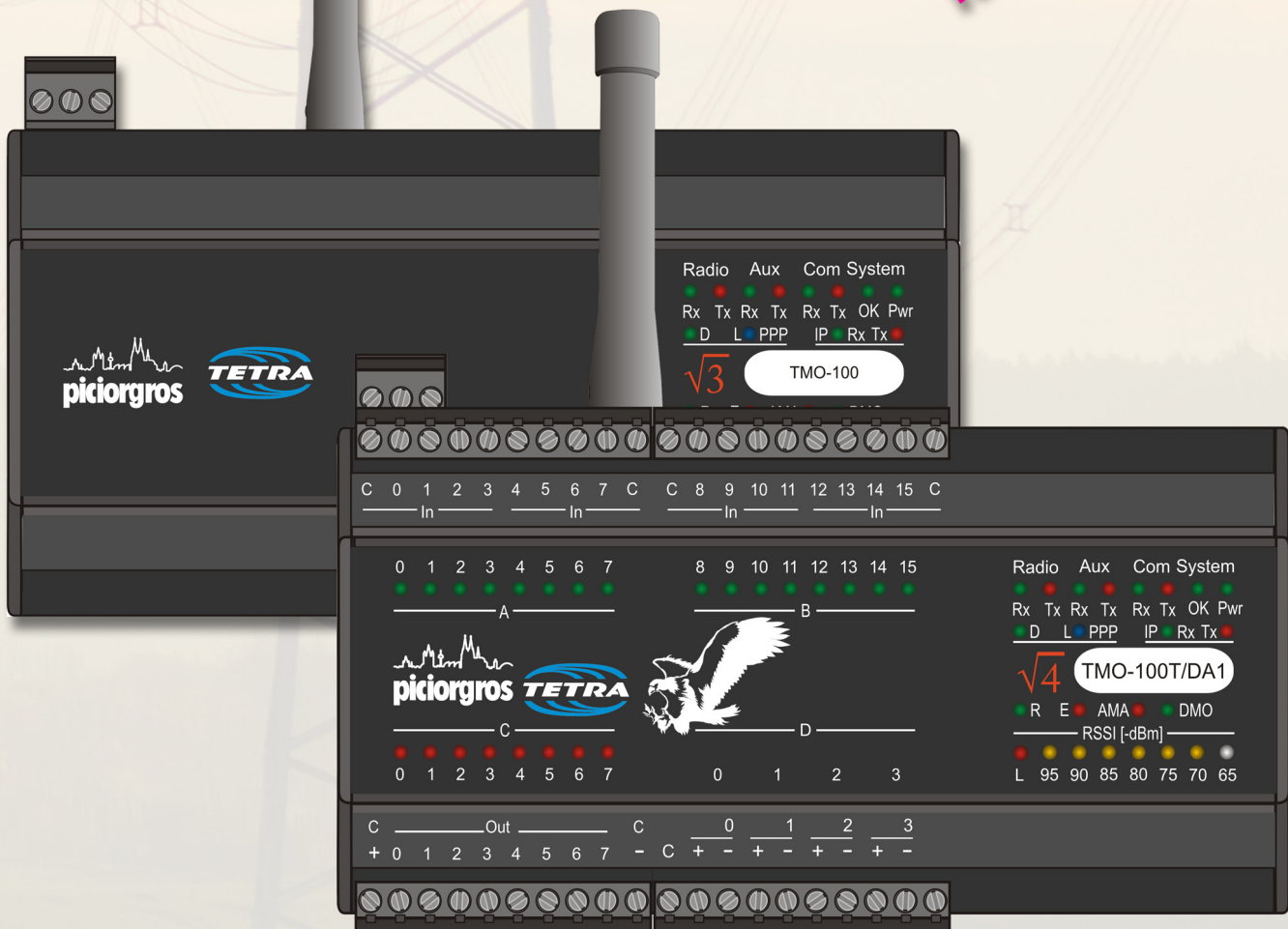
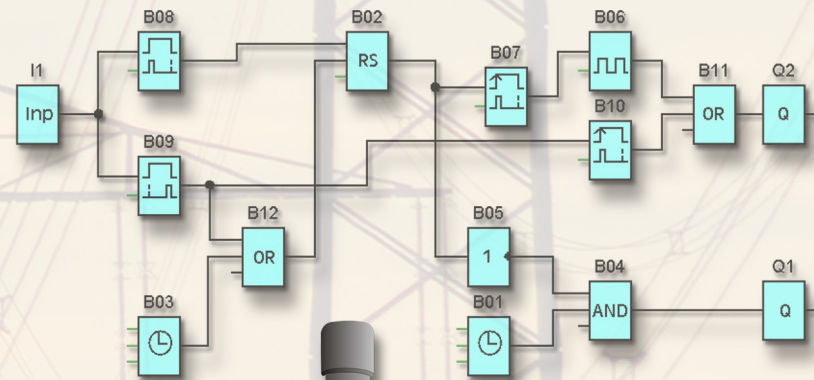


