Eurotherm®
by **Schneider** Electric

Eurotherm PAC
Store & Forward
User's Guide
Data Management
Tool

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Preface

This guide describes how to configure and use the Store and Forward utility provided with Eurotherm PAC.

You can view this document online or you can print it, in part or whole, by using the print feature in Adobe Acrobat Reader.

This guide assumes you know how to use Microsoft Windows, including navigating menus, moving from application to application, and moving objects on the screen. If you need help with these tasks, see the Microsoft Help.

In some areas of the product, you can also right-click to open a menu. The items listed on this menu change, depending on where you are in the product. All items listed on this menu are available as items on the main menus.

Revision Information

This is the third release of this document.

Terminology

The following table elaborates on the terminology used in this document:

Term	Description
.uhh	A tamper-proof history file of data, created and stored in a device proprietary to Eurotherm.
Review	Display and printing software for archived Data Recording files, .uhh. Suitable for recorders, data acquisition units, etc.
SNTP	Simple Network Time Protocol. A communications protocol to synchronise computers and instruments to a consistent time and date.
InSQL or Wonderware® Historian	Wonderware's high performance historian database and information server.

Documentation Conventions

This documentation uses the following conventions:

Convention	Used for
Initial Capitals	Paths and file names.
Bold	Menus, commands, dialog box names, and dialog box options.
Monospace	Code samples and display text.

Technical Support

Eurotherm offers a variety of support options to answer any questions on products and their implementation.

Before you contact Technical Support, refer to the relevant section(s) in this documentation for a possible solution to the problem or check Eurotherm's web site for reported issues. If you need to contact local technical support for help, have the following information ready:

- The type and version of the operating system you are using.

- The firmware version and hardware configuration of the instruments being used.

- The exact wording of the error messages you saw.

- Steps taken to reproduce the problem.

- Any relevant diagnostics or output listing from the Event Viewer, Log Viewer, instrument log files, or any other diagnostic applications.

- Details of what you did to try to solve the problem(s) and your results.

- If known, the local Technical Support case number assigned to your problem, if this is an ongoing problem.

Introduction

Historical data is an important part of any production quality requirement. Therefore, loss of any data resulting in gaps in the historic information is not acceptable for many batch and monitoring systems.

Typically, long-term historian data is written to a computer server, but loss of communications with a measuring device can cause a loss of data in batch and monitoring systems. The concept of Store and Forward eliminates these gaps in the collected data by using the historical data stored locally on a measuring device. The local historical data is forwarded to the Historian server and used to replace any gaps in collected data by extracting data contained in the .uhh files and writing it to the database.

When Wonderware PAC reads runtime data from LIN instruments and 5000/6000 recorders, the data can be stored in any of the following databases:

- Wonderware® Historian (InSQL) – used for process values

- Wonderware Alarm DB – used for alarm and events

- AlarmSuite – used for alarms and events

Note: For compatibility, Wonderware Historian must be V9.0, onwards.
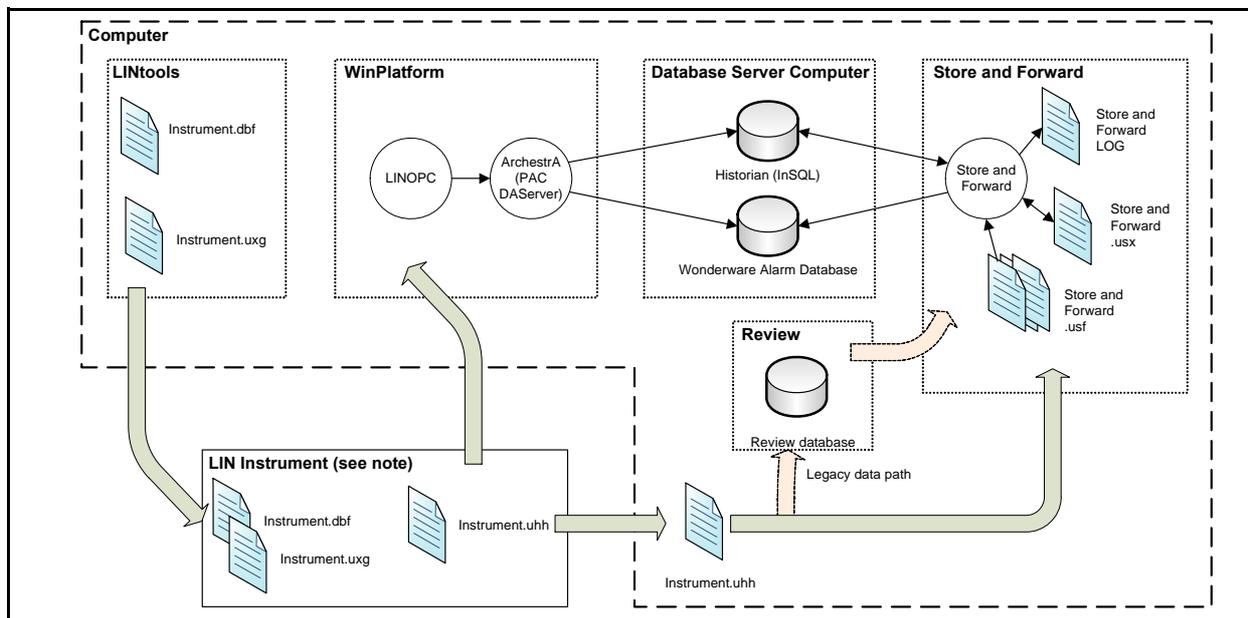
A failure in any of the following components can cause missing data in the databases:

- Server computer or its processes

- Database computer or its processes

- Instrument network

- Database computer network

Functionality

Instrument Data Flow

The Store and Forward process is shown in the following figure.

Note: Only the T2750, T2550, Eycon™ 10/20 Visual Supervisors, T800 Visual Supervisor, and 5000/6000 graphic recorders can generate .uhh files.

The flow of data is as follows:

- The instrument strategy file (.dbf) is created using LINtools (through ArchestrA) and downloaded to the instrument.

- Assuming a correctly configured and fully working Eurotherm PAC setup, runtime data is sent to a workstation running LINOPC and a PAC DAServer. From here, data is recorded directly into Historian and Wonderware Alarm Database.

- If there is any communication or configuration problems meaning that runtime data cannot be directly added to Historian or Wonderware Alarm Database, the data is buffered in the instrument until they can be automatically FTP'd to a computer running the Store and Forward tool.

- Store and Forward runs periodically, taking the FTP'd data and compares it against Historian, scanning for gaps in the data. If data is now available where gaps previously existed in the databases, they are automatically filled. Event messages from the LIN instrument are added to the Wonderware Alarm Database.

In previous version of Store and Forward, Review was needed to take the FTP'd .uhh files and convert it into a format that Store and Forward could process. This process flow still remains, but the conversion using Review is now optional because the Store and Forward process can handle the .uhh files directly.

The interfaces to Store and Forward are shown in the following table.

Interface	Description
Review	This is used to transfer .uhh file data from the instruments into a Review database located on a computer, which is accessible to the Store and Forward tool. The use of Review is optional.
.usf	This is an XML file used to configure Store and Forward. It contains the mappings that associate .uhh file data with Wonderware Historian (InSQL) tags and alarm groups.
.usx	This is an XML file used to store context data. This is a record of the data written to the databases.
.log	This is a log file primarily used to record the Store and Forward events. It is a circular buffer containing the last 1000 messages. The oldest message is overwritten when the last of the 1000 messages have been used.

Filling Gaps in the Data

Store and Forward tool will only write data to the databases where there are gaps in the runtime data.

Wonderware Historian (InSQL)

Values stored in Wonderware Historian (InSQL) have an associated value making it possible to determine where gaps start and end. The Store and Forward tool will only write local historian data to gaps in the databases.

Alarm Databases

There is no information in the alarm databases to indicate where gaps in the event messages have occurred. Therefore, all .uhh messages are written to the databases whether or not the messages have been written by the runtime system. Consequently, the alarm history may contain two instances of the same message.

An alarm message is associated with a recording group only, and not a specific LIN field.

Secondary and Primary .uhh Data

This is applicable when an instrument is configured to operate as a redundant pair (duplex), for example, a T2750 PAC. When they are synchronised, both processors create .uhh files. Store and Forward uses either primary or secondary .uhh files, whichever is available.

Store and Forward Setup Concepts

Setting up Store and Forward requires:

- The instruments to record data to .uhh files. Refer to "Instruments" on page 10 for details.

- Optionally, Review to transfer .uhh data into a database. Refer to "Review" on page 13 for details.

- The data mapping configured in the .usf file. Refer to "Understanding the .usf File" on page 14 and then either "Auto-generation of .usf Files" on page 14, or "Manually Creating a .usf File" on page 18 for details.

- The Alarm DB Logger correctly configured to receive and store event messages from the instrument, and Store and Forward alarms. Refer to "Configuring the Alarm DB Logger" on page 21 for details.

- The text description and alarm priorities customisation, if required. Refer to "Configuring Alarm Priority and Descriptions" on page 23 for details.

- Running the Store and Forward tool. Refer to "Running Store and Forward" on page 24 for details.

- Configuring a WindowViewer object to view Store and Forward alarms. Refer to "Configuring a WindowViewer object to view Store and Forward alarms" on page 25 for details.

Instruments

Store and Forward can be used with instruments that support recording to .uhh files as follows:

- T2750 and T2550 PAC

- Eycon 10/20 Visual Supervisors and T800 Visual Supervisor

- 5000/6000 graphic recorders

The recording configuration is different for each instrument type, as outlined in the following sections.

