

# Product Bulletin

telemetry + control solutions

## AD2000 APPLICATION EXAMPLES

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## SYSTEM APPLICATION EXAMPLES

### Water Treatment System

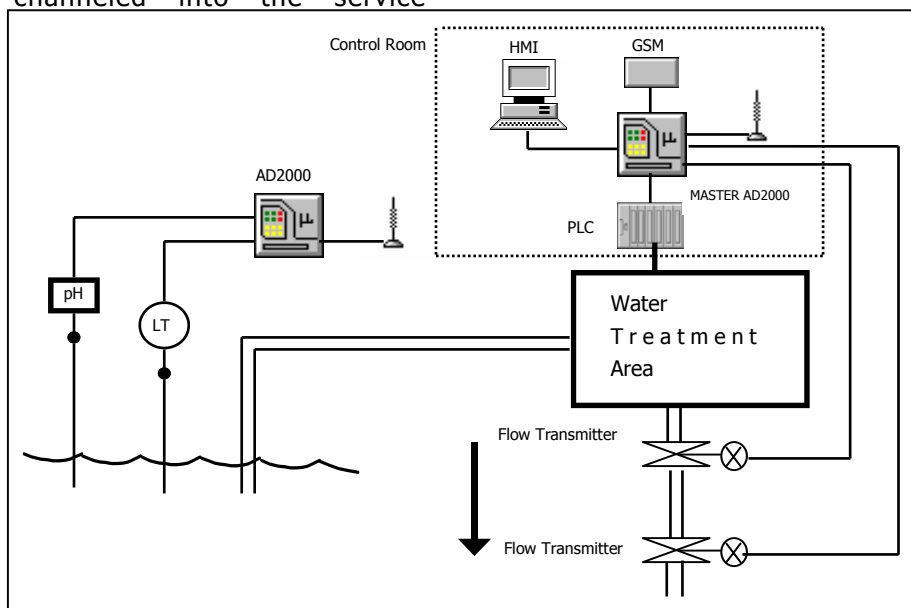
The AD2000 can be used in many waste water applications where, for example, the remote monitoring of water levels, pH and flow of the untreated water needs to be performed. This is then relayed back to a central control room for monitoring purposes. Often the remote site is located in an area where there is no communications infrastructure such as phone lines. To install such lines could be expensive and take many months to arrange. The use of a radio based AD2000 telemetry RTU can reduce these capital costs and be installed in a matter of days.

The diagram below shows a typical system layout where the water from the catchment area is channeled into the water treatment area. Here it undergoes a series of filtration processes. Then the treated water is channeled into the service

reservoir for storage. By connecting transducers to the AD2000, various monitoring points can be installed throughout this system. For example, the flow transmitters in the pipeline can be connected to the AD2000 analog (4-20mA) inputs to measure pipeline leakage. The AD2000 is also able to totalize the flow.

In addition the AD2000 can provide supervisory controls via the in-built ladder diagram functionality enabled by the OvalMap2000+ software. For example, the monitoring and control sequences for pumps, actuators of control valves and other instrumentation devices can be enabled.

All real-time trending of the data captured can be displayed on any HMI package as well as stored in the in-built data-logger and retrieved when desired. The AD2000 can also be connected to a GSM modem to send out SMS alarm messages to operators.



## OVALMAP 2000 + CONFIGURATION SOFTWARE – ADD POWER TO YOUR SCADA SYSTEMS

A medium to large SCADA (System Control And Data Acquisition) system consists of several different components. Engineering and configuration time are required to connect these components in order to arrange data flow across the network. The time involved can be significant if you use a variety of software packages, protocols and transmission media.

The OvalMap2000+ software package is designed to program the functionality of the popular AD2000 and simplify the engineering requirements for SCADA systems. Large systems can be configured in a matter of hours rather than days.

OvalMap2000+ has an easy to use graphical interface that runs under Windows 95, 98, NT, 2000 and XP PCs. The software allows the easy configuration of a range of telemetry systems – from small point to point to complex multi-point SCADA systems. Support for popular protocols allows easy connection to external devices such as Programmable Logic Controllers (PLC), Human Machine Interfaces (HMI) and Distributed Control Systems (DCS) packages. Significant engineering time savings can be achieved with this software

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when designing large SCADA and telemetry networks.

Data-logging features within the package allow the AD2000 to be set up as a logging device. Simple form entry allows the appropriate channels to be configured and scaled for calibration. The logged data and configuration information can be uploaded remotely via radio or dial-up telephone modem. Export functions to Comma Separated Variable (CSV) text files and Excel spreadsheets ease data diagnosis and analysis. Logging options include time triggered, event triggered and real time. The AD2000 units have 4Mbit FLASH chips on-board providing secure data storage (52,428 single analog channel records). A scheduler function is part of the package so automatic, unattended uploads can be performed.

