Smart Gateway+
Model PRGEN-SGAT-SGP

SMARTREK Datasheet Smart Gateway+

1 Overview

The Smart Gateway orchestrates the traffic on the SpiderMesh network, a gateway, such as the Smart Gateway+, is required on every SpiderMesh network to retreive data from the Atrax nodes, control their parameters and output, as well as provide an interface for the user to access these acquisition and control features.

The Smart Gateway+ is the flagship model for SpiderMesh network management from Smartrek Technologies, providing even more features and stability as the previous models, while ensuring an unmatched ease of use and ease of deployment. It differentiates itself by allowing multiple output interfaces to be used at the same time, while keeping everything in sync and reducing the latency between data acquisition on an Atrax node, and the moment its values appear in your Human-Machine Interface (HMI). Furthermore, the local processing and acquisition features provide a completely self contained way of deploying acquisition networks, without any dependencies on cloud services, internet or third-party equipment, allowing a completely no recurring cost solution for wireless data monitoring and control.

1.1 Features

The Smart Gateway+ offers connection to the Smartrek Web Application, providing a complete solution for remote management of your acquisition system. In addition, either Modbus TCP and RTU *(RTU serial adapter in option)* can be used to provide direct integration with other equipments, such as SCADA systems and PLCs. Locally, the gateway provides an experience similar to the Smartrek Web Application, powered by the Smart Gateway+ itself, allowing for redundancy of data storage, internet-less operation and higher security.

1.2 Applications

- Local or remote Smartrek Web Application
- Local storage of data history
- Modbus TCP and RTU connectivity
- Scalable architecture
- On-device automation scripts
- Connect up to 1000 nodes *(contact us for more)*

1.3 Options

Modbus RTU
A DB9 adapter is available on purchase to provide a RS232 serial connection that can be used to connect your SpiderMesh network to Modbus equipment.

Wi-Fi
The Wi-Fi adapter adds a Wi-Fi access point, which can be used to connect to the Smart Gateway+ via Wi-Fi, as well as connect to the Smartrek Web Application wirelessly.

Cellular Router
The addition of a cellular router allows the management and monitoring of your SpiderMesh network without any prior internet infrastructure deployed, while keeping internet connectivity costs low compared to cellular sensors by requiring a single point of connection only.

Automation System
Adds a PLC-like controller to the Smart Gateway+ for the deployment of automation scripts directly on the gateway itself, with software your technicians are already comfortable with, providing the least amount of friction for integration within your systems.

Contents

2 Data

The Smart Gateway+ retrieves the datapoints for each and every connected sensor. These data points become available from every available interface for use within your systems, Scada, or monitoring workflow. Use the local application from the Smart Gateway+ itself to configure alarms, visualisations, reports, and much more[1].

Each interface provide a way to change the configuration of the connected Atrax nodes. For instance, this can be done either by writing Modbus registers, or within the menus of the Smartrek Web Application.

2.1 Modbus

When used as a Modbus gateway, the Smart Gateway+ automatically maps each information from your sensors to Modbus registers for easy access within your Scada application or other Modbus compatible devices. Refer to the Smart Gateway+ user manual for information on how to enable Modbus and how to read the register table.

2.2 Local Storage

The Smart Gateway+, if configured to do so, will store each data points indefinitely (up to the storage limit of the device), allowing access through a REST API or through the Smartrek Web Application. The user manual provides information about the commands required to configure and use these features.

Note that while the Smart Gateway+ receives no power and the battery backup is active, the data points are not stored in storage. In order to provide full battery operation, an Uninterruptible Power Supply (UPS) is suggested.

If the Smart Gateway+ is configured to send data points to the cloud Smartrek Web Application, the data is retained until a successful upload is performed. Local storage can be configured in addition if desired.

2.3 Data poll timing

The SpiderMesh parameters are configured on the gateway, such as the Smart Gateway+. To emphasize, this means that the timing of polling is determined by parameters on the gateway itself. Make sure the selected parameters match the minimal requirements of every Atrax sensor connected to your network. It is recommended that the DYN period is contained within **1s** to **45s** when using the Smart Gateway+.

[1] Contact support for additionnal information on which features are currently available.

3 SpiderMesh

SpiderMesh is a Low Power Wide Area Network (LPWAN) protocol, from concept to reality, it is a Machine-to-Machine (M2M) wireless technology built from the ground up.

The first truly cooperative mesh technology, featuring bit synchronized communication, we make it possible to counter the well known effect of packet collision as the network increases in size. A true differentiation between SpiderMesh and other mesh protocols.

