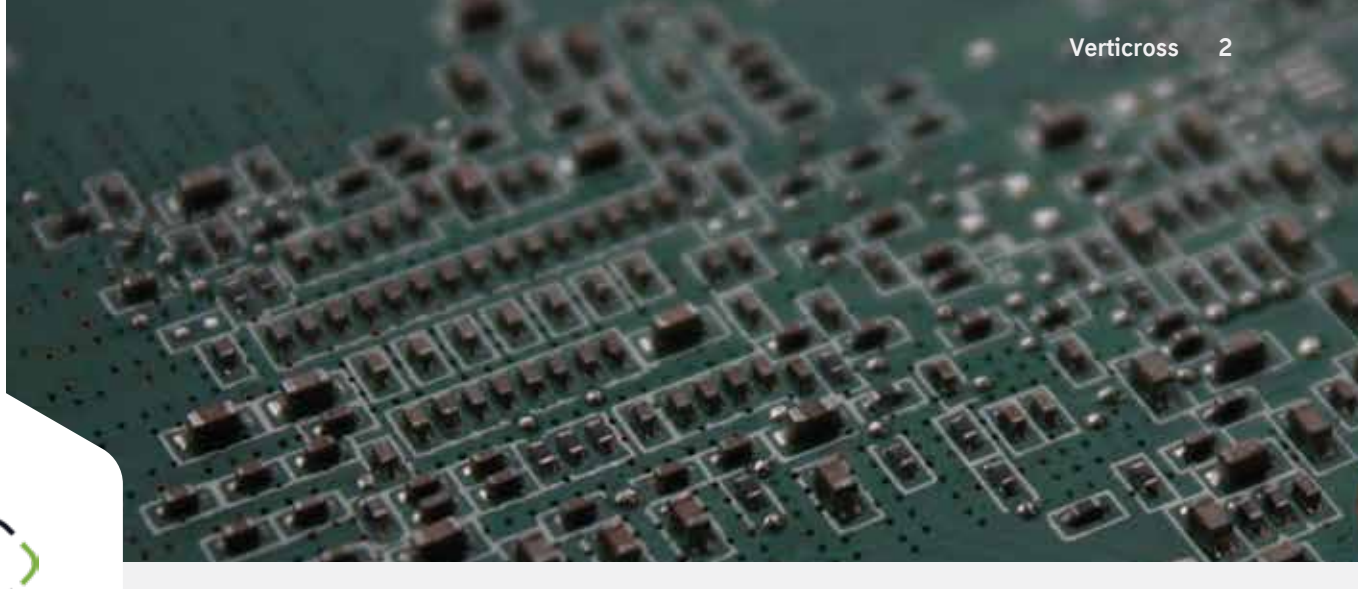
VERTICROSS

Feeder Remote Terminal Unit (FRTU-09)



About Verticross

Verticross is an automation company focused on transforming customers' businesses through state-of-the-art technology. Specialising in power, water, gas, oil, transportation and security, our mission is to become a global leader in communication systems, data acquisition and analytics by the year 2024.

Verticross is led by a dynamic team of professionals who possess a wealth of experience in applied research and development in the areas of communication and data transfer protocols for embedded systems in the automation of energy, water and gas utilities.

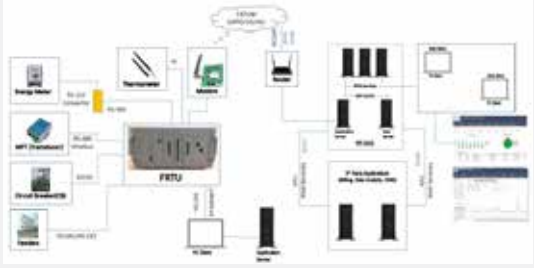
The communication systems form an integral part of data acquisition for billing, audit, decision support and analytics. Our products include automatic meter readers, energy management solutions and pump monitoring systems, while our services encompass consultancy, installation, commissioning, facilities management and IT support.

Our products and solutions conform to international standards and can be seamlessly integrated with legacy system. In addition, they can be customised in order to address and exceed customer expectation.

Feeder Remote Terminal Unit (FRTU)

The Feeder Remote Terminal Unit (FRTU) monitors all sub-station equipment and acquires data from all incoming and outgoing feeders on a real-time basis. It captures status signals of devices and conducts automatic data logging to provide substation level control. In addition, it monitors entire substation equipment, viz., breakers, transformers, feeders, batteries, transducers, energy meters, etc., thus facilitating energy management, load forecasting and scheduling, and eventually leading to substation automation.

FRTU is equipped with appropriate acquisition and data management software and interfaces like LAN and/or GPRS/4G to work as a full-fledged SCADA system.