PAC Instruments (T2550/T2750)

Data recording in PAC instruments is configured using the Data Management feature in LINtools Engineering Studio, as shown in the following figure. When the database is saved, this produces a .uxg file that contains a definition of all the recording groups. This file must be downloaded to the instrument along with the .dbf file.

Data Recording configurator in LINtools

Data Recording icon shows this field is set for recording

MinMax Recording (PAC only)

Within LINtools Engineering Studio, it is possible to specify MinMax recording for a field. Fields with this recording attribute will store both the maximum and the minimum values for the field over the recording interval. these fields cannot be used for store and forward.

Important: Store and Forward does not support fields with Min/Max recording enabled.

Visual Supervisors

The Visual Supervisors (Eycon and T800) .uhh data recording is defined by the function blocks in the LIN instrument strategy stored in the .dbf file. this is configured using LINtools Engineering Studio.

The LIN blocks used to define the data recording are shown below.
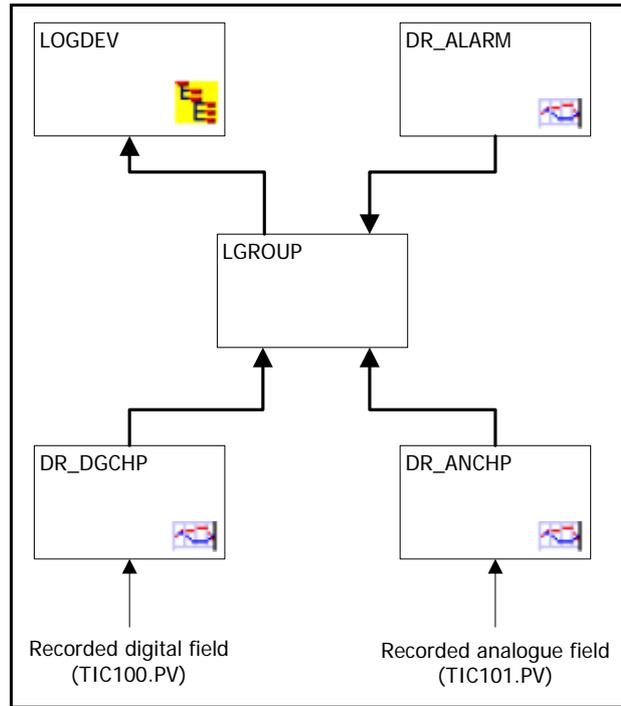
The following notes apply for the Visual Supervisors configuration:

• The GROUP or AREA block is specified in the FiltBlk field of the DR_ALARM block to provide filtering, and in the Groupn field of the LOGDEV block to specify the device medium used to log the data.

• The DR_ANCHP and/or DR_DGCHP is specified in the Point fields of the LGROUP block.

• Recorded values are connected to CurrVal field of the DR_ANCHP block or the DR_DGCHP blocks.

• Renaming via UYN files is also possible.

5000/6000 Recorders

The 5000/6000 recorders can be configured by any of the following means:

• Instrument front panel

• Bridge software for online configuration

• C-Edit for offline configuration

Adding a channel to a group will automatically cause its value to be recorded to a .uhh file. The group properties determine the recording rate.

Time Synchronisation

It is important to ensure all computers and instrument times are synchronised. To synchronise the computer time with a LIN instrument:

• include a TOD_DIAG block in the .dbf, with the **Mode** set to SLAVE or SNTP.

- If not using SNTP, open the LIN Ports Editor control applet using the Windows Control Panel, and set the **Synchronize Time** parameter to **True** within the **Advanced Port Settings** section.

Important: The co-ordinated Universal Time (UTC time) on all PCs and instruments should be synchronised. That is not to say that UTC time should be used in preference to the local time, but the times, when converted to UTC should be the same.

To synchronise the computer time with a recorder, use SNTP (Simple Network Time Protocol). Refer to the instrument handbook for further details.

Review

The use of Review to generate data for Store and Forward was mandatory for Eurotherm PAC Software version 6.0 and earlier. However, since then, it is not necessary because the Store and Forward tool can read the .uhh files directly. The Review tool can still be used if wished, but this does not provide the most efficient way of running Store and Forward.

Review is used to extract the data from the .uhh files and transfer it into its database, where it is accessible to the Store and Forward tool.

There are a number of ways in which Review can transfer .uhh file data into its database. However, when using the Store and Forward tool, it is recommended that the following features are configured:

- Scheduled Transfer From Folders

    This reads the .uhh files from a folder on the computer and regularly transfers them to the Review database. This requires that the instrument is configured to *push* the files onto the computer. This computer must be configured as an FTP server.

    An alternative is to use Auto Backup and Transfer in which Review *pulls* the files directly from the instrument.

- Run as a Service

    Ticking the box on the **Scheduled Transfer From Folders** window will cause Review to run as a service.

- Source Archive Folder

    Any file Review transfers into its database will always be copied to a sub-folder of the Master Archive Folder, where the sub-folder is named after the instrument. To limit the number of copies, set the **Source Archive Folder** on the **Scheduled Transfer From Folders** window to be the same as the **Master Archive Folder**. The instrument should then be configured to *push* their files into the appropriate sub-folder of the Master Archive Folder.

- Auto Archive

    This should be configured to remove old data from the database. It is important to ensure that the Review database does not exceed its 2 Gigabyte limit. The speed at which the database grows is dependent on the rate of recording and the frequency of the auto archive.

- House keeping the Master Archive Folder

  Review always copies transferred files into the database defined in the Master Archive Folder. Normally these files should be kept since they are the master archive. Backups and archiving of this data should be performed to prevent data loss, and to prevent the hard disk from becoming full over time.

Understanding the .usf File

The .usf file is the configuration file for the Store and Forward process. It contains the data mappings that allows the Store and Forward tool to associate .uhh file data with items in the databases it is writing to. The .usf file can be created manually or automatically.

For information on how to generate the .usf file automatically, refer to "Auto-generation of .usf Files" on page 14. For information on how to generate the .usf file manually, refer to "Manually Creating a .usf File" on page 18.

Auto-generation of .usf Files

The .usf files can be automatically generated whether you are using Operations Server or Wonderware PAC (ArchestrA-based platform). Refer to the relevant section based on the installed software:

- For Operations Server installations (where ArchestrA *is not* being used), refer to "Auto-generation of .usf Files for Operations Server Systems" on page 14.

- For Wonderware PAC installations (where ArchestrA *is* being used), refer to "Auto-generation of .usf Files for Wonderware PAC (ArchestrA-based) Platforms" on page 15.

Auto-generation of .usf Files for Operations Server Systems

For Eurotherm PAC T2550 and T2750 instruments not within an ArchestrA-based platform, .usf files are automatically generated when the project is 'Built', subject to the setup criteria (refer to "Auto-generation setup procedure" on page 15). Once created, the .usf files are automatically placed in the current project (*Test01* in the example below) in a top-level folder named *StoreForwardConfig* as shown in the following figure.

Note: Users running on an ArchestrA-based platform should use the **Configure UStoreForward** tool within the ArchestrA IDE to automatically create .usf files. Refer to "Auto-generation of .usf Files for Wonderware PAC (ArchestrA-based) Platforms" on page 15.
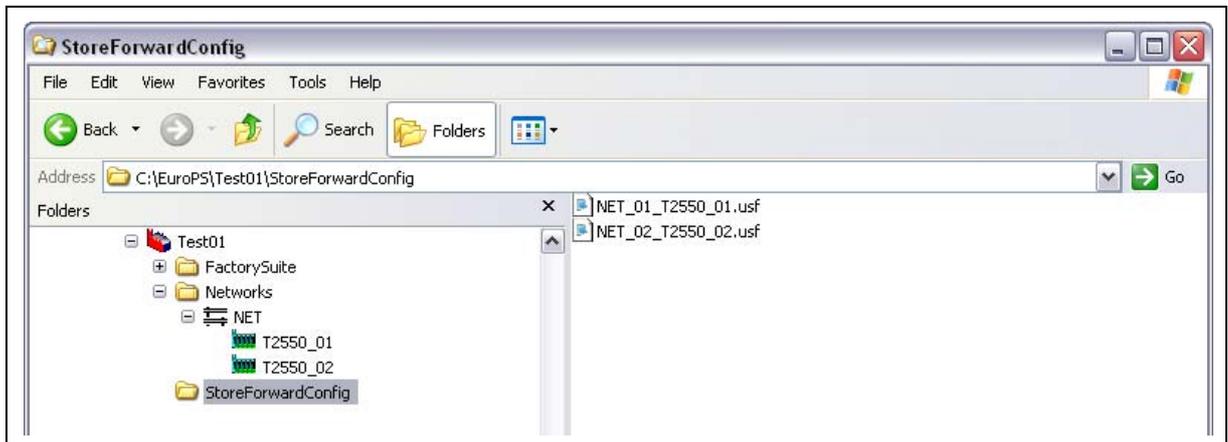
Auto-generation setup procedure

Auto-generation of .usf files for the Eurotherm PAC T2750/T2550 instruments occur under the conditions specified below:

- Data recording is configured in the T2750/T2550.

- Appropriate tags have been selected for trending in the project.

