



nodeG5 Edge MQTT Gateway

Supporting



Deploy edge or FOG compute with an IIoT gateway that supports python, docker & ML inferencing to monitor & manage CAN J1939/OBD2, OPC UA, Serial RS485, Modbus TCP/RTU, WiFi & Bluetooth industrial assets.

EDITION : Feb 2025

DESIGNED IN AUSTRALIA. ASSEMBLED IN SINGAPORE.

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SAFETY OF USE



ALL CONDITIONS	All specialist electronic devices must be operated with due care to avoid damage or injuries and should be installed and operated by a trained personnel.
	DO NOT OPERATE THIS EQUIPMENT IN ENVIRONMENTS CONTAINING POTENTIALLY EXPLOSIVE GASES OR LIQUIDS, EXAMPLE, GAS STATIONS AND CHEMICAL PLANTS AND EXPLOSIVE STORES.
POWER SETUP	Inadequate current or dips in voltage may cause the device to fail to connect to data services even if the LEDs are lighted up. Supply over 40 VDC may cause permanent damage to the device.
SIM CARD	Never remove or insert SIM card when device has PWR switched in "ON" position. Damage caused to device or SIM in such case will not be warranted.
CONFIGURING THE ROUTER	Do not reboot/power-down the device until the writing process is acknowledged as completed.

ABOUT	CPU CORE		MANAGEMENT		
	CPU	NXP i.MX8M Plus QuadLite, quad- core ARM Cortex-A53, 1.8GHz	NETWORK ROBUSTNESS	 Designed for maximum uptime from available network 	
1. 1 nodeG5	NPU	AI/ML Neural Processing Unit, up to 2.3 TOPS		 NetMgr WWAN connect timeouts End-to-End PING connectivity testing with reboot 	
PECIFICATIONS	REAL TIME CO- PROCESSOR	ARM Cortex-M7, 800Mhz	NETWORKING	· Dynamic DNS	
			CLOUD	· Azure IoT Hub	
	STORAGE & ME	MORY	MANAGEMENT	AWS IoT Core / Sitewise Client Ubidots Client	
	RAM	2GB LPDDR4		 MQTT Client with TLS Security On-board Real Time Clock Real Time Data Mode 	
	Storage	32GB eMMC flash, soldered on-board	INTEGRATED		
			DATA FEATURES	· FIFO Data Mode	
	NETWORK		REMOTE MANAGEMENT	· SSH for Remote LINUX Management	
	LAN	2x 1000Mbps Ethernet ports, RJ45	MANAGEMENT		
	WIFI*	802.11ax WiFi			
	BLE*	Bluetooth 5.3 BLE	USER CUSTOM	PROGRAMMING	
	CELLULAR*	4G/LTE CAT4 cellular module, Quectel EG25-G (Global bands)		 Run Python (2.7.15 & 3.6.5)/ LUA/ BASH scripting Run containers on Debian Linux 	
	GNSS*	GPS			
	0.000				
	I/O		WARRANTY		
	USB	2x USB2.0, 1x USB3.0 type-A connectors	· 5 year manufacturer	warranty	
	RS485/ RS232*	Up to 2x RS485 (half-duplex)			
	CAN BUS*	Up to 2x CAN bus 2.0B ports			
	Digital I/O	Optional 4IN + 4OUT digital I/O			
	Debug	1x serial console via UART-to-USB bridge, micro-USB connector.			

* denotes features that may be model specific

ABOUT

1. 2 HARDWARE

DIMENSION	
- L	
- W	
- H	
WEIGHT	

PHYSICAL SPECIFICATIONS

132mm 84mm 25mm

550g

POWER

8 to 36 VDC, 3 - 10W
 12 VDC typical

PERIPHERALS INCLUDED

· Power Supply Unit with DC plug lock

Input 100-240VAC 50/60Hz, 36W output 12VDC 3A
 Cellular rubber duck antenna with SMA connector

· CAT-5 LAN cable (3M)

· 2x11-pin dual-row mating plug for industrial I/O

OPTIONAL ACCESSORIES

· High-gain outdoor antenna (wall mounted)