# SCADA, Voice and Data Communication



## and TEDS Data Modem

The only  
TETRA & TEDS  
Modem and RTU

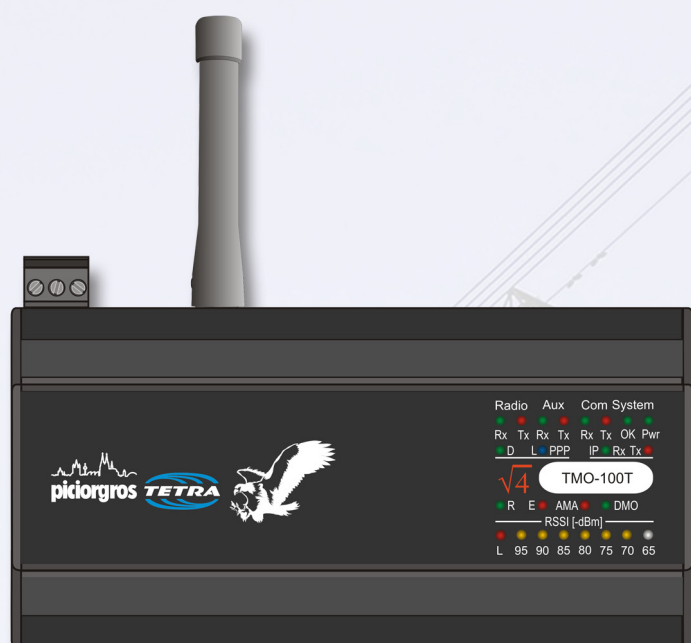


[www.TetraModem.com](http://www.TetraModem.com)

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# Professional SCADA Solutions



## TMO-100, the All-In-One Solution

The TMO-100 is a multi featured TETRA Data Communication device. It contains a class 3 (3 Watt) TETRA modem, two serial interfaces (RS-232, or RS-485/RS-422), an Ethernet port, a voice interface for a microphone/speaker handset, the power supply, and optional built-in or external digital and analog I/O. These unique characteristics are combined with powerful TETRA features like secondary control channel, Packet Data, Multi Slot Packet Data, SDS length of up to 2047 bits and automatic PPP link set up if enabled. Instead of using AT-Commands as many other products, the TMO-100 already recognizes multiple protocols like Modbus RTU, Modbus/IP, DNP3, DNP3/IP, ROC, BSAP, PakBus, Sinaut, IEC60870-5-101, IEC60870-5-104 and others. And

in combination with automatic LZ77 data compression, it makes the TMO-100 the best TETRA Data Modem available on the market for any application in Utilities, Gas and Oil, Water and Wastewater, Public Transportation and many more.

## IP-Router, Data-Modem and RTU with embedded Micro-PLC

As IP-communication becomes more and more important in automation industries, the TMO-100 data modem has been designed to support TCP as well as UDP over Ethernet and also over TETRA infrastructure. When IP communication with Packet Data or MSPD is enabled, after powered on the TMO-100 automatically sets up the PPP-link to the TETRA infrastructure, receiving the network IP-address and serving as a TETRA-router on the local IP-port. For this purpose the unit provides NAT (Network Address Translation), port forwarding, as well as port translation.

Due to these features, the TETRA infrastructure is transparent and not visible to the application. The PLC, RTU or ORTU simply has to be set up by programming the IP-address, and then it can be connected directly to the Ethernet port of the TMO-100; starting to communicate with other devices or with the SCADA-server in the control room.

And last but not least the device can send SNMP/Trap, E-Mail messages or alarms over the local Ethernet port and also over the TETRA network if an E-Mail server is available.

The TMO-100 can be configured either via the embedded web server, the Modbus-RTU or Modbus/IP protocol using its serial interface or remotely via the TETRA infrastructure.

