tManager Details and Best Practices
Topics

• System Architecture
  – Projects
  – Configuration Software
  – Adapters, Endpoints, Triggers, Maps & Message Path
  – tManager Limits
  – Email Notification Adapter
• XML Schemas and Columns
• Search & Replace
• Supervisory Controller
• Appliance and Project Modes
• Trigger and Endpoint Configuration Options
• Best Practices
• Using Non-RA Controllers
System Architecture: Hardware Connections

Enterprise/Business/Plantwide Systems

- Computer System
- Ethernet or Rockwell Bridge
- Ethernet

Plant Floor

Rockwell Automation
- ControlLogix
- CompactLogix™
- FlexLogix™
- SLC 500
- PLC-5
- MicroLogix 1100 & 1500

Schneider
- Modbus TCP/IP
- Quantum

Siemens
- Industrial Ethernet
- S7-300
- S7-400

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Computer Adapters

- **Database**
  - Microsoft SQL
  - Oracle
  - My SQL
  - IBM DB2
    - AS-400
    - System I
  - Reference KB #159 for supported versions

- **Messaging**
  - Red Hat Jboss JMS
  - IBM WAS JMS

- **Communication**
  - TCP/UDP
  - FTP
  - Bi-Directional Email
    - SMTP outbound included with all adapters
System Architecture: Configurable Elements

Automatically Found
- Database Tables
- PLC Tags

What You Define/Configure
- Message Paths
- Triggers
- Endpoints
- Maps
System Architecture: Projects

- **Projects** -- containers for adapters, maps and message paths
- A tManager configuration can have 1 or more projects
- Benefits of multiple projects:
  - Can divide the triggers and associated message paths by functionality or location, for ease of support
  - Can start and stop transactions as a group
- Non-automation adapters (such as databases)
  - Defined in every project where they are required
- Automation Adapter
  - Controller configurations are defined once, and then are available in all projects
System Architecture: Software Programs

- **Project Editor**
  - Create and edit adapters, triggers, endpoints, maps, and message paths
  - View status information for triggers and endpoints within the project
  - Use the **Tag View** screen to view and change the values in controller tags
  - Edit multiple projects at the same time by opening multiple instances of the *Project Editor*
    - Although multiple people can monitor/edit the same project, locks prevent the same element from being edited

- **xATM Manager**
  - Perform administrative functions
    - Configure and troubleshoot network settings
    - Backup/restore
    - View System Limits
    - Time Synchronization
    - License Management
    - Configure System and Audit Logs
    - Update firmware & create support files
    - Configure users
  - View, copy, rename and start/stop all projects on the appliance
  - View trigger and endpoint status information for the entire appliance
System Architecture: Adapters

- **Adapters** define where the data is going to or coming from
  - Each tManager includes licenses for an Automation Adapter, an Email Notification Adapter, and 1 or more Database or Messaging adapters
- The adapter configuration screens differ depending on the type of adapter
  - **Automation Adapter**: view and configure (assign names and timeout values) controllers and associated bridges
  - **Email Notification Adapter (described later)**: import the schema to be used for the email message
  - **Database Adapters**: define the host IP address & port, database name, & username/password
    - For each license (MSSQL, Oracle, etc) you can define multiple adapters pointing to different databases
- Adapters are containers for triggers and endpoints (described next)
## System Architecture: Default Adapter Ports

<table>
<thead>
<tr>
<th>Adapter</th>
<th>Default Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSSQL</td>
<td>1433</td>
</tr>
<tr>
<td>Oracle</td>
<td>1521</td>
</tr>
<tr>
<td>MySQL</td>
<td>3306</td>
</tr>
<tr>
<td>DB2</td>
<td>446</td>
</tr>
<tr>
<td>JMS (WAS)</td>
<td>2809</td>
</tr>
<tr>
<td>JMS (JBoss)</td>
<td>1099</td>
</tr>
<tr>
<td>WMQ</td>
<td>1414</td>
</tr>
<tr>
<td>FTP</td>
<td>21</td>
</tr>
</tbody>
</table>
System Architecture: Automation Adapter / Automation Tree