PLC functions within the package allow the AD2000 product to run internal control logic and extensive control and monitoring conditions can be defined. The triggering (event or polled) of data across the communications network is easy to use and a feature not usually found in other PLC products. A full range of math functions (including floating point), timers, counters, data shift, data move, normal Boolean logic as well as the addition of special function blocks (e.g. flow calculation, scaling) allows medium task control logic to be achieved.

## Irrigation and Control System

An example of a typical application for the AD2000 Remote Telemetry Unit is a gate automation and remote monitoring system for irrigation projects.

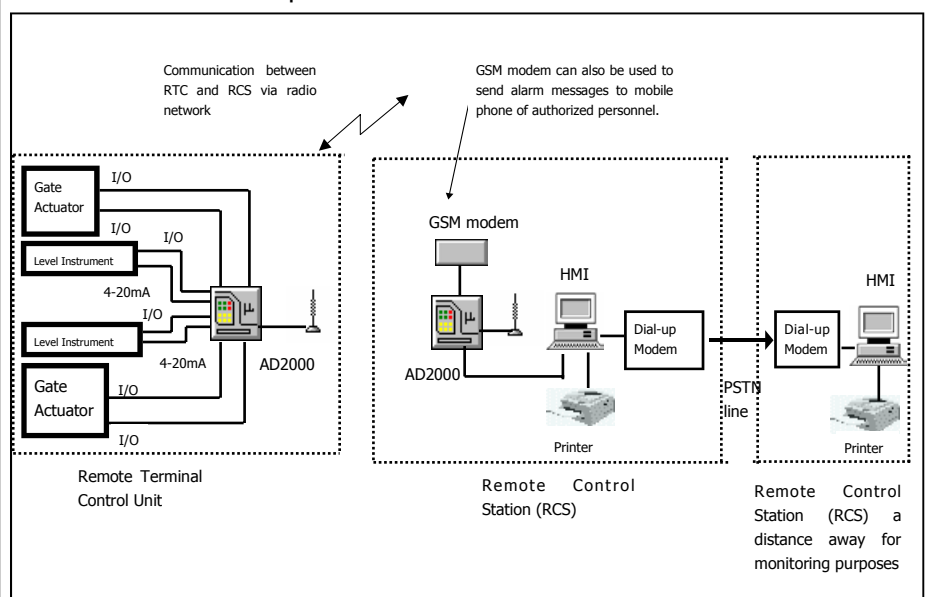
An AD2000 at the irrigation site is configured as a remote unit receiving 2 sets of analog (4-20mA) and I/O signals from the upstream and downstream level sensors, where the level signals are transmitted to an AD2000 in the Remote Control Station via the AD2000 in-built radio modem. The Remote Control Station (RCS) in turn enables the supervisory controls of the actuators via the wireless radio network.

In addition a GSM modem can send SMS messages to the hand phones of authorized personnel. Another AD2000 unit installed at the Remote Control Station (RCS) a distance away, is connected to the RCS via a dial-up modem for

monitoring purposes. This shows that an AD2000 telemetry system can be networked via various means such as radio, GSM, Ethernet, landlines or the PSTN.

All real-time trending on water level and gate movement information can be displayed on a HMI package. An AD2000 can interface directly to popular packages such as Citect, iFix, Wonderware etc. The data can also be captured in the integral data logger. Historical information can be retrieved when desired. The AD2000 integral PLC capability performs all functions according to the control system requirements.

This system demonstrates that all functions are integrated in a single product and are selectable, depending on system requirements. This design enables total system integrity and flexibility for the user. The diagram below illustrates the system layout.



## Pipeline Transfer System

The Oval AD2000 Remote Telemetry Unit can be used for monitoring pipeline flow conditions.

The AD2000 is able to perform supervisory controls via its in-built ladder logic, for example, by enabling the control sequences of control valve actuators. This Ladder Diagram functionality is enabled via the OvalMap2000+ software package which provides an easy to use graphical interface that runs on any Microsoft Windows platform PC (e.g. Windows 95, 98, ME, NT, 2000 and XP). A full range of math functions (including floating points), timers, counters, data shift, data move, normal Boolean logic as well as the addition of special function blocks allows medium task control logic to be achieved. Powerful copy and paste features allow common logic to be

