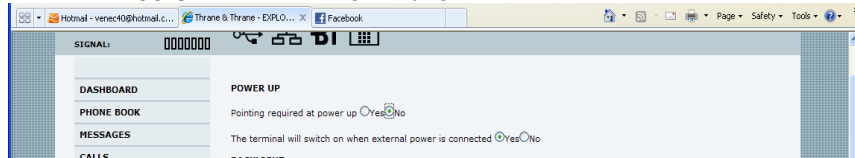


2. Click on **Settings> LAN**
3. Now you should see the web server interface. The screenshot below shows the settings that are required. These settings are configured via the EXPLORER's web server interface. Remember to click apply before leaving the web page to insure the settings have been saved.
Note: Consult the appropriate EXPLORER user manual for a more detailed explanation.
4. NAT Mode Select **"Router"**
5. Under the APN section, the user has two options to configure this field. Select **"User Defined"** enter the APN, user name and password provided by Stratos. When you created a User Profile with a Public Static IP address, a username and password was created for the profile (page 5 of this application note). The username and password that was created for the profile is entered into this field. The administrator or the end user also has the option to configure the User Profile as the default login on the BGAN Network via the Stratos Dashboard. If they chose to make the User Profile the default login, they are not required to manually configure this section.
Note: If no static IP address is used, your IP address will change every time you connect to the BGAN network. To verify the IP address assigned to the terminal click on the Thrane & Thrane **"Dashboard"** screen and you'll see the IP address of your active data connection. You may need to refresh the page.
6. Automatic Activation select **"Enable"**
7. Click **"Apply"**

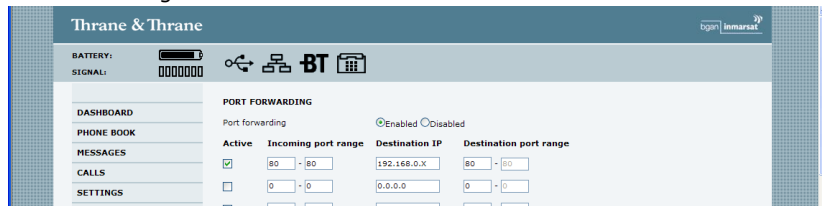


8. Now your terminal is configured to start a Standard connection after you register on the network.

9. Click on **"Setting"** on the left menu.
10. Select the **"No"** radio button for Pointing required at power up.
11. Select the **"Yes"** radio button for the terminal will switch on when external power is connected.
12. Click **"Apply"** before leaving the page.



13. Click on **"LAN"** from the menu on the Left.
14. Click on **"Port Forwarding"** select **"Enable"**.
15. Check the Active box and enter **"80"** for the **"Incoming port Range"** and the IP address you configured in your iBoot-G2 ex. 192.168.0.X then for the destination port **"80"**
Your configuration should look like the below screen shot:



16. Click **"Apply"** before leaving the page.
17. Restart your terminal after properly pointing the terminal. The Explorer terminal will register automatically on the BGAN network and you will be connected automatically with a Standard PDP connection.

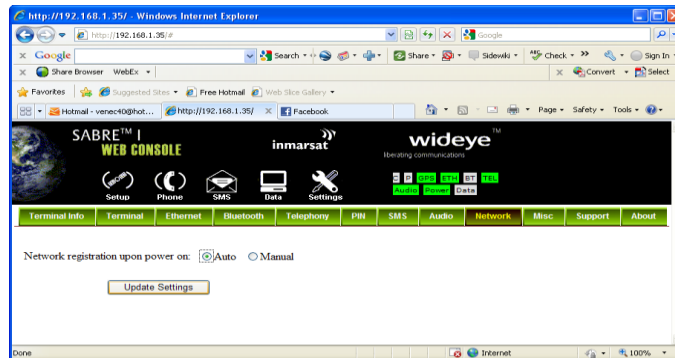
Wideye Sabre 1

The terminal needs to be configured to switch on when external power is connected, no pointing is required at power up, and to automatically activate a Standard PDP connection. The BGAN terminal can be configured from the Wideye Sabre 1's built-in web server (via a PC's web browser).

1. Open your internet web browser and type the following IP address in the address bar:
192.168.1.35
2. You will be prompted for the Username: admin Password: Wideye. You should see the web interface of the Wideye shown below.



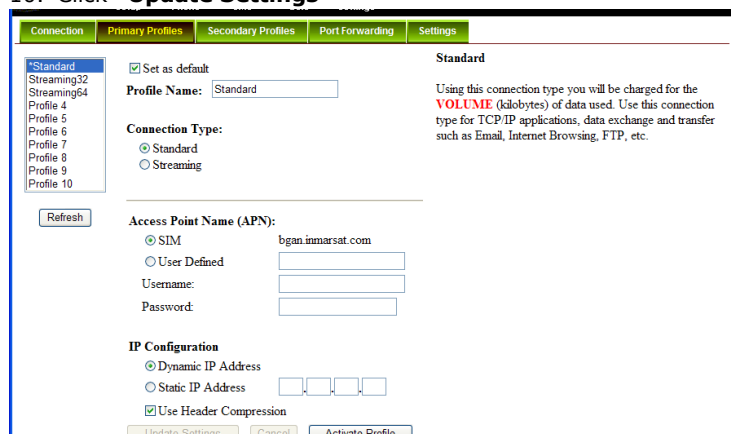
3. Click on **"Auto network registration upon power on"**
4. Select the **"Auto"** radio button, and then click **"Update Settings"**.



