



# USER GUIDE BGAN Installation & antenna orientation

How to prepare the Orbit, Moxa & BGAN modem How to install and pre-orientate the BGAN Antenna How to fine adjust the BGAN antenna How to configure BGAN communication in Atlas Tests in case of not being able to communicate & to check the correct configuration

#### HOW TO PREPARE THE ORBIT 360 DATA LOGGER, MOXA & BGAN MODEM

1. Verify that all cables are plugged in correctly and check for continuity (according to the wiring diagram shown below).

2. Make sure the data logger has the correct .sit file configured with BGAN communication in Atlas (see chapter 4 of the Orbit 360 user manual).

3. Verify that the BGAN SIM card is activated correctly with remaining data on the subscription.

4. Make sure that the IP from which you are trying to connect to the BGAN has permission in the Inmarsat Firewall to make the communication. To avoid this requirement you can use the option in Atlas to use a "M2M Gateway in BGAN connections". This setting can be found in "Settings>Process" in Atlas (see screenshot here below).



#### HOW TO INSTALL AND PRE-ORIENT THE BGAN ANTENNA

The BGAN system operates with a directional antenna which means that the orientation of the antenna is crucial for its operation and good coverage.

Before installing the antenna support boom to the mast make sure the antenna will be located and orientated in such a way that it has a clear line of sight between the antenna and the satellite (unobstructed).

Follow these steps to verify in what direction to point the antenna. These steps should be performed outside:

**Do not stand in front of the antenna.** This device emits high-energy radiofrequency waves. Do not place the head or other body parts in front of the satellite antenna when the system is operational. Keep a distance of at least 1 m from the front of the satellite antenna.

1. Connect the BGAN RF antenna and screw the antenna onto the support boom (final antenna orientation will be adjusted later).

2. Connect the cross-wire ethernet cable from the BGAN modem to your laptop.

3. Power on the BGAN modem.

4. Wait until the Power and the GPS LEDs are on (fixed).

#### 5. Set the IP addres 192.168.128.150 / 255.255.255.0 on your laptop

5A. Start by disabling the Wifi connection on your laptop.

5B. Open the "Control Panel" > "Network and Internet" > "Network and Sharing Center" > "Ethernet". Now right-click

the "Ethernet Status" icon and click on "Settings".

5C. In the "Ethernet Settings" tab, click on "Internet Protocol version 4 (TCP/IPv4)" and then click "Properties".

5D. In the properties window set the following configuration:

Click on "Use the following IP address:"

IP Address: 192.168.128.150

Subnet mask: 255.255.255.0

Default gateway: Leave empty --> (Important as this avoids consuming data from your BGAN data plan)

5E. Now click on "OK" until you exit the menu.

Network and Sharing Centre				
← → • ↑ 🖺 > Control Pa	anel > Network and Internet > Network and	Sharing Centre		
Control Panel Home	View your basic network informa	ation and set up conr	nections	
Change adapter settings	View your active networks			
Change advanced sharing settings	Red 2 Private network	Access typ Connectio	e: Internet Ins: Ethernet	
Media streaming options				
	Ethernet Status	×	Ethernet Properties X	Protocolo de Internet versión 4 (TCP/IPv4) Properties X
	General		Networking Sharing	General
	Connection	Internet	Connect using: o	You can get the settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate the settings.
	Media State: Duration:	Enabled 02:54:25	Configure This connection uses the following items:	Obtain an IP address automatically ( Use the following IP address: )
	Speed: Details	1.0 Gbps	Eliente para redes Microsoft      Viware Bridge Protocol      Uso compartido de archivos e impresoras para redes M	IP address: Subnet mask: 192 . 168 . 128 . 150 255 . 255 . 255 . 0
	Activity		<sup>1</sup> <sup>1</sup> <sup>1</sup> <sup>1</sup> <sup>1</sup> <sup>1</sup> <sup>1</sup> <sup>1</sup> <sup>1</sup>	Default gateway:
	Sent —	Received	regulation de projecto des      restancia de projecto des      restancia de projecto des      restancia de restanci de restancia de restancia de	Obtain DNS server address automatically © Use the following DNS server addresses:
	Bytes: 870,259,956	7,019,773,766	Install Uninstall Properties	Preferred DNS server:         8         8         8           Alternative DNS server:         8         8         4         4
	Properties Disable D	iagnose	Protocolo TCP/IP. El protocolo de red de área extensa predeterminado que permite la comunicación entre varias redes conectadas entre sí.	Validate settings upon exit Advanced
		Close	OK Cancel	CK Cancel

6. Now open your web browser to access the BGAN terminal by typing the following default IP address: **192.168.128.100.** 

N	Nueva pestaña		a	×
$\leftarrow$	$\rightarrow$	C	ß	192.168.128.100

7. In case you have received an email from Kintech Engineering with a unique APN username and password you must use these for the BGAN configuration.