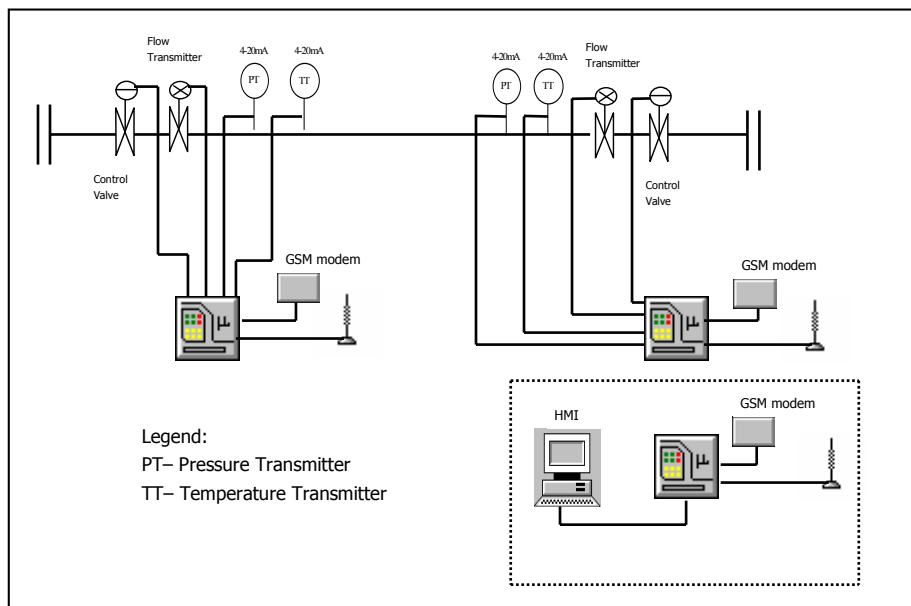
duplicated across the system.

The AD2000 is also able to perform pipeline leak detection by using data measured from various transducers installed along the pipeline. Flow totalizing is also possible. The control valves can also be activated by the digital inputs of the AD2000. If flow computers are installed the AD2000 can gather data from these via the RS232 port.

The system provides real-time and logged data back to the central monitoring system HMI display package. The AD2000 can readily interface directly to popular packages such as iFix, Citect, Wonderware, Cimplicity etc.

The radio system utilizes the internal digital data radio. Radio diagnostics are available and secure data transfer is achieved at baud rates up to 4.8kbps.

The diagram below illustrates an example system layout.



## WHAT IS AN AD2000?

The AD2000 is a Remote Telemetry Unit (an RTU) designed to allow the monitoring and control of remotely located equipment. By connecting two AD2000s together via a radio or telephone link (e.g. cable, GSM or CDMA) you can transfer the status information measured on one AD2000 to another. A simple application is to read a simple on/off switch input (e.g. a switch to start or stop a motor or pump) at one site to cause an on/off action at another site (e.g. a relay output to a motor control contact to start or stop the pump). More complex networks allow several AD2000 units to be connected via a communications



network to one master unit so that all the remote sites can be monitored at a convenient central location (such as your office). Large networks of several hundred AD2000s are possible but let's start small first!

The AD2000 units can monitor 8 analog devices (like level transducers, flow meters, temperature transmitters,

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## Tank Farm System

The Oval AD2000 Remote Telemetry Unit can be used in a tank farm environment where real-time readings (e.g. temperature and liquid levels) can be monitored and polled by the Oval AD2000, either instantaneously (as required by the operator) or at a preset time interval (periodically). An AD2000 is located at the remote field station and the data information is transferred via radio back to the control station, where another AD2000 unit is located.

The digital inputs on the AD2000 can be used as an on/off trigger for the alarm controls if the level reaches a certain set level. There is also the added feature of short message service (SMS) by the AD2000 to the system operators to notify them of the plant status if required. Various examples of different applications for tank farms using the AD2000 include

power stations, fuel depots, refineries, food industries and chemical plants. These can be networked across a wide area (using the PSTN dial-up or GSM/CDMA mobile phone networks) so that several regional tank farms can be monitored at the corporate head office.

All real-time trending of the data captured can be displayed on a HMI package. The AD2000 can interface directly to popular packages such as Citect, iFix, Wonderware, Cimplicity etc. The data can also be stored in the inbuilt data-logger and retrieved when desired.

The radio system utilizes the internal digital data radio. Radio diagnostics are available and secure data transfer is achieved at baud rates up to 4.8kbps.

