



# Telescada



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## An Overview of the Telescada System and System Components

*The Telescada Real-Time Wireless Gas Transmission & Distribution Monitoring System is comprised of three main and several subordinate components. First are the **Field Devices** that remotely monitor and record system attributes like pressure, temperature and flow. Second is the **Communications Network** that transmits the alarms and historical data from the Field Devices. Third is the **Host Computer Program**, that logs and records all alarms and data from the Field Devices to a Microsoft Access Database and presents it to the system operator for further action. Subordinate components such as the Customers **Gas SCADA System**, Research and Development, Engineering, Operations, Customer Service and other departments are provided access to the field data via other Communications Networks.*

### How the Telescada System Works

*The Field Devices continuously monitor and record system variables locally at the customer configured rate. Each variable is compared to its associated alarm value to determine if an alarm exists. If an alarm does exist, the Field Device will immediately transmit the alarm condition to the Host Computer or SCADA Master. In the event that the Field Device is not successful in contacting the Host Computer the Field Device will initiate a back-off sequence and continue attempting the transmission until completed successfully. If no alarm exists, the Field Device will simply log the data locally and transmit it to the Host Computer or SCADA Master at the next scheduled data dump.*

*The Host Computer running the TelescadaMASTER software will audibly alarm and flash on any unacknowledged alarm. The alarm window will display the (time, date, name, address, analog values, alarm status and battery voltage) of the Field Device reporting. Upon receipt of any and all Field Device information, the Host Computer with TelescadaMASTER software records the information into the database and updates all of it's components for easy access and viewing by the system operator. Upon receipt of an alarm the operator is presented with an option to keep the Field Device on line for continued polling prior to line disconnect. Should the operator not choose to stay connected, s/he can connect to a particular Field Device on demand as required for further analysis. The Host Computer databases are accessible to subordinate users via the local computer network (LAN/WAN/Intranet) or may be updated regularly to a network server. Subordinate users may desire to view and manipulate the data with various third party software packages already familiar to them.*

*When transmitting to a non-Telescada SCADA Master, the Field Devices respond to polls from the SCADA Master to transmit status and data via the specified protocol. Quiescent reporting capabilities of the ATS Series Remote Terminal Units allow for the transmission of unsolicited messages to the SCADA Master in the event of an alarm condition.*



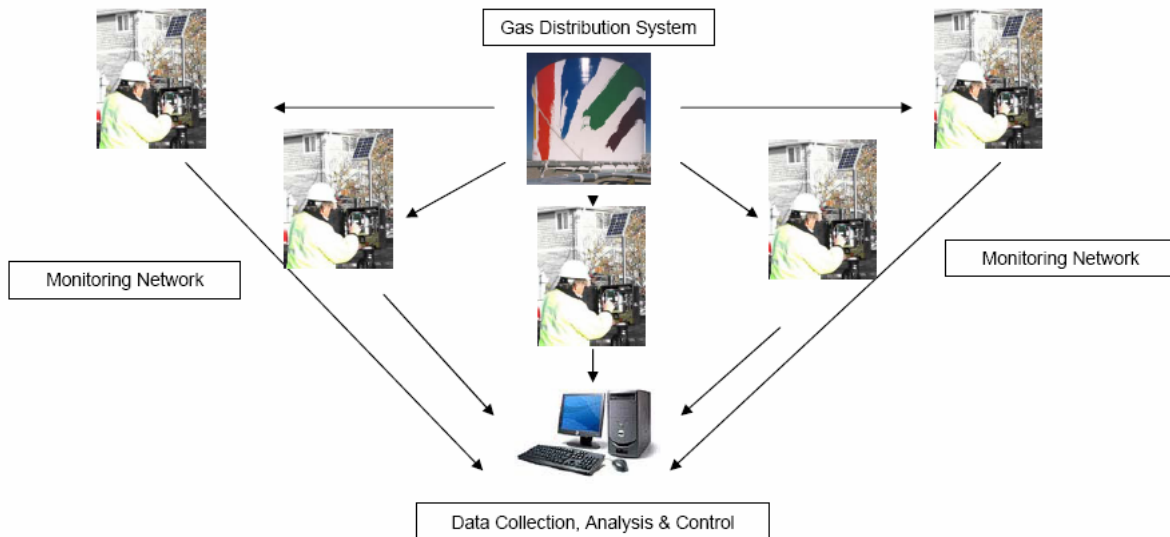
## How the Telescada System Components Work Together