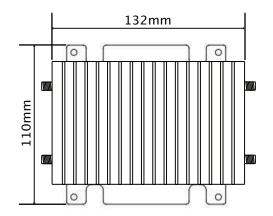
· High-gain outdoor antenna (pole mounted)

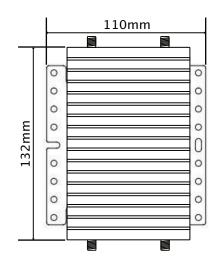
· 2x 2.4GHz / 5GHz WiFi BLE Antennas

Mounting plate

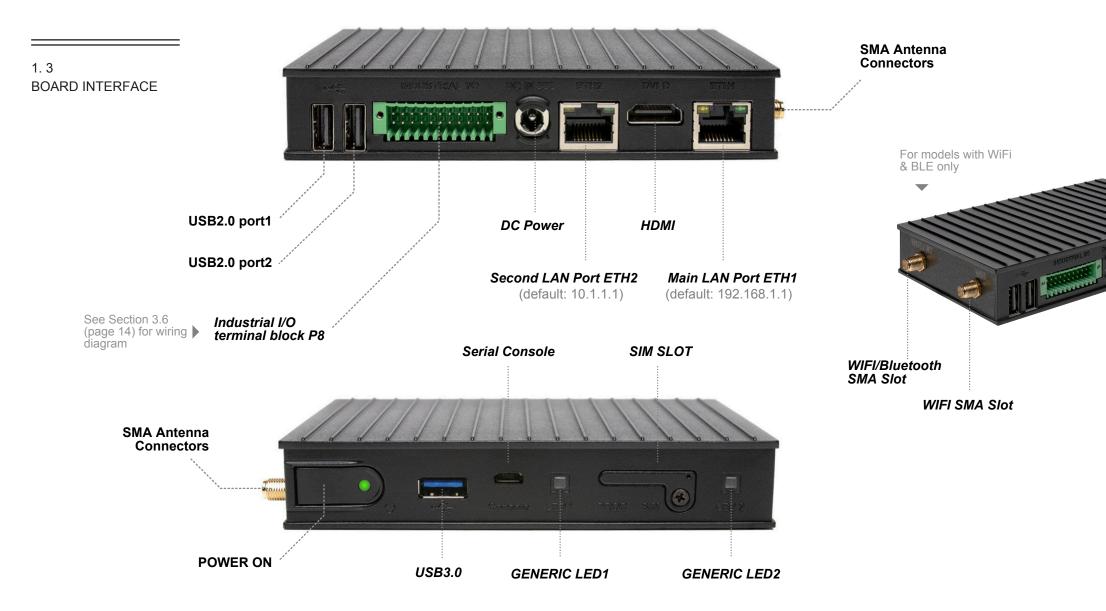
With the nodeG5 you have the option to install it using a mounting plate onto different surfaces.

The orientation and dimensions are as below:





ABOUT



SETTING UP

2. 1 SIM INSTALLATION INSERTING THE SIM CARD

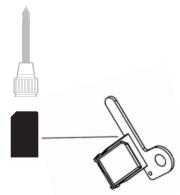
TION

STEP 1 of 5 - Unscrew the SIM cover and insert the micro SIM card into the slot.

WHAT YOU'LL NEED

- 1. 4G Data Enabled micro SIM Card
- 2. PC/Laptop with an Ethernet port
- SIM card network details APN/USERNAME/PASSWORD. You would need to get this information from your operator.





STEP 2 of 5 - Screw the cover back on and connect up the power adapter and the cellular antenna

SETTING UP

2. 2	STEP 3 of 5 - STEP 4 of 5 -	Plug in the Ethernet cable from ETH1 to your pc and power up the nodeG5. Launch your browser and enter address as <u>https://192.168.1.1</u>	
LOGGING IN	STEP 5 of 5 -	Log in.	
For Security, after your first successful log in, you will be prompted to change your username & password.	 NODEG5 CON ← → C 	SOLE × 〕 192.168.1.1 ☆ Ξ	
Note: If you are using a SSH console: The login username is: root The default password remains as: node12345		Username admin Password node12345 Log in	The default username is: admin The default password is: node12345

nodeG5

3.	1
Ql	JICK
ST	ART

The Quick Start tab brings together all the settings you need to establish an immediate cellular connection in one page.