- The InSQL server name has been defined in **Project Organiser**. This is achieved by right-clicking on the **InSQL Trended Tags** folder, selecting **Properties**, and entering the server details. An example is shown in the following figure.
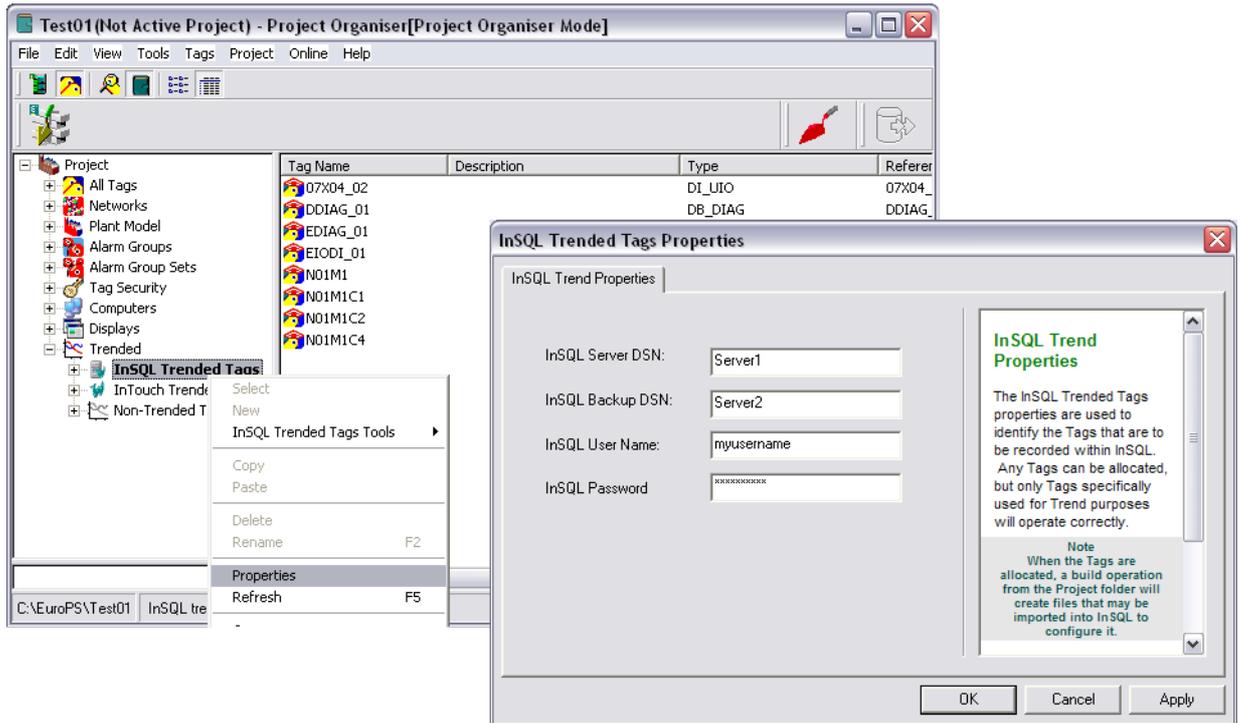
Auto-generation of .usf Files for Wonderware PAC (ArchestrA-based) Platforms

Using the ArchestrA IDE, the **Configure UStoreForward** tool can create the appropriate .usf files for your strategies and configuration within the Galaxy. This information is used to determine the mapping between UHH data and historized ArchestrA objects.

Note: Users running Operations Server and not on an ArchestrA-based platform should instead refer to "Auto-generation of .usf Files for Operations Server Systems" on page 14.

The Configure UStoreForward tool is accessed from the Wonderware PAC toolbar button, or from the FoxboroPAC menu within the ArchestrA IDE. The tool is run from a single window, which is shown in the following figure.
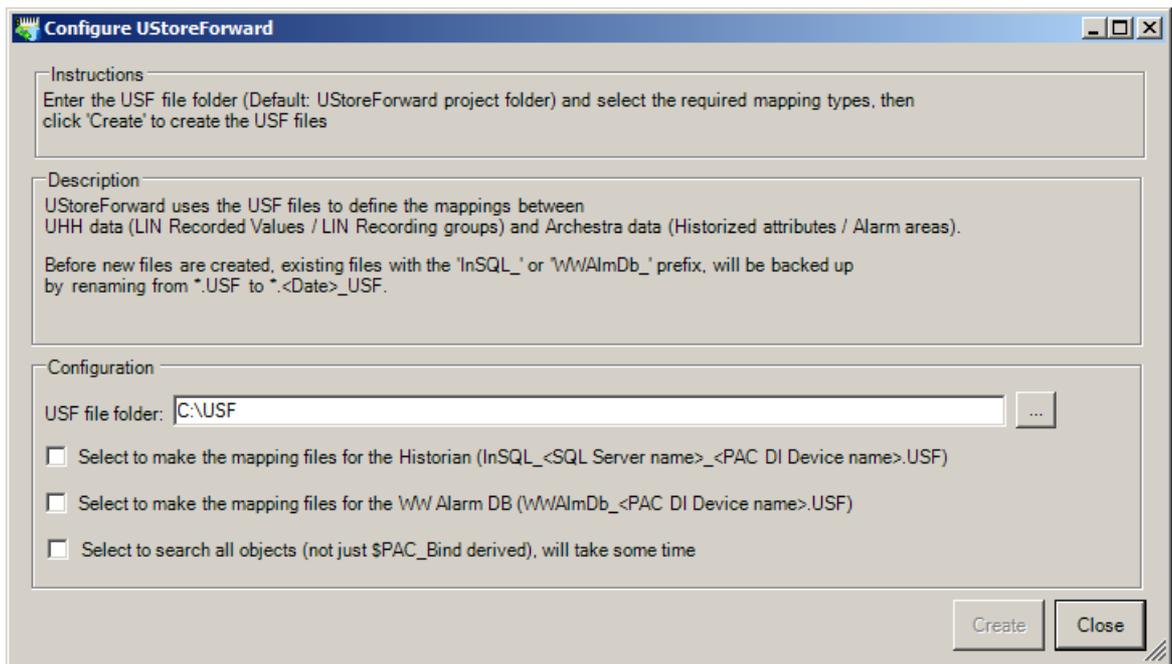
The UStoreForwardConfig window is split into two main sections:

- The top section provides guidance on how to use the tool.

- The bottom section provides the configuration options prior to creating any .usf files. Here, the user can:

  - specify the path where the .usf files are created (**USF file folder** field). The default location is the same path as configured in the main Store and Forward utility.

  - choose to create the mapping files for historian tags

  - choose to create the mapping files for the Wonderware Alarm Database. This maps an ArchestrA *area* to a Recording Group.

  - Opt to search for all ArchestrA object fields that are bound to LIN block fields. By default, only those blocks derived from the $PAC_Bind template will be searched (this includes the PAC Application templates, $PAC_PID_2, for example).

    Objects that are bound to LIN blocks but haven't been derived from the $PAC_Bind template will have been manually bound, as opposed to automatically using the PAC Binding tool. To search for these, select the **Select to search all objects (not just $PAC_Bind derived)** checkbox. The searching of these objects can take a considerable time to run. Therefore, if it is known that only $PAC_Bind derived objects have been bound, it is advisable that this option is not selected in order to save time.

Preparing the tool to run

Before the Configure UStoreForward tool is run, it is necessary to first check the path of where the mapping files will be created. This defaults to the same path as configured in the Store and Forward tool, but can be changed by typing the path manually or browsing to a location by clicking the ellipsis button.

If the chosen path already contains .usf files (from a previous mapping using this tool, or manually created), they are renamed to a suffix of *.<Date>_USF*. Only those files that have a prefix of *InSQL_* or *WWAlmDb_* are renamed.

Next, determine whether the creation of .usf mapping files should be map Eurotherm PAC instrument fields to Historian and/or the Wonderware Alarm database. Tick either of both of the check boxes appropriately.

Finally, click the **Create** button at the bottom of the window. The tool can take some time to run, depending on the number and complexity of strategies within the Galaxy. An indication of progress is shown in the bottom left of the window.

The .usf files created by the UStoreForwardConfig tool are named using the following scheme:

`InSQL_<Historian Server>_<PAC instrument>.usf`

where:

`<Historian Server>` is the name of the Historian server
`<PAC instrument>` is the DIDevice representing the PAC instrument.