<table>
<thead>
<tr>
<th>Color</th>
<th>Status in the Automation Tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>Core item label</td>
</tr>
<tr>
<td>Brown</td>
<td>Item can be configured, but is not yet configured</td>
</tr>
<tr>
<td>Green</td>
<td>Item is configured</td>
</tr>
<tr>
<td>Red</td>
<td>Item is configured &amp; has an error</td>
</tr>
<tr>
<td></td>
<td>NOTE: Cursor over the module to see the error</td>
</tr>
<tr>
<td>Gray</td>
<td>Item is in the rack/bridge but cannot be configured</td>
</tr>
<tr>
<td>Blue</td>
<td>Item is a driver</td>
</tr>
</tbody>
</table>

In this example, the local rack item can be configured, but is not yet configured.
System Architecture: Endpoints

- **Endpoints** -- define the characteristics of the data transaction
  - Associated with an adapter
  - Configuration Options (defined later)
    - All endpoints: Transaction Logging, Store & Forward, Status Tags
    - Non-Automation endpoints: Failover
    - Automation endpoints: Flow Control
System Architecture: Triggers

- **Triggers** -- specify when data is transacted from the controller to the business environment or from the business environment to the controller
  - Three Types: **Periodic, Scheduled**, or **Event** (based on message instruction Enable bit)
  - Can add the following conditions to all three types:
    - Always, Never, Change, LT, LTE, GT, GTE, EQ, NEQ, BAND (bitwise AND)
      - Comparisons can be between 2 tags, or between a tag and a constant
  - To periodic triggers, can also add edge-triggered conditions:
    - ELT, ELTE, EGT, EGTE, EEQ, ENEQ, EBAND
  - Configurable **Scan Period** $\geq 250$ ms
    - Recommend $\geq 1$ second (default) since the tManager is targeted for transactional applications
System Architecture: Maps

- Maps -- used to define the specific data that is transferred to or from the controller
  - For databases, specific controller tags are connected to columns in a database table, or to stored procedure inputs and outputs
  - Can add Functoids (KB # 151), Constants and Macros (KB # 166) to maps
  - Functoids are dropped between the input and output sides of a map, and allow you to perform operations on inputs before they are written to outputs. Online Help has a list and description of all the available functoids
System Architecture: Message Paths

- **Message Path** – used to link trigger sources to endpoint destinations with a map
  - If multiple triggers are used, the map will execute if any 1 of the triggers fires
  - The same trigger can be used in multiple message paths
- The **View SQL** button displays the SQL code generated by the tManager
  - Can copy and share with IT
System Architecture: tManager Limits

Configuration Software
There is no limit. You can install the xATM Manager & Project Editor software packages on multiple systems

Appliance Configuration
The following limits are enforced on the tManager. These counts are cumulative for the entire appliance. For example, you can have several projects that combined have 25 triggers or 1 project with 25 triggers.

Max Projects = 8
  Max Triggers = 25
  Max Endpoints = 25
  Max Maps = 25
  Max Paths = 25
Max Adapters = 16
  – Each adapter definition for a database, JMS, etc uses one of these adapter counts
  – Although the Automation Adapter is only configured once and is used across all the projects, it uses up 1 of the adapter counts for each project. For example, if you have 8 projects, only 8 of the available adapters will be available for non-automation adapters
  – Any combination of any licensed adapters can be used in a project

Max Automation = 32
  – The Automation Adapter contains an Automation Tree. Inside this tree, you may be connected to a maximum of 32 controllers.
  – Recommend maximum = 16 controllers (including all Rockwell, Siemens, and Schneider controllers)

Tag/Variable Count Limit = n/a (there is no tag limit)
System Architecture: Email Notification Adapter