MENU OPTIONS	Basic settings for nodeG5 Gateway for Cellular Internet Access	You can find resource PDF links in our web config to help guide you through the different setups.
Quick Start Cellular WAN Dynamic DNS Ethernet Wireless Serial / CAN	G5 Quick Start Guide.pdf LAN (eth1) Port Settings LAN IP Address 192.168.1.1 / 24	Key in the IP Address for your nodeG5 gateway here.
IoT Hardware IoT Client Management System Status Logout	Cellular SIM Settings APN telstra.internet Dial Number *99# User Name (PAP/CHAP only)	To connect the nodeG5 to a cellular network the following information is required. You will be able to get them from your internet service provider.
	SIM PIN Code (If required only)	Click on UPDATE to save your settings.

Password Management



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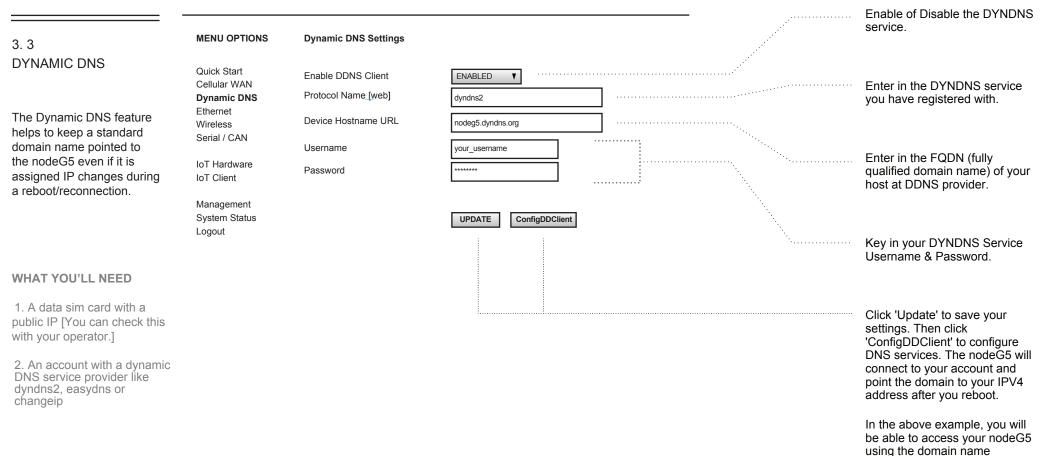
3. 2
WAN &
CELLULAR
SETTINGS

MENU OPTIONS Quick Start Cellular WAN Dynamic DNS	WAN & Cellular Settings Primary WAN Interface	Cellular T	 	Select your primary WAN interface from the options given. (Note that Wi-Fi is model dependent & you will need to complete the rest of your the settings in 'Wireless' tab.)
Ethernet Wireless Serial / CAN	Cellular SIM Settings			To connect the nodeG5 to a
IoT Hardware	APN	telstra.internet		cellular network the following information is required. You will
IoT Client	Dial Number	*99# builder	be able to get them from your	
Management	User Name (PAP/CHAP only)		 	internet service provider.
System Status Logout	Password (PAP/CHAP only)		If you will like to override your	
Logout	SIM PIN Code (If required only)			network assigned DNS, you can input your own address here.
	Service	LTE_UMTS Preferred		Otherwise leave it blank.
	Assigned DNS	192.168.1.20	 ······	Set the amount of minutes
	NetMgr WWAN Connect Timeout	3	 	before the system does a reboot (0 = never)
	Advanced Settings			

