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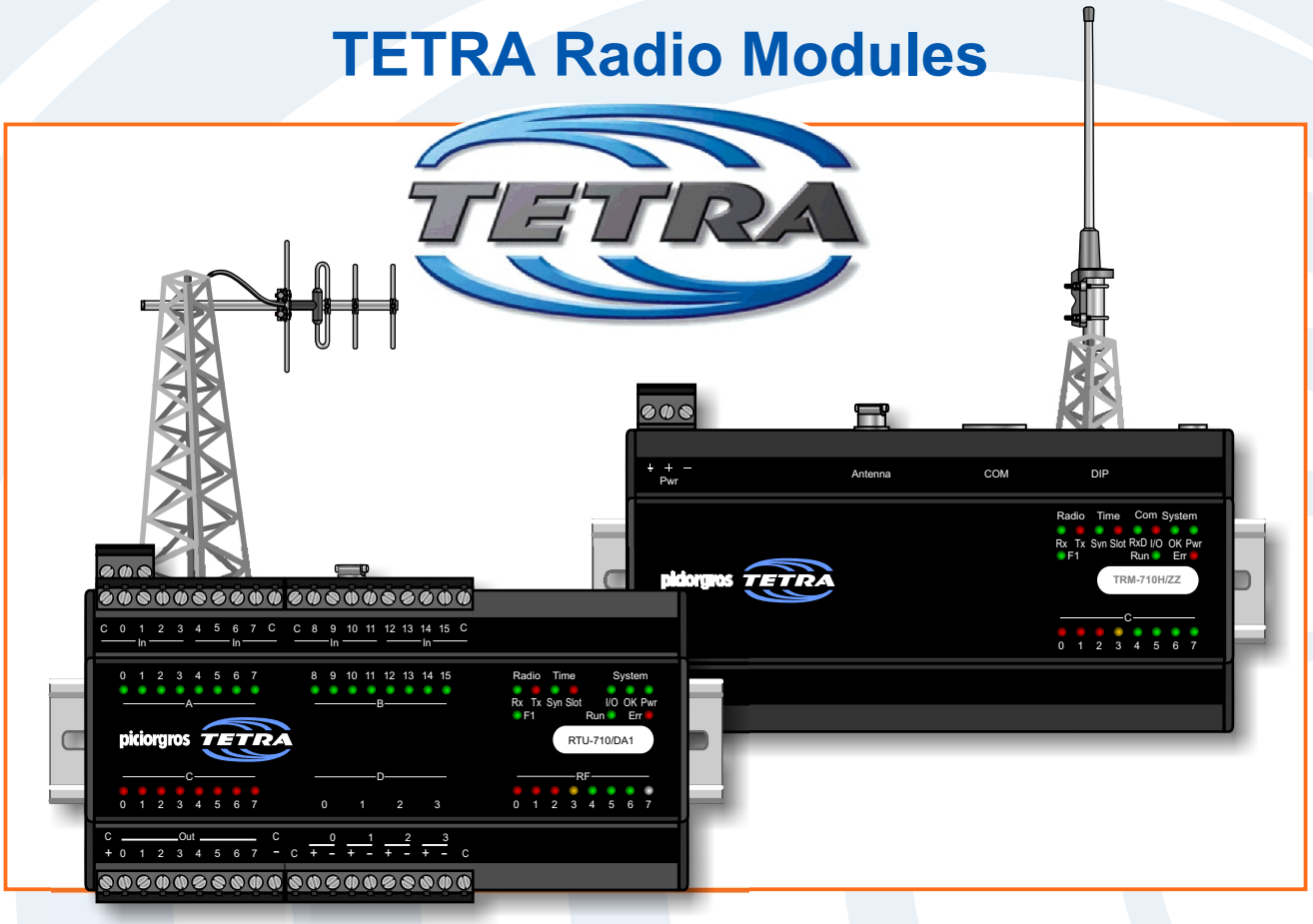
TETRA Radio Modules



TETRA: An ETSI standard for public digital trunked radio systems.

TETRA (Terrestrial Trunked Radio) is a standard framework for implementation of cellular digital radio networks for voice and data, similar in some ways to GSM. TETRA supports circuit and packet switched data services (in addition to voice communication), and also direct communication between field terminals.

The TETRA standard was developed by ETSI (European Telecommunications Standards Institute] initially for the European Community, but has now found acceptance worldwide. The technology, initially developed for voice communications, now also supports data, using SDS (Short Data Service). The turnaround time for an SDS packet can be 0.3 seconds approximately.

Piciorgros TETRA Radio Modules are based the TETRA standard. A master station (MDP-310.200T or TRM-710T/ZZ) can handle up to 240 slave radio RTUs with integrated I/O (RTU-710T) or radio modems with serial interfaces (TRM-710T).

TRM-710.200T/ZZ TETRA Radio Master Station: At the lowest communication layer, the TRM-710.200T/ZZ operates with 3964R, RK-412 or Timeout protocol. At the next higher layer, it can handle MoP/MoP2, MODBUS, or IEC-608870-5-01 protocols. Hardware interfaces available are RS-232, RS-422/485, or (optionally) Profibus-DP.