The ATS Series Remote Terminal Units continuously monitor and record system variables locally at the customer configured rate. Each variable is compared to its associated alarm value to determine if an alarm exists. If an alarm does exist, the Field Device will immediately transmit the alarm condition to the Host Computer running the TelescadaMASTER software or the SCADA via wireless or hard wired communications.

The ATS Series Remote Terminal Units are interrogated and programmed locally at the installation site by a Microsoft Windows compatible Telescada software application called T-Link. T-Link provides a graphical front panel for the user with graphically selectable device configuration. No programming knowledge is necessary to operate T-Link.

Field Device communications with the SCADA Master are dependant upon the desired communications protocol and communications medium. ATS Series Remote Terminal Units can be configured for industry standard and custom protocols transmitted over CDMA or GSM cellular modems, UHF/VHF or 900MHz Data Radio Modems or POTS Telephone Modems.

For users that choose not to integrate the Field Unit data to a Gas SCADA, Telescada offers The TelescadaMASTER a Microsoft Windows compatible mini SCADA Master program. The TelescadaMASTER coordinates remote interrogation, programming data and alarm retrieval from a network of Telescada ATS Series Field Devices. The TelescadaMASTER was designed for installation and use on a desktop PC running Microsoft Windows. The TelescadaMASTER is a very intuitive and user friendly program.





## **An Overview of the ATS Series Field Devices**

*The ATS family of Remote Terminal Units was developed to satisfy utility monitoring and control applications where AC power and remote wiring are not readily available or cost effective. Specifically for use in Natural Gas Transmission and Distribution applications, these instruments are designed for real-time monitoring, data recording and alarm reporting.*

*Developed with the assistance of several Natural Gas Local Distribution Companies (LDCs) they provide a cost effective means to achieve real-time system data and alarms without seriously impacting operations or maintenance personnel and budgets. These products are designed to eliminate the requirement for weekly visitation by operating personnel affording the utility essential system operating data immediately to the comfort of central control. The stand alone versatility of this product has enabled utilities to apply it in various applications that previously could not be cost justified. End of line pressure monitoring, construction monitoring, winter gauging and temporary system flow studies have become typical applications of this product, in addition to their primary function of permanent system attribute monitoring. Various packaging and communications options make this system versatile and affordable.*

### **Each ATS Series Remote Terminal Unit Provides the Following Features:**

*Sealed Lead Acid Battery Operation with Solar Charging. (No AC power required, but can be AC powered if so desired)*

*Operating Parameters Configured, Locally or Remotely. (No special programming knowledge required)*

*Local RS-232 Communications Port / Remote (Modem) Communications Port.*

*4 (Four) Analog (voltage) Inputs, 0-5VDC, or Conditioned for 4-20mA*

*4 (Four) Status / Alarm (Dry Contact Closure) Inputs.*

*4 (Four) Control (Dry Contact Closure) Outputs*



## An Overview of the ATS Series Field Device Models

### **ATS-8** - Standard Configuration

Communicates via dial-up telephone circuit, CDMA 1xRTT,  
Or GSM/GPRS cellular or UHF/VHF/900MHz RF communications.  
Housed in a Class 1, Group D enclosure for hazardous atmospheres.  
Dimensions re 11"H x 9"W x 6"D.



### **ATS-8CA** - Standard Configuration

Communicates via dial-up telephone circuit, CDMA 1xRTT,  
Or GSM/GPRS cellular or UHF/VHF/900MHz RF communications  
Housed in a heavy gauge, custom color painted (standard black)  
Cast Aluminum enclosure. Dimensions are 15"H x 13"W x 6"D.