	Disabled			you can choose to PING an external IP address.
Enable Reboot on PING failure	Disabled V			
PING Remote Host	8.8.8.8		••••••	Add in a test IP address (i.e.
PING Interval	5			Google at 8.8.8.8 T)
PING retries	5		¹⁹⁴⁴ -1947 - 19	Input the PING interval & number of retries made before the system reboots.
	Update	······································	ter en	When you have completed your

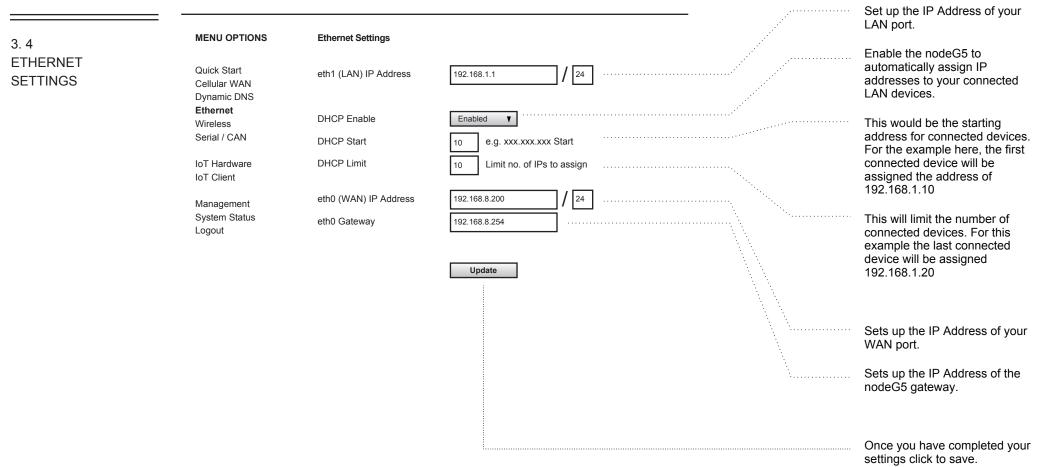
settings on this page, click 'Update' to save them.

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"nodeG5.dyndns.org" on any

regular browser.



3. 5	MENU OPTIONS	Wireless Settings			Select to enable (Note that Wi- Fi is model dependent.)
WIRELESS SETTINGS	Quick Start Cellular WAN Dynamic DNS	Wireless Mode	Disabled T		Key in the SSID of your wi-fi router.
	Ethernet Wireless Serial / CAN	Settings for 'Infrastructure Mod	de' : connects to your wi-fi router for internet access		Input the security settings to connect to your router.
	IoT Hardware IoT Client	SSID Security Type	ssid WPA-PSK V	······	Key in the IP address for your nodeG5, or leave this blank to
	Management System Status Logout	Password IP Address	192.168.1.1 / 24		let it be assigned via DHCP.
		Router IP			Create a SSID for your nodeG5
		Settings for 'Access Point Moo	de' : connection point for your wi-fi enabled devices		access point.
		SSID Security Type	ssid ···································		Input the security settings to authenticate a connection with devices.
		Password IP Address for AP mode	192.168.1.1 / 24		Key in the IP address for your nodeG5 as access point.
			Update		When you have completed your settings on this page, click 'Update' to save them.

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3. 6 SERIAL, CAN & I/O SETTINGS

MENU OPTIONS	Serial / CAN Settings		
Quick Start	Serial Port A Parameters	······	
Cellular WAN	Speed	19200 E.g. 9600, 19200, 38400, 57600, 115200	
Dynamic DNS Ethernet	Data Bits	8 E.g. 7, 8	
Wireless Serial / CAN	Parity	None V	Match the pottings with your
IoT Hardware IoT Client	Stop Bits	1 7	Match the settings with your attached serial devices to the respective port (see wiring
IOT Client	Serial Port B Parameters		diagram on the previous page).
Management System Status	Speed	9600 E.g. 9600, 19200, 38400, 57600, 115200	
Logout	Data Bits	8 E.g. 7, 8	
	Parity	Even V	
	Stop Bits	1 🔻	
	CAN Port Parameter		Match the settings with your attached CAN devices to the
	CAN Port C Baudrate (On-board)	500000 E.g. 50000, 100000, 125000, 250000, 500000, 1000000	respective port (see wiring diagram on the previous page).
	CAN Port E Baudrate (FCCAN)	250000	diagram on the previous page).
		Update	
			Click on 'Update' to save your settings.

