Trilliant Communications Hub

SEAP-2000-V

The ***Trilliant Communications Hub (Hub)*** is a smart metering infrastructure component 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 16 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 so that power consumption is very low even 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 UnitySuite Head-End Software and, additionally, SMS messaging is used to allow on-demand requests from the UnitySuite Head-End Software 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 of poor cellular coverage.

Home Area Network Connectivity

HAN connectivity is supported by a ZigBee radio operating in the unlicensed 2.4 GHz band. Acting as the ZigBee Trust Center, the Hub controls HAN access for all devices and manages provisioning and security for the HAN. Communications with both electric and gas meters are possible, and metering extensions to the ZigBee SEP are supported. Meters using 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. In addition to 4 meters, up to 12 additional HAN devices can then be connected, including in-home displays, thermostats, and load control devices in support of a complete smart energy solution.

Intelligent Communications Hub

The 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 Hub to ensure reliability and security of each device. Extensive logging capability stores the messages, alerts, and data from all devices on the HAN. The Hub itself includes a tamper alarm to monitor unauthorized access to the cabling and internal circuitry of the unit. Alerts can be configured to be stored, reported with the next daily update, or immediately reported to the UnitySuite Head-End Software. In this way, critical alerts can be reported as soon as possible without interfering with other Hub functions.

Secure Network Communications

By leveraging open security standards, the Trilliant Communications Hub safeguards all data communications. HAN communications utilize 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 1.1 (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 Upgradable

- 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

Trilliant Communications Hub

Functionality

connectivity	• to/from utility head end via GPRS cellular data services • to/from local Home Area Network via ZigBee Smart Energy Profile 1.1
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 1.1 (w/ support of metering extensions)
other device support	ZigBee Smart Energy Profile 1.1
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, & Environmental

input voltage	230 VAC (184V- 264VAC) 50 Hz
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: 40.1 mm / 1.58”
weight	275 g
operating temp	-13 °F / -25 °C to +131 °F / +55 °C
operating humidity	10 to 95% non-condensing
installation	3-screw mount to wall or panel
ingress protection	EN 60529 IP52
sealing / locking	tamper seal with electronic access door alarm
impact	EN 60068-2-75
enclosure	Lexan 503R glass-filled polycarbonate

Regulatory Compliance

general	CE
radio emissions	EN 55022 Class B
unlicensed radio operation	EN 301 328
GSM Operation	EN 301 511
EMC	EN 301 489 -1, -7, -17
safety	• EN 60950-1 IT Safety • EN 50360 Mobile RF Safety • EN 50371 RF Safety
environmental	• RoHS • WEEE

GPRS Radio Performance

protocols	• GPRS Class 12 and Class 10 • support for coding schemes 1-4 • mobile-terminated SMS
data rates	up to 80 kbps
frequency bands	• GSM 800/900 MHz • GSM 1800/1900 MHz
transmit power	• 32 dBm @ 1800/1900 MHz • 26 dBm @ 800/900 MHz
receive sensitivity	• -105 dBm @ 800/900 MHz • -108 dBm @ 1800/1900 MHz
antennas	• integrated inverted-F omnidirectional antenna • SMA female connector for optional external antenna (+7 dBi maximum gain)

ZigBee Radio Performance

protocols	• ZigBee Smart Energy Profile 1.1 • 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 rate	250 kbps
frequency band	2.400 - 2.483 GHz
channels	16 channels
channel spacing	5 MHz
transmit power	8 dBm (maximum)
receive sensitivity	-98 dBm (@ 1% PER)
antenna	• integrated inverted-F omnidirectional antenna • +2.8 dBi maximum gain

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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