- You can gather information and then use the tManager’s Email Notification Adapter to place that information into the body of an email. For example, an email can be sent when equipment parameters go out of range, and the email can include the parameter numbers
  - The adapter connects to a SMTP server to send the email
  - An Email Notification Adapter license is included at no additional charge with every tManager
  - The Email Notification Adapter counts towards the tManager Max Adapters limit
  - This adapter does not need to be defined in order to send out Store & Forward notifications or System Log Error notifications. Those work independently

- When the Email Notification Adapter is created, you specify the schema to be used for the email message
  - Example schemas are in the \My Documents\My eATM tManager\Files folder
  - A formatted ASCII schema is the easiest to use

- The following slide shows the Email Notification adapter and endpoint configuration screens, a sample formatted ASCII schema, and a sample map

- For additional information concerning the Email Notification Adapter, go to http://kb.oldi.com and look at answers 58 and 73
System Architecture: Email Notification
Creating XML Schemas from UDTs or Arrays

- You can create an XML schema from an array tag or UDT (user-defined data type) tag by right-clicking on the UDT or array in a Tag List and selecting **Generate XML schema from type**.
- The new XML schema will be imported into the tManager and listed in the **Schemas** section of the **Navigation Pane**.
Mapping a UDT or Array Tag into an XML Database Column

• Before an XML database column can be used in a tManager map, you must attach an XML schema to the database column
  – Locate the imported schema (previous slide) in the Schemas Navigation page
  – Drag the schema over the XML column in the database table
  – If you hold the cursor over the xml type you will see the XML schema that is linked to the XML column

• To map control data to the XML column, drop a controller tag defined as a UDT or array onto one side of a map, and the XML column to the other side.
  – Drag a connection between the controller tag and the XML column
  – When this map is used, the data from the controller structure will be converted to XML and written into the XML column
Search & Replace

- The **Edit ➔ Search and Replace** pane allows you to quickly replace items in the tManager configuration based on textual matching.
- Can replace:
  - Tags
  - Database Columns
  - Procedure Parameters
  - Database Tables
  - Procedures/Functions
  - Maps
- In the **Replace** text box:
  - use the '?' character as a wildcard to match single characters in the search
  - use the '*' character as a wildcard to match any sequence of characters in the search
• Items are shown in light gray if they exist in the configuration and there are no errors in replacing them
  – These items are displayed in light blue when they are selected.

• Items are shown in pink if they have an error (such as the item does not exist in the configuration or the replacement is invalid).
  – Hold the cursor over the item to see the error text. These items are displayed in red when they are selected.

• In this example, the replacement tag `model2` does not yet exist in the controller.
Supervisory Controller -- Benefits

• A Supervisory Controller can control and retrieve status information from the tManager
  – Can be any PLC or PAC that’s configured in the Automation Tree

• Communication supported between the tManager and Supervisory Controller includes:
  – tManager status feedback
    • Run
    • Halted
    • Suspended (free memory on the appliance went below 10% and has not returned to 15% or greater)
  – Store & Forward active signal (i.e. If communication with one or more devices is timing out)
  – Error notification (if there are one or more errors that need attention)
  – Ability to restart the appliance and change its status to/from Running and Halted
  – Ability to Start/Stop individual projects
  – Ability to reset to the tManager to factory defaults:
    • IP address (192.168.1.254)
    • Username and password (admin / admin)
  – Free running counter showing the tManager’s heartbeat
Supervisory Controller – Control Methods

• ControlLogix and CompactLogix controllers
  – Communication can be over the backplane or EtherNet/IP
  – Choose the Backplane or EtherNet/IP Control Method
  – Configure an Add-on-Profile (AOP) in RSLogix5000

• Other controllers
  – Choose the Controller Tags Control Method
  – Define a Control Tag (3-element array of INT32s) and
    Status Tag (4-element array of INT32s), which will be used
    to map Supervisory Controller commands and status

• Supervisory Controller Quick Start Guide
  – Answer 88 in the OLDI Knowledgebase (http:\\kb.oldi.com)
  – Has detailed setup and usage information, including
    examples and a detailed description of the Control and
    Status tags
Supervisory Controller – Add-on-Profile

- If you are using the **Backplane** or **EtherNet/IP Control Methods**, you need to configure an Add-on-Profile in the **RSLogix5000** software.
- Refer to Online Help or the *Supervisory Controller Quick Start* for detailed instructions.