CONFIGURATION - WIRING UP

The industrial I/O signals are routed to terminal block P8. Pin-out is determined by the I/O modules configuration below:

. 6 ERIAL, CAN & I/O ETTINGS					A
CAN bus & Serial	Default CAN Port E	· PIN 4 (CAN_H) · PIN 2 (CAN_L) · PIN 5 (ISO_GND_1)		200000000000000000000000000000000000000	
he nodeG5 features up o 2 CAN 2.0B ports with MX8M Plus CAN ontroller. CAN bus	* CAN Port C	· PIN 12 (CAN_H) · PIN 14 (CAN_L)	Pin	Signal Name	Isolation P Domai
ignals are routed to the ndustrial I/O connector.		· PIN 21 (ISO_GŃD_3)	1	RS232_TXD / RS485_POS	1
			2	CAN_L	1
NOTE: One CAN bus port is always available. Additional CAN and serial ports occupy additional			3	RS232_RXD / RS485_NEG	1
	* Serial (RTU)	· PIN 7 (RS485 POS)	4	CAN_H	1
	Port B	· PIN 7 (RS485_POS) · PIN 6 (RS485_NEG)	5	ISO_GND_1	1
		· PIN 8 (ISO_GND_2)	6	RS232_RXD / RS485_NEG	2
			7	RS232_TXD / RS485_POS	2
ustrial I/O expansion			8	ISO_GND_2	2
s & are only available			9	INO	3
en the nodeG5 is	* Serial (RTU) Port A	· PIN 1 (RS485_POS) · PIN 3 (RS485_NEG)	10	IN1	3
ordered with these			11	IN2	3
ional ports.		· PIN 5 (ISO_GND_1)	12	RS232_TXD / RS485_POS / CAN H	3
			13	IN3	3
RS485 2-wire, half-			14	RS232_RXD / RS485_NEG / CAN_L	3
lex cables are			15	OUT0	3
uired.			16	OUT1	3
	Connector Type:		17	OUT3	3
			18	OUT2	3
	22-pin dual-row plug with s	pring connections	19	24V_IN	3
			20	24V_IN	3
	Locking: screw flange		21	ISO_GND_3	3
			22	ISO_GND_3	3
	Pitch: 2.54mm				

Wire cross-section: AWG20-AWG30

CONFIGURATION - WIRING UP

Digital Inputs & Outputs

3.6 SERIAL, CAN & I/O SETTINGS

Key characteristics:

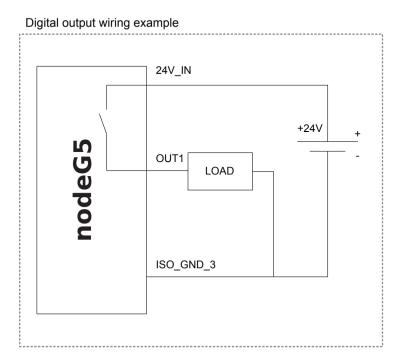
- Designed for 24V PLC applications

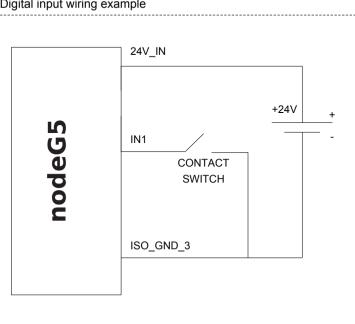
- Galvanic isolation from main unit and other I/O modules