To do this, click on the "Connections" section and select Manage APN ´s and the window shown in the manual below will appear. To display the APN parameters click on the QC:BGAN.INMARSAT.COM... (indicated by an arrow in the screenshot below). This will allow you to edit the parameters and you will be able to add the username and password you received by email. Once added, save the changes. These parameters are unique for each BGAN sim card, so they cannot be used for other installations.



HUGHE	5	Home	Connections	Setting	s M2M	Security	SMS
9502			N	lanag	e APNs		
ALL SETTINGS	Enter the Your APN	information su I data will be s	upplied by your s aved so the term	service pr ninal can	ovider to access t be easily configur	he BGAN Netw red.	vark.
Manage Contexts	Defined A	APNs					
Automatic Contexts	Defini APN (L	ad APNs Jser Name) ININMARSALCOM (GI	CU10970981		Add an APN Access Point Name	RSATCOM	
601 Manage APNs	Network	Assigned APN			User Name G	CU1087098	
	Remo	ove APN	Make Defa	ault	APN Require	s Password	_
					🗹 Remer	nber my Passwor	d
					Add New APN	Save Changes	

8. In the lower part of the **STATUS box** (indicated in the screenshot below) you can find the recommended orientation and inclination of the BGAN antenna. Now screw on the support boom to the mast according to this orientation and incline the BGAN antenna as indicated. Roughly adjust the BGAN antenna as indicated below in the **inclindation angle diagram** (in the example below for that specific location the inclination should be 46,5° and the orientation should be 147.3°, however both of these settings are unique to each location so please look carefully what is shown in your case).

HUGHE	S Filme	Connections Settings	Security SMS	
9502		Home		
STATUS Connection	Terminal Information			
Registered	Model	BGAN USER TERMINAL, Hughes 9502		
Beam: REGIONAL 13	IMEI	353938-03-001013-0		
Signal Strength: 56	Software Version	5.9.2.0		
40	SIM Information			
GPS	IMSI	901112112489883		
3D GPS Fix	APN	bgan.inmarsat.com		
Location: 32.89572° N 117.20218° W	Subscriber Phone Number	Not configured by Service Provider.		
Last Fix: 18-Jul-2012, 14:41 UTC				
Pointing Info	Troubleshooting			4
🕺 1.4 Americas	Terminal Logs			
S 147.3° ▲ 46.5°	Log Type Curren	t Log Archived Log	Reset Log	4
	To download the logs	to disk, Click or right-click the links below a	nd select 'Save Target As'.	

9. In the upper part of the **STATUS box** (indicated as Connection as shown below) check the green bar in order to verify the **Signal Strength**. Any value over 50 dB will be suitable for a good coverage (i.e. 56 dB as in example below).



HUGHE	5	Home	Connections	Settings	L t M2M	Security	SMS
9502				Hom	е		
STATUS	Termi	nal Information					
Connection	Mode	el	BGAN USE	ER TERMINAL,	Hughes 9502		
Registered	IMEI		353938-03-	001013-0			
Beam: REGIONAL 13 Signal Strength: 56	Softw	are Version	5.9.2.0				
40	SIM Information						
GPS	IMSI		9011121124	89883			

10. You should fine adjust the BGAN antenna until the signal strenght is as strong as it can be on the given location.

- 11. Exit the BGAN terminal in your web browser and turn off the BGAN modem.
- 12. Disconnect the ethernet cable from your PC and plug it back into the Moxa Nport.

13. Now turn on the BGAN modem, the data logger and the Moxa unit. If the BGAN modem and the Moxa unit and data logger are already turned on, then just turn the data logger off and then on again.

