

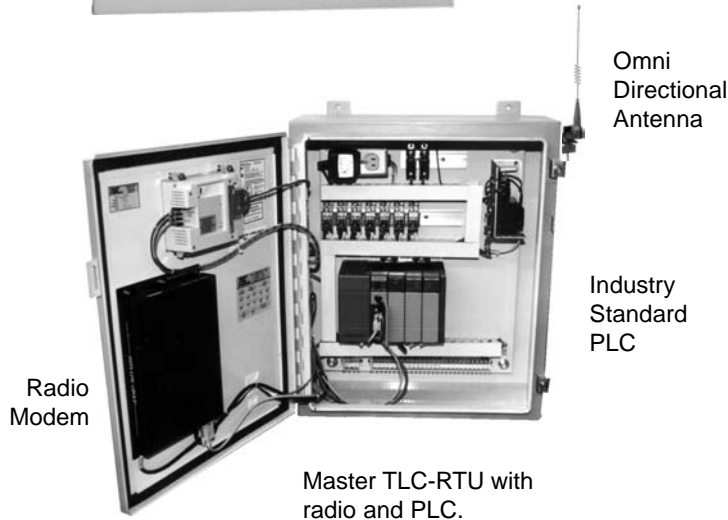
Ultra Reliable Data Communications using Spread Spectrum Radio Modems



Touch screen operator interface on door of master. Operator can poll data from any remote with a simple touch of the screen.



Remote RTU-1 with radio and micro PLC.



Master TLC-RTU with radio and PLC.



Remote RTU-2 with radio and micro PLC.

The TLC RTU-R is a radio based SCADA system designed to operate using frequency hopping spread spectrum technology (no site license required) for ultra reliable data communications. These RTU's can be set up on a Peer to Peer network between two locations or as a multi-drop network between one Master and up to 16 remote slaves. In this example the master is provided with a touch screen operator interface and an industry standard PLC which controls the starting and stopping of two remote well pumps. Sequencing, set points and levels are displayed on the touch screen as well as all alarm conditions. The remote are provided with a micro PLC which communicates operating status to the master and provides local logic control functions. Various antennas are available to provide up to 20 miles of range capability when line of sight path for radio signal is achieved. Actual range depends upon terrain, obstacles and local interference. Additional repeaters can be provided to extend the range up to 60 miles. All components are readily available from several sources, no proprietary components are required.

ENGINEER'S SPECIFICATIONS FOR TLC RTU-R RADIO RTU'S

I. General

Furnish one complete radio telemetry system to control the operation of one main well pump located at elevated tank and two remote well pumps located as shown on the plans. The system shall be PLC based using standard PLC's with locally available components and service. Custom, proprietary components will not be accepted. Telemetry system shall be complete with radios and antennas as required. Installation and connecting wiring shall be provided by contractor per NEC codes.

II. Radio Specification:

Radio Modems shall be pre-configured at the factory for each application. No modem field setting, programming or adapters required.

License free spread spectrum carrier bands shall be 902-928 MHz spread spectrum, interference immune; no site license required.

Data rate up to 115.2 Kbaud, uncompressed full duplex

Range up to 20 miles, line of sight, depending on local conditions, external antennas and one watt power setting.

Data format / interface shall be any asynchronous data stream, RS-232, RS-422/485 or CMOS/TTL interface.

Power 8 to 18 VDC / 120 VAC. 180mA transmit mode, 100mA receive mode.
Indicators for Power, Carrier, Data In, Data Out

Error checking: advanced 32 bit CRC error detection and packet protocol acknowledgment for the ultimate in data reliability and integrity.

III. MASTER PLC Specification:

The master RTU shall be supplied with a modular PLC consisting of power supply, CPU, rack and required I/O cards.

CPU shall have minimum of 8K words and 4K additional data storage. Typical scan time 1 ms/K.

Communication port to provide Full-Duplex and Half-Duplex Master/Slave RS232 protocol.

CPU shall be provided with Flash Erasable Programmable Read Only Memory (EPROM) to provide non-volatile back-up. Operating temperature shall be 32 Deg. F to 140 Deg. F.

Discrete inputs and outputs shall be 120 VAC or 12 VDC.

Analog inputs and outputs shall be 4-20ma with 16 bit resolution on inputs and 14 bit on outputs.

IV. SLAVE PLC specification

The slave RTU shall be provided with a micro PLC with discreet 120 VAC or 24 VDC inputs, AC relay outputs and analog I/O expandable to 32 I/O points.

CPU shall have minimum of 1K user memory programmable in ladder logic.

CPU shall be provided with a RS232 port supporting Full Duplex and Half Duplex protocol.

V. Operator Interface

Provide a touch screen operator interface to allow the operator to monitor all aspects of the system. Menus shall be provided to select automatic or manual operation, sequence selection of lead pump and time delays for starting and stopping to prevent hunting. Communication statistics shall be displayed along with communication alarms and pump fail alarms. All alarm shall be stored with a time stamp. A printer port shall be provided to connect to optional printer.

Touch screen shall be a minimum of 5 inches diagonal and shall be LCD Mono or STN color.

The touch screen shall operate on 24 VDC with 15 Watt maximum load. The touch screen shall have a NEMA 4 rating and shall operate from 32 Deg F. to 122 Deg F.

VI. Documentation

The complete system shall be factory tested and provided with both a hard copy of the PLC ladder programs and touch screen program as well as a copy on disk. Wiring diagrams and complete as build bill of material shall also be provided.