- Digital outputs maximal output current - 0.5A per channel

Digital I/O Operating Conditions

ParameterDescriptionMinTyp.MaxUnit24V_INExternal power supply voltage122430VVIN LowMaximal input voltage recognised as LOW4VVIN HighMinimal input voltage recognised as HIGH6V							
VIN Low Maximal input voltage recognised as LOW 4 V	Parameter	Description	Min	Тур.	Max	Unit	
VIN Low Maximal input voltage recognised as LOW 4 V	24\/_IN	External power supply voltage	12	24	30	V	
VIN High Minimal input voltage recognised as HIGH 6 V			12	24	4	V	
	VIN High	Minimal input voltage recognised as HIGH	6			V	





Digital input wiring example

nodeG5

3.7
IOT HARDWARE

MENU OPTIONS	IOT Hardware Setup				·*
Quick Start Cellular WAN	Modbus mode [modbus.pdf]	Enat	oled T		
Dynamic DNS Ethernet	CAN bus mode [OBD2.pdf]	Disa	bled V OBD/C2Q: Query mode C2R: Read Mode		
Wireless Serial / CAN	COMeth mode [COMeth.pdf]	Disa		···.	·
	Event Drop Type	Disa	bled T		********
IoT Hardware IoT Client	Poll Period	15	secs	·	·
Management	Poll Time Out	5	secs		· · · · · · · · · · · · · · · · · · ·
System Status	Query Pause	0.1	secs (pause between query required for Modbus)	·	
Logout	Time Stamp Offset	0	eg +8 or -6.5 (offset from UTC+0)		
	Bluetooth Radio	OFF	T		

UPDATE

Click to enable Modbus mode

Choose 'Query mode' to send request packet & read response values. Choose 'Read mode' when slaves auto report their status/values. J1939 users will also need to choose that CAN bus option here.

ComETH BOT supports query and reading of on-board digital input.

Select the time interval of reading data events of the iotasset listing. If you wish, have a different polling period for different assets, refer to our web FAQ to set your iotasset.txt configuration.

The timeout specifies the time period to accept responses after each network request. Ensure adequate spacing that takes into account network traffic and latency.

If you require a pause between separate poll queries, set it here.

Set your local timezone for event timestamp.

Enable the Bluetooth option here. Note that this feature is model dependant.

Update and reboot the nodeG5

			Show a snapshot of the current data
3.7	MENU OPTIONS	IOT Hardware Setup	
IOT HARDWARE	Quick Start Cellular WAN Dynamic DNS Ethernet Wireless		DELETE ALL JSON DATA
	Serial / CAN IoT Hardware IoT Client	DATA SNAPSHOT :: Show Data DELETE DATA Warning : Will delete all user sensor data	Ensure that the gateway HTTPS console must be accessible before proceeding with these steps.
	Management System Status Logout	Check File :: Check iotasset.txt UPLOAD IOTASSET.JSON FILE	1. Click on the 'UPDATE IOTASSET.JSON FILE' button.
	-		 In the new window, click on 'CHOOSE FILE' & select the updated file from your local folder.
IMPORTANT ::			3. Click 'UPLOAD FILE'
Please upload the following settings via the Management tab .			 Close the page & log in again for security purposes.
- iotasset.json with hardware device settings (e.g Modbus addresses)			If the update failed, check that the connection to the gateway is stable. Or else please contact
 connstr.txt with Azure settings (e.g. Azure IoT device id token) 			support@amplified.com.au
			Click to see the current configurations file in a new web page.

	MENU OPTIONS	IOT Client Setup			Enter the Device ID you use to set up your Microsoft Azure IoT Account.
3. 8 IOT CLIENT	Quick Start				Select if you are connecting to Azure IoT Hub or IoT Central.
	Cellular WAN Dynamic DNS	Client Setup :: Azure IoT			Enter the endpoint/host for sending the data. By default this is set to
	Ethernet Wireless Serial / CAN	nodeG5 Azure IoT Quick Start Guide web pdf Device ID YourAzureDeviceID			'global.azure-devices- provisioning.net'
	IoT Hardware	Client Type	IoT Hub Client		Enter in the ID scope assigned to
	IoT Client	Provisioning Host			your Azure device provisioning service.
	Management System Status Logout	ID Scope SAS Private Key			Enter the SAS private key that is generated using your device
	Logout	Enable Client	Enabled T	····	connection string.
				· · · · · · · · · · · · · · · · · · ·	Select to Enable the Azure IoT Client
		Client Setup :: AWS IoT			
		nodeG5 AWS IoT Quick Sta	t Guide <u>web pdf</u>	;	
		Thing Name	YourAzureDeviceID		
		Торіс			Enter the Thing Name, Topic, Endpoint & AWS Port as per the
		AWS Endpoint			settings in your AWS account
		AWS Port Enable Client	Enabled V	;	
				··	Select to Enable the AWS IoT Client