Analysing the results

Once the UStoreForwardConfig tool has completed the mapping process, the window changes to show the result of the mapping. An example output is shown in the following figure.
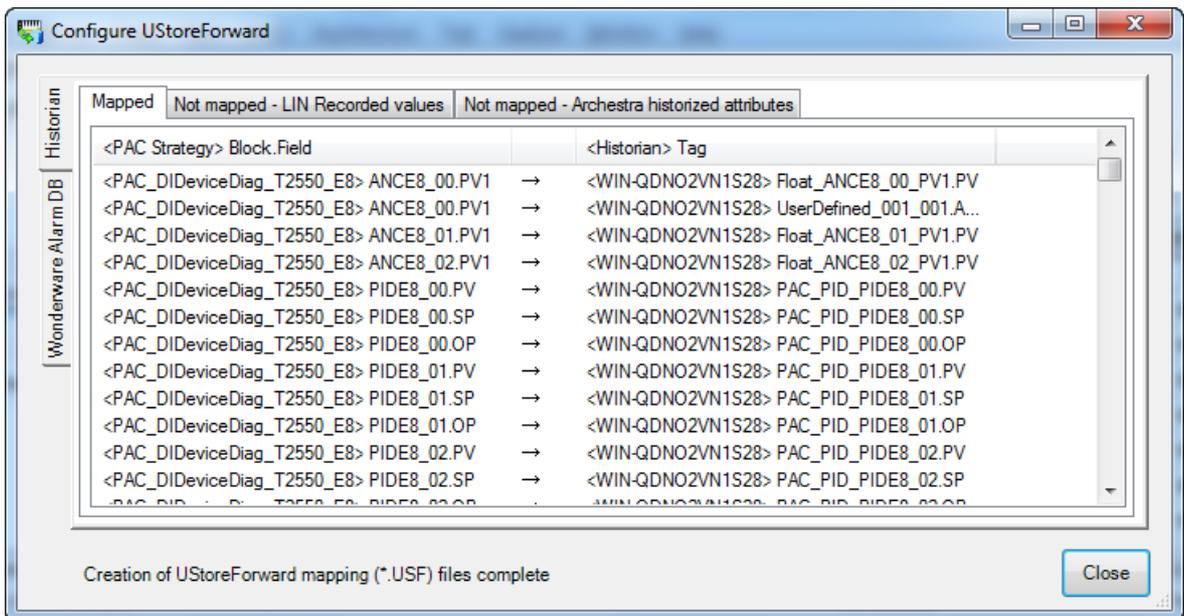
The window displays the results for either the Historian mapping, or the Wonderware Alarm Database mapping, dependant upon the selected tab on the left-hand side. For both set of mappings, the results are split into three separate tabs across the top.

The tabs are:

- **Historian** section:

    ○ **Mapped** tab. The mappings shown in this tab show the successful mapping between the LIN tags in the Eurotherm PAC strategy and the historized attribute in ArchestrA. These items will be processed by Store and Forward.

- ○ **Not mapped - LIN recorded values** tab. The mappings shown in this tab have not been successfully mapped to Historian. Any Eurotherm PAC strategy fields listed here are in a Recording Group, but have not been flagged in ArchestrA as an object that should be historized.

- ○ **Not mapped - Archestra historized attributes** tab. The mappings shown in this tab have not been successfully mapped to Historian. Any Historian tags listed here have been flagged to be Historized, but the equivalent Eurotherm PAC strategy field is not included in a Recording Group.

- • **Wonderware Alarm DB** section:

  - ○ **Mapped** tab. The mappings shown in this tab show the successful mapping between the PAC strategy Recording Group and the ArchestrA Area. Event messages in the .uhh files for these recording groups are written to the ArchestrA alarm Area.

  - ○ **Not mapped - LIN Recording Groups** tab. The mappings shown in this tab have not been successfully mapped to the Wonderware Alarm Database. Any Eurotherm PAC Recording Groups listed here have been configured in the strategy, but an associated ArchestrA Area does not exist. Event messages written to .uhh files for these recording groups are not written to the Wonderware Alarm Database.

  - ○ **Not mapped - Archestra historized attributes** tab. The mappings shown in this tab have not been successfully mapped to the Wonderware Alarm Database. ArchestrA Areas exist but no Eurotherm PAC Recording Groups have been configured with corresponding area names.

An example of the output for the Wonderware Alarm DB tab is shown below:
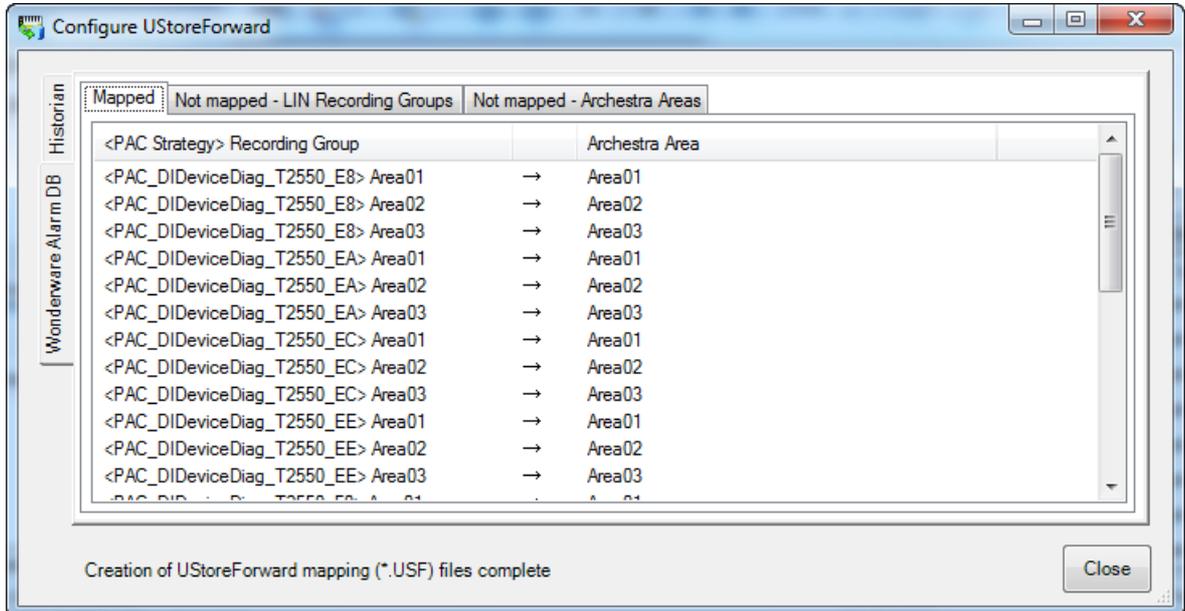
Manually Creating a .usf File

The manual creation of .usf files is described in the following sub-sections. To provide a start point, the sample file UStoreForward_SAMPLE.usf is installed with Store and Forward (refer to Appendix A "This is an example of a .usf file (UStoreForward_SAMPLE.usf)." on page 41). It has an XML format and can be edited with a standard text editor, for example Notepad.

The two XML elements in the file that contain the mapping data are <AlarmDb> and <InSQL>. In the sample file, both of these are commented out (enclosed by a <!-- and -->).

.UHH Area and Group Names

Identifying any item in .uhh data always requires area and group names. This is included in the mapping data used in the .usf file. The easiest way to determine what items are, is to transfer a .uhh file into the Review database and create a chart. The **Select Point** window used to add points into the chart displays two drop-down boxes – Instrument and Log Group. These list the Area and Group names, respectively.

5000/6000 Recorders

The area and group names are named after the instrument and recording group names.

Alarm Database <AlarmDb>

The AlarmDb element is used to map .uhh messages to alarm groups. All the mapped messages are written as events to both the Wonderware Alarm and the AlarmSuite Databases. An example is shown below:

```
<AlarmDb>
    <Type>WWAlmDb</Type>
    <Maps>
        <Map>
            <UhhMsg>
                <Area>NET.E8.T2550_E8</Area>
                <Grp>T2550_E8_GRP_1</Grp>
                <Cat>2</Cat>
            </UhhMsg>
            <AlmGrp>T2550_E8_GRP_1</AlmGrp>
        </Map>
        <Map>
            <UhhMsg>
                <Area>NET.E8.T2550_E8</Area>
                <Grp>T2550_E8_GRP_2</Grp>
            </UhhMsg>
            <AlmGrp>T2550_E8_GRP_2</AlmGrp>
        </Map>
        <Map>
            <UhhMsg>
                <Area>NET.E8.T2550_E8</Area>
                <Grp>T2550_E8_GRP_3</Grp>
                <Cat>2</Cat>
            </UhhMsg>
            <AlmGrp>T2550_E8_GRP_3</AlmGrp>
        </Map>
        <Map>
            <UhhMsg>
                <Area>NET.E8.T2550_E8</Area>
                <Grp>T2550_E8_GRP_4</Grp>
                <Cat>2</Cat>
            </UhhMsg>
```

```
            <AlmGrp>T2550_E8_GRP_4</AlmGrp>
        </Map>
    </Maps>
</AlarmDb>
```

The Maps section can contain many Map sections. Each Map section maps a specific .uhh message to an EurothermSuite alarm group. The messages are defined by Area <Area>, Recording Group <Grp>, and Message Category <Cat>.

The Message Category is optional. If it is omitted, all message categories are mapped. If it is defined, then only the specified message category will be mapped. If more than one message category is required, the Cat section can be defined once for each category.

The .uhh message categories are identified by the numbers, as shown in the following table.

Category	Description
1	System messages
2	Alarm messages
4	Power-up messages
8	General messages
16	Batch messages
32	Login messages
64	Signing messages
128	Audit trail messages
256	Annotation messages
512	AMS2750D messages
0x80000000	Uncategorised messages

<InSQL>

The InSQL section maps .uhh values to Wonderware Historian (InSQL) tags. An example is shown below:

```
<InSQL>
    <Server>SVRB</Server>
    <Maps>
        <Map>
            <UhhPt>
                <Area>NET.E8.T2550_E8</Area>
                <Grp>T2550_E8_GRP_1</Grp>
                <Desc>PID00_E8.PV</Desc>
            </UhhPt>
            <InSqlTag>
                <Tagname>PID00_E8.PV</Tagname>
            </InSqlTag>
        </Map>
        <Map>
            <UhhPt>
```

```
                    <Area>NET.E8.T2550_E8</Area>
                    <Grp>T2550_E8_GRP_4</Grp>
                    <Desc>PID84_E8.OP</Desc>
                </UhhPt>
                <InSqlTag>
                    <Tagname>PID84_E8.OP</Tagname>
                </InSqlTag>
            </Map>
        </Maps>
    <InSQL>
```

The Server section is not optional, and specifies the name of the Wonderware Historian (InSQL) server.