RTU-710T TETRA Radio Slave Stations:
On-off inputs: The module's 16 opto-isolated on-off inputs can be connected in groups of 4 for +ve or -ve polarity. Each input is assigned a 16-bit counter that can be used as a time totalizer or event counter at up to 10 pulses/sec, if and as required.

On-off outputs: The on-off outputs are opto-isolated PNP transistors (+ve switching) rated for loads up to 500 mA, 12-24 VDC.

Analog inputs: These inputs accept 0-20 mA or 4-20 mA (0-10 VDC optional) sensor/transmitter signals that are digitized at 12-bit resolution.

I/O Expansion: RTU-710T modules have an I/O expansion bus interface through which Type PEM I/O Expansion Modules can be connected, to increase the I/Os available. Every time the RTU module is started up, it automatically scans this bus interface to check what Expansion Modules are connected, and their I/O configurations.

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TRM-710.200T/Z TETRA Master Station Modem

The TRM-710.200T/Z Radio Modem is intended for use as master station in a TETRA radio network. Data received by the TRM-710.200T/Z via its serial interface is converted to TETRA frames and transmitted through the radio packet switching system to a TRM-710 (slave radio modem) or RTU-710 (radio RTU with I/Os). The slave TRM-710 reconverts the data into its original format (e.g., MODBUS or IEC 60870-5-101) before sending it out via its serial port, while the RTU-710 responds by reporting input states and values or setting outputs as commanded.

Protocol conversion is done by the radio modems (master and slave) in both directions (TETRA <-> serial). Serial protocols supported are: MODBUS-RTU, IEC 60870-5-101, and user-configurable data-blocks, while 3964R and Timeout protocols are supported at the link level (OSI Layer 2).

Operation: Data received by the master station via its serial interface is transmitted using TETRA packet switched SDS (Short Data Service) to the target radio module. If the data to be sent exceeds the SDS limit of 120 or 140 characters, it is broken up by the sending station into sub-frames, and reassembled by the receiving station into its original composition.

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TRM-710.200T/Z

Tetra-Master Station Modem

Function:	Master station radio modem for TETRA networks with serial interface
RF output power Pout:	up to 1W
Frequency Range:	Tetra Standard
Interfaces:	Two independent serial interfaces: RS-232 or RS-422 / RS-485
Protocols (Link Layer):	• 3964R • Timeout
Protocols (Application Layer):	• MoP / MoP2 • Modbus-RTU • IEC-60870-5-101
RF field strength indication:	LED 8-segment bar-graph display of received RF signal strength.
Power supply voltage:	12 - 24 VDC nominal (9.6 - 28.8 VDC operating)
Enclosure:	Aluminum pressure die-cast housing, DIN rail mounting. Protection class: IP-65
Operating temperature:	-20ºC to +70ºC
Mounting:	Din-rail 35 mm
Size (w/o connectors):	80 x 162 x 62 mm

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TRM-710.200T - TETRA Slave Radio Modem

The TRM-710.200T Radio Modem is intended for use as a slave station in a TETRA radio network. It is accessed by polling, and transfers data between a central control system linked to a remote master station and the serial port of the slave station. The TRM-710.200T has RS-232 and RS-422/485 serial interfaces.

Protocol conversion is done by the radio modems (master and slave) in both directions (TETRA <-> serial). Serial protocols supported are: MODBUS-RTU, IEC 60870-5-101, and user-configurable data-blocks, while 3964R and Timeout protocols are supported at the link level (OSI Layer 2).

Operation: Data received from the master station over the TETRA network is transferred to the serial port without further handshaking. If an acknowledgement is received from the terminal connected to its serial interface, this is passed on to the master station. If no acknowledgement is received from the local terminal, the TRM-710.200T sends a null data block to the master station. This allows the central control system to confirm the integrity of the TETRA radio network when the slave station terminal fails to respond.

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TRM-710.200T

TETRA Radio Modem with Serial Interface

Function:	Slave station radio modem for TETRA networks
Max. RF transmit power:	P_{out} up to 1W
Frequency range:	TETRA standard
Interfaces:	Two independent serial interfaces: RS-232 or RS-422 / RS-485
Protocols supported:	Layer 2 (Link Layer): 3964R Timeout Layer 7 (Application Layer) MoP / MoP2 MODBUS-RTU IEC-60870-5-101
RF field strength indication:	LED 8-segment bar-graph display of received RF signal strength.
Power supply voltage:	12 - 24 VDC nominal (9.6 - 28.8 VDC operating)
Enclosure:	Aluminum pressure die-cast housing, DIN rail mounting. Protection class: IP-65
Operating temperature:	-20ºC to +70ºC