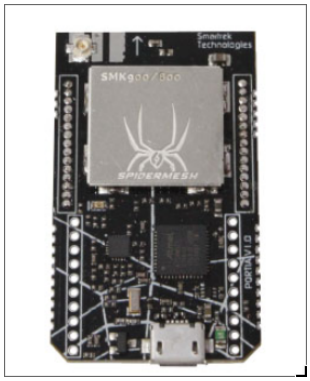
While standard protocols re-transmit data in a nondeterministic fashion in the event of a packet collision, SpiderMesh makes it possible to avoid these collisions. Thus, unrivaled and unmatched performance in terms of power consumption, network size and reliability in maintaining M2M communication.

Table 1: General Network Specifications

Specifications	Performance
Frequency Band	North America: 902-928MHz Europe, Australia/NZ: 860MHz Japan: 925MHz
Wireless Technology	SpiderMesh
Encryption	AES-128
Range	Up to 10km/7Miles (LOS*) 500m average (NOLS**) 300m (decidious forest)
Max hop count	30 (total range is 30x node-to-node range)
Max number of A-Link on network	Unlimited

*LOS: line of sight **NLOS: near line of sight

3.1 Portia



The Smart Gateway+ as well as all the other ATRAX products are powered by the SpiderMesh Portia module. PORTIA radio transceivers provide an extremely high wireless network range. To achieve this, radios use the proprietary SPIDERMESH technology, a cooperative mesh wireless protocol developed by Smartrek Technologies. This protocol provides synchronous communication between the links to mitigate network contention issues. This strategy allows PORTIA radios to offer a connectivity solution for the most challenging applications.

The nodes act as repeaters within the linked networks. Data transfer is bidirectional, and thus, nodes allow for controlling and/or reading digital/analog external modules, therefore connecting them to the mesh network. Activating a link in the field only requires the node to be on the same radio frequency channel as the network during deployment. This considerably reduces installation complexity as there is no technical knowledge required for its use.

For more details about the Portia radio module, refer to the PORTIA module datasheet.

3.2 Node Regsiter Configuration

The Portia radio module provides hardware registers that can be tuned to change its configuration. The SpiderMesh network allows remote reads and writes of these registers and as such, the Portia within the Smart Gateway+ can be configured through its registers to better suit the system to your application. Registers can be used to configure the RF channels and other mesh parameters, access internal memory and much more. Public available registers are documented within the PORTIA module datasheet.

3.3 Gateway Requirement

Any SpiderMesh network requires a SpiderMesh Gateway. The Smart Gateway+ acts as a SpiderMesh gateway.

3.4 OTA Update

OTA stands for Over The Air. It is a method of delivering software or firmware updates to devices over wireless networks without requiring physical access to the device itself. In the case of SpiderMesh and, more specifically, the Smart Gateway+, the following can be updated via OTA Updates:

1. **Portia Core Firmware**: This is a software that controls and manages various functions of the device. Updates are usually backward compatible which means you can update from an older version to a newer one without losing any data or functionality.
2. **Portia VM (Virtual Machine) Firmware**: This refers to the virtual machine software used by Portia, which runs on top of the core firmware and provides additional features like sensor access and scripting capabilities.
3. **Portia Coprocessor Firmware**: This is a specialized piece of hardware that can be used for additional processing tasks in addition to the main functionalities provided by the Portia Core and VM software. It's not commonly updated over OTA but could potentially include updates like bug fixes or performance improvements.

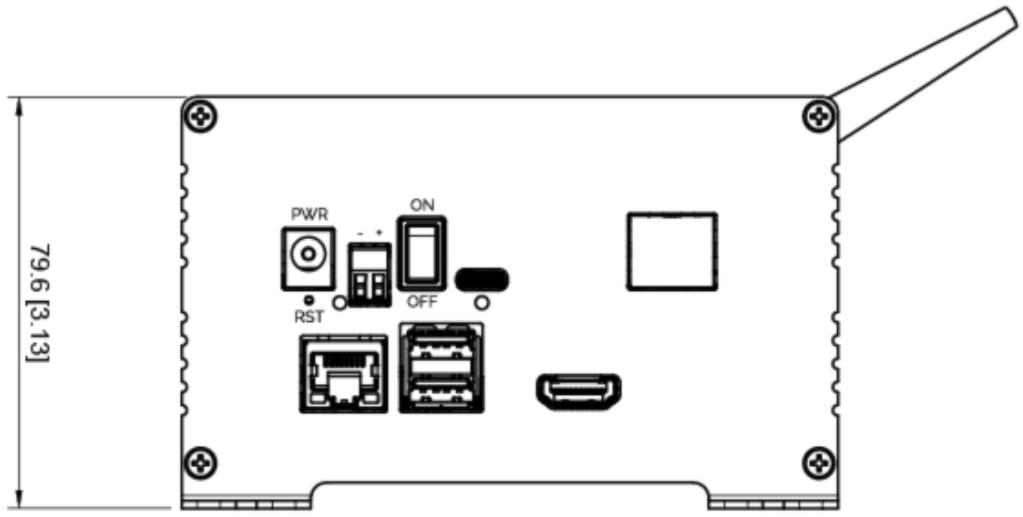
Updates are delivered to users via `.uf2` files and can be initiated from the Gateway. Users should refer to their gateway documentation for instructions on scheduling an update on their network.

