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KONA PHOTON GATEWAY

QUICK START GUIDE

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PROPRIETARY:

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1 Introduction

This guide provides step by step instructions and troubleshooting tips to users to setup their Gateway quickly and correctly with a Network Server.

2 What is in the Box

The Kona Photon Gateway is comprised of the Kona Photon Radio Module (radio module) and the Kona Photon Solar Panel Assembly (solar panel), which are shipped in separate boxes.

2.1 Kona Photon Radio Module

The radio module is available in two frequency variants and can be ordered with LTE (default) or satellite backhaul modem. The Kona Photon Radio Module product variants are listed in Table 1.

Table 1: Kona Photon Radio Module Product Variants

T-Code	Product Descriptions	Region
T0008479	LORA GATEWAY MODULE, KONA PHOTON, 900 MHZ, CELLULAR MODEM	NA
T0008551	LORA GATEWAY MODULE, KONA PHOTON, 860 MHZ, CELLULAR MODEM	EU
T0008552	LORA GATEWAY MODULE, KONA PHOTON, 920 MHZ, CELLULAR MODEM	APAC
T0008746	LORA GATEWAY MODULE, KONA PHOTON, 900 MHZ, SATELLITE MODEM	NA
T0008747	LORA GATEWAY MODULE, KONA PHOTON, 800 MHZ, SATELLITE MODEM	EU

The contents of the box containing the Photon Radio Module include:

- Kona Photon Radio Module
- Ground Cable
- RJ-45 Cable Weatherproof Adaptor
- Mounting Bolts
- Test Certificate (Includes Shortened Declaration of Conformance on EU versions only)



Figure 1: Solar Gateway Packaging

2.2 Kona Photon Solar Panel Assembly

The Kona Photon Solar Panel Assembly is available in two sizes, 50 and 95 W, as list in Table 2.

Table 2: Kona Photon Solar Panel Assembly Product Variants

T-Code	Product Descriptions
T0008623	SOLAR PANEL MECHANICAL ASSEMBLY, 95 W, KONA PHOTON
T0008624	SOLAR PANEL MECHANICAL ASSEMBLY, 50 W, KONA PHOTON

The contents of the box containing the Photon Solar Panel Assembly include:

- Kona Photon Solar Panel Assembly
- Mounting Knuckle
- Mounting Arm
- Mounting Bracket
- Mounting U-bolt hardware
- Ground Cable



Figure 2: Solar Panel Packaging



Figure 3: Solar Panel Mounting Accessories

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3 Quick Start Setup

3.1 Tools Required for Commissioning

The following tools and/or equipment are required for commissioning and monitoring the Kona Photon Gateway.

- 1. Laptop running Windows 10/11
- 2. KonaFT self-extracting installer (software)
- 3. Kona Photon Gateway
- 4. Cat5 or better Ethernet cable
- 5. RF antenna for LoRa communication
- 6. PoE injector (PoE 802.3af or better)

3.2 Gateway Commissioning Procedure

1. Gateway Setup:

Follow the below diagram to setup the Photon gateway. Make sure that the Ethernet cable, and LoRa antenna are connected to their respective ports properly on the Gateway.





2. Kona Field Tool:

Install KonaFT on Windows PC. Copy the KonaFT self-extracting installer software onto the computer then double-click on the installer icon to start the installation process.

3. <u>Network Server:</u>

Register Gateway and Sensor on Network Server. Register your Sensor (with OTAA) and Gateway on the Network Server. (Follow the Tektelic Network Server Guide T0005158_NS.)

- 4. Install SIM card:
 - Remove cover from access port. Use pull tab to remove the SIM tray.

Insert SIM into Slot 0 and re-insert SIM tray.



Figure 5: SIM Tray Removal

5. Apply Power:

Use PoE injector to power Gateway. Minimum requirement for PoE injector is PoE 802.3af.

6. Module Bootup:

Bootup time of the Gateway is approximately 2 minutes. During bootup, the LED status is Flashing Green.

7. Module LED status:

After bootup, LED status will be Flashing RED. The LED will remain flashing red until the Gateway receives a downlink packet from the Network Server. Upon reception of a downlink packet from the Network Server, the LED will change to Solid Green. (Refer table 1 for different LED states).

8. <u>Retrieve Module IP address:</u>

The Kona Enterprise Gateway supports DHCP on the Ethernet port. The Gateway MAC address is printed on the Gateway label. Using the MAC address and your local DHCP tools, determine the IP address of the Gateway.

9. <u>Start KonaFT:</u>

Launch KonaFT. Enter your gateway's IP address and port number 161 (default) on KonaFT then Select Start Button.