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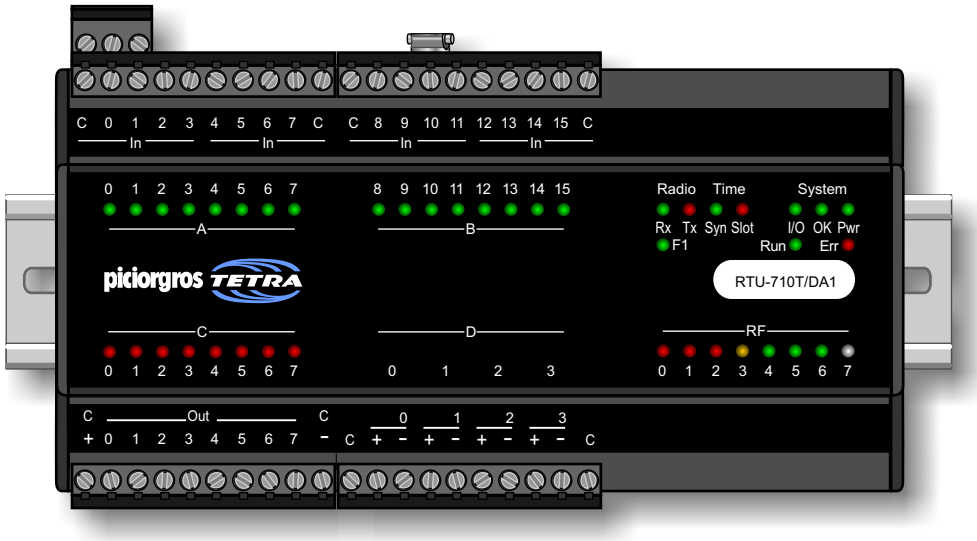
RTU-710T Slave I/O Module for TETRA Networks



The RTU-710T is a slave I/O module with on-off inputs, analog inputs and on-off outputs that can be directly operated on TETRA radio networks. Event counting and time totalizing functions can be enabled for on-off inputs. An optional PicoLogo Micro-PLC feature allows the RTU-710T to act as an autonomous micro-PLC. All I/Os are electrically isolated from the module's electronic circuits.

On-off inputs: The 16 opto-isolated on-off inputs can be connected to input switching circuits with arbitrary polarity in groups of 4. Each on-off input can be enabled with a 16-bit event or time totalizing counter. On-off inputs can switch at rates up to 10 Hz.

On-off outputs: The on-off output switching PNP transistors are also opto-isolated and can switch loads of up to 500 mA at 12-24 VDC.

Analog inputs: The analog inputs accept 0-20 mA or 4-20mA current loop signal, or 0-10 VDC voltage signal, converting these to digital values with 12-bit resolution.

Extension modules: The RTU-710 has a local I/O expansion port via which PEM I/O Extension Modules can be bus-connected to increase the number of I/O's of an RTU-710 station. When an RTU-710 is powered on, it first checks this I/O expansion port and automatically determines the number and types of its local I/Os.

RF field strength indication: An 8-segment bar graph LED display on the front face of the RTU-710 indicates received radio signal strength. This simplifies commissioning and identification of radio communication problems. A central control system connected to the master station of the radio network can read field strength values of RTU-710 slave stations by interrogating the appropriate register.

Protocols: RTU-710T Slave I/O Modules can be accessed using the MoP/MoP2, MODBUS-RTU, or IEC-60870-5-101 protocol, in polling mode. Through a TETRA master station modem (TRM-710.200T/Z), a central control system can read on-off input states, event/time counter values, and analog input measurements; and set on-off and analog outputs at a remote RTU station.

Pico-Logo soft-PLC: The RTU-710 is optionally available with the PicoLogo soft-PLC feature that gives it autonomous logic control and other micro-PLC capabilities.

Plug-in screw-terminal connections: All I/0 connections are made through high quality screw-terminal plug-in block connectors. Panel wiring can therefore be done if necessary before RTU modules are delivered.

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RTU-710T

TETRA RTU Slave Station with On-Off and Analog I/O

Specifications

Function:	Slave RTU station for TETRA radio networks, with on-off and analog inputs, and on-off outputs.
RF transmit power:	P_{out} 1 W
Frequency range:	TETRA standard
On-off inputs:	• 16 on-off inputs, potential-free, of which: • 8 inputs are user-configurable each with a 16-bit time-totalizing counter • 8 inputs are user-configurable each with a 16-bit event counter
On-off outputs:	Standard: 8 solid-state PNP outputs, potential-free Optional: 16 solid-state PNP outputs, potential-free
Analog inputs:	4 analog inputs: 4-20 mA, 0-20 mA, or 0-10 VDC.
I/O expansion interface:	Supports up to 16 daisy-chained Type PEM I/O Extension Modules
RF field strength indication:	LED 8-segment bar-graph display of received RF signal strength.
Power supply voltage:	12 - 24 VDC nominal (9.6 - 28.8 VDC operating)
Enclosure:	35mm DIN rail mounting
Dimensions:	80mm x 162mm x 62mm (excluding terminal blocks)
Operating temperature:	-20ºC to +70ºC