

Trilliant® Communications Hub

SEAP-2001-V

The Trilliant Communications Hub (Comms Hub) is a component of the smart metering infrastructure that connects a Home Area Network (HAN) of metering devices, information displays, and other smart energy devices to Trilliant's UnitySuite® Head-End Software (HES) via a Wide Area Network (WAN) connection over GSM cellular data services. Using the ZigBee Smart Energy Profile (SEP), the Hub operates as a central point in a HAN of as many as 6 Smart Energy devices. The Hub compiles metering data from multiple devices and reports the data back to the UnitySuite Head-End Software as configured, typically during non-peak periods. Communications via the WAN are minimized to ensure low power consumption while maintaining connections with all associated HAN devices.

Wide Area Network Connectivity

WAN connectivity is supported by a quad-band GPRS radio, providing WAN data rates up to 80 kbps. The Hub employs standard IP protocols for communications to and from the HES. Additionally, SMS messaging allows on-demand requests from the HES to the Hub. The primary service provider and roaming network information are configurable, enabling communications wherever GPRS service is available. The WAN antenna is internal, but an SMA connector supports an optional external antenna for installations in areas with poor cellular coverage.

Home Area Network Connectivity

HAN connectivity is supported by a ZigBee radio that operates in the unlicensed 2.4 GHz band. Acting as the ZigBee Trust Center, the Comms Hub controls HAN access for all devices. It manages provisioning and security for the HAN. The Comms Hub supports communications with both electric and gas meters and metering extensions to the ZigBee SEP. Meters that use the DLMS/COSEM protocol are transparently supported through ZigBee tunneling, and battery-powered meters are supported by mirroring the meter data in the Hub's internal memory. The Comms Hub connects to three meters. Up to 3 additional HAN devices can be connected, including in-home displays, thermostats, and load control devices to support a complete smart energy solution.

Intelligent Communications Hub

The Comms Hub offers a multitude of intelligent features to make the solution extensible, upgradeable, and secure. Firmware upgrades to all HAN devices are managed through the Comms Hub to ensure the reliability and security of each device. Extensive logging capability stores the messages, alerts, and data from all devices on the HAN. The Comms Hub, itself, includes a tamper alarm that monitors unauthorized access to the cables and internal circuitry. Alerts can be configured to be stored, reported with the next daily update, or reported immediately to the HES so that critical alerts are reported as soon as possible without interfering with other Comms Hub functions.

Secure Network Communications

By leveraging open security standards, the Comms Hub safeguards all data communications. HAN communications use the security elements of the ZigBee protocol while ensuring interoperability with ZigBee-compliant devices. Similarly, WAN communications employ highly secure IP-based protocols to guarantee the safety and security of all data communications.



The Trilliant Communications Hub connects a ZigBee-based Home Area Network (HAN) to the Head End Software (HES)

Communications Bridge

- Dual radio design integrates both HAN and WAN connectivity
- Connects electric meters, gas meters, in-home display units, and smart energy devices

Reliable WAN Connectivity

- Leverages widely deployed GPRS networks
- SMS messaging for device wake-up

HAN Device Support

- ZigBee Smart Energy Profile 1.1b (with support of metering extensions)
- Connects to multiple smart energy devices

Simple Installation and Deployment

- Attaches directly to meter board
- Powered from electric meter
- Commissioned locally via ZigBee with a handheld terminal

Configurable and Upgradeable

- Configurable over-the-air from the head end
- Supports over-the-air firmware upgrades for itself and all associated HAN devices

Security

- Built-in proven security technology
- Ensures secure user data communications

FUNCTIONALITY

Connectivity:

- to/from utility head end via GPRS cellular data services
- to/from local Home Area Network via ZigBee Smart Energy Profile 1.1b

Reporting Modes:

- daily push of data during configurable interval
- on-demand response to SMS messaging
- automatic alarm reports

Alerts: configurable for daily, and immediate reporting

Data Logs: all events, data messages, and commands

Commissioning: locally with handheld terminal via ZigBee

HAN Devices: up to 16 devices total

Metering Support:

- up to 4 meters total, with up to 2 gas meters
- DLMS/COSEM
- ZigBee Smart Energy Profile 1.1b (with support of metering extensions)

Other Device Support: ZigBee Smart Energy Profile 1.1b

Configurability: over-the-air configurable and firmware upgradeable

Data Storage: 8 Mbyte serial flash memory

LEDs: separate power, WAN, and HAN LEDs indicate status/link quality

POWER, PHYSICAL, AND ENVIRONMENTAL

Input Voltage: 230 VAC (184V-264VAC) 5 Hz

AC Connector: 2-position AMP-DUAC connector

Power Consumption:

- normal operating mode (no GPRS Tx): 0.35 W
- maximum (during GPRS Tx): 3 W

Dimensions:

- length: 165.1 mm / 6.5"
- width: 63.5 mm / 2.5"
- thickness: 41.3 mm / 1.63 in

Weight:

- 237 g / 8.36 oz (Product only)
- 298 g / 10.51 oz (Product w/ power-cable and box)

Operating Temp: -25 °C to +55 °C (-13 °F / +131 °F)

Operating Humidity: 10-95% non-condensing

Installation: 3-screw mount to wall or panel

Ingress Protection: EN60529 IP52

Sealing/Locking: tamper seal with electronic access door alarm

Impact: EN 60068-2-75

Enclosure: Lexan 503R glass-filled polycarbonate

GPRS RADIO PERFORMANCE

Protocols:

- GPRS Class 12 and Class 10
- Support for coding schemes 1-4
- Mobile-terminated SMS

Data Rates: upto 80 kbps

Frequency Bands:

- GSM 900 MHz
- GSM 1800 MHz

Transmit Power:

- 29.6 dBm @ 1800 MHz
- 33.6 dBm @ 900 MHz

Receive Sensitivity:

- -106.9 dBm @ 900 MHz
- -104.7 dBm @ 1800 MHz

Antennas:

- integrated inverted-F omnidirectional antenna
- SMA female connector for optional external antenna (+2.15 dBi maximum gain)

ZIGBEE RADIO PERFORMANCE

Protocols:

- ZigBee Smart Energy Profile 1.1b
- IEEE 802.15.4 MAC layer
- IEEE 802.15.4 PHY layer (2.4 GHz)

Modulation: DSSS – OQPSK (Direct Sequence Spread Spectrum Offset Quadrature Phase-Shift Keying)

Data Rates: 250 kbps

Frequency Band: 2.400 - 2.483 GHz

Channels: 16 channels

Channels Spacing: 5 MHz

Transmit Power: 17.59 dBm (peak EIRP)

Receive Sensitivity: -102 dBm (@1% PER)

Antenna:

- integrated inverted-F omnidirectional antenna
- +2.4 dBi maximum gain

REGULATORY COMPLIANCE

General: CE

Unlicensed Radio Operation: EN 300 328

GSM Operation: EN 301 511

EMC: EN 301 489 -1, EN 301 489-7, EN 301 489-17

Safety: EN 60950-1 IT Safety, IEC 62311 RF Safety

Environmental: RoHS, WEEE

SECURITY

General: asymmetric keys, X.509-based certificates

HAN:

- ZigBee Trust Center
- CBKE
- ECC-based crypto cipher
- AES-128

WAN:

- TLS & digital envelopes
- ECC Suite B crypto cipher
- AES-128



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