![Diagram of RSLogix5000 configuration](image)

- Under the **Connections** tab, set the **Requested Packet Interval** to:
  - 20 ms or greater if the tManager is in the same chassis as the controller. 50 ms is recommended.
  - 150 ms or greater if the tManager is not in the same chassis (for example, over EtherNet/IP).
Supervisory Controller – Controller Field

- **Controller** field on the **Supervisory Controller** configuration screen:
  - Contains the name of the current Supervisory Controller
  - Is automatically populated after you select a **Control Method** and press **Apply**
    - Contains **Controller tags** if the **Controller Tags Control Method** is selected
    - Contains **Controller not connected** if an Add-On-Profile has not been properly configured in any of the controllers connected via the selected **Control Method**
    - Contains **Controller not configured** if the controller connected to the tManager via an Add-On-Profile isn’t configured in the tManager’s Automation Tree

- Configuring a CompactLogix as a Supervisory Controller
  - At this time, the **Controller** field will contain **Controller not configured**, even if the CompactLogix is configured in the Automation Tree
  - To verify it is working properly, view the **Supervisory Controller Free Running Counter** on the **Status** screen in the eATM Manager software
Modes: tManager Appliance Modes

- **Run**
  - When the appliance is in **Run** mode, all projects, triggers, and endpoints can be individually stopped or started
  - The STS LED on the tManager will be solid Green

- **Halt**
  - When the appliance is in **Halt** mode, all projects, triggers, and endpoints are stopped
  - The state that each project, trigger and endpoint was in before the appliance was put into **Halt** mode is remembered and called the desired state
    - If the desired state is **running**, it is displayed in gray
  - While the appliance is in **Halt** mode, the desired state of a project, trigger, and/or endpoint can be changed
  - When the appliance is put into **Run** mode again, each project, trigger, and endpoint is put into its desired state
  - The STS LED on the tManager will be blinking Green
Modes: tManager Appliance Modes, cont’d

- Suspended (rare)
  - Happens when the free memory on the tManager decreases to less than 10% of total memory. The xATM Manager Status screen shows the Free Memory usage
  - An event is logged in the system log, & the needs attention indicator is activated
  - All of the triggers and endpoints are suspended (stop running)
  - If free memory increases to 15%, the tManager will return to run mode.
- Triggers and Endpoints
  - When the tManager gets suspended, all of the triggers and endpoints are suspended (stop running)
  - The state that each trigger and endpoint was in before the appliance was suspended is remembered and called the desired state
    - If the desired state is running, it is displayed in gray
  - While the appliance is suspended, the desired state of a project, trigger, and/or endpoint can be changed
  - When the appliance returns to Run mode again, each project, trigger and endpoint is put into its desired state.
Modes: Project Run Mode

- If you are using a Supervisory Controller to start/stop projects:
  - Either the Supervisory Controller or the user (via the tManager software) can stop a project
  - Both have to be in agreement to start a project (needs to be started in the software, and the Supervisory Controller state for the project must be Run)

- The **Project Status Tag** contains the user and Supervisory Controller modes for the project.
  - It’s configured under **Edit → Project Settings** (in the *Project Editor*)

- By default, the Supervisory Controller mode for each project is Run
Modes: Project Stop Mode

- All triggers are stopped
- **Endpoints that were previously running continue to run**
- The state that each trigger was in before the project was put into **Stop** mode is remembered and called the desired state
  - If the desired state of a trigger is **running**, it is displayed in gray
- While the project is stopped, the desired state of a trigger can be changed. Endpoints can be started and stopped
- When the project is returned to **Run** mode, each trigger is put into its desired state
Trigger Handshaking