### **ATS-8CF** - Standard Configuration

Communicates via dial-up telephone circuit, CDMA 1xRTT,  
Or GSM/GPRS cellular or UHF/VHF/900MHz RF communications  
Housed in a NEMA 4/12 high impact strength, UV resistant  
Fiberglass polyester enclosure. Dimensions are 15"H x 13" W x 6"D.



### **ATS-8CP** - Standard Configuration

Communicates via dial-up telephone circuit, CDMA 1xRTT,  
Or GSM/GPRS cellular or UHF/VHF/900MHz RF communications  
Housed in a NEMA 4/12 high impact strength, UV resistant  
Fiberglass polyester enclosure. Carry handle and integrated solar  
Panel designed for portable and/or temporary locations.  
Dimensions are 12"H x 10" W x 5"D.





## **ATS Series Remote Terminal Unit Component Serviceability and interchangeability**

*The ATS Series Remote Terminal Units are constructed of a modular design. The TPC-12 Motherboard, I/O boards, Communications Mediums, Transducers and/or Transmitters are all designed to be replaced without impact upon other system elements. Should one element fail, it can be repaired or replaced keeping the instrument in service and extending instrument life. The TPC-12 microprocessor is socketed permitting easy firmware upgrading or replacement.*

## **ATS Series General Installation Requirements**

*The ATS Series Remote Terminal Units are delivered ready for field installation. To install the ATS RTU simply*

- 1. Secure the enclosure as desired via pipe, vent stack or pole mounting;*
- 2. connect the transducer plumbing;;*
- 3. connect the provisioned modem;*
- 4. connect the battery power wires*
- 5. Rotate the solar panel to face in a Southerly direction.*
- 6. Set the RTU time clock.*

*The RTU address and analog alarm settings can be configured on a bench in the instrument shop, in the field with a Laptop or via remote communications by the system operator. Shop configuration and test is ideal.*

## **Communications and Device Polling in the ATS System**

*In an effort to minimize the re-occurring monthly cellular data transmission costs and reduce power consumption the ATS Series RTUs were designed to quiescently report on alarms and call in with their scheduled data dumps. Neither polling, nor leased lines are required, but the ATS Series can be polled provided the user pays attention to frequency of polling and its effects on power consumption. The device will call in early warning alarms and data dumps. This enhances the real-time throughput for alarm calls and minimizes the need for additional telephone lines or cellular services. In normal service mode the ATS Series RTUs monitor and record system attributes, then once a day send the recorded data to the Host PC or SCADA Master.*

## **ATS Series Device Operation, Functionality, Alarms and Displays**

*The ATS Series RTUs are low power consuming microprocessor based devices with 4 analog inputs each with HHL HL LO, LLO alarm set points; 4 contact closure status alarm inputs NO or NC and 4 contact closure control outputs NO or NC The unit continually checks for out of range parameters and logs data for retrieval to the Master Controller.*



An optional Local Display Module (P/N LDM-220) is mounted inside the cover of the enclosure and plugs into the Local Port of the ATS motherboard. To activate the LDM-220, press and hold the on/off button for 5 seconds, this will power up and initialize the Local Display. Scroll up and down to read the appropriate variables. The unit will turn itself off after 15 minutes of inactivity to conserve battery life. The unit has a Test push button to initiate a test alarm or simply to verify communications with a Laptop or the Host Computer. Note: alarms can only be acknowledged by the Host Computer via primary communications. This ensures that the System operator is aware of all field activity.

### **Pressure Transducer Specifications, and Calibration Requirements and Methods**

The most widely use application of the ATS Series Remote Terminal Units in the Gas Distribution Industry is the monitoring, alarming and recording of district regulator site pressure. Each ATS RTU is designed with internally mounted solid state pressure transducers specifically designed for the Telescada application.