Packet Data Throughput (Downlink kbits/s)		
Type Modulation	Channel 25 kHz	50 kHz
$\pi/4$ DQPSK	15,6	
$\pi/8$ DQPSK	24,3	
4-QAM	11	27
16-QAM	22	54
64-QAM	33	80
64-QAM	44	107
64-QAM	66	160
Note: All channels are 4 slots		



## TMO-100 - TETRA Modem for SCADA and Telemetry Applications

The TMO-100 is the ideal solution for almost any SCADA solution using TETRA infrastructure. Monitoring and controlling from a SCADA server for many different applications can be easily set up using the TMO-100/DA1 with embedded digital and analog I/O or just the TMO-100 with serial and IP interfaces to be connected to RTU's or PLC's on site.

Many protocols such as Modbus RTU, or Modbus/IP, DNP3 and DNP3/IP, IEC60870-5-101 and -104 and others are already preinstalled and can be chosen "with just a click" on the embedded web server. And of course for IP-Routing the device is equipped with an embedded router, so no additional device is needed when using Packet Switched (IP) Data.

## Automatic generated Voice Alarm Messages

With the new built-in Speech Feature the TMO-100 can be used for automated announcements and alarms. It can voice up to 16 pre-recorded messages and has also implemented constant messages like numbers, days of the week, months, measures and many more. Using the PicoLogo MicroPLC the stored messages can be assembled from different speech segments and even dynamic numbers can be spoken.

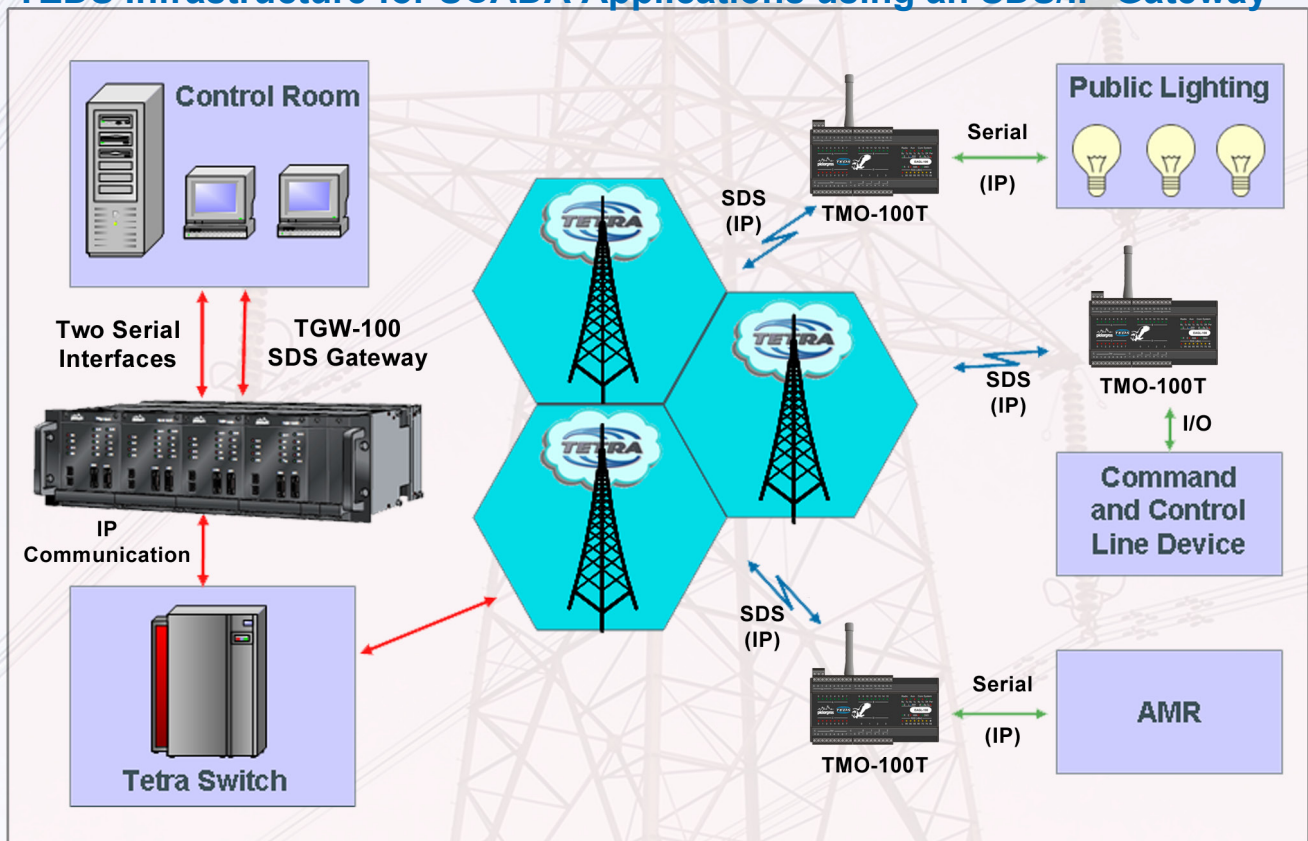
The recording of these messages is done using the embedded web browser and a TETRA hand terminal. One simply has to click the "record" button and is then able to speak any (maximum) 15-second message into the terminal. The announcement is then stored without any loss of the high ACELP voice quality.