Gateway Info	Parket Forwarder Applic	ation	
TCODE:	Step Step	Spectral Scan	
Serial Number:		Spectrum Analyzer	
Module Name:	Current okt fivd:	Eamola Darioda	0.Eur
Module Revision:	# of transmitted packets	semple renou.	0.5 ps
Gateway ID:	With fine timestamp	Antenna Selection:	Antenna 0 🔻
MAC Address:	Without fine timestamp	Avgerage count:	1
Gateway Temperature:	# of received packets	Start Frequency (kHz):	902300
Operating Band:	CRC passed	: Stop Frequency (kHz)	914900
Module Time:	ORC fail	Rin Constant Adda	200
GPS Status:	Rx packet error rate:	: Gen apacing (vnz).	200
Latitude:	No match	Start Spectrum	Analyzer
Althude:	Reset Counters	No overlay 🔻	

Figure 3: Start KonaFT

10. Verify GPS:

The Kona Enterprise gateway should be placed such that there is a clear view of the sky from the top face of the module. When GPS lock is achieved, a GPS status of "Locked" will appear on KonaFT along with its GPS coordinates.



Figure 4 : GPS Information

11. Verify 3G/4G Connectivity:

The Wireless Modem tab in KonaFT is only displayed on modules with a modem and provides LTE modem information, Network provider information, APN information, RF information, call statistics and IP address.

- Select the "Wireless Modem" tab and click "Poll Now" button in each section
- Verify a public IP is assigned in the top window
- Verify Session State is CONNECTED in the Home Network window
- Verify Call Status is CONNECTED in the Call Statistics window
- The APN setting of the modem can be viewed in the Active Profile Parameters window
- Signal Strength (RSSI) of the cellular connection is displayed in the RF Information window

nces					I				
ral Board Details	s Utilities	Configuration	Firewall	Wireless Modem	HM Alarm	Log			
Poll Now									
INCLU INUMUEL	+0000010600	70							
Hardware Revis	1.1								
Device State	DEVICE CONF	NECTED							
Public IP	10.96.41.54								
Telephone Nr	15872235716								
Home Network						Active Profile Parame	ters		
		ſ		Roll Now					all New
- Pol				POILINGW					
Home Network	TELUS					Authentication	0		
Roaming Status	OFF				=	Profile Name	TELUS ISP		
Data Capabilities	LTE					APN Name	isp.telus.com		
Session State	CONNECTED					User Name			
Data Rearer	I TF				*	IP Address	0000		· · ·
RF Information						Call Statistics			
Poll				Poll Now		Poll		F	Now
Radio Interface	LTE				^	Call Status	CONNECTED		-
Active Band Class	: 2				=	Bytes Transferred	0		
Active Channel	0					Bytes Received	0		
Signal Strength	-65					Current TX Rate	4294967295		
ECIO.	5				-	Current RX Rate	1201067205		-
dress 10.7.7.77	SNMP V2c			Poling Interval:	5s 🖹		. =	<u> </u>	TENTELI

Figure 5: Wireless Modem Information

12. Verify Firewall configuration:

- Select Firewall tab on KonaFT, then select "Read Firewall Configuration". The existing firewall rules will be displayed.
- Default Firewall rules will allow SSH connectivity from any address.
- Please contact Tektelic if pre-loaded Firewall rules are required from the Factory.
- The Firewall tab allows users to edit, create or delete Firewall rules for the Gateway.

rences									
eneral Board Details	Utilities	Configuration	Firewall	Wireless Modem HM	Alarm Log				
Firewall Enabled				Read F	Firewall Configuration		Set Fire	ewall Configuration	
Name			Descrip	ion	Chain	Target	Enabled	Delete	Maugula
1 factory	Tektelic Internal SSH external Tektelic Internal SSH				INPUT	ACCEPT	Enabled		Move Up
2 tektelic external					INPUT	ACCEPT	Enabled		Insert Filter
3 tektelic internal	Tektelic Inte	ernal SSH			INPUT	ACCEPT	Enabled		Save Filter
Filter Settings Advanced Mode Filter Enabled Filter Enabled Filter Name ¹ Filter Description Chain ¹ Dest. Prot Range Protoco Target ⁴	Mark for o	deletion v to:	ICMP ICMP Rate Li En Avg. r Burst I SSH Ip Defence Enable	ed nt bibled imit 0 5 ed e e	Public Key Revoke Keys		Set Public Key]	Move Down

Figure 6: Firewall Information

13. Verify LoRa traffic:

LoRa operation can be confirmed by using an OTAA sensor and joining with a Network Server.

- Ensure that both Gateway and Sensor is registered on the network server.
- Power on the sensor to initiate the join request.
- When the Gateway receives an uplink packet (the join request from the Sensor), the CRC passed and #of received packets fields in KonaFT will increment.