Transducers are factory calibrated for set and span then cured and sealed. The only field adjustment is the gain of the analog amplifier to offset minor variations and drift. This adjustment is done via a 10 turn trimpot on the ATS Motherboard, P1 for analog 1 etc. refer to ATS-12 PC Board outline and instructions attached. Telescada uses Setra Model 209 Stainless Steel, Capacitance Sensing Transducers in all gas pressure monitoring applications. Strongest in the Industrial market, these devices specify an RSS accuracy of  $\pm 0.25\%$  of full scale output at  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$ . While actual error may vary slightly from transducer to transducer, it is important to point out the factor critical to SCADA and Data Acquisition applications is repeatability. Also with a Repeatability of  $+0.05\%$  Full Scale MAXIMUM, better linearity, higher burst pressures, the Model 209 has all stainless steel wetted parts. The thermal effects which create the bulk of the total error become quite negligible in this installation as these transducers are calibrated at  $+70^{\circ}\text{F}$ ,  $+2\% \text{FS}$  thermal effect is based on  $+70^{\circ}\text{F} = 0\%$  error. Where linearity can be corrected in the software and the most process sensitive operating pressures are mid-scale (0-30" WC & 0 – 100 psig) ranges Telescada has developed the 209 as our best choice transducer.

### **ATS Series Remote Terminal Units I/O capabilities**

The ATS Series (TPC-12 Motherboard) supports five (5) Analog Inputs; one is used to monitor battery voltage; one to four are available for external use with 0-5vdc in. Each Input has four Remotely programmable thresholds and hysteresis. Each input is user configurable to be critical or non-critical - when a critical threshold is exceeded the RTU will sent an alarm report to the Master Controller. The ATS Series supports four (4) contact closure Status Inputs each one filtered and ESD protected. Each input is user configurable to be critical or non-critical, NO or NC. Upon change of state at any critical point the RTU will send an alarm report to the Master Controller. The ATS Series also supports four (4) Control Outputs.



## **ATS Series Communications Interface**

*The ATS-8 has two communications ports.*

*One RS232 local service port interfaces with host (Laptop Computer) or LDU (Local Display Unit) - Communication speed is user configurable from 300 baud to 19.2 baud.*

*One Modem port with FCC registered DAA interface. Digital data communication speed is programmable. Both call originate and call answer modes are supported. Six user configurable telephone numbers for call out.*

## **ATS Series Remote Terminal Units Weather and Corrosion protection**

*The ATS-8 is designed for outdoor operation in a Class 1, Div. II hazardous environment (Class 1, Div. 1 Enclosure Option Available). Heavy gauge cast Aluminum, and NEMA 4 Fiberglass reinforced plastic enclosures are standard issue. Operating Temperature: -20C to +50 degrees C, Humidity: 5% to 95%, non-condensing. The TPC-12 electronics module is coated with Humi-Seal to protect against condensation and oxidation. The enclosure is vented to conform with NEC requirements for charging batteries. The vent is designed with kriss cross baffles and insect screen to prevent infestation and maintain the NEMA rating.*

## **ATS Series Factory Acceptance and Testing Procedures**

*Each ATS Series subassembly is thoroughly tested and electrically calibrated prior to final assembly. After final assembly each unit is calibrated, configured and 100% tested for operation prior to 24 hour burn-in. After burn-in cycle is complete each unit is 100% final tested again before preparing for shipment.*

## **ATS Series Communications Protocols, Standards and Codes**

*The ATS Series employs the Telescada KIS protocol for local communications. This protocol is simple, serial ASYNC and is available to customers and third party solutions providers as required. While the ATS Series uses KIS protocol locally and for communication with Telescada software products, the Telescada offers the ATS Series Protocol Translation Module for contemporary remote protocol communications. Protocol Options Include;*

*Modbus RTU*

*DNP3*

*Custom Protocol Development upon Request*

*The ATS-8 is designed for compliance with part 68, FCC Rules. All third party communications devices supplied by Telescada comply with part 68, FCC Rules.*