3.8
IOT CLIENT

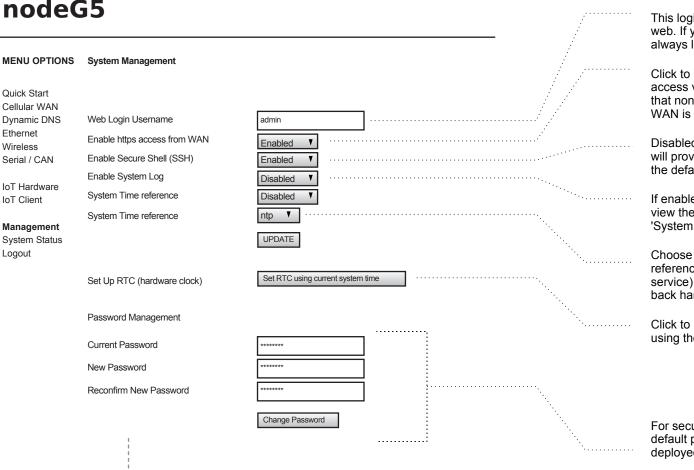
MENU OPTIONS Quick Start Cellular WAN	IOT Client Setup			
Dynamic DNS Ethernet				
Wireless Serial / CAN	Client Setup :: Ubidots			
	nodeG5 ubidots IoT Quick Start Gui	de <u>web pdf</u>	 	
IoT Hardware IoT Client	Device Token	YourAzureDeviceID	 	Enter the Device Token & Name as per the settings in your Ubidots
Management	Device Name		 	account
System Status Logout	Enable Client	Enabled Y	 ······································	
			 аланан алан алан алан алан алан алан ал	Select to Enable the Ubidots IoT Client
	Client Setup :: MQTT			
	nodeG5 MQTT IoT Quick Start Guid	le <u>web pdf</u>		Enter the MQTT Broker IP that you
	Broker Host	test.mosquitto.org	 	want to connect to
	Message Topic			And your Topic as per the settings in
	Host Port	1883		your Broker/ to describe your data set
	Username for port 1883			And the Broker Port details as per
	Password for port 1883		 	the settings in your MQTT Broker
	Enable Client	Enabled T	 ······	
			^{та} л	Enable the nodeG5 as a MQTT loT Gateway

nodeG5

3.10 MANAGEMENT

Note that from the internet, the nodeG5 can only be accessed via HTTPS (secure) to ensure all data between user and nodeG5 web configuration page is encrypted.

We give our clients the choice to install their own signed certificate (e.g. Verisign or Digicert) via SSH to nodeG5 console. Since there is no packaged signed SSL certificate in each nodeG5, a complaint of error might be issued from the browser. Note that this does not affect the secure encryption of data to configure the nodeG5 via HTTPS.



This login name is only used for web. If you are using SSH, always log in as 'root'.

Click to enable remote https access via WAN port 443. Note that non secure https access via WAN is not allowed.

Disabled by default. If enabled it will provide root access using the default login details on page

If enabled you can download/ view the log page from the 'System status page.

Choose a system time source reference as ntp (online time service) or rtc (on-board battery back hardware clock).

Click to update hardware clock using the current time system

For security, please do not use default password for your deployed unit.