#### HOW TO CONFIGURE BGAN COMMUNICATION IN ATLAS

- 1. Open the corresponding data logger in Atlas and click on "Site Settings"
- 2. Click on the "Communication" on the left-hand menu and select BGAN in the "Connection type" section.
- 3. Type the IP address associated to your BGAN SIM card (this was sent to you by Kintech Engineering) and "950" in TCP

Port.				
	AN08 ID_000008 Site Window			_ 🗆 X
	SITE SETTINGS	AN08 ID_000008		
	General			^
	Channels	Communication settings		
	Communication	Connection type		
	Scheduled download	Internet     Select this option to make     (satellite modem) to receiv	the logger use its external BGAN modem e incoming connection.	
	After download	For future scheduled conne Iridium address:	ections, I want Altas call the following static	
		IP address (BGAN SIM)	XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	
	U Download now	BOAN TCP Port	950	
	Legi Real time	CSD CSD	550	
	Upload settings			
	ADVANCED	Password protection		
	Firmware update	Full Access Password: Gives the user access to download new logger configurations remotely.	data remotely, decrypt raw data (.log file) a update	
		Enable full access password	Set	
	Data management	Real Time Access Password: Gives the user access to com	nect in real time (requires enabling full access	
	Settings history	password first).		
	Site history	Enable real time access password	Set	
	Site documentation			
	Export site		+ Advanced options	
		Download settings		
		-		_
		Download mode		
		I will manually download data from this logger		
		<ul> <li>Atlas should automatically connect to the logger and</li> </ul>	d download data	~
		ScreenShot Save		Close

If you have followed all of the above mentioned instructions you should now be able to connect to the data logger directly from Atlas. Make a short (not to consume to much data) realtime connection from Atlas to the data logger to verify this.





#### **TESTS IN CASE OF NOT BEING ABLE TO COMMUNICATE & TO CHECK THE CORRECT CONFIGURATION**

There are two different points to test:

#### A. How to test the communication between Moxa NPORT 5110 and the Orbit 360 data logger

To test the communication with the data logger through a Moxa (RS232/TCP converter), previously configured for working with a BGAN, the following steps must be carried out:

1. Using the Ethernet cable from the Moxa unit connect this cable to the laptop.

2. The IP in the Moxa has to be set to 192.168.128.101. The laptop should have its IP address in this same range. You can set the IP address in the laptop to 192.168.128.150 with the network mask 255.255.255.0.

In the following screenshot it is shown how to setup the IP address of the Laptop.

Protocolo de Internet versión 4 (TCP/I	Pv4) Properties	Х				
General						
You can get IP settings assigned auton this capability. Otherwise, you need to for the appropriate IP settings.	natically if your network supports ask your network administrator					
Obtain an IP address automatical	Obtain an IP address automatically					
• Use the following IP address:		1				
IP address:	192 . 168 . 128 . 150					
Subnet mask:	255.255.255.0					
Default gateway:						
Obtain DNS server address autom	natically					
Use the following DNS server add	resses:					
Preferred DNS server:	8.8.8.8					
Alternative DNS server:	8.8.4.4					
Validate settings upon exit	Advanced					
	OK Cancel					

3. Now open a web browser and type the IP address of Moxa (192.168.128.101). You will be requested to type in the password of the Moxa unit (the password is "eol2020" or "moxa"). You should now see the Moxa configuration page (see below screenshot)

In case you can not access the configuration page of the Moxa unit you should contact Kintech Engineering for further support and help to use the software 'NPort Administrator' to check the Moxa configuration. This software must be ALWAYS opened as an administrator.





NPort Web Console X						×
$\epsilon \rightarrow C$ 0 192.168.127	.254				<b>≌</b> ☆	J
	www.m	oxa.com 🚄				
Main Menu	Welcome to Ni	Port's web console	e !			
Basic Settings     Network Settings     Serial Settings     Operating Settings     Operating Settings	Model Name MAC Address Serial No. Firmware Version	NPort 5110 00:90:E8:59:DD:4A 2081 2.5 Build 15041515				
Auto Warning Settings     Monitor     Change Password	System Uptime NPort's web console provi	0 days, 00h:02m:03s	5.			
Load Factory Default	Load Factory Default     Server name, real time clock, time server IP address, and Web console,     Teinet console Enable, Disable function.					
	Network Settinas					

😸 NPort Administrator-Me	onitor				-	×
Eile Eunction Monitor ⊻ie	w <u>H</u> elp					
🚊 🚄 🎽 Exit Add Remo	we Go	Stop				
Function			Monitor - Stopp	ed - 0 NPort(s	;)	
Port     Origuration     Origuration     Origuration     Port Monitor     Of Port Monitor     Of Port Mapping     Of IP Address Report	No	Model	MAC Address	IP Address	Alive	
Message Log - 0 Monitor Log	1 3 · 0					
No Time		Description				
low: 24/07/2018 13:16:02						

4. Now verify that the data logger is correctly configured for working with the BGAN communication: The modem type int the data logger must be set to "7 - BGAN / Direct com" and the word "BGAN" should appear in the upper right corner of the data logger display.