The Maps section can contain many Map sections. Each Map section maps a .uhh point defined by a <UhhPt> section, to a Wonderware Historian (InSQL) tag defined by a <InSqlTag> section.

The <UhhPt> section identifies point Area <Area>, Recording Group <Grp> and Descriptor <Desc>. The descriptor comes from the Description field in LINtools (refer to "PAC Instruments (T2550/T2750)" on page 11).

The <InSqlTag> section identifies a tag by its tag name <Tagname>.

Configuring the Alarm DB Logger

The Alarm Database Logger determines which alarms are added to the Wonderware Alarm Database. Using the Alarm DB Logger Manager tool, the Store and Forward process can be added as an alarm provider and thus log:

• Instrument event messages (usually created when a LIN block enters an alarm state within an instrument), and

• Store and Forward process alarms.

Without configuring the Alarm Database Logger, no instrument event messages, nor any Store and Forward alarms will be added to the Wonderware Alarm Database.

To launch the **Alarm DB Logger Manager**, launch the tool found under the Start menu at **All Programs** > **Wonderware** > **InTouch** > **Alarm DB Logger Manager**. The Alarm DB Logger Manager window opens, showing the state of the Alarm Database Logger, as shown in the following figure..

Click on the **Settings** button to display the **Alarm DB Logger Manager - Configuration** window, as shown in the following figure.
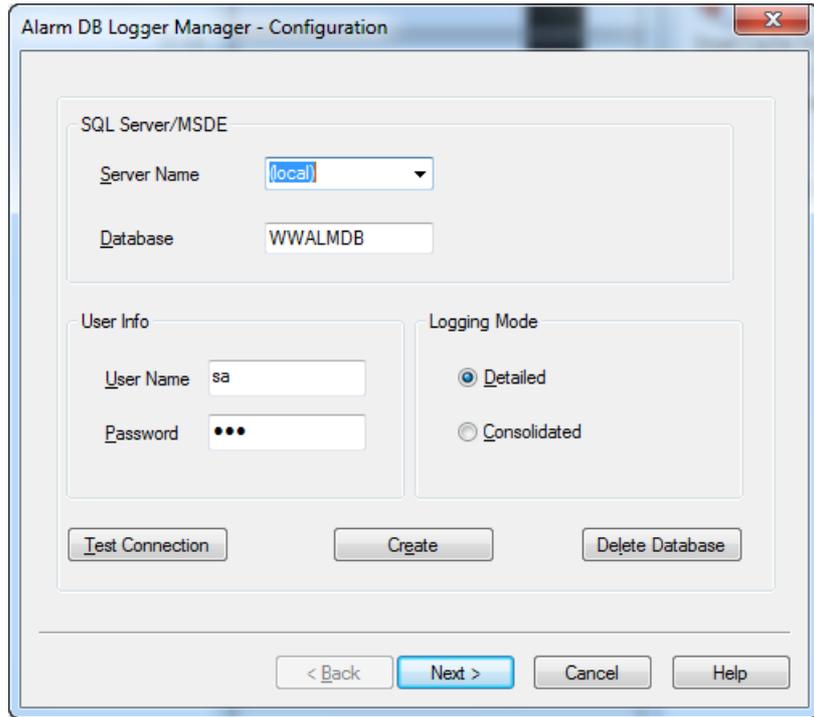
Click the **Next** button to move onto the next configuration screen, as shown in the following figure.
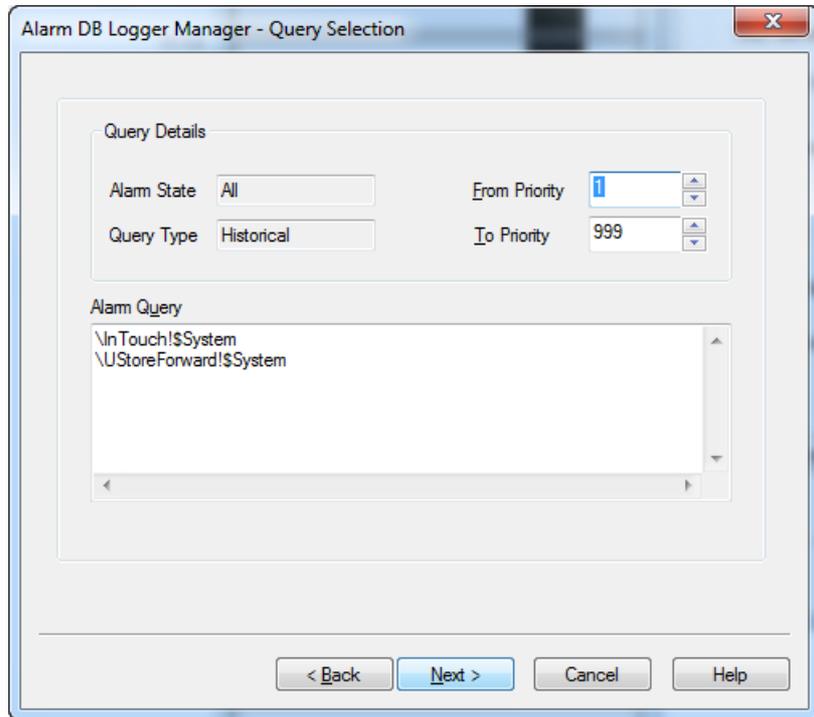
In a default configuration, only the **\InTouch!$System** entry is listed under the **Alarm Query** field. Add an extra line to the field and insert **\UStoreForward!$System**, as is shown in the previous figure.

Continue to step through the configuration by clicking the **Next** button until the configuration is complete.

Configuring Alarm Priority and Descriptions

By default, all Store and Forward self-generated alarms and warnings are given a priorty of 500 (based on a scale between 1 and 999, with 1 being the highest priority alarm). The priority of Store and Forward alarms can be individually modified by editing a *config.ini* configuration file.

In addition, the text description for the Store and Forward alarms and warnings can be changed to suit the end-user's preference (and language).

The *config.ini* file that configures the alarm priority and text descriptions for each alarm can be found at the following location (assuming the default installation location was selected on a Windows 7 computer):

```
c:\ProgramData\Invensys\Foxboro PAC\LIN\config.ini
```

Open this file in a suitable text editor, such as Notepad, and then refer to one or both of the following sections:

- "Configuring the Alarm Priority" on page 23.

- "Configuring the Alarm Descriptions" on page 23.

Configuring the Alarm Priority

With the *config.ini* file open, locate the `[UStoreForward_Alarm_Prio]` section. The default entries for this section are shown below:

```
[UStoreForward_Alarm_Prio]
USF_FILE_INVALID=500
USF_USX_FILE_INVALID=500
USF_GAPS_USX_FILE_INVALID=500
USF_HIST_CONN=500
USF_HIST_WRITE=500
USF_HIST_GAPS_FILLED=500
USF_HIST_GAPS=500
USF_HIST_NO_TAG=500
USF_HIST_NO_UHH=500
USF_UHHNAV_NO_UHH=500
```

Each line within this section defines the alarm priority for each Store and Forward alarm. The syntax is:

```
<alarm name> = <priority>
```

where `<alarm name>` is a fixed and defined string description (which must not be altered), and `<priority>` is a numeric value between 1 and 999 representing the priority of the alarm (1 being the highest, 999 the lowest).

Caution: Be careful not to alter other sections within this file.

Change the alarm priority for each line as required and save the *config.ini* file.

Configuring the Alarm Descriptions

With the *config.ini* file open, locate the `[UStoreForward_Alarm_Desc]` section. Each line within this section defines the alarm description for each Store and Forward alarm. The default entries for this section are shown below:

```
[UStoreForward_Alarm_Desc]
USF_FILE_INVALID=UStoreForward - USF file invalid
```

```
USF_USX_FILE_INVALID=UStoreForward - USX file invalid
USF_GAPS_USX_FILE_INVALID=UStoreForward - Gaps USX file invalid
USF_HIST_CONN=UStoreForward - Failed to open connection to
Historian
USF_HIST_WRITE=UStoreForward - Failed to write to Historian
USF_HIST_GAPS_FILLED=UStoreForward - Gaps filled in Historian
USF_HIST_GAPS=UStoreForward - Unfilled gaps in Historian
USF_HIST_NO_TAG=UStoreForward - Tag not configured in Historian
USF_HIST_NO_UHH=UStoreForward - UHH data not updated
USF_UHHNAV_NO_UHH=UStoreForward - No UHH files received
```

The syntax is:

```
<alarm name> = <description>
```

where `<alarm name>` is a fixed and defined string description (which must not be altered), and `<description>` is a string description of the alarm. the <description> can be changed to meet the end-user's needs.

Note: It is advisable (but not essential) to keep the start of the description as "*UStoreForward*" so it is immediately obvious to what the alarm is relating.

Caution: Be careful not to alter other sections within this file.

Change the alarm descriptions for each line as required, and save the *config.ini* file.

Running Store and Forward

For Store and Forward to work, the process needs to run on a computer with access to the FTP'd .uhh files (or the Review database, and also to the databases it is writing to, if Review is being used). Typically this would be a server computer.

It is not essential that Store and Forward runs all the time, since it maintains a context and knows what data has been written.

To launch the Store and Forward application, click on **Start** > **All Programs** > **Eurotherm PAC Store and Forward** > **Store and Forward**

Once it is running, confirm that the **UStoreForward configuration and work Folder** path corresponds to the folder containing the .usf files, or is a parent of this folder. The path also defines the folder that Store and Forward will use to store the log and context files.