Passwords are never stored directly but as a hash string to increase device security.

nodeG5

3. 10
MANAGEMENT

			utilise USB flash drives.
MENU OPTIONS	System Management		1. Format a USB thumb-drive (e.g. NODE32) and label it 'nodeG5'
Quick Start Cellular WAN Dynamic DNS Ethernet Wireless Serial / CAN			 After the nodeG5 is powered up insert the thumb-drive into an available USB port. Click 'Download config.db from nodeG5', wait 5 seconds & remove thumb-drive
	Configuration Parameters Management	-	4. Insert the thumb-drive into new
IoT Hardware IoT Client	Please insert usb drive labelled 'nodeG5'.		nodeG5 and click 'Upload config.db to
	Configuration file (config.db) backup & restore		nodeG5', wait 5 seconds and
Management System Status			remove thumb-drive
Logout	Download config.db from nodeG5 Upload config.db to nodeG5		5. Check in new nodeG5 that parameters
209001			from other nodeG5 has been copied over
	User Configuration and Scripts Management		To input your own LLIA or Dython
	Please insert usb drive labelled 'nodeG5'.		To input your own LUA or Python program:
	Files (e.g. iotasset.json, firewall.user, user.lua, user.py or connstr.txt) must be in the /user folder.		program
			1. Write your LUA or Python program and name it as 'user.lua' or 'user.py'
	Download /user to nodeG5 Execute user.lua Script [nodeG5 Lua.pdf]		2. Save the program in /user folder in
	Delete User files Execute user.py Script [nodeG5 Python.pdf]		your thumb-drive (drive labelled 'nodeG5')
			3. Insert the thumb-drive into your nodeG5
			4. Click 'Download /user to nodeG5',
			wait 5 seconds and remove the thumb-

To allow 'cloning' of parameter settings to multiple nodeG5 in deployment we

drive

5. You can click 'Execute Program' to test your program

Your program will automatically be executed after complete boot-up of the nodeG5.

		15	Ensure th must be a with this s	at the gateway HTTPS console accessible before proceeding steps.
3. 10 MANAGEMENT	MENU OPTIONS Quick Start Cellular WAN Dynamic DNS Ethernet Wireless Serial / CAN IoT Hardware IoT Client Management	System Management	1. Click o button. 2. In the r FILE' and the specif (Please c support@ assistanc 3. Click 'L If the firm will get th "RESULT	n the 'UPDATE FIRMWARE' new window, click on 'CHOOSE select from your local folder fic firmware update .zip file. heck with amplified.com.au for any e). JPLOAD FIRMWARE PATCH'. ware has been successful you e following message:
	System Status Logout	System Recovery Management Factory Settings Reboot System	log in aga If the upd connectio else pleas	lied" osing the page, you will need to in for security purposes. ate failed, check that the in to the gateway is stable. Or se contact gamplified.com.au
				boot' to soft reset the evice.
				tory Settings' to revert all rs to factory default.

nodeG5

3. 11 SYSTEM STATUS

MENU OPTIONS	System Status	
Quick Start	Main	
Cellular WAN Dynamic DNS	Firmware Version	5.15.32+gb917e043c529
Ethernet	System Date & Time	Thur Aug 10 02:41:16 UTC 2023
Wireless	Upload and CPU Load (1,5,15m)	02:41:16 up 16 min, 1 user, load average: 0.25, 0.22, 0.13
Serial / CAN	Temperature	39 * C
IoT Hardware		
IoT Client		
	Cellular WAN	
Management		
System Status	Modem firmware	EC25EUGAR06A07M4G
Logout	IMEI	864303052713149
	USIM IMSI	502181121133668
	USIM ICCID	8960181171211336711
	Modem State	connected
	Interface	wwan0
	SIM APN	telstra.internet
	IP address	21.173.254.22
	Operator Name	U Mobile
	Roam Status:	home
	Service Mode:	Ite
	Signal Strength:	63%
	Cellular Data (since bootup)	RX packets 30 bytes 3286 (3.2 KIB)
		TX packets 42 bytes 3994 (3.9 KIB)
	System Log :	System Log File Run a system diagnostic test
	Diagnostics :	Run Diagnostics Diagnostics Output File

CONTACT US

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	Bentley WA 6102, Australia
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