*The ATS-8 is designed for compliance with UL 1604, Electrical Equipment for Use in Class 1 and Class 11 Hazardous (Classified) Locations.*



## ATS Series Data Logging and Reporting

The TPC-12, Revision D, RTU Module has capacity to store up to 26,000 records configurable from 1 to 255 days. Analog channels 1 through 4 may be selected for recording.. Analog sampling rate is selectable: 15, 20, 30 & 60 seconds. Analog data recording rate is selectable: 1, 5, 15, 30 and 60 minute intervals are available. Automatic data dumps are configurable daily, weekly or may be retrieved on demand Local alarm log maintains the most current 25 records with date and time stamp. The alarm log can be retrieved on demand. **In normal service mode the ATS Series RTUs monitor and record system attributes, then once a day send the recorded data to the Host PC or SCADA Master.** Should remote communications become disabled or taken offline, the RTU will continue to record data. When operating in record only mode data is retrieved locally via a PC running T-Link.

The charts below outline the memory capacity of the available TPC-12 firmware revisions

TPC-12 RTU Revision 1.0 Firmware				TPC-12 RTU Revision 1.02 Firmware & Double Memory			
Recording Interval (Minutes)	Analog Channels Recorded	Records/Day	Total Days of Recording	Recording Interval (Minutes)	Analog Channels Recorded	Records/Day	Total Days of Recording
1	1	1440	9	1	1	1440	18
5	1	288	45	5	1	288	90
15	1	96	135	15	1	96	255
30	1	48	255	30	1	48	255
60	1	24	255	60	1	24	255
1	2	1440	5	1	2	1440	9
5	2	288	23	5	2	288	45
15	2	96	68	15	2	96	135
30	2	48	135	30	2	48	255
60	2	24	255	60	2	24	255
1	3	1440	3	1	3	1440	6
5	3	288	15	5	3	288	30
15	3	96	45	15	3	96	90
30	3	48	90	30	3	48	180
60	3	24	180	60	3	24	255
1	4	1440	2	1	4	1440	5
5	4	288	11	5	4	288	23
15	4	96	34	15	4	96	68
30	4	48	68	30	4	48	135
60	4	24	135	60	4	24	255

TPC-12 RTU Revision 2.0 MIN/MAX Firmware & Double Memory				TPC-12 RTU Revision 2.0 MIN/MAX/AVE Firmware & Double Memory			
Recording Interval (Minutes)	Analog Channels Recorded	Records/Day	Total Days of Recording MIN and MAX for each channel	Recording Interval (Minutes)	Analog Channels Recorded	Records/Day	Total Days of Recording MIN, MAX and AVERAGE for each channel
30	1	48	255	60	1	24	255
30	2	48	135	60	2	24	255
30	3	48	90	60	3	24	180
30	4	48	68	60	4	24	135



## **An Overview of the TelescadaMASTER Master Controller**

*The majority of our pressure, flow and temperature customers export data from the ATS Series Remote Terminal Units directly into a 3rd party Gas SCADA. For those that want a desktop solution, or a solution that can be used by Gas Engineering, or Technical Services in addition to Gas SCADA, Telescada offers the TelescadaMASTER Master Controller.*

*The TelescadaMASTER Master Controller receives alarm and historical data from the Field Devices. This data is analyzed and sorted to the appropriate database(s) in the system. Should an alarm message be received the data will be posted in the alarm window and the computer will enunciate the alarm to the operator for disposition. The Master Controller operator can view system alarms, events and data as required. Through the Master Controller cooperative applications and utilities the operator can view and analyze one or several system variables historically or in real time. The system utilities enable the operator to arrange and print various trends and reports to facilitate information management. Empowered parties from other departments also have access to share the system information as required for job performance via the company network. It may be desirable to maintain the database(s) on a network server and not allow company wide access to the Master Controller computer.*

