

# The Sage Advisor

## SCADA, SECURITY & AUTOMATION NEWSLETTER

Volume 30, Issue 1 • Fall 2020

A Publication of Sage Designs, Inc.

### GeoSCADA 2020 Releases with Major Upgrades & New Features

Sage Designs is pleased to inform our customers of the release of GeoSCADA 2020! This major update to Schneider Electric GeoSCADA (formerly ClearSCADA) includes a bundle of hotly anticipated new features and improvements designed to improve and expand GeoSCADA's first in class functionality.

GeoSCADA 2020 now supports IPv6! This next-generation improvement over IPv4 can be enabled/disabled at both ends, and expands device support for this fast-growing new protocol.

Transport Layer Security (TLS) is now supported! TLS is available between clients and servers, and can be set at each end to assure identity. Additionally, permanent standby server security has been enhanced through refinements handling of permissions. Permissions can now be restricted by specific client type (e.g. ViewX vs Virtual ViewX). For ease of use configuration settings for these servers are now available through the main, with settings pushed to the permanent standby.

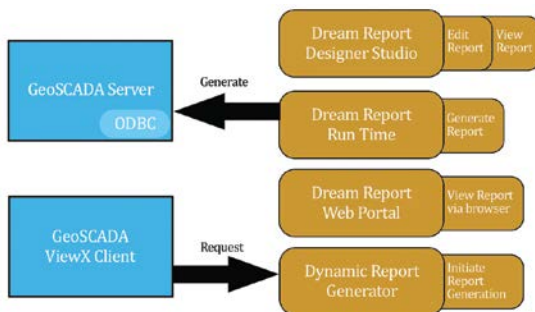
In GeoSCADA 2020, complete support for the SCADAPack 470/474 series has been built into the product. This mirrors the device profiles and communication presets already present for the SCADAPack 570/575 series that has been present in previous versions, adding hundreds of additional enhancements. Even more configuration features have been added for the entire x70 line of SCADAPacks within GeoSCADA 2020 – contact your Sage Designs representative for details on the new options! For more information on the SCADAPack 47x series, see our feature article elsewhere in this issue.

For those concerned with version upgrades, GeoSCADA 2020 now includes an automatic database backup on upgrade. This backup will by default save versioned current and configuration files to ensure system continuity. The range of the backup is configurable and can be disabled if so desired.

New Database performance displays now enable GeoSCADA 2020 users to find "noisy" data sources via a new page in the Server Status tool that shows live update counts with a 'Top 25' to highlight sources that may experience noise or have poorly configured point reporting. This can be used to find and change dead-bands, logging rates, and other sources of noise in your reporting.

In an improvement to ViewX, GeoSCADA 2020 now functions by single TCP Client Connection. ViewX clients now connect outgoing-only for security and ease of setup.

In a major new feature update, GeoSCADA 2020 is now available with full integration for Dream Reports reporting software! Dream Reports is a SCADA-oriented reporting

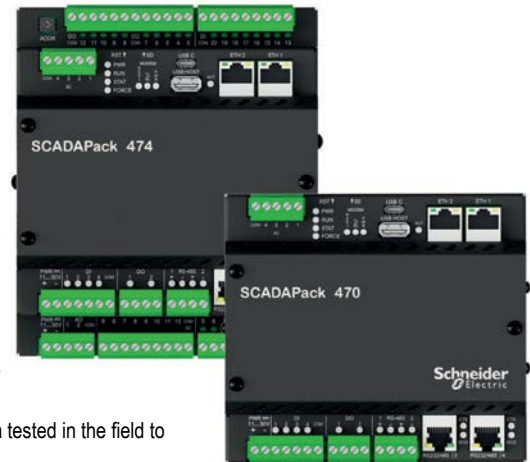


package that allows for the easy creation and propagation of powerful reports on your data. GeoSCADA 2020 integrates with Dream Reports through ODBC to generate Dream Report run time, and GeoSCADA 2020 ViewX clients can request reports from the Dream Report software.

[GeoSCADA 2020, Continued on Page 6](#)

### New SCADAPack 47x is High-tech and Low Cost

We are pleased to announce that the SCADAPack 47x, the newest SCADAPack in the x70 product lineup is now released and available for purchase. These much-anticipated models have completed not only an extensive factory testing process but have also been beta tested in the field to great success.



The 47x RTU is designed with a strong focus on both Cybersecurity and ruggedized communications. This hardware features conformal-coated boards and the wide operating temperatures of -40...70 °C (-40...158 °F) associated with SCADAPack RTUs, and while the hardware is a new product in the SCADAPack family, the RemoteConnect (RemoteConnect with Ecostruxure™ Control Expert "Unity Pro") programming and configuration software has been field proven in the 57x series controller over several years.

SCADAPack RemoteConnect configuration software facilitates configuration, logic development, and diagnostics in a single application, helping to reduce costs and overhead associated with maintaining multiple software applications for managing a single device. The SCADAPack x70 Logic Editor within RemoteConnect software features 5-language support for IEC 61131-3. The Logic environment supports on-line editing and diagnostics so your process need not be halted to modify existing code. The logic engine portion of the software is based on EcoStruxure™ Control Expert (Unity

Pro) software components, allowing for code reuse and sharing between Schneider Electric Modicon™ PLCs and SCADAPack Smart rPACs (remote Process Automation Controllers). In addition to the RemoteConnect, the 47x dual core architecture allows a separate operating system such as Linux to run simultaneously which allows for programming in other environments such as Python where the standard set of 5 IEC6-1131-3 languages won't meet your needs.