- **Handshake Mode** defines the Handshake position the message path must be in, in order for the trigger to fire again (be re-armed)
- All Message Paths go through all 5 modes, regardless of the **Handshake Mode** setting
- Handshaking is individually configured for each Message Path associated with the trigger. Each Message Path can have a different setting
- Handshaking modes can be viewed/changed on the Trigger configuration screens. Highlight a **Message Path** associated with the trigger and press **Edit**.
List of when triggers are re-armed for the various Handshaking modes

- **Insert Message Path**
  - **Received from Src:** Re-armed after data was gathered from the Automation devices (but the outgoing message has not been sent)
  - **In Queue:** Re-armed after the Outgoing Message was built and placed in the tManager queue to be sent to the Database Endpoint
  - **Sent to Dest:** Re-armed after the Outgoing Message has been received at the Database Endpoint

- **Select or Stored Procedure Message Path**
  - **Received from Src:** Re-armed after data was gathered from the Automation devices. This includes any tags used in a Select Message Path **Where** statement
  - **In Queue:** Re-armed after the Outgoing Message was built and placed in the queue for the Database or Procedure/Function Endpoint
  - **Sent to Dest:** Re-armed after the Outgoing Message has been received at the Database or Procedure/Function Endpoint
  - **Response in Queue:** Re-armed after the return information was received and is in the queue, waiting to be sent to the Automation Endpoint (PLC tags)
  - **Sent to Src:** Re-armed after the return information was written to the Automation devices
Handshaking Recommendations

- The recommended handshaking mode if Store & Forward is enabled:
  - **In Queue** (for all Message Path types).
  - Anything higher than **In Queue** (**Sent to Dest**, **Response in Queue**, or **Sent to Src**) will cause the trigger to stop firing as long as the last message remains in the Store & Forward Queue

- Selection to use if you want to stop the Trigger if the Insert or Update was not completed for any reason:
  - **Sent to Dest** (note: do not do this if Store & Forward is enabled. Use **In Queue** instead)

- Handshake mode selection effects when the next trigger firing occurs:
  - When combining transactions under one trigger, remember that the trigger cannot fire again until the completion of all the messages at their level of handshaking. Therefore, one slow message, or one message with a high level of Handshaking selected, would cause all messages to wait for its completion
  - It's often best for each message path to have a separate trigger
Handshaking Defaults

- The default handshaking mode are:
  - Insert: **In Queue**
  - Update: **In Queue**
  - Select: **Sent to Src**
    - Change to **In Queue** if Store & Forward is enabled. Otherwise, the trigger will stop firing as long as the last message remains in the Store & Forward queue
  - Stored Procedure: **Sent to Src**
    - Change to **In Queue** if Store & Forward is enabled
    - Change to **In Queue** or **Sent to Dest** if there are no Return variables. Otherwise, the trigger will stop firing while the Message Path waits for the return variable
Triggers – More configuration considerations

• If any of the tags used in the trigger’s firing conditions aren’t available, or the inputs on it’s associated maps are not available, the trigger will fault and won’t fire
  – This faulted state is signified in the Project Editor with a yellow triangle next to the trigger name
  – When faulted, the trigger will not fire any of its messages; no transaction will occur until all the required data is available
    • Consider having separate triggers for each message path
  – One reason not to mix input tags from different controllers on the same map – if communication to one controller fails, all the messages paths associated with the map’s trigger will stop firing
  – Reference the Troubleshooting presentation for information on troubleshooting a faulted trigger
Endpoint Configuration Options

• Transaction Logging
  – The Transaction Log keeps a log of transactions that have occurred on a trigger or endpoint (more details in the Troubleshooting presentation)
  – Not typically used for Automation Endpoints

• Store & Forward
  – If enabled, data will be written to the tManager’s non-volatile compact flash if communication is interrupted. Once communication is resumed, data will be pulled from the S&F queue and written to the original destination
  – Can enable email notification for Store & Forward events (normally IT)

• Failover (only non-automation endpoints)
  – Can specify an alternate database or messaging endpoint that data is sent to/read from when the original destination/source is not available
  – If several endpoints are listed they will be tried in order
  – Optional automatic recovery
Endpoint Configuration Options (cont’d)