Note: If automatically generating the .usf files using Wonderware PAC, the file path used when creating the .usf files must match that as configured in Store and Forward. If they don't match, the .usf files must be manually moved to the folder configured in Store and Forward.

If using Review, ensure the **Review** radio button is selected under **UHH Data Source** section.

If not using Review, ensure the **UHH Files** radio button is slected under the **UHH Data Source** section. Specify where the .uhh files are stored on the computer (usually the incoming FTP folder) in the **UHH File Path** field. If an archive of the raw .uhh files if required, also specify where the .uhh files are archived after processing (**Archive Path** field). More information on these configuration options can be found in section, "Store and Forward User Interface" on page 26.

# Configuring a WindowViewer object to view Store and Forward alarms

Store and Forward alarms (and event messages forwarded from the LIN instrument) are logged in the Wonderware Alarm Database, provided the Alarm DB Logger has been configured to accept Store and Forward as an alarm provider. Refer to "Configuring the Alarm DB Logger" on page 21 for details. Historical alarms can then be viewed using the **AlmDbViewCtrl** object using WindowViewer.

To view a summary of the current alarms using WindowViewer, an **AlarmViewerCtrl** object needs to be used, correctly configured to show Store and Forward alarms.

When placing an **AlarmViewerCtrl** object using WindowMaker, view the properties of the object and select the **Query** tab. Enter the following in the **Alarm Query** field:

`\UStoreForward!$system`

An example of the property window with this field completed is shown below.
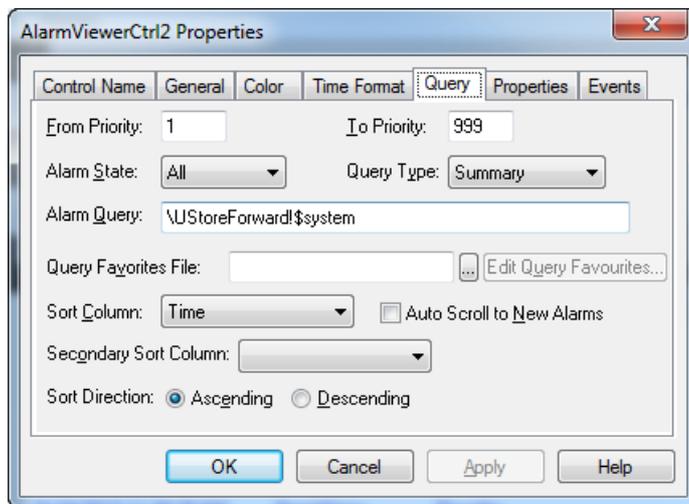
An example of a WindowViewer alarm summary display is shown in the following figure. The top section shows any current alarms (using the **AlarmViewerCtrl** object, configured as shown above), and the bottom shows the contents of the Wonderware Alarm Database (**AlmDbViewCtl** object).
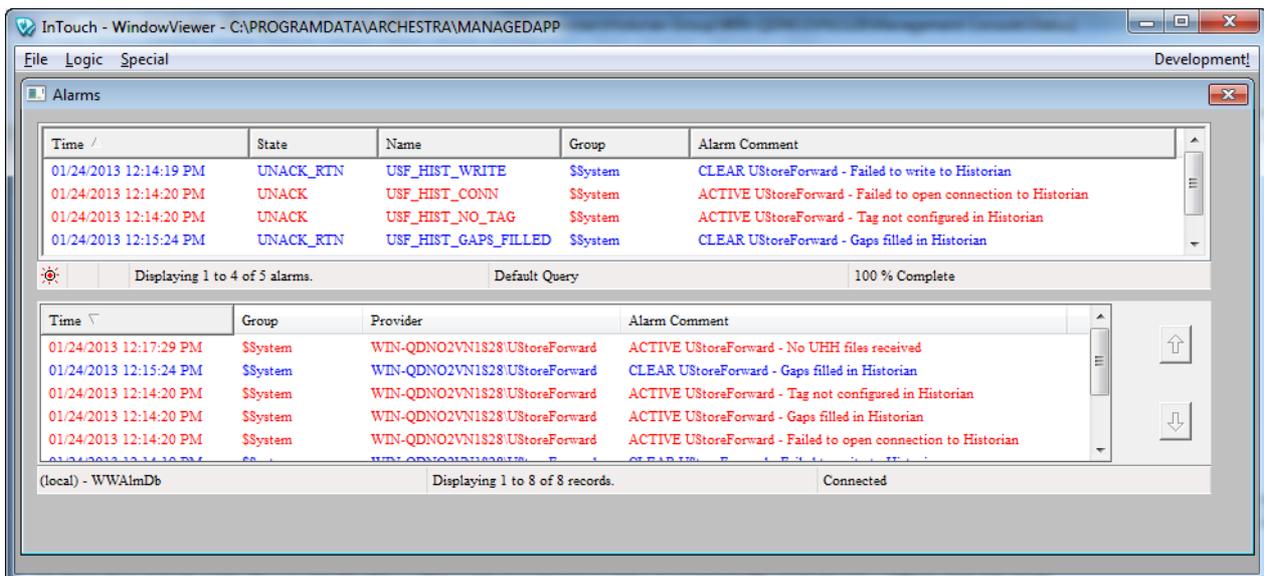
Store and Forward User Interface

When Store and Forward is run in the foreground (not as a service), the tool can be configured to operate in a legacy mode (using Review to prepare the data that is passed to Store and Forward), or by accessing the .uhh files that have been FTP'd from the instrument. The options to configure the Store and Forward tool depend on which mode you wish to use the tool. This chapter explains how to configure Store and Forward for both scenarios.

- To configure Store and Forward to use .uhh files directly, follow the procedure outlined in "Configuring Store and Forward to use .uhh Files" on page 26.

- To configure Store and Forward to use Review as the input datasource, follow the procedure outlined in "Configuring Store and Forward to use Review" on page 29.

In addition, a manual update feature allows the user to manually specify a defined date range of tags and alarms to be imported into Historian databases. For further information, refer to "Manual Update Feature" on page 33.

Configuring Store and Forward to use .uhh Files

Configuring Store and Forward to use .uhh files directly, provides the ability to process the stored data pushed from the instrument to an FTP server. By using this method, the Store and Forward mapping files (.usf) can be automatically generated by Wonderware PAC's IDE. The mapping files provide the correlation between ArchestrA's objects and the LIN instrument's fields within a strategy.

To launch the Store and Forward application, click on **Start** > **All Programs** > **Eurotherm PAC Store and Forward** > **Store and Forward**. An example of the Store and Forward user interface is shown below.

The fields in this user interface are explained below:

- **UStoreForward configuration and work folder** section. The **Path** field defines where the mapping files (.usf) and work folders should be on the computer. The mapping files can be automatically generated by clicking the **Configure UStoreForward** button within the Wonderware ArchestrA IDE, and this **Path** field should point to the same folder that the .usf files are output. This folder is also where Store and Forward stores the .usx and .log files.

- **Automatic Updates** section – contains the single option, **Enable**, which when ticked, enables automatic updating.

- **UHH Data Source** section – determines the data source, and if directly from UHH data files, the data and archive paths.

  - **Review** radio button – do not select this option. This is only used if Review is being used to provide the data for Store and Forward.

  - **UHH Files** radio button – select this option to indicate that UHH files are to be used directly. Specify the path of these files in the **UHH file path** field.

  - **UHH file path** – specify the location of the UHH files that have typically been FTPd from the instruments. The location can be browsed by clicking the ellipses button.

  - **Archive path** check-box and path – if you wish to archive the UHH files once Store and Forward has processed them, select this check-box and specify the path where the files should be archived to. The location can be browsed by clicking the ellipses button. The files are archived for a specified number of days (**Age (days) of files to purge** field), or kept forever. If the **Archive path** check-box is not selected, the UHH files are deleted immediately after processing.

  - **Age (days) of files to purge** – specifies the number of days that the UHH files are archived before being deleted. To stop any UHH files be deleted, specify 0 in this field.

- **Timing** section – defines three time-related fields that determine the maximum age of gaps to be filled, the delay between each Store and Forward scan, and how long before an automatic detection of overdue UHH files triggers.

  - **Age (days) before gaps are no longer processed** – configures the maximum age for which gaps detected by Store and Forward will continue to be processed. If the gaps detected by Store and Forward have not changed after three successive updates to the UHH data, then all gaps with an end time greater than, or equal to this field, are no longer processed. At this point, the gap context data is moved to the .usx file.

    A typical value for this field varies and depends on the storage capacity of the instrument. Usually this is set somewhere between 10 and 30 days. Set this field to 0 to disable this feature.

  - **Delay between Updates (mins)** – configures the wait period between Store and Forward scans, after which it checks and processes any new .uhh data.

    A typical value for this field is 15 minutes.

Note: It is possible to set the **Update rate (mins)** field as low as 1 minute. This is acceptable only for test purposes, as it is insufficient to allow Review sufficient time to perform its house-keeping duties.

  - **Number of Updates before UHH data is overdue** – Determines the number of times Store and Forward has looked for new data to process before regarding the lack of any new .uhh data as being overdue. The number entered in this field, multiplied by the **Delay between Updates** field (above) gives the amount of time before .uhh data becomes overdue. An USF_HIST_NO_UHH (UHH data not updated) alarm is generated and sent to the Alarm Database logger on the next iteration of the Store and Forward process.

    Set this field to 0 to stop the detection of overdue .uhh files.