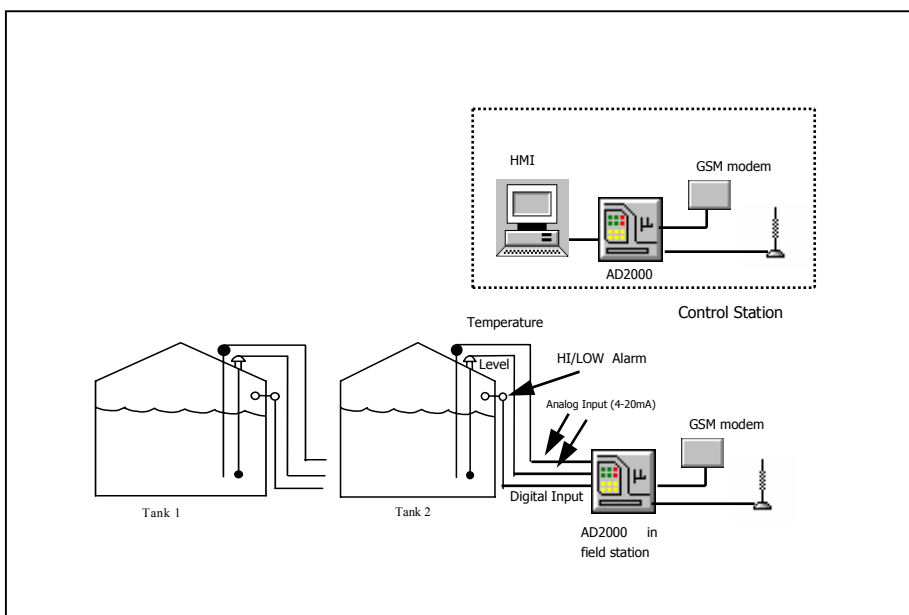
The diagram below illustrates the system layout.

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conductivity devices etc.), 16 digital inputs (switches and other on/off devices that indicate binary status) and 4 digital outputs (either relay or transistor). They can be connected to UHF radios for data transfer. These can be dedicated communication systems which require you to install all the radio infrastructure. This is an initial one off expense which varies according to the complexity of the radio regime but often can be paid back quickly because you own the network and will not be charged to transfer the data. Or you can use the GSM or CDMA mobile phone networks (you need only install the local antennae) but of course you then have to pay the on-going contract fees to the telecom carrier to use the service. There is also an in-built RS232 port for connecting to applications that run on your PC (for example to provide graphical representation of your system) or to external equipment such as a PLC and other intelligent devices (e.g. flow computer, Motor controller, power line monitor). An on-board PCMCIA slot also allows a range of PC cards to be inserted into the AD2000 (e.g. to enable connection to Ethernet networks).

Your field instruments are wired into the AD2000 via the screw terminals. The common interface standard for analog devices (such as level and flow transducers) is 4-20mA but others such as 1-5V or 0-20mA/0-5V or 0-1V for very specialised instruments are

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available. The two interface standards for digital devices (such as on/off indicators and limit switches etc.) are low voltage (10-50V ac or dc) and high voltage 60-130V ac or dc).

As well as the basic functions of transmitting data from one site to another, comprehensive programming is possible at each AD2000 via the OvalMap2000+ software. (This is a Windows application that runs on your PC.) This will allow local control logic to be performed at each AD2000 location. (For example, for tank control systems you can determine different levels to start and stop pumps and for leak detection in pipelines you can provide complex flow delay times before alarms are enabled.) Each AD2000 has an in-built real-time clock so you can also

program certain events to occur at different times of the day. Should you wish to record what happened at a particular time (e.g. when a tank overflows) the information can be logged to the in-built data-log memory which can be read at a later date or stored for your archives. You can log actual values, constants and even text strings (e.g. you can log the text string "Pump failed") or even a combination (e.g. "the Tank Level is high at 5.05m" where the level is the actual measured value at the time.)

When using CDMA or GSM modems, SMS messaging becomes possible. This allows you to have events such as fault conditions reported directly to your hand phone. The actual transducer value (e.g. tank level) can be embedded into the

message. A simple message syntax also allows remote setting of points at each AD2000 unit from your hand phone (so you can start and stop pumps from your phone). This can be PIN protected if you wish.

There are many possible uses of the AD2000 and several configurations are available. For further information, please email support@ovalasia.com.sg or call us on (65) 62661178 or go to the support page at our website www.ovalasia.com.sg where all the technical documentation can be downloaded. In addition, a 30 day trial version of the OvalMap2000+ software package is available for your evaluation.

## WHY USE THE AD2000? Because ...

- ... it is a unique RTU solution in a compact package.
- ... it combines the functions of an RTU, PLC **and** a data-logger.
- ... it is specifically targeted at low to medium I/O applications.
- ... it is designed for radio communications - compared to ad hoc PLC/radio modem solutions.
- ... it is **easy to use** - aimed at technician level not computer science level.
- .. it can be used with existing PLC infrastructure and takes away the hard work of setting up connectivity.
- ... it uses the latest wireless technology.
- ... it has a proven track record with 1000s of units installed.
- ... it includes additional features such as built-in SMS messaging.
- ... the protocols supplied do not cost any more to use.
- ... large multi-point systems can be designed in terms of **hours** not days, thereby saving on engineering design costs.
- ... you can start small and grow as your system requires.
- ... its **price** is competitive.

All information is supplied in addition to the full system documentation available with the OvalMap2000+ software and online at our website in Adobe PDF format. At all times please contact our support at support@ovalasia.com.sg should there be anything that you do not understand or feel needs explaining further. We welcome your feedback at all times.