	Board Details	Utilities	Configuration	Firewal	Wireless Modern	HM Alarm	Log					
Gatewa	y Info							Packet Forwarder	Application	Spectral Scan		
	TCODE:	T0004250						Stop	Start	Construm Analysis		
	Serial Number:	987654321						Check	Switch	Spectrum Analyzer		
	Module Name:	Macro Kona						Current pkt fwd:	semtech	Sample Period:	0.5 µs	0
м	odule Revision:	A						# of transmitted p	ackets: 0	Antonna Coloction	Antonna 0	-
	Gateway ID:	647FDAFFFI	E0000D9					With fine time	stamp: 0	Antenna Selection.	Antenna v	
	MAC Address:	647FDA000	0D9					Without fine time	stamp: 0	Avgerage count:	1	\$
Gateway	y Temperature:	40 °C						# of received p	ackets: 113	Start Frequency (kHz):	902300	٢
C	perating Band:	US915						CRC	assed: 53	Stop Frequency (kHz)	914900	-
	Module Time:	Mon Feb 12	18:42:03 2018					0	RC fail: 60	Ris Seadles (AHa)	200	
	GPS Status:	Unlocked						Rx packet erro	or rate: 0.530973	bir specing (viz).	200	
	Latitude:	0						No	match 0	Start Spectru	m Analyzer	
	Longitude:							Peret O	ountere	No overlay 💌		

Figure 7: # of received packets and CRC information

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T0008479_QSG Confidential A join response from the Network Server will transmit a downlink packet to the sensor. This will increment the #of transmitted packets in KonaFT and LED status will change to Solid Green. (Refer table 1 for different LED states).

Preferences		
Constal Based Datata Utilities Configuration	Conversity Ministers Medican Link Alarma Law	
General Board Details Ourdes Corniguration	Pirewaii Wireless Houern Piri Alarm Log	
Gateway Info	Packet Forwarder Application	Spectral Scan
TCODE: T0004250	Stop Start	Spectrum Apalyzer
Serial Number: 987654321	Check Switch	opecoloni relaricei
Module Name: Macro Kona	Current pkt fivd: semtech	Sample Period: 0.5 µs 🚔
Module Revision: A	# of transmitted packets: 5	Antenna Selection: Antenna 0
Gateway ID: 647FDAFFFE0000D9	With fine timestamp: 0	
MAC Address: 64/FDA0000D9	Without fine timestamp: 0	Avgerage count: 1
Operating Band: US915	# of received packets: 19	Start Frequency (kHz): 902300
Module Time: Fri Feb 9 16:15:46 2018	CRC passed: 17	Stop Frequency (kHz) 914900
GPS Status: Unlocked	CRC fail: 2	Bin Spacing (kHz): 200
Latitude: 0	Rx packet error rate: 0.0526316	Start Spectrum Analyzer
Longitude: 0	No match 0	
Altitude: 0	Reset Counters	No overlay
Minimum -137 🔚 Maximum Auto 🕾	(Import from file) (Export to file)	
IP Address 10.7.7.77 SNMP V2c Port 161 Stop Interfail Host IP Auto V Update Host IP	re Initialized Poling Interval: 5 s 👘 Poling Interval: 5 s 👘 Poling Interval: 5 s	
GUI S/W v0.20 FE FPGA v 82 GPIO FPGA v 0x3003.20	8 BSP v1.6.3	ii.

Figure 8: # of transmitted packets

Note:

At this point of time, you can check on NS that gateway is online and view the uplink and downlink packets. (Follow the Tektelic Network Server Guide T0005158_NS.)

3.3 Gateway Installation

Please refer to details contained in the User Guide, T0008479_UG.

4 Troubleshooting Tips

4.1 LED States

The following table describes different LED behaviours.

LED States	Functional Description	How long is it reasonable to stay in this state
No LEDs	No Power to gateway.	Until power is applied.
Flashing Green (Start-Up)	Module is Initializing	Up to 15 minutes – Includes time for software upgrade or recovery. Typical boot time is < 2 minutes.
Flashing Green (Operation)	No downlink packets have been transmitted by the gateway in the last 10 minutes. When GPS signal is unlocked from locked state for 24 hours.	Until the gateway starts transmitting packets. (downlink packets) Until GPS is locked again.
Solid Green	Gateway is operational with a packet forwarder running. LoRaWAN packet transmission and reception functions are operating normally.	It should stable in this state.
Solid RED	Unit is in fault condition and requires service	Undesired stable state. Power cycle the gateway. If the condition persists, contact customer support.
Alternating Red/Green	Safe-Shutdown Mode	Gateway will reboot after 5 minutes.

Table 1: Different LED States

4.2 Can't install/launch the KonaFT

Missing LIBAY32.dll - Check whether open SSL is installed or not.

4.3 KonaFT can't connect with Enterprise Gateway

Check the IP address of the Enterprise gateway is correct. Check network connection is available.

4.4 LED remains Flashing Green

Check power supply capabilities. If the current is < 0.5V then radio won't start, and the gateway will start continuously.

4.5 Finding out Gateway's IP address

Check router logs or use IP scanner tools to look for gateway's MAC address and associated IP address.

4.6 GPS – No Lock

Check antenna cable and antenna location. GPS Antenna should support 5V to active antenna. Make sure that your antenna support this.

4.7 3G/4G

Check APN settings via KonaFT (refer Figure 5). Check if SIM is activated by checking with your provider. You need to know ICCID from the label on the gateway before talking to your provider.

5 References

- [1] Kona Photon User Guide T0008479_UG
- [2] Tektelic Network Server Guide T0005158_NS, 2018.