5. Click on the **"Data Icon"**
6. Click on **"Primary Profiles"**
7. Select the **"Connection Type"** as **"Standard"**
8. Check the box **"Set as default"**
9. Under the APN section, the user has two options to configure this field. Select **"User Defined"** enter the APN, user name and password provided by Stratos. When you created a User Profile with a Public Static IP address, a username and password was created for the profile (page 5 of this application note). The username and password that was created for the profile is entered into this field. The administrator or the end user also has the option to configure the User Profile as the default login on the BGAN Network via the Stratos Dashboard. If they chose to make the User Profile the default login, they are not required to manually configure this section.

Note: If no static IP address is used your IP address will change every time you connect to the BGAN network. On the data **"Connection"** tab you can see the IP address of your connection during an active PDP connection.

10. Click **"Update Settings"**



Your configuration should look like the above screen capture.

11. Click on **"Port Forwarding"**

12. Click **"Add"**, enter **80** in the **"Incoming Port"**
13. In the **"Destination IP Address"** field enter the IP you assigned to the PNSC 192.168.1.X.
14. Choose the Protocol **"TCP"**
15. In the **"Destination Port"**, enter **80**
16. Check **"Enable"** and click **"Apply"**



17. Click on the **"Settings"** tab
18. Select **"Router Mode (Multi User)"**
19. Check the box for **"Auto PDP context Activation"**. This option configures the terminal to start a Standard PDP connection automatically after the terminal register on the BGAN network.
20. Refresh the terminal

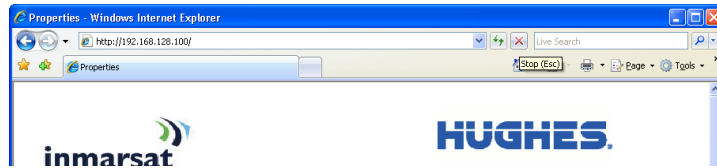


21. After restarting the Sabre 1 and properly pointing the terminal. The Sabre 1 will register automatically on the BGAN network and will automatically establish a Standard PDP connection.

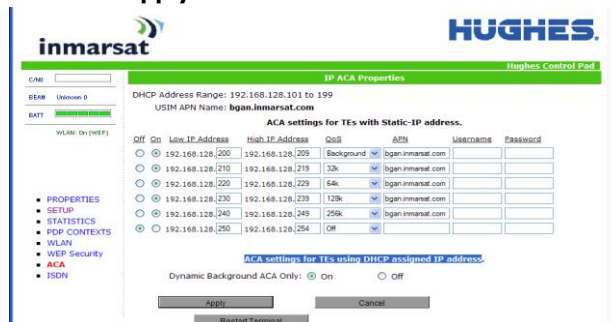
Hughes

The terminal needs to be configured to switch on when external power is connected, no pointing is required at power up, and to automatically activate a data connection. The BGAN terminal can be configured from the Hughes built-in web server (via a PC's web browser).

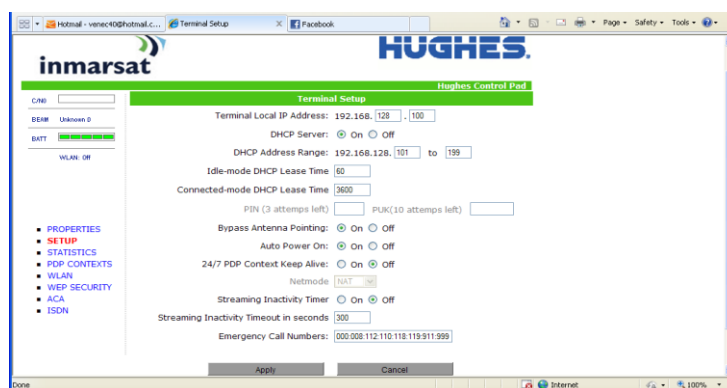
1. Open your internet web browser and type the following IP address in the address bar:
192.168.128.100



2. Click on **"ACA"** on the menu on the left.
3. Select **"ACA settings for TEs with Static IP address"**, click the radio button **"On"** for the range of 192.168.128.200 – 192.168.128.209.
4. In the QOS field, select **"Background"**.
5. Under the APN section, the user has two options to configure this field. Select **"User Defined"** enter the APN, user name and password provided by Stratos. When you created a User Profile with a Public Static IP address a username and password was created for the profile (page 5 of this application note). The administrator or the end user also has the option to configure the User Profile as the default login on the BGAN Network via the Stratos Dashboard. If they chose to make the User Profile the default login, they are not required to manually configure this section.
6. Click **"Apply"**



7. Now click on **"Setup"**
8. Make sure **Bypass Antenna Pointing** and **Auto Power On** radio buttons are set to **"On"**
9. Click **"Apply"**



10. Then Click "**Restart Terminal**"

11. After restarting the Hughes and properly pointing the antenna. The Hughes will register automatically on the BGAN network and will automatically establish a Standard PDP connection.

Technical Summary

Specifications

Category	Item	Spec
Physical	Height	2.0" 60mm
	Width	3.2" 82mm
	Depth	4.2" 107mm
	Weight	8.6 oz 244g
	MTBF	360,000 hours
	Temperature	0 - 50 degrees C
Power	Input	IEC 320 C14
	Input Cord	6AWGX3C 10A 250 UL/CSA/VDE Rated (1.25mm2X3C)
	Voltage Range	Auto Sensing 105-240 VAC
	Switched Receptacle	IEC 320 C13
	Capacity	12 A Max at 105-125 VAC, 10 A Max at 210-240 VAC

Tested

Product	Result	Comments
Wideye Sabre Ranger	Successful	Default Setup
Hughes 9201	Successful	Default Setup
Thrane & Thrane EXPLORER 300/500/700	Successful	Default Setup

Vendor Contact Details

Dataprobe Inc
 Email: tech@dataprobe.com
 Web site: dataprobe.com/support

Stratos Contact Details

Web site: <http://www.stratosglobal.com>