FRTU Architecture

Major functional units in FRTU are:

- Central Processing Unit (CPU)
  1GHz ARM Cortex -A8 32-Bit RISC Processor
  - Manages input, output, energy meter data and sends all this data to the server.
- Digital Input (DI)
  16 channel opto-isolated inputs
  - Monitors feeder status, switch positions, etc.
- Digital Output (DO)
  8 channel Digital output with 2Amps current carrying capacity potential free contacts.
  - Controls (On/Off) feeders, relays, alarms, etc.
- Analog Input (AI)
  8 channel analog inputs with 24-bit ADC resolution
  - Reads voltages, currents, power factors, and other data from transducers.
- Analog Outputs (A0)
  8 channel analog outputs with 16-bit DAC resolution
  - Analog output values are updated for every transmission.
- Power Supply
  48V DC input power supply. 220V AC power optional.
  - Supplies required voltages to all equipment.
- Communication (2G/4G Modem)
  GPRS/4G Module and its circuitry is communicated through processor card by UART interface.

Features

- IEC 60870-5-101 and IEC 60870-5-104 protocols used to transmit data from substations to master control centres
- Diagnostic software for continuous monitoring of the FRTU and reporting of hardware errors to the connected master stations
- Database configuration and maintenance software tool for database modification, configuration, and data downloads
- GPRS/GSM/4G used to transmit data
- Generates custom reports for aggregation, analysis and creation of MIS reports
- Auto detects devices and performs device checks using the required baud rate and protocol stack
- Reads data from different device makes/models with varying standards of communication protocols
- 0.5 to 1.0 m sec digital data scanning resolution and time stamping
- User friendly configuration tool for ease of configuration and management
- Devices that can interface with FRTU include sub-station batteries, transducers, breakers, switches, transformers, isolators, feeder meters and sensors
- Data can be integrated with the sub-station monitoring system (SCADA)

Specifications

Main Processing Unit (MPU)

CPU	32-bit ARM Cortex-A8, 1.0GHz
DDRAM	256MB
SPI flash	8MB

Communication Interface

Description	RS-232		RS-485	
Connector	DB-9 Female		DB-9 Female/ Phoenix 3 pin	
Type	Serial Port		RS-485/Modbus	
Bit rate	100 bit/s – 57600 bit/s		100 bit/s – 9600 bit/s	
Signal lines	TxD	PIN 2	Data-(A)	PIN 1
	RxD	PIN 3	Data+(B)	PIN 2
	GND	PIN 5	GND	PIN 3
Level	typical: ± 10V DC		Peak to peak ± 2.5V DC	

Ethernet Interface

Type	IEEE 802.3, 10/100BaseT
Connector	RJ 45

Operating Voltage

90 V to 270 V AC	max. 100 mA
18 V to 36 V DC (Optional)	--
110 V / 220 V DC (Optional)	--

Physical Attributes

Dimensions	335 mm x 190 mm x 170 mm
Housing type	Metal housing (IP51)
Mounting	Tabletop
Weight	Less than 1500 gms

Environmental Conditions

Nominal operating temperature range	-25 °C to +60 °C
Max. operating temperature	-40 °C to +65 °C
Relative humidity	5% to 95 % (non-condensing)

Immunity Test

Surge IEC 61000-4-5, 2005	4 KV/6KV Performance criteria A
Conducted Emission CISPR 22	150 KHz to 30 MHz Performance criteria A
Radiated Emission CISPER 22	30 MHz to 1000 MHz Performance criteria A
Electrostatic Discharge IEC 61000-4-2, 2008	6 KV in Contact Discharge 8 KV in Air Discharge
Radiated Susceptibility IEC 61000-4-3, 2010	80 MHz to 1000 MHz (3 V/m) Performance criteria A
Electrical Fast Transient IEC 61000-4-4, 2011	4 KV Performance criteria A

Other Features

Communication	Ethernet, 2G/4G, RF
Data storage	Up to 90 days of Energy meter data
Digital Inputs	16 Channels
Digital outputs	16 Channels
Analog Inputs	8 Channels
Analog Outputs	8 Channels

Power Supply

Input Voltage	36V to 52V DC
Output Voltage	5.0V DC
Output Current	2.5 Amps max
Protections	Short circuit and overload
Surge handling capacity	4KV / 6KV as per IEC 61000-4-5
Connection type	Single phase 2 wire

Digital Inputs

Number of channels	16
Input type	Source
Input Isolation	5KV
Input Voltage range	24 V / 48 V / 110 V / 220 V DC
Guaranteed ON voltage	20V DC
Guaranteed OFF voltage	4V DC
Short Circuit Protection	Available
Noise Filter	Available

Digital Outputs

Number of channels	8
Maximum Output Power	2Amps potential free contacts
Isolation	2KV
Output voltage range	24V DC +/-10%
On-State Voltage	Max 1 VDC, load current @ 80mA max
Off-State Voltage	24V DC +/-10%

Analog Inputs

Number of channels	8
Standard Input Range	-5V - 0 - 5V DC, 0 to 20 ma Currents
Input Type	Single ended
Short circuit protection	Available
A/D resolution	24 bit including sign bit
Full scale accuracy	± 0.1% at 25°C ±0.2% from -40°C to 75°C
Differential Non-Linearity	< 1 L.S.B.
Repeat ability	+/-0.05%

Analog Outputs

Number of channels	8
Standard output range	5V DC at 200ma max
Output Type	Single ended
Short circuit protection	Available
DAC resolution	16 bit
Full scale accuracy	± 0.1% at 25°C ±0.2% from -40°C to 75°C
Differential Non-Linearity	< 1 L.S.B.
Repeatability	+/-0.05%

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