## **TelescadaMASTER Installation, Operation, Functionality, Alarms, and Displays**

*TelescadaMASTER was developed as a NT compliant application and can run on any Windows OS. Developed with the knowledge the some utilities keep legacy assets in service for a considerable time frame, the TelescadaMASTER can operate on Windows98, NT and XP platforms Much like any other Microsoft application TelescadaMASTER has file folders, pop up windows, scroll bars and list boxes. The main menu screen offers the operator buttons to access and view list boxes for the Alarm Log, Event Log, Data Dump Log, Communications Server and RTU List. Each RTU can also be open as another button on the main menu for faster access to information. Each button will open a list box containing all of the database information for that particular function. A GUI button is also provided for each active communications port allowing the operator to view graphically any activity on that port. Pull down menus are also available for each of these menu items. Additional pull down menus are available for Utilities allowing the operator access to Reports, Graphs and Master Database Editing.*

## **TelescadaMASTER Computer and Peripheral System Requirements**

*Designed for the typical windows operating system PC, The TelescadaMASTER Controller requires a Pentium 200  $\mu$ P or higher with at least 32Meg Ram, at least 4 GB Hard Drive, a minimum of 4 available communications ports for modem connections, network interface card, monitor, mouse, keyboard and printer.*



### **TelescadaMASTER Data Storage Methodology**

*All data is stored and manipulated in Microsoft Access MDB format. The common format of MS Access allows data to be easily transferred to other applications.*

### **TelescadaMASTER Additional I/O Capabilities**

*The system capacity is limited only by the number of modems and telephone lines provided on a single machine. It is realistic to expect that with 4 modems the system could comfortably handle some 500 RTUs or more. Each RTU is configurable for up to three different telephone numbers each for alarms and data dump, if the primary line is busy it will call the secondary line then the third before going into back off and trying again.*

### **TelescadaMASTER Vendor Support**

*Telescada's in-house software staff is dedicated to the maintenance and improvement of our software products. Though designed to be low maintenance products, telephone and local support may be required. Telescada offers a number of software maintenance plans, based upon the number of points installed. Annual maintenance agreements include license to all software updates.*

### **ATS Series Field Device, T-Link and TelescadaMASTER Field Training**

*Telescada offers customers on-site installation support and training by factory personnel in the ATS Series Remote Terminal Units, T-Link Local Programming Utility and TelescadaMASTER Master Controller. In most cases installation support and training is customized to suit the needs of the user.*

### **Telescada Limited Warranty and Service Procedure**

*Advanced Control Systems Corporation/Telescada warrants its products to operate within specifications under normal use and services for a period of one year from the date of shipment. Components products, spares, replacement parts and repairs are warranted for 90 days. Software is thoroughly tested and thought to be functional. It is supplied "as is" with no warranty of any kind covering detailed performance. Accessory products not manufactured by Advanced Control Systems Corporation/Telescada are covered by the original equipment manufacturer's warranty only. In exercising this warranty, Advanced Control Systems Corporation/Telescada will repair or at its option, replace, any product returned to the customer service department or an authorized service facility within the warranty period, provided that the warrantor's examination discloses that the product is defective due to workmanship or materials and has not been caused by misuse, neglect, accident or abnormal conditions or operations. The purchaser is responsible for the transportation and insurance charges arising from the return of products to the servicing facility.*



*Advanced Control Systems Corporation/Telescada will return all in-warranty products with transportation prepaid. This warranty is in lieu of all other warranties, expressed or implied, including but not limited to any implied warranty of merchantability, fitness, or adequacy for any particular purpose or use. Advanced Control Systems Corporation/Telescada shall not be liable for any special, incidental or consequential damages whether in contract, or otherwise. Out of warrantee repair is offered on all components manufactured by Telescada. Please consult your sales contact for a list of repair charges.*

*The modular design of the ATS Series makes replacement of any element quick and easy. Parts that are worn, have reached the end of their functional life, or have been damaged in the course of use can be replaced by new components in the field.*

***We look very forward to installing a Telescada Solution  
in your Distribution system very soon.***

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