5. Now make a real time connection with the data logger (using Atlas installed on your laptop). with the laptop changing the Ip defined by the Moxa IP (192.168.128.101).

Connection via		
<ul> <li>Internet</li> <li>Iridium</li> <li>BGAN</li> <li>CSD</li> <li>Serial Line</li> </ul>	Use this option to conn Satellite Module. Manually speci IP address TCP Port	nect to your data logger equipped with the BGAN ify the IP addres 192.168.128.101 950

\* In case its not working, check the serial cable between the data logger and Moxa. It is necessary to verify that the cable is connected following the diagram. \* The connection of the TX and RX cables is very important because if they are connected in an inverted way, communication will not be possible.



BGAN ANTENNA



# B. Final test of the communication between Atlas and the data logger (via internet and BGAN Modem and MOXA NPORT).

Check that the Ethernet cable is corretly connected between the Moxa unit and BGAN modem. Make sure that the Ethernet cable in use is a "crossed ethernet cable".

Configure the .sit file in Atlas and try to make a communication in real time using the IP address of the BGAN modem (This IP address was sent to you by Kintech Engineering).

\* In case you can not make a real time connection between Atlas and the data logger do the following:

- Make sure that the SIM card inserted in the BGAN modem is active and with data available.

- Make sure that the IP from which you are trying to connect to the BGAN has permission in the Inmarsat Firewall to make the communication. To avoid this requirement you can use the option in Atlas to use a "M2M Gateway in BGAN connections". This setting can be found in "Settings>Process" in Atlas (see screenshot here below).

- Open a browser and type the IP address of the BGAN provided by Kintech Engineering. The Moxa configuration page should appear. **ATTENTION**: Only do this in the case of communication problems, as you will be consuming data from the BGAN satellite subscription.

Use M2M Gateway in BGAN connections

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#### IN CASE YOU DONT HAVE A LAPTOP FOLLOW THESE STEPTS TO ADJUST THE ANTENNA

1. Power on the BGAN modem.

2. The BGAN LEDs carry out a startup sequence that lasts 25-30 seconds. Wait until the Power LED on the front panel starts blinking with the other two LEDs off.

3. With the Power LED blinking, press the Function Button (less than 2 seconds, without holding it). If done correctly, the three LEDs will start blinking at the same time. The modem now enters orientation mode.



4. Once the modem is in orientation mode, there are two options to fine adjust the BGAN antenna:

a. Headphones: Insert the headphones into the 3,5 mm Audio Jack on the modem. These headphones are not supplied with the equipment, although most of the ones supplied with mobile phones are compatible. The BGAN modem will emit a beep proportional to satellite coverage. The better your orientation and therefore the coverage, the sharper and faster the beep.

b. **Voltmeter (recommended)**: Insert the supplied audio jack cable with the white connection terminal into the BGAN modem. Now measure DC voltage with a voltmeter (see photo on the right). The modem will generate a voltage directly proportional to the correct orientation of the BGAN antenna and therefore to the satellite coverage signal. It is recommended to leave the BGAN antenna screwed onto the support boom with a value of 2,5 V or more for an optimal connection and **never less than 2 V**. The better your orientation and therefore the coverage, the higher the voltage value.

5. When you are done with the final adjustment of the antenna fix its position onto the support boom.

6. Press the Function Button (< 2 seconds, without holding it) to exit orientation mode.

7. To confirm that the orientation of the BGAN antenna is correct and the modem is available to communicate, wait until all three LEDs remain on. It may take about 2-5 minutes to stay on after a sequence of on and off. If the 3 LEDs do not remain fixed (on) after a few minutes, start the orientation process again (starting from chapter 2).

8. Make a real-time connection using Atlas from the office to verify that everything is OK.



#### SUMMARY OF THE THREE LEDS

See on the right the LED flow chart of the BGAN modem.

- 1. Power LED fixed: power OK.
- 2. GPS LED blinking: BGAN modem searching for GPS signal.
- 3. GPS Fixed LED: GPS signal OK.
- 4. NET LED blinking: registering on the network.

5. NET LED fixed (three fixed LEDs): BGAN modem with satellite coverage and ready for communication.

**Note**: The three LEDs turn off after one minute of inactivity to save power. To turn them back on and check the modem status short press the Function Button (<2 seconds).



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Last modified: 16.05.2024