- **Optimisation** section, consisting of a single option, **Assume historized values sourced from the same instrument/recording group have the same gaps in the Historian**. The optimisation option works by assuming that all fields in a Recording Group in an instrument are linked, and so missing data in one of the fields will mean missing data in all of the fields. However, in ArchestrA-based systems, individual objects can be undeployed separately, and therefore this assumption cannot be made. Care should be taken when selecting this option.

- **Historian Type** section - defines the Historian type to be used. This will be determined by the type installed in the particular system configuration.

Once the configuration is set, click the Update button to commit any changes.

The text in the bottom left of the UStoreForward configuration window shows the mode in which Store and Forward is running. In the example shown, the Store and Forward process is not running as a service. Possible values are:

Status	Description
Not installed as a service	Store and Forward is not configured as a service.
Not running as a service	Store and Forward is configured as a service, but is not running. This can be confirmed by the Services window, accessed using the Windows Control Panel.
Running as a service	In this mode, Store and Forward is running as a service, and executes all the Store and Forward activity.

Configuring Store and Forward to use Review

Configuring Store and Forward to use Review relies on Review processing the UHH files first, and then feeding the data from Review to Store and Forward.

To launch the Store and Forward application, click on **Start** > **All Programs** > **Eurotherm PAC Store and Forward** > **Store and Forward**. An example of the Store and Forward user interface is shown below.
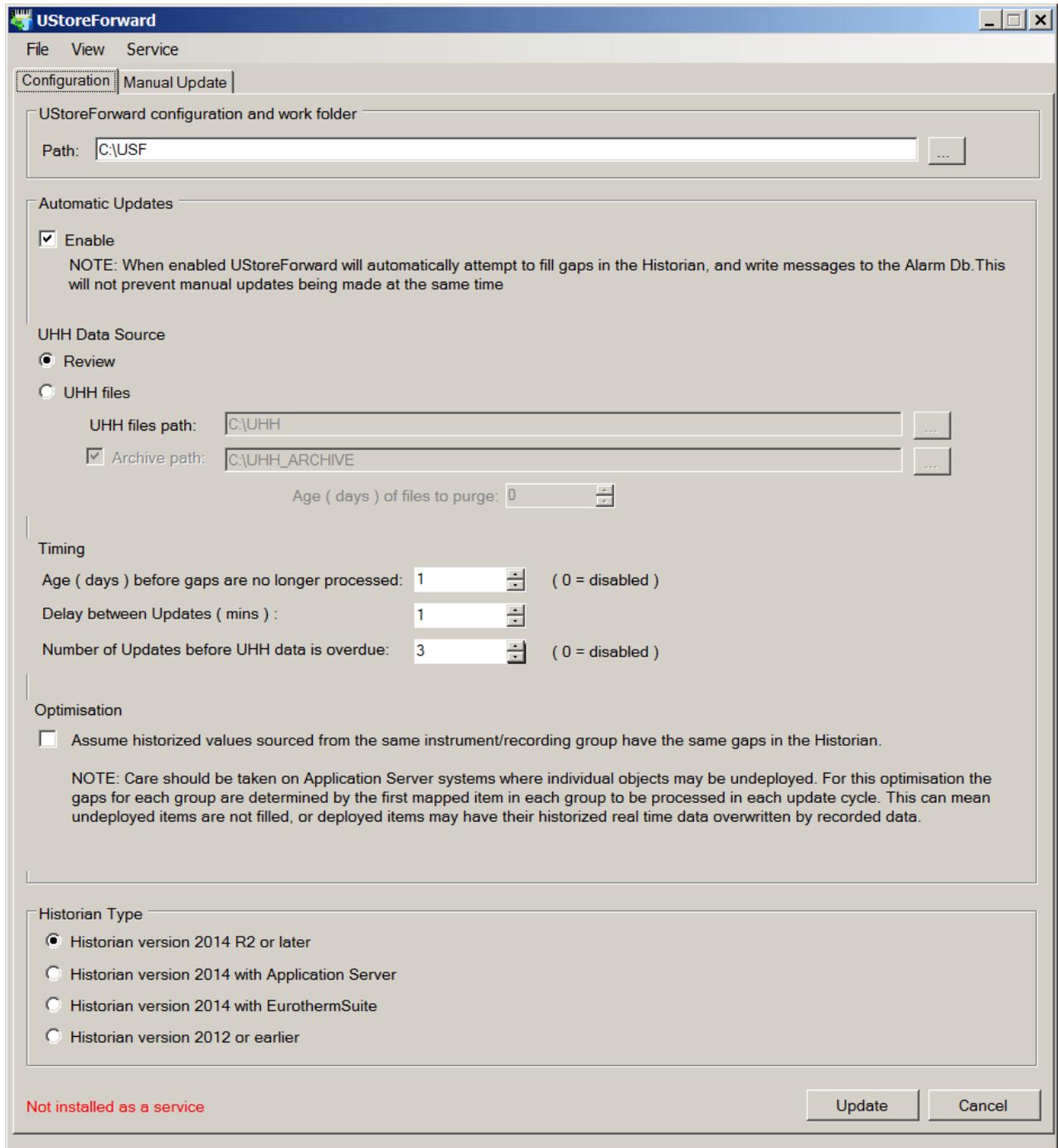
The fields in this user interface are explained below:

- **UStoreForward configuration and work folder** section. The **Path** field defines where the mapping files (.usf) and work folders should be on the computer. The mapping files can be automatically generated by clicking the **Configure UStoreForward** button within the Wonderware PAC IDE, and this **Path** field should point to the same folder that the .usf files are output. This folder is also where Store and Forward stores the .usx and .log files.

- **Automatic Updates** section – contains the single option, **Enable**, which when ticked, enables automatic updating.

- **UHH Data Source** section – determines the data source for Store and Forward.

- **Review** radio button – select this option to ensure that the output of Review is used to provide the data for Store and Forward. Ticking this option greys out the remaining fields.

- **UHH Files** radio button – do not select this option. This is only used when instrument UHH files are to be used directly.

- **UHH files path**, **Archive path** and A**ge (days) of files to purge** fields will all be unavailable when the **Review** radio button is ticked, and the contents can therefore be ignored.

- **Timing** section – defines three time-related fields that determine the maximum age of gaps to be filled, the delay between each Store and Forward scan, and how long before an automatic detection of overdue UHH files triggers.

  - **Age (days) before gaps are no longer processed** – configures the maximum age for which gaps detected by Store and Forward will continue to be processed. If the gaps detected by Store and Forward have not changed after three successive updates to the UHH data, then all gaps with an end time greater than, or equal to this field, are no longer processed. At this point, the gap context data is moved to the .usx file.

    A typical value for this field varies and depends on the storage capacity of the instrument. Usually this is set somewhere between 10 and 30 days. Set this field to 0 to disable this feature.

  - **Delay between Updates (mins)** – configures the wait period between Store and Forward scans, after which it checks and processes any new .uhh data.

    A typical value for this field is 15 minutes.

Note: It is possible to set the **Update rate (mins)** field as low as 1 minute. This is acceptable only for test purposes, as it is insufficient to allow Review sufficient time to perform its house-keeping duties.

  - **Number of Updates before UHH data is overdue** – As the Store and Forward tool does not access the .uhh files directly if Review is being used, this field is ignored and can be left at any value.

- **Optimisation** section, consisting of a single option, **Assume historized values sourced from the same instrument/recording group have the same gaps in the Historian**. The optimisation option works by assuming that all fields in a Recording Group in an instrument are linked, and so missing data in one of the fields will mean missing data in all of the fields. However, in ArchestrA-based systems, individual objects can be undeployed separately, and therefore this assumption cannot be made. Care should be taken when selecting this option.

- **Historian Type** section - defines the Historian type to be used. This will be determined by the type installed in the particular system configuration.

Once the configuration is set, click the Update button to commit any changes.

The text in the bottom left of the UStoreForward configuration window shows the mode in which Store and Forward is running. In the example shown, the Store and Forward process is not running as a service. Possible values are:

| Status	Description
Not installed as a service	Store and Forward is not configured as a service.
Not running as a service	Store and Forward is configured as a service, but is not running. This can be confirmed by the Services window, accessed using the Windows Control Panel.
Running as a service	In this mode, Store and Forward is running as a service, and executes all the Store and Forward activity.

Manual Update Feature

The Manual Update feature allows the user to manually select historical data either from .uhh files or Review, and write it to the Wonderware Historian and Alarm databases. Manual updates may be performed whether or not automatic updates are enabled. The Manual Update feature is accessed under the Manual Update tab within the UStoreForward window.

There are two known circumstances whereby running the Manual Update feature may be required, in order to ensure the Historian databases are as complete as possible. These are:

1. Incorrectly shutting down the Historian. The only supported means of shutting down the Historian server is via the Wonderware System Management Console. However:

   ○ If Historian is shut down because of a power cut, then Good Quality data is returned for the period when the Historian was shut down and has no data.

   ○ If Historian is shut down via the Windows task bar, then the Historian is not guaranteed to return Bad Quality data for the period when it was shut down and has no data.

2. Disaster Recovery. Following a disaster recovery when the last item backed up is Good Quality, and then Historian goes offline, there is a risk that Bad Quality doesn't get reported.

   ○ Historian tier 2 in the period between backup and historian going offline. If a backup of the historian tier 2 history blocks is taken at time A and the tier 2 server later fails at time B, when we restore according to the current disaster recovery procedure we end up with a flat line between time A and time B. This is a result of the last value in the restore data being Good Quality, so the historian trends show flat line instead of the gap which would result from poor quality data. the gap from time B onwards is filled by the replicated data from tier 1.