- Flow Control (only automation endpoints)
  - Use this option if you want to control when tag values can be modified on your PLC/PAC
  - Allows sets of data to be stored in the tManager, in the endpoint's Store & Forward (S&F) queue, until the PLC signals it is ready to receive it. For example, if you want to download a recipe from the database when you are getting close to finishing the current batch, but you don’t want to actually load it into the controller until the current batch is done
  - Multiple sets of data can be stored, and then sent individually to the PLC. The amount of data that can be stored depends on the size of the S&F queue, configured on the Store & Forward tab. If S&F is not enabled, then only one set of data can be stored at a time.
  - See answer 86 OLDI Knowledgebase (http://kb.oldi.com) for configuration and usage details
Endpoint: Flow Control Usage

- The controller initializes the **Request** and **Response** tags to zero
- To request the first set of data from the queue, the controller increments the **Request Tag** to the next non-zero value
- When the tManager sees that the **Request Tag** is not equal to the **Response Tag**, the appliance loads the first set of data into the controller tags
- After loading the data into the controller, the tManager sets the **Response Tag** equal to the value of the **Request Tag**
  - If an error occurs, it is set to the negative value of the request tag
- When the controller sees that the **Response Tag** equals the **Request Tag**, it processes the data in the controller tags
Endpoints: Store & Forward

- Typically only used with non-automation endpoints
- Recommended for any transaction that you would like to store on the module until its destination is once again functioning
  - Once available, the data is passed out in a FIFO
- **Time To Live** is the maximum length of time that a transaction will be saved in the Store & Forward queue
  - After this time period, the transaction will be deleted
  - It will get deleted sooner if the queue runs out of space
- For **Size of queue**, allocate enough space for the storage of your transactions during the selected **Time To Live**. Recommend <=10 MB. Maximum is 200 MB
  - When larger sizes are selected there is a slow response time when you save the endpoint configuration, due to the large drive area allocation
  - 2 GB total is available for the system & audit logs, transaction logs files and S&F queues on the tManager’s compact flash
Endpoints: Store & Forward (Cont’d)

- You cannot modify an endpoint configuration in any way unless the endpoint is stopped and the Store & Forward queue is empty (the software will prompt you to empty it).
- Store & Forward will not work if the **Handshaking Mode** of a message path is set to **Response in Queue** or **Sent to SRC**:
  - No message will be placed into S&F if these handshaking modes are selected for your message path. The handshaking mode selection is made on the Trigger configuration screen.
Endpoints: Best Practices

• Create separate endpoints for each adapter based on the properties that your transaction will require
  – Store & Forward
    • Inserts and Updates sent to a database normally utilize Store & Forward
    • Select requests from the database would typically not utilize Store&Forward
    • Stored Procedures may or may not utilize Store&Forward
  – Failover
    • Failover is often used for recipe download applications – if the primary database is not available you can get the recipe from the failover database
    • Normally failover is not configured for production data logging, or, if it is, it’s not the same failover location that is used for recipe downloads

• Separate endpoints are recommended if you have a transaction message which you might expect to be more time-consuming (x-sec vs. <1-sec to complete).
  – The use of a separate endpoint will allow faster transactions to continue while the slower transactions wait in the queue for their completion

• Endpoint status tags reflect the status of the last transaction through the endpoint. If a separate status tag is desired for a particular transaction, use a separate endpoint
Mapping Best Practice…One Map, One Controller

• Although you can use tags from multiple controllers in a single map, it is not recommended
  – If any of a map’s input variables are not available when the trigger fires, the trigger is marked as faulted and will not retry for 60-seconds
  – If multiple controllers are used in a map, loss of communications with any of these controllers would cause the trigger to stop firing until all of the controllers are once again available
• If you need tags from multiple controllers mapped into a single database table at the same time……
  – Recommend mapping all the tags into a data concentrator controller
  – Map tags from the data collector PLC to the database table in a single map
Non-RA controllers

- With non-RA controllers, tags are not automatically enumerated. You must individually define the tags you’d like to access.
- The example below is for a Siemens tag.
Siemens

- Cont’d Siemens example

Example Using Data Block
For this example, we are using the type Data Block (DB).