4 Mechanical

The enclosure of the Smart Gateway+ is not certified for outdoor use. Make sure to install the gateway in a enclosure, or indoors, where the humidity levels are controlled. If required, add Atrax repeaters for the link between your network and the chosen installation emplacement for the gateway.

Table 2: Mechanical Specifications

Spec	Units	Value
Operating tempreature	°C	-20 to 70
Voltage connector		Barrel Jack 5.5mm or Terminal Block
Input Voltage	V	12
Power	W	45
Dimensions (enclosure)	mm	127L x 77W x 80H
Weight	g	588 (1.30lb)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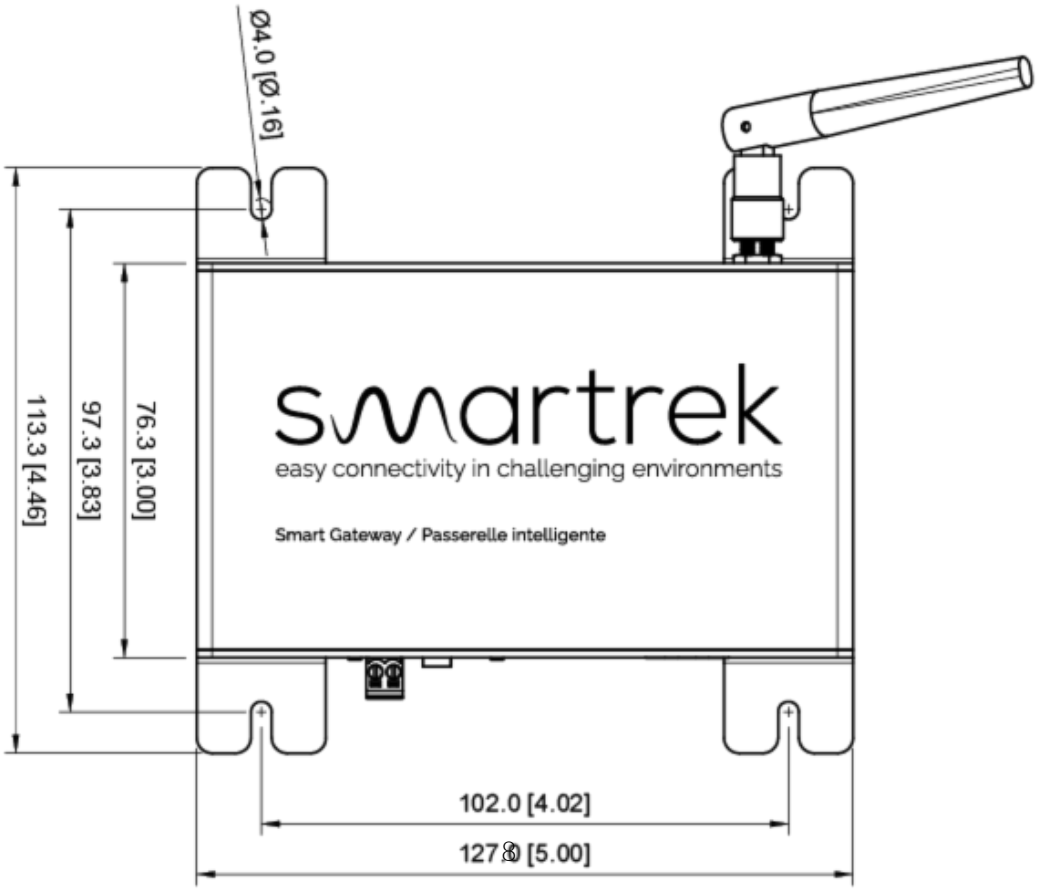
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113.3 [4.46]
97.3 [3.83]
76.3 [3.00]
smartrek
easy connectivity in challenging environments
Smart Gateway / Passerelle intelligente
102.0 [4.02]
127.0 [5.00]

5 Ordering Information

Device Model	Country
PRGEN-SGAT-SGP	North america