## Over The Air Upgrade (OTA-Function)

The TMO-100 TETRA Stack, DSP, MMI and the firmware, can now be upgraded via the TETRA infrastructure transparently during normal TMO-100 operation. This important "Over The Air" tool is needed in SCADA networks when new features or protocols should be implemented or if the infrastructure will be upgraded and therefore the modems also need to be upgraded.

The powerful OTA-Scheduler manages the SDS upgrade traffic and can serve several thousand modems in parallel. Once upgraded and restarted, the modems will automatically switch back to the previous software in case they can not re-register to the TETRA infrastructure in a certain time

## TEDS Infrastructure for SCADA Applications using an SDS/IP-Gateway







# System Features:

General Info	Technical Info
<p><b>Type of Device:</b> TETRA Modem for Serial and IP Communication Alarm Device for SDS and Status Messages TETRA Mini RTU with digital and analog I/O</p> <p><b>Hardware Options:</b> Data Modem/ Mini RTU/ IP Router</p> <p><b>Data + Voice Option:</b> Via Microphone Speaker Set</p> <p><b>Field Strength Display:</b> LED bar graph on the front panel</p> <p><b>Operating Voltage:</b> 12-24 Volt DC +/- 20%</p> <p><b>Average Power Consumption:</b> P &lt;= 3 Watt</p> <p><b>Operating Temperature:</b> -20 deg C to +65 deg C</p> <p><b>Enclosure:</b> Anodized aluminium with plastic ends according to DIN 43880</p> <p><b>Mounting:</b> 35 mm DIN rail</p> <p><b>Dimensions:</b> 80mm x 162mm x 62mm</p> <p><b>Frequency Range:</b> 350-370 MHz 370-400 MHz (available as 370-430 MHz) 410-430 MHz (available as 370-430 MHz and 400-470 MHz) 450-470 MHz (available as 400-470 MHz) 806-870 MHz</p> <p><b>Sustainability:</b> Waste Electrical and Electronic Equipment (WEEE) and Restriction of Hazardous Substances (RoHS) compliant</p>	<p><b>Interfaces:</b> COM: RS-232 or RS-485/422, SubMin-D AUX: RS-232 SubMin-D Ethernet: Ethernet interface 10/100 MBit I/O: Embedded analog and digital I/O</p> <p><b>Operating Modes:</b> Status Messages send (Alarm) and receive (Control) SDS-based data Communication Packet Data based data Communication Multi Slot Packet Data Communication Text Messages send via digital or analog Alarm Inputs</p> <p><b>Protocols:</b> Modbus-RTU, Modbus/IP, IEC-60870-5-101, IEC-60870-5-104 DNP3, DNP3/IP, PakBus, ROC, BSAP Siemens Sinaut ST1, ST7, and more Customer Specific Protocols</p> <p><b>TETRA Features:</b> SDS, Status, SCCH, PD, MSPD SDS size up to 2047 Bit, Multi SDS transmission Encryption, Authentication Auto PPP-Link set up after Power on Class 3 (3 Watt) Output Power (350 - 470 MHz) Class 1 (1 Watt) Output Power (800 MHz) Static RX Sensitivity: min -112 dBm (Typ -115 dBm) Dynamic RX Sensitivity: min -103 dBm (Typ -107 dBm)</p> <p><b>Special Device Features:</b> Embedded Web Server for Configuration Embedded User Application Interface <i>PicoLogo™</i> Embedded Data Logger Embedded IP Router Remote I/O Control by SCADA, SDS and Status AUX-Port can interface to GPS Receiver <i>OTA - Over The Air Software Upgrade (Option)</i></p>



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