The following figure shows the Manual Update tab. Refer to this figure (with numbered annotations) and the field descriptions that follow.
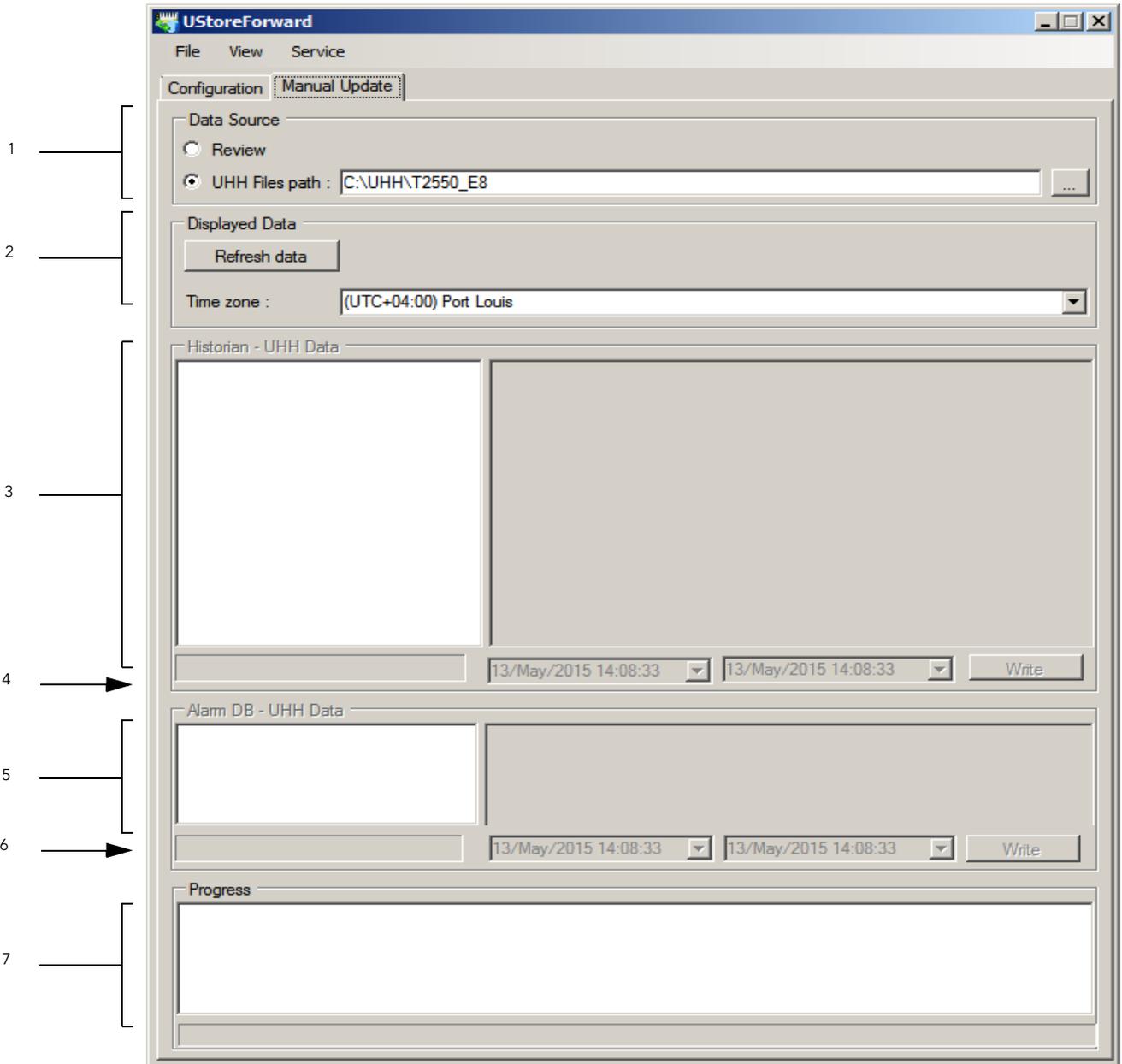

The fields in the Manual Update tab are as follows:

1. **Data Source**. This determines the source of the data, which can be either:

    ○ **Review –** the data is taken directly from the Review database, or

    ○ **UHH Files path –** the path can be specified by typing it manually or browsing to a folder containing the .uhh files. All .uhh files in the folder and any subfolder are used as the data source. The files are copied to the <UStoreForward Folder>\UhhNav\ManualUpdate folder automatically, but can also be placed here manually.

Note: There is a 2GB limit for the files in this folder.

2. **Displayed Data** section. This loads the data selected in the **Data Source** section (1), into the tool for processing.

- ○ **Refresh Data** button. Click this button to analyse the data and populate the rest of the window. The time when the data was last refreshed (button was clicked) is shown to the right of the button. Clicking this button populates section (3) in the user interface as shown in the following figure:
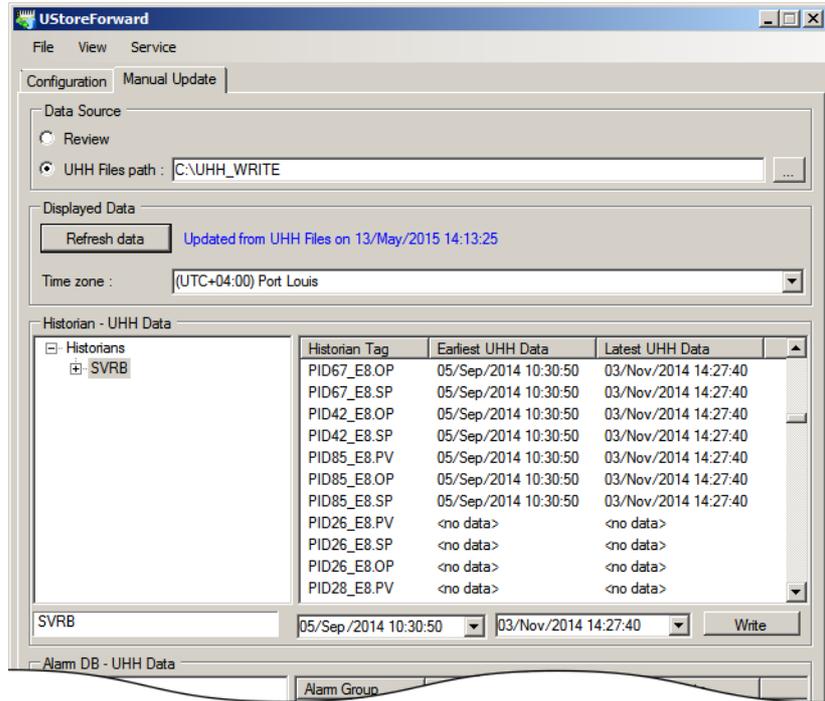
- ○ **Time zone** – All UHH and Historian data is stored using Universal Co-ordinated Time (UTC). However, the Historian tools, Query and Trend, display the data in any selected time zone. By default, this is the local time zone for the PC. Use the **Time zone** field to display the data in a different time zone.

3. **Historian - UHH Data** section. This section displays all the mapped Historian tags and the UHH data that is available in the UHH Data Source (1). The mapped Historian tags are derived from the .usf file which maps the UHH data with the Historian tags. Refer to "<InSQL>" on page 20, or for a full explanation of the .usf file, refer to the section "Understanding the .usf File" on page 14.

   The Historian tags are shown in the tree view in the left hand pane of section (3) of the window. These can be selected by clicking on them as follows:

   - ○ Click on the Historians – This selects all tags in all Historians.

   - ○ Click on <Historian Server Name> – This selects all tags in the named Historian.

   - ○ Click on <Historian Tag name> – This selects the single named tag in the named Historian parent node.

   The list view in the right-hand pane indicates the time range of the selected tags in the UHH data source. The display is dependent on the node selected in the left-hand pane (detailed above):

   - ○ Historians – Lists each of the Historian servers, and for each server, displays the earliest and latest UHH times. Double-clicking on a server in this list automatically selects it in the tree view on the left.

○ <Historian Server name> – Lists all the tags in the selected Historian, and for each tag, the earliest and latest UHH times. Double-click on a tag in this list will automatically select it in the tree view on the left.

○ <Historian Tag name> – For the selected tag, lists the time range of each contiguous set of UHH data.

4. The selected node in section (3) and its associated time range is displayed in section 4 of the window. The start and end times may be edited either by typing directly into the **Start** and **End UHH Data** fields, or by selecting from the drop-down calendar.

Clicking the **Write** button will write data over the specified time range to the selected Historian tags. Prior to writing, a confirmation box is displayed as a confirmation, as shown in the following figure.
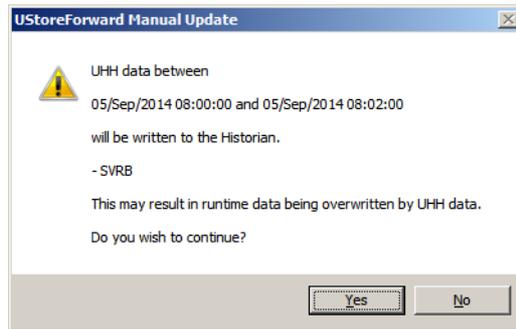
5. **Alarm DB - UHH Data** section. This section displays all the mapped Alarm Groups and the UHH recording groups that are available in the UHH