

# MD303cpu



The MD300 range of RTUs is specifically designed for operation in the harsh environments of electricity substations and other extreme plant conditions.

CGI provides resilient building blocks that allow our clients to customise the physical architecture of a distributed control system with flexibility for innovative modelling, control and data capture. Our unique focus on local service excellence in design, manufacture, project delivery and support has resulted in the retention of key clients for over 20 years. These strong partnerships foster product currency, evolution and the innovation necessary to meet current and future business requirements. We are the partner of choice for electricity utilities as they transform and seek to adopt increasingly intelligent, automated and data-centric grid solutions.

## 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 a large number of Linux applications while still providing the powerful SMS/RTU functionality that is compatible with the previous MD range RTUs and CGI configuration utilities.



## Key features

- No moving parts (fan-less, disk-less)
- Cybersecurity: hardened OS, firewall, authentication, cryptography, encryption, aligning with IEC-62443
- Application / solution flexibility IEC61131-3 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 -20°C to 70°C
- 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

## Communications architecture

The CGI SMS/RTU application supports a large number of protocols in both master and slave configurations such as IEC 61850, DNP3 with SAV2 and SAV5, Modbus, MD3, SNMP, MQTT and Sparkplug B, with IEEE2030.5 (DOE communications) coming soon.

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. 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, rather than via cyclic logic such as IEC61131-3 (supported but not preferred). 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 avoids the performance-impacting recalculation of equipment states on each logic cycle.

## 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. This allows access to view data for (and send commands to) other parts of the substation as an integrated system. This greatly simplifies routines that require information from many IEDs in the system such as transformer AVR with multiple transformers.

## 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

*CGI works collaboratively with our clients and is committed to the continuous improvement of the design and performance of CGI's products. While every effort is made to ensure the information provided in this brochure is accurate, specifications are subject to change without notice.*

## About CGI

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

We are insights-driven and outcomes-based to help accelerate returns on your investments. Across hundreds of locations worldwide, we provide comprehensive, scalable and sustainable IT and business consulting services that are informed globally and delivered locally.

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