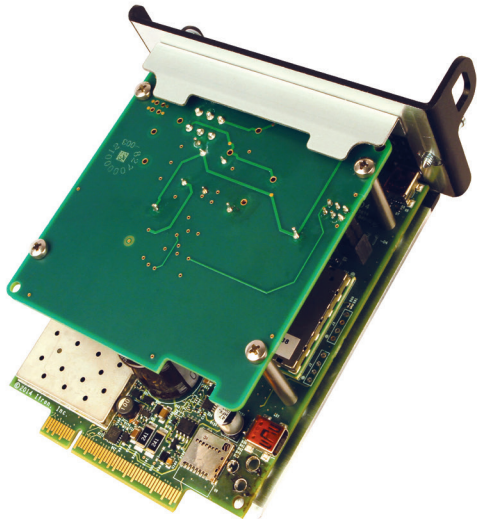

OpenWay® Riva

Adaptive Communications Technology Module for the Cisco Connected Grid Router

The OpenWay Riva™ Adaptive Communications Technology Module for the Cisco Connected Grid Router enables meters and grid devices equipped with Adaptive Communications Technology (ACT) to communicate with each other in an entirely new way.

SOLVING KEY DEPLOYMENT AND CONNECTIVITY CHALLENGES

Adaptive Communications Technology combines RF mesh and PLC communications on the same chip set, which is powered by an advanced microcontroller running a Linux-based operating system. This enables continuous and dynamic selection of the optimal communications path and frequency modulation based on network operating conditions, data attributes and application requirements.

The OpenWay Riva ACT module for the Cisco Connected Grid Router is installed in an available expansion slot within the Connected Grid Router and serves as the network-level communications component within the Adaptive Communications Technology based OpenWay solution.

With adaptive communication capabilities, deployment of network infrastructure is easier, faster and less costly. It also reduces the amount of time and effort needed for upfront network design and propagation studies. Itron is first in bringing this new technology to the market to address the deployment and network performance challenges presented by dense, urban environments and diverse service territories.

With these new capabilities, meters and other grid devices can process, analyze, communicate and react in real-time, intelligently switching communication modes between PLC and RF to provide optimal network performance with assured connectivity. This intelligence at the meter also provides a platform for new, real-time analytic applications at the device and field area network level.

By enabling each connected device to intelligently find and utilize the best, fastest and most reliable communications path – whether RF or PLC – and choosing among multiple modulation schemes in every circumstance at every level of the network, Adaptive Communications Technology can eliminate many of the costly compromises and performance trade-offs that utilities continually make in specifying a single communication technology to address the full diversity of their service territories and use case requirements. And because it was designed on a global technology platform utilizing software-defined communications technology, ACT is also readily adaptable to support the specific communication standards and protocols in use in countries and regions throughout the world.

SPECIFICATIONS

FEATURES AND BENEFITS

Flexible Two-Way Communications

Execute all support for meter reading, configuration update and firmware download functionality

Upgradable Firmware

» Customize firmware upgrades with the ability to automatically roll-back if activation fails

» Create multiple firmware images including primary and pending

Adaptive Communications

» Support both RF and PLC for “last-mile” communications to the meters via the IPv6 Mesh

» Support standards-based, true IPv6 mesh communications where each meter is assigned a global routable IPv6 address

» RF links implement IEEE 802.15.4 g/e standard

» IPv6 mesh network uses the 6LoWPAN adaption layer and RPL as a mesh routing protocol

Flexible Architecture

» Cell-based scaling to manage capacity and coverage growth

» Software defined radios to adapt to evolving standards and regional frequency bands

» Multi-link mesh technology to address “all environments”

Standards based, IPv6 mesh communications

» RF: IEEE 802.15.4g/e

» PLC: IEEE 1901.2

» Demonstrated multi-vendor interoperability toward certification under WiSUN Alliance and HomePlug Alliance’s “Netricity” program

» 6LoWPAN adaptation layer

» RPL for mesh routing

Assured Connectivity with Adaptive Communications Technology

» Multi-Link technology (RF and PLC) with dynamic selection

» Multi-Modulations for optimal link performance

» Multi-Application Smart Grid network

» RF Implementations at 900MHz and 870MHz

Industry leading network layer security

» Certificate based endpoint authentication

» Supports independent routing of non-meter traffic

» Encrypted RFMESH/PLC at layer 2

Long Range and High Capacity modes for both RF and PLC links

» Adaptive RF Data Rates:

- 600 kbps
- 200 kbps
- 150 kbps
- 12.5 kbps

» Adaptive PLC Data Rates:

- 200 kbps
- 165 kbps
- 100 kbps
- 34 kbps
- 23.3kbps

Network resiliency for high reliability

» Dynamic route selection within cell

» End point failover to neighboring cells

» Quality of Service (QoS) with 4 priority queues

Full Smart Metering functionality

» Two way communications

» DLMS/COSEM or ANSI C12.19/C12.22

» Last Gasp outage messages (time stamped)

» Power Restore messages (time stamped)

Embedded Edge Computing Platform

» Powerful compute platform in every gateway

» Flexible Linux environment for application development

» Enables distributed intelligence

» Add features with application downloads

OPENWAY RIVA ACT COUPLER

The OpenWay Riva ACT Coupler is an external unit that couples the power line carrier (PLC) communication links between the 3-phase mains and the OpenWay Riva ACT Module.

» Surge protection for PLC interface

» Filtering of all 3 phases of CGR power feed

» Simplified deployment

- CGR1240 kit includes a custom mounting bracket that integrates with the CGR1240 pole mount kit
- All cabling to/from the ACT coupler are connector terminated

» LED status indication provides visible indication of the following of each of the 3 phases:

- ACT Coupler Unit Receiving Power
- ACT Coupler Unit Delivering Power
- ACT Coupler Unit Protection Services (indicates the MOV Thermal Protection for that phase is functioning properly)

HARDWARE SPECIFICATIONS

Feature	Description
Form Factor	Single Connected Grid Module
Dimensions (H X W X D)	3.81 cm x 10.77 cm x 13.34 cm (1.50” x 4.24” x 5.25”)
Weight	226.8 grams (8 ounces)

NEIGHBORHOOD AREA NETWORK (NAN) INTERFACES

Signals	Description
Power Line Carrier (PLC)	
Single Phase Connection	2 pin interface
PLC Protocol	
IEEE 1901.2	Adaptive Tone Mapping, Mesh
PLC Operational Bands	
FCC above CENELEC	~ 155kHz to 488kHz
ARIB2	~ 155kHz to 403kHz
PLC Modulations	Data Rates
D8PSK	200 kbps
DQPSK	165 kbps
DBPSK	100 kbps
ROBO	34 kbps
Super-ROBO	23 kbps
RF Protocol	
IEEE 802.15.4g/e	Frequency Hopping, Mesh
RF Operational Bands	
900 MHz ISM	Channels adjusted for market specific needs
870 MHz	Optional band (requires additional filter)
RF Output Power	
1 Watt	Maximum. Power adjusted to meet local requirements
RF Modulations	Data Rates
802.15.4g OFDM option 3	600 kbps
802.15.4g OFDM option 3	200 kbps
802.15.4g FSK	150 kbps (or 50 kbps mandatory mode)
Long Range mode	12.5 kbps
Operating Conditions	
Operating Temperature	–40 °C to +70 °C (–40 °F to 158 °F) with type test to 85C (185F) for 16 hours.
Shock and Vibration	• 30G at 6 ms, Class Cm • IEEE 1613 Class VS3 • IEC 870-2-2 Class Cm
Operating Seismic Earthquake	IEC 61850-3, Class S3
Relative Humidity	5 to 95 percent noncondensing

Non-Operating Conditions	
Temperature	-25 ºC to +85 ºC (-40 ºF to +185 ºF)
Non-Operating Relative Humidity	5 to 95 percent noncondensing
Altitude	3014 m (10,000 feet); maximum operating temperature is derated with increasing altitude per IEEE 1613a-2008
Non-Operating Free-Fall Drop	100 mm (4 inches) per ENG-339611
Non-Operating Shock and Vibration	• 50-60 G (3.76 m/s minimum) • 3-500 Hz at 1.12 GRMS (BP at 10 and 100 Hz)
Safety	• USA: UL 60950-1 • Canada: CAN/CSA C22.2 No. 60950-1 • Europe: EN 60950-1 • Rest of world: IEC 60950-1 • CSA-certified to UL/CSA 60950-1, 2nd Edition
Electromagnetic Compliance	• 47 CFR, Part 15 • EN55022 Class A • CISPR22 Class A • EN 300-386
Radio	• FCC Part 2, FCC Part 15.247

POWER CONSUMPTION

Requirements	Description
Peak Power Consumption	
6.7 Watts	Both RF and PLC actively transmitting
Nominal Power Consumption	
3.5 Watts	Assumes normal/expected RF & PLC transmit duty cycles

Itron

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