For this example, it is DB25 at OFFSET 14 in the Siemens controller and it is a data type of REAL.
Background
Softing

Softing is a leading global provider of products for Industrial Automation and for Automotive Electronics.

For over 35 years, the core business of Softing Industrial Automation has been industrial data communication with products ranging from chips & stacks up to dedicated gateways and data transfer modules.

Softing acquired Psiber Data GmbH and OLDI in 2014. Psiber Data sells cable testing products. OLDI is an Original Design Manufacturer (ODM) that designs and sells PAC/PLC modules under other company brands and a few with the OLDI brand. OLDI as a company will continue as an ODM.

OLDI and Psiber Data products will transition to the Softing brand in 2015.

Softing also acquired the industrial communications product line from Trebing and Himstedt (TH) in 2014.

As of January 1, 2015, the official North America company name is Softing Inc.
How Can Softing Industrial Automation Help Customers?

Communications cards
- Standalone and In-chassis hardware for:
  - Moving data
  - Converting protocols (gateways)
  - Monitoring networks

Software for:
- Moving data
- Monitoring networks
- Developing embedded communications code

Embedded HW & SW for:
- Network communications

Portable Network & Cable Testers
- Ethernet based protocols
- PROFIBUS

Software for:
- Moving data
- Monitoring networks

Embedded HW & SW for:
- Network communications
- Sells Softing and OLDI branded products
- Global Encompass Product Partner
- Products for Rockwell Authorized Distributors:
  - Data Exchange Modules
  - Communication and Protocol Modules
  - Network Monitoring and Cable Test Tools
- Headquartered in Knoxville, TN
Products sold through the Rockwell Automation Channel

- **Move Data**
  - eATM
  - Enterprise Appliance Transaction Modules
  - cATM
  - Controller Appliance Transaction Modules

- **Run Custom Code**
  - SAM
  - Special Application Modules

- **Certify Cable**
  - WireXpert
  - Advanced Cable Certifier for Ethernet copper or fiber

- **Connect Networks**
  - PCI; PCI Express
  - Network Cards for High Temp Environments

- **Monitor Networks**
  - TH Scope; TH Link
  - Monitor; Diagnose EtherNet/IP and other networks

ControlLogix®
# Softing Sales Contacts

<table>
<thead>
<tr>
<th>Mike Bunning</th>
<th>Scott Sibenc</th>
<th>Jim Ralston</th>
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<tr>
<td><a href="mailto:mike.bunning@softing.us">mike.bunning@softing.us</a></td>
<td><a href="mailto:scott.sibenc@softing.us">scott.sibenc@softing.us</a></td>
<td><a href="mailto:jim.ralston@softing.us">jim.ralston@softing.us</a></td>
<td><a href="mailto:tom.jallo@softing.us">tom.jallo@softing.us</a></td>
<td><a href="mailto:alex.tabora@softing.us">alex.tabora@softing.us</a></td>
<td><a href="mailto:mark.saunders@softing.us">mark.saunders@softing.us</a></td>
</tr>
</tbody>
</table>
Resources

• Softing US Web
  – Softing US main website: http://www.softing.us/ra
  – To place an order http://www.softing.us/contact/
  – Product information http://www.softing.us/products/
  – Knowledge Base http://kb.aldi.com
  – Service Request https://ssl.aldi.com/ecustomer_enu

• Phone & FAX
  – In the US: 800-625-8678
  – International: +1-865-251-5252
  – FAX: +1-865-579-4740

• Address
  – Softing Inc.
  – 7209 Chapman Hwy
  – Knoxville, TN 37920

• Rockwell Web
  – Softing’s Encompass Listing http://www.ab.com/db/encompass/bps_ext.SEARCH
  – Knowledge Base https://rockwellautomation.custhelp.com
    (Softing reposts many Knowledge Base articles in Rockwell’s Knowledge Base)