[New SCADAPack 47x Continued on Page 2](#)

#### Inside this issue:

- Enhancements to Trio Q-Series Radios
- Accutech Debuts New High Performance Batteries
- MQTT for the Municipal Industry
- How To Read HART data using Remote Connect
- Sage Designs Online Training Classes

The 47x features a flexible protocol implementation which allows the user to easily associate database objects including physical points and other configured objects with a DNP3, Modbus or both. The DNP3 Level 4 implementation supports multiple DNP3 masters and DNP3 routing. Modbus support includes a Master scanner which can be configured to poll more than 100 Modbus slave devices without programming and Modbus slave plus store and forward. The x70 controllers facilitate communications bridge functionality using either protocol. With its tagged (named) object database, logic programs become easily readable improving the configuration and debugging both configuration and logic programs. Importing and exporting of both configuration parameters and the object database increases engineering efficiency with the use of external templates and manipulation of configurations.

One of the great features of the x70 family of SCADAPacks, continued in the 47x series, is the ability to use the RemoteConnect software for configuration, diagnostics, logic development, and device management either locally through any of the communication ports (default: USB device port) or remotely through serial or TCP/IP networks. This feature also supports upgrading of SCADAPack firmware, 6000 series I/O expansion module firmware, HART device configuration through comms ports, and data monitoring via vendor supplied plug-in DTMs which allow Asset Management Software (AMS) TCP/IP network access to HART instruments and actuators via HART pass through. Some of the diagnostics include:

- View system information and status from object browsers within RemoteConnect software
- View advanced diagnostics using the Telnet command line interface, including

built-in protocol analyzers for DNP3 and Modbus

- Dozens of diagnostic details can be read through the RemoteConnect interface and can be added to the program as objects for use in programming and/or as SCADA variables

## SPECIFICATIONS

### Architecture

The Dual ARM® Cortex® A7, plus ARM Cortex M3 Processor runs at 500 Mhz and supports 4 MB battery backed static RAM (SRAM), 256 MB, dynamic RAM (DDR3) and 256 MB flash memory (NAND). Strong DNP3 support provides for a maximum of 40,000 DNP3 events. The 47x's database capacity is typically 15,000 objects with a typical maximum of 6,000 database objects linked with logic programming.

Maximum DNP3 Slave devices (polled by the SCADAPack when it is operating as a DNP3 Master), approximately 90 with a maximum number of DNP3 Slave objects (polled by the SCADAPack when it is operating as a DNP3 Master), approximately 15,000 across DNP3 Slave devices

Maximum Modbus Slave Devices when polled using the configurable Modbus Scanner6 is 150 with maximum objects mapped from Modbus devices 3,000.

File system storage is approximately 70 MB with USB host storage supporting a single-partition plug-in USB mass storage device with up to 32 GB with a FAT32 file format.

### Communications

Serial Ports: 1, 2: RS-485: 2-wire half-duplex operation, 4-pin removable terminal block with a maximum baud rate of 115,200 bps. Serial Ports: 3 and 4 are RS-232: Tx/D, Rx/D CTS, RTS, DCD, DTR or RS-485: 2-wire half-duplex operation, 8-pin modular RJ45 jack, maximum baud rate 115,200 bps.

Serial Port: 5 is RS-232: Tx/D, Rx/D, CTS, RTS, DCD, DTR with switched power out for modem, 350 mA available at RTU inputs voltage 12...24 Vdc, 8-pin removable terminal block under top cover. Serial Protocols supported are DNP3 level 4 slave/master and peer-to-peer, Modbus RTU slave/master.

The 47x has 2 Ethernet Ports. 8-pin modular RJ45 jack, 10/100 Mbps UTP (10/100 Base-T), transformer-isolated which can be configured either as switched or as independent ports. IP Protocols supported include DNP3 level 4 in TCP or in UDP Master/Slave and peer-to-peer, Modbus/TCP Server, Modbus/TCP Client, Telnet Server and FTP Server.

The USB Device Port is USB 2.0-compliant C-type receptacle which Supports communications at 1.5 Mb/s and 12 Mb/s. The USB Host Port is USB 2.0-compliant A-type receptacle which Supports USB mass storage devices up to 32 GB and Supports communications at 1.5 Mb/s and 12 Mb/s

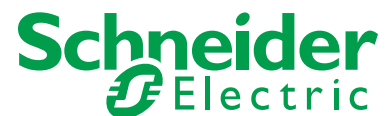
Optional terminal adaptors provide the possibility for drop-in wiring replacement of existing SCADAPack P1 or SCADAPack 32 (P4) RTUs. This approach can save substantial time and costs when upgrading existing panels to SCADAPack 474. The terminal adaptors provide pin headers that accept the older style 'gray' plug-in terminal blocks. The adaptors position the terminal headers to approximately the same physical position as they are on the existing SCADAPacks. If panel space allows, and the wiring scheme is compatible with the terminal adaptors, the SCADAPack 474 can be placed into the existing panel, and



existing wiring to the lower I/O board can be plugged onto the terminal adaptors without removing the wires from the terminal blocks. Your Sage Designs representative can provide further about ease of replacement using these terminal adaptors.

### Pricing

The SCADAPack 470 controller is being introduced with a selling price under \$1500, which is notably an even lower cost than the SCADAPack 350. This, coupled with the fact that the RemoteConnect and Unity logic for SCADAPack is free, plus the ability to remotely manage the hardware, makes these units an amazing value. Call of email your local Sage Designs representative today for a price quote or more info on this amazing new addition to the SCADAPack family!



## Schneider Electric Updates Legacy Product Options

After a thorough review of product options and sales, Schneider Electric is trimming several lesser-adopted product accessories from their lines. It is intended that streamlining the product lines to better reflect customer purchasing will lead to easier production, better focus on the products that are most important to our industries, and shorter production lead time. These changes affect several Sage Designs represented lines.

### Accutech

Accutech units will entirely phase out the

legacy polycarbonate housings as well as: Acoustic Monitor, valve controller, absolute pressure, and SS junction box options.

### SCADAPack

Effective September 30, 2020 the SCADAPack line will be removing the SCADAPack 100 series, a controller which is being replaced by the fantastic SCADAPack 470 referenced elsewhere in this newsletter. Sage firmly believes that this 470 option will be an improvement on function from the 100 and is excited to assist

any SCADAPack 100 customers with this transition!

SCADAPack 312, 314, and 333s will also be discontinued September 2020. The functions provided by these units will be better served by the SCADAPack 470. If you'd like a demonstration of the new 470, contact your Sage Designs representative today!

### SCADAPack Accessories

The following SCADAPack accessories have also been discontinued: SCADAPack

integrated Trio radio options, CO2 software, WITS communication options, 5902 Bell 202 modem modules, and I/O simulation modules.

These options and accessories have never represented a significant portion of the California/Nevada customer base and we are excited to see the increased speed and quality of production resulting from the streamlining of these products and the new products being made available.

# SCADAwise™ Training Classes

## GeoSCADA

## SCADAPack

### GeoSCADA Level 1 Training Course

Online Instructor-Led Classes, Ask your Sage Representative for Dates & Signup Info

- Day 1 (8AM - 4PM) Installing GeoSCADA, Introduction to GeoSCADA, Components, Using ViewX, Using WebX, GeoSCADA Help
- Day 2 (8AM - 4PM) Configuring using ViewX, Database Organization, Basic Telemetry Configuration, Creating Mimics, Creating Trends
- Day 3 (8AM - 4PM) Configuring using ViewX, Templates & Instances, Logic Languages, Security, Communications Diagnostics
- Day 4 (8AM - 4PM) Reports, System Configuration, System Architecture, Questions

**Cost:** GeoSCADA Training Course \$2,200

Sage Designs' GeoSCADA Level 1 Course has been certified by (a) the California Department of Public Health as courses qualifying for contact hour credit for Water Operator Certification for Drinking Water Treatment or Distribution in the State of California and (b) the State of Nevada Department of Environmental Protection, Bureau of Drinking Water for contact hours towards the Nevada Drinking Water Operator Certification Program.

**(28 Contact Hours)**

### Telepace Studio Training Course

Online Instructor-Led Classes, Ask your Sage Representative for Dates & Signup Info

- Day 1 (8AM - 4PM) SCADAPack controller operation, Series 5000 I/O, Telepace Studio introduction
- Day 2 (8AM - 4PM) Telepace Studio advanced programming techniques and advanced functions
- Day 3 (8AM - 2PM) Controller communications, Modbus Master/Slave protocol, Diagnostics, Modems

**Cost:** SCADAPack Telepace Studio Course \$1,650\*

\* You must have a licensed copy of Telepace Studio installed on your computer for this course. If you do not have a licensed copy, you may purchase one with the class at a special course price. Course price for Telepace Studio: \$610 + applicable CA sales taxes

Sage Designs' Telepace Studio Course has been certified by (a) the California Department of Public Health as courses qualifying for contact hour credit for Water Operator Certification for Drinking Water Treatment or Distribution in the State of California and (b) the State of Nevada Department of Environmental Protection, Bureau of Drinking Water for contact hours towards the Nevada Drinking Water Operator Certification Program.

**(14 Contact Hours)**

### GeoSCADA Level 2 Training Course

Online Instructor-Led Classes, Ask your Sage Representative for Dates & Signup Info

- Day 1 (8AM - 4PM) Installation, Understanding the Architecture of GeoSCADA, Application Design Considerations, Server Automation Interface, GeoSCADA Logic Engine, Using ODBC and SQL.
- Day 2 (8AM - 4PM) Advanced Mimic Design and Techniques, Data Grids and Data Tables.
- Day 3 (8AM - 1PM) Accessing Historical Data, Ad Hoc trends, Archiving

**Prerequisite:** GeoSCADA Level 1 Training Course

**Cost:** GeoSCADA Level 2 Training Course \$1,825

### Remote Connect & SCADAPack x70 Logic Programming

Online Instructor-Led Classes, Ask your Sage Representative for Dates & Signup Info

**Course Description:** This three-day hands-on course is designed to give each participant a detailed introduction to the SCADAPack x70 controller series (SCADAPack 47x and 57x) and RemoteConnect, its configuration and programming tool. Topics include system configuration using RemoteConnect to configure communications protocols, point addressing, and SCADAPack x70 variable types, introduction to the Unity based logic editor, and the use of scanners and function blocks to access remote data.

**Cost:** Remote Connect & SCADAPack x70 Logic Programming \$1,800

**(20 Contact Hours)**



**Schedule Your Own**

**ClearSCADA Test Drive**

### Free Hands-On Test Drive

Call to Schedule a Test Drive

Call 1-888-ASK-SAGE

email: [info@scadawise.com](mailto:info@scadawise.com)

**SAGE DESIGNS, INC.**  
SCADA & Security Products



Download the Registration form at: <http://www.SCADAwise.com>

**\* \* \* Registration Deadline: 4 weeks before 1<sup>st</sup> day of course \* \* \***

All registrations are subject to cancellation fees. A confirmation notice will be sent to all registrants on or before the deadline date.



## Enhancements to Trio Q-Series Radios

We are pleased to announce the Trio Q series have received new enhancements to their:

- Efficiency
- Security
- Regulatory Compliance
- Ease of Use
- Hardware Profile

These improvements are designed to increase data transmission throughput, increase compatibility with scalable cybersecurity management, decrease the impact of electromagnetic interference, better comply with industry standards for regulatory compliance, and be even easier to use.

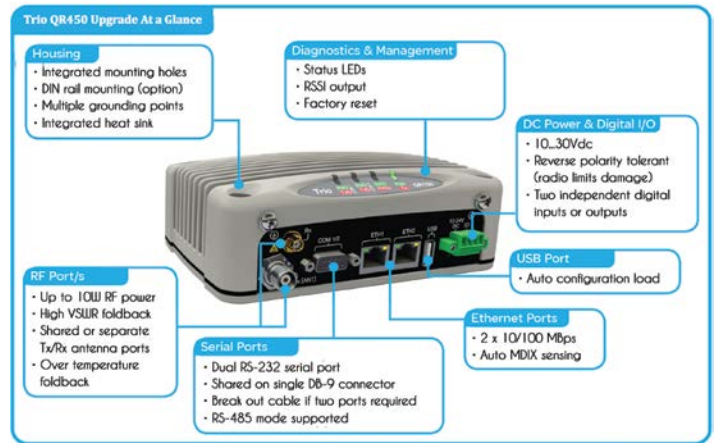
The new firmware enhancement will maximize data transmission throughput with QAM High-Speed Modulation for more remotes per base and faster poll cycles. QAM is expected to double the data rate of previous Trio Q radios. Combined with RoHC, throughput gains of more than 150% are achievable. QAM high speed modulation will allow for up to 60kbps in 12.5 channels and 120kbps in 25k channels, will be field firmware-upgradable, feature electrical noise-optimized forward error correction, and offers improved dynamic speed selection.

The update will also offer increased performance with Forward Error

Correction to increase system availability in electrically noisy operating environments, something which becomes more relevant by the day as electronic devices proliferate. The new firmware includes the addition of Collision Free Machine Learning Token Grant Channel Management (TGCM) to improve efficiency and increase system capacity. TGCM is a collision-free, low latency, channel management scheme. Smart machine learning algorithms are embedded in TGCM to optimize radio channel performance while providing a collision free experience. TGCM supports multiple store and forward system topologies and is ideal for traffic dominated by unsolicited messages (IEC-61870, DNP).

The firmware update will also provide Zero Touch Secure onboarding to further reduce installation time and cost. Secure onboarding will allow for change from factory default to field installed without the need for to connect a laptop or PC.

To better operate in scalable cybersecurity environments the new Trio Q firmware package will include Radio Access Control as well as RADIUS user authentication firewall, bringing alignment towards IEC 62443-4-2 Level 2. The firmware update to Trio Q security options will include a table of radios being communicated with, as well as



the ability to monitor SNR, QAM EVM & other new parameters.

As industry standards progress and evolve the Trio Q rises to meet the challenge! This new firmware update offers compliance with the following additional standards: ETSI RED 300 113 v2.1.1 in 12.5kHz channels (QAM), IEC 1613 / IEC 61850-3 Substation Hardness.

Additionally, the Trio Q remote will now be available with a Generation II hardware profile with additional options and advantages. The new hardware profile can feature an optional-configurable Rx antenna port, and two user-configurable Digital I/O points, dependent on selecting these options at time of order. It will also feature on

all units easier-to-view LED indicators, enhanced cybersecurity with FIPS Level 2-Certified Trusted Platform Module, and a larger heat sink to allow for improved transmit duty cycle. This new hardware profile will be offered in tandem with the original Trio QR hardware profile, and new profile units will be fully compatible with their predecessors for those looking to mix and match within an existing system.

Impressively, these new and improved units are being offered at the same price per unit as the original Trio QR. Contact your Sage Designs representative today to learn more about this no-charge additional value!

## Accutech Debuts New High Performance Batteries

Effective immediately, all standard Accutech transmitters will be shipped with double the internal energy than previous versions. They will now have 38 amp-hours via dual-cell D packs. This improved battery life is a product of WiSTAR architecture and a new certification process. There will be no change in transmitter form factor as a result of this improvement, nor will there be any change in list price for the increased ability. All product PID numbers will remain the same, and there is no action required to take advantage of this greater ability.

This program does not have an effect on existing dual-cell or quad-cell battery packs. Current Accutech transmitters (already in the field) do not receive any performance enhancements through this program. However, we are extremely happy to announce that the upgraded battery packs are compatible with existing sensor units. Subsequent orders for battery pack replacements will be routed to the new longer-life packs, and offer the same benefits. Please note that these battery packs will only operate in the current aluminum housing units, and will not be

compatible with the old polycarbonate housings.

While there is no part number change for the sensors themselves, Schneider Electric will be retiring the TBUM297900 part number currently used for battery replacement units and replacing it with TBUM297531 for these double-capacity upgraded units. Cost per unit will be slightly higher, but each purchase will represent a net cost savings vs purchasing the equivalent energy via the previous units.

If you have questions about your currently installed Accutech units, or would like to investigate their new longer independence for your applications, contact your Sage Designs representative today!



**Schneider Electric**

## GeoSCADA 2020 Releases with Major Upgrades & New Features continued from page 1

For your convenience, Dream Reports is now available through Sage Designs as well. Contact your local Sage representative for a quote today!

Virtual ViewX has been improved to allow document downloads through the web client. Where these had previously been limited to local to the Virtual ViewX server, GeoSCADA 2020 offers additional convenience for things like pdfs linked from mimics or Excel files created by scripts in your ViewX software. System settings control has also been implemented to control for allowed and disallowed file types (i.e. the ability to disallow executable files).

In a much-requested cosmetic improvement, Mimic and Trend displays in GeoSCADA 2020 now have configurable tab names. All items can now have an alternate name to assist in your on-screen organization. For those with the GeoSCADA Mobile Option, Search and the ability to execute Methods like RTU refresh have been added to that interface. Users can now find objects by part of name and perform actions/navigation on found items within the Search feature. The Method feature now allows Call functions on any object, the

ability to configure all objects and methods in advance on the server, and checks all user privileges while logging all actions.

For those interested, GeoSCADA 2020 now includes drivers for Allen Bradley Micro800, CompactLogix, and ControlLogix with tag browsing. These will support Analog, Digital, and String data. Tags read can be arrays or structures. Clock settings is supported, as is faster scanning with multi- and large packet support.

For information on GeoSCADA 2020 upgrades or new installations, contact your Sage Designs Representative today!

**Schneider Electric**

## How to Read HART Data Using RemoteConnect

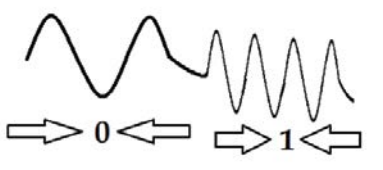
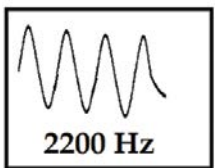
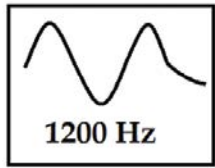
This will be a quick guide to help you read HART data using Remote Connect. The SCADAPack x70 family of controllers (570/574/575 and the newly introduced 470/474) uses the 6602 expansion module to read HART data.

In addition to receiving your usual sensor data for flow, temperature, etc, by using both frequencies you will now be able to get digital data such as tag name, calibration settings, or sensor diagnostics. You will also be able to do loop integrity validation, lowering maintenance costs and improving reliability for your system. All with no retrofitting of your existing analog wires!

Remote Connect is FDT 2.0 based on FRAME that offers a Unity Pro based logic engine. It offers an open standard IEC 61131-3 programming environment with support for: ladder logic, structured text, instruction list, sequential flow-chart diagram and function blocks. It supports Modbus and DNP3 (up to Level 4 Secure Authentication.) All SCADAPack x70 Controllers use Remote Connect for programming including the SP 570/574/575 and the 470/474. Best of all remote Connect is free to download and use!

HART (Highway Addressable Remote Transducer) is a hybrid analog/digital industrial automation open protocol created in the 1980s, becoming an open protocol in 1986. Typical analog wires can only send one unit of data at a time. However using Audio Frequency-Shift Keying (AFSK) allows for the ability to send both digital and analog data over that same wire. By using two different frequencies and assigning a 0 or 1 value to the different frequencies you're able to send both analog and digital over the same line.

First, let's pull up the information on the



"real." Hit ok and then apply. Let's go back to the objects browser in the online diagnostics to see the values of the sensor you have connected to your 6602.

6602 module through the Help section. On the top ribbon, click on the drop down arrow next to the "?" mark and choose "Help". You can then search "About the 6602" to find the section the

documentation that describes the module and its two variations (with and without Analog Outs.) The 6602 Module has 8 analog in and 4 optional analog out. There is a limit of one 6602 module per SCADAPack.

Now let's create a project and add a 6602 module to the project. Create a new project, and once you're done setting up with your preferred configurations under the confirmation tab select "Physical I/O" then "local."

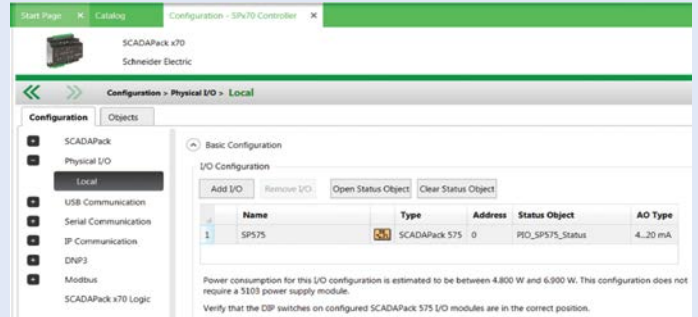
Select "Add I/O" and choose the 6602 Module from the drop down. Note that there are two 6602 variations. For the purpose of this demonstration we'll use the module with no analog outs. We'll leave the configurations in this window as is. Hit ok and you'll get a pop up window asking if you would like to make the object associations be manual or automatic. We'll select automatic and leave the DNP3 and Modbus numbers unassigned.

Next we will go to the objects tab and add an object browser specifically for the 6602. Click on the objects tab, then object browsers and select "add browser." Name this browser "HART" hit enter then click on the green arrow to go into that specific browser. Select "add entry" instead of adding the objects one at a time we can select all the objects that are part of the group. Select the option to add all objects in the group and hit apply changes.

At this point you can write the configurations down to the SCADAPack and go online with the RTU. Under online diagnostics, select the objects tab and then in the object browser select the browser name HART.

We will now change the format the data is shown from integer to real values and add scaling. Let's go back to the Configuration tab, Objects, Object Browsers, HART. Double click on the first Analog Input and change the display format to "real (Eng)" and hit apply. Now select object configuration, scroll down to the HART module and double click on the first Analog Input. Change the logic variable type to

Now we will create an animation table in the logic editor to see the values and explore some of the preprogrammed function blocks for HART. Open up the logic editor and click on "derived variables"

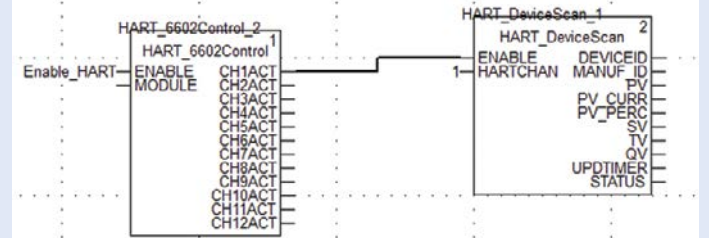


within the folder structure of "Variables & FB instances." This brings up the IO points of our project. Right click on the HART analog input we have configured and choose "initialize animation table." At this point you can rename the animation table if you desire. To see the live data in the logic editor we need to go online with the SCADAPack. Click on "mode" from the top ribbon and select "connect." We now see the live data in the animation table.

We will now take a look at the HART function blocks. Start by once again opening up the Help menu. Type in "HART Function Blocks" into the field. Similar to Google, if you use the quotation marks when you search it will search for the whole phrase and not just for the three individual words. You should now be looking at the page with the three function blocks listed: HART\_6602Control, HART\_Command and HART\_DeviceSCAN.) You can click on any of the links to give you more in depth information on each individual function block.

Remote Connect will then ask you if you'd like to create a variable out of it, select yes. Now let's set this variable to be 1 so that it begins scanning right away. Double click on the Elementary Variables selection under Variables & FB Instances. In the column for Value of the variable we created type in the number 1. Let's go back to the function block we're creating and right click again to bring up the FFB Input Assistant. This time we'll type in the HART\_DeviceSCAN, place this FB on the editor. And link CH1ACT to the Enable Input of this function block. For HARTCHAN enter 1.

Under Build in the ribbon select Analyze Project to make sure there are no errors and go back to the configurator and write everything to the device. Now let's connect to the SCADAPack. Under Mode select Connect. It will take a couple of minutes for this process to complete and you should start seeing data.



Let's create a Function Block to read data from the device you have connected to your 6602 module. Open the logic editor and add a new section under Project>Program>Tasks>M AST>Sections and call this "HART\_Reading" and select FBD (Function Block Diagram) as the programming language. Right click on the editor page and select FFB Input Assistant. Since we know the names of the functions blocks we want to use thanks to the previous Help article we read we can type those names into the FFB type field. We'll start first with HART\_6602Control. Hit ok and place it in the editor. We need to enable the function block to scan for HART devices. Double click on the Enable input line and type in "Enable\_HART"

You are now properly set up to read HART data from your device. With the SCADAPack x70 controllers and a 6602 Module you can easily tap into the benefits of your HART devices. The 6602 Module has 8 Analog Inputs and 4 optional Analog Outs. Please reach out to your local Sage Designs representative for inquiries into x70-series controllers, 6000-series modules, or our online Remote Connect class.



# MQTT for the Municipal Industry



While many larger municipalities have full blown SCADA systems monitoring their larger sites, there are many smaller sites and many smaller municipalities of under 1000 people that cannot justify or afford the cost of a SCADA system with an HMI computer, radios, and communications infrastructure.

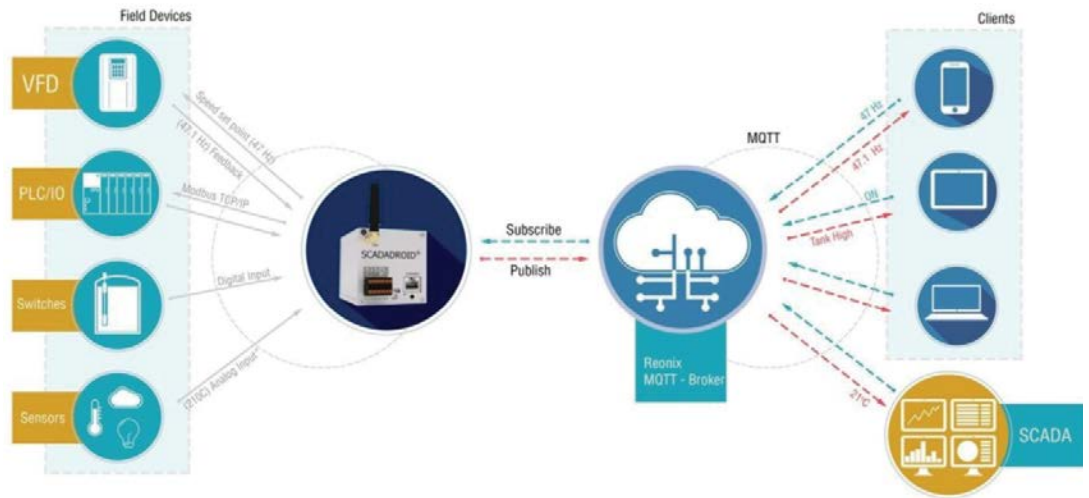
MQTT (Message Queue Telemetry Transport) has opened a whole new world of applications allowing even the smallest hamlets and communities to be able to monitor their lift stations, and pumping stations real time.

One of the methods of reading data from and writing data to the SCADADroid is through MQTT.

The center of any MQTT system is the MQTT broker as shown in the diagram above. SCADADroid has been tested with a variety of brokers including Chariot from Cirrus-link, and the open source Eclipse Mosquitto broker.

When a device needs to send data to the broker, it is said to publish data. These devices are typically referred to as Edge devices as they reside at the end of the internet. Clients subscribe to the broker to tell the broker which information they would like to receive when a device publishes it. Most IIoT (Industrial Internet of Things) Edge devices can only publish to a broker. The SCADADroid can both publish and subscribe as illustrated above. This allows the user through one of the clients to both monitor the pressure, as well as to send a pressure setpoint to the SCADADroid, all through MQTT.

The SCADADroid uses configuration tabs and menus to set up the MQTT parameters such as user name and password, and security certificates if required. Tags are scaled and units are assigned in the SCADADroid. The scaled value, and the units (i.e. PSI) will be published to the broker on either change of the pressure by a certain amount or on a periodic interval, all configurable in the SCADADroid. This is one of the strengths of the SCADADroid



in that no programming is required, and no software needs to be installed to configure the SCADADroid for MQTT. Further information on the SCADADroid MQTT may be found on the Reonix website or by asking your local Sage Designs representative.

Once published, many services are available to view and collect the data. One of these is the SCADADroid dashboard. This is a cloud based service from Reonix and can be used if a customer wants to use an MQTT broker with no setup or technical expertise. It is used here as an example of what can be done, but some Reonix clients have developed their own MQTT system which they own outright and pay no recurring fees to Reonix.

MQTT client programming development tools are widely available for little to no cost. Additionally, new tools make it easy to make one application that can be an app on the Apple Store, Google Store, or used in a web browser on a computer. This is the case with the SCADADroid dashboard.

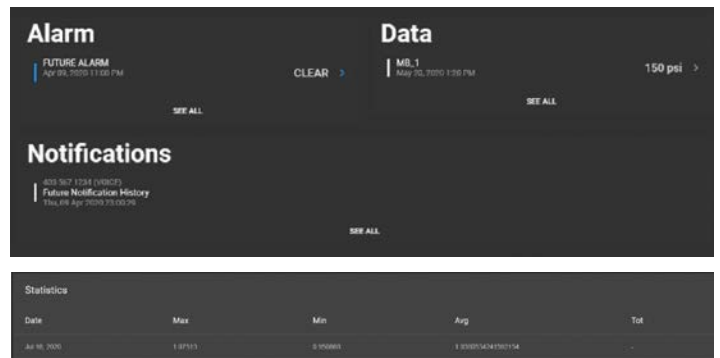


No matter which app or browser is used for the SCADADroid dashboard, upon logging in, users see a map with their stations identified. A blue check

mark means that there are no alarms at the station, and the SCADADroid is communicating. A black circle with a line through it means the system is offline. A red circle means there is an unacknowledged alarm at the station, and a yellow circle means that there is an acknowledged alarm at the station.

Clicking on the circle will bring you to the Data page of the station. It will display the last transmitted tag name, values and units as configured in the SCADADroid.

the dashboard will calculate the daily minimum, maximum, and average value of the value. This is useful in water systems for monitoring min and max chlorine levels, or maximum turbidity values as an example. If the dashboard finds an analog value that has a rate, as indicated by day, hours, second etc., it will also totalize that analog value. These values show up as a daily record which may then be exported to a CSV file that can be imported into excel.



In this case, the tag MB\_1, the value of 150, and the units of psi are automatically picked up from the broker that picks it up from the published information from the SCADADroid. From here, MB\_1 can be added to a trend, or a table. Trends and tables are useful because they can display data from multiple stations at once. For instance, you can monitor all the levels across the system for the wetwells in one location and monitor how the levels track through the system.

For each analog value, whether from the analog inputs on the SCADADroid, a Modbus TCP/IP connection from a PLC, or a Modbus RTU Serial device like an ultrasonic level transmitter,

For discrete values, such as pump run status, the minimum, maximum and average on time is calculated as well as the number of cycles. This is useful for lift stations, and monitoring pump performance. On a two or three pump lift stations, as it shows when pumps are not performing well as compared to the other pumps.

If you would like to know more about the dashboard, MQTT, it's performance and history, contact your Sage Designs representative who can answer your questions and connect you with the full white paper.

## Sage Designs Completes First Online Training Classes

Sage Designs has proudly offered in-person training classes helping our customer base receive quality training and earn Continuing Education units for over 17 years. In early 2020 we had just completed one of these classes and were about to start another, when the first lockdown order forced cancellation of all upcoming classes. With no indication of when lockdown orders would be lifted we knew we had to innovate in order to keep the industry informed. The result: We have combined physical, digital, web-based and cloud technologies to improve the overall experience of all our courses.

### Telepace Studio Ladder Logic

We asked our customers what they valued about Telepace training, and the answer came back loud: Hands-on experience. With this in mind we created our "hands-on-line" training model that continues to offer a hands-on experience while also creating time, cost, and safety advantages that lockdown-proof our course. What does this mean? All Telepace students are shipped a training

package which includes a pre-wired RTU and I/O simulation kit, as well as course materials and our traditional Sage promo giveaway pack. If we can't get your hands to the RTU, we'll bring the RTU to your hands!

Even keeping this hands-on experience we knew the transition would only be successful if we could continue the high quality of our instruction experience. Where other companies have resorted to YouTube videos and other recorded materials, we know our industry expects better. We searched high and low for the instruction methods and tools that would allow us to do that. The result? Our Telepace classes continue to be led by a live instructor and are still limited to the same number of trainees per class to ensure that personal attention is paid to all participants. Trainees are able to see the instructor, their programming screen, and white board at will and are able to share their own programming windows to get the individual attention required to solve difficult problems.

### RemoteConnect

For our newest and most exciting course

we are using the hands-on-line model to get state of the art SCADAPack x70-series controllers into the hands of our trainees. We are continuing to offer the same personalized instruction and limited class size of all Sage Designs trainings.

This latest addition to our course roster was developed with input from Sage Designs' own Tony Sannella, who has continued to improve on the course design by incorporating feedback from our trainees and customers to supplement the basic manufacturer materials with additional content. This helpful addition to the course contents, created to address questions left by the basic materials, is currently exclusive to Sage Designs classes but will eventually be found in an updated version of the manufacturer's manual. We are excited to be on the front line of content creation, and to be able to share that with you our customer!

While these classes are relatively new they are proving to be exceedingly popular, and will only become more so with the release of the SCADAPack 470 Remote

Connect programmed RTU mentioned elsewhere in this newsletter.

Sage Designs is proud to have offered training services for nearly 17+ years and is excited to offer classes in this new form. We have completed one session each of Telepace, GeoSCADA, and Remote Connect and received high reviews from all trainees.

We are also hearing from trainees about an incidental benefit; that they are more able to get training approved when the budget only requires the cost of the course instead of course cost plus hotels, travel, and meals. We encourage you to ask your local Sage Designs representative about the availability of our new online training courses, and to reserve a seat today!



## Pill SCADAWise BOX

The Pillbox™ is a self-contained housing for field installation of electronics packages that need protection from the elements as well as unwelcomed attention. Inside, there is up to 3 sq. ft. of panel space with 3' of mounting DIN rail for mounting equipment and 3' of wiring Panduit. The equipment panel slides in behind the retainer system which allows for easy removal of all mounted components. The bottom of the retainer system includes a battery tray allowing the removal and service of the batteries without tools for disassembly.

✓ Easy to Install

✓ Tamper-resistant

✓ Low Maintenance

✓ Engineered Solution

For more information contact:

**SAGE DESIGNS, INC.**

SCADA & Security Products

150 Shoreline Hwy., #8A

Mill Valley CA 94941-3634

1.888.ASK.SAGE

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



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Mill Valley, CA 94941-3634

Return Service Requested

♻️ SAVE A TREE

# The Sage Advisor

SCADA, SECURITY & AUTOMATION NEWSLETTER

## Calendar of Events

With the current bans on large gatherings, all regular events are, unfortunately, cancelled.

Sage Designs hopes that these events are able to be restarted as soon as possible, and looks forward to seeing you again.

In the meantime we continue to be available to (safely) visit your location when allowed by the COVID safety rules of your organization.

We are also available by phone and web to continue to serve you. We are generating copious online content and invite you to join one of our webinars or meetings.

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### SCADA

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SCADAPack RTU/PLC Controllers  
RealStream Lift Station Solution  
Pillbox Ruggedized SCADA Enclosures  
WIN-911 Alarm Notification Software  
ScadaDroid Alarm Dialer  
Dream Report Industrial Report Generation

### WIRELESS

Accutech Wireless Instrumentation  
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