MD303cpu

The MD300 range of RTUs is purpose-built for reliable performance in harsh electricity substation and industrial environments.

Designed and manufactured in Australia, the MD300 range provides robust, adaptable building blocks for distributed control systems. Through long-term partnerships with electricity utilities, we continue to evolve intelligent, automated and data-centric solutions that support modern grid transformation.

Use cases

The MD303cpu is a rugged, industrial communication processor designed to meet the demanding applications and I/O loads of larger sites and aggregation gateways.

Use cases may include, but are not limited to, the following:

- DER Constraint Manager – generators & batteries
- Battery Energy Storage Systems (BESS) – grid scale
- Security Gateway and Protocol Converter
- IIoT Gateway (MQTT + Sparkplug B)
- Substation Management Unit (SMU)
- Substation RTU or Distributed Intelligent Unit (DIU)
- Intelligent Grid Solutions
- Local webserver HMI (HTTPS)
- Transformer Auto Voltage Regulation
- Remote I/O or Marshalling IED

The MD303cpu unit utilises a hardened Linux kernel running CGI's SMS/RTU applications and embedded webserver HMI (optional). This provides flexibility in supporting many Linux applications while still providing the powerful SMS/RTU functionality that is compatible with the previous MD range RTUs and CGI configuration utilities.

Communications architecture

The CGI SMS/RTU application supports many protocols in both master and slave configurations such as IEC 61850, DNP3 with SAv2 and SAv5, Modbus, MD3, SNMP, MQTT and Sparkplug B.

The MD303cpu has very flexible communications options with six Ethernet ports, four of which are SFP based allowing a choice of different physical transceivers (TX, T, SX or LX).

The Ethernet ports run at up to 1Gbps and can be configured as individual LAN, fault-tolerant HSR/PRP, bridged or bonded networks.

Key features

- No moving parts (fan-less, disk-less)
- Cybersecurity: hardened OS, firewall, authentication, cryptography, encryption, aligning with IEC 62443
- Application / solution flexibility IEC 61131-3 languages, distributed database, real-time SQL
- WebHMI (HTTPS)
- Open-source operating system provides abundant customisation capabilities
- 6 Ethernet ports
- 8 Serial ports
- Remote I/O communication
- Industry standard protocols
- Operating temp -20ºC to 70ºC
- Power range 24 – 125 V DC
- Mounted: 19" Rack 1RU
- Wiring: 5mm-pitch, up to 2.5mm2

Regulatory compliance

- EMI: CISPR 22 / EN55022 Class A
- EMC: AS 60870.2.1
- IEC 61000-4-2/4-3/4-4/4-5/4-8

Safety

- Designed in accordance with:
- IEC 61010-1, IEC 61010-2-201

In addition, the MD303cpu includes eight serial ports supporting RS485 (2wire/4wire) or RS232 operation.

Physical I/O

The unit provides three general purpose I/O points. The MD300 range of I/O units together with a Remote I/O interface are used to provide a configurable mix and quantity of I/O.

A single MD303cpu with its four Remote I/O ports can support up to 1024 physical I/O points. Various architectures for connecting the MD300 I/O modules are supported.

Data modelling

For power system applications where fast, event-driven processing is required, CGI's distributed database and Sequential Logic Control based Substation Management System is recommended. At the heart of this system is the object-based model of the substation where updates are performed following a change of state. The change of state processing can then trigger control logic to start or ripple changes to higher level objects.

Our approach simplifies control logic via pre-processed object data and optimises performance. The object-based data model and control logic is further enhanced with CGI's MDplc, the embedded IEC61131-3 platform.

Distributed processing & control logic

The ability to distribute the database allows it to be hosted on multiple nodes. Distribution is automatically propagated to each node. Each node can be configured as required to view data in other nodes that make up the Substation Management System.

This distribution of data extends to the control logic where control routines can be specified to execute in a particular node. This allows the processing to be carried out at the lowest level, reducing physical cabling infrastructure, increasing overall processing power as well as allowing logic to continue running on failure of some devices. Access to view data for (and send commands to) other parts of the substation are an integral part of the system. This greatly simplifies routines that require information from many IEDs in the system such as transformer AVR with multiple transformers. Additional logic and control can also be configured with MDplc, the integrated IEC61131-3 platform.

Technical

Power Supply

- 24 to 125 V DC range
- 50 Watt

Processor

- Intel Atom® E3826 dual core, 2 GB DDR3L, or
- Intel Atom® E3845 quad core, 4 GB DDR3L

Interfaces

- Ethernet options (10/100/1000):
- 2 x baseT and 4 x SFP (baseT or baseX)
- 8 x RS232/RS485 serial ports
- Console port (serial)
- CompactFlash interface
- USB port
- 3 x General purpose I/O channels
- Four Remote I/O interface ports

Options

- Conformal coating
- Internal GPS
- Internal 3G Modem

While every effort is made to ensure the information provided in this brochure is accurate, specifications are subject to change without notice.

About CGI

Insights you can act on

Founded in 1976, CGI is among the largest IT and business consulting services firms in the world.

Across hundreds of locations worldwide, we provide comprehensive, scalable and sustainable IT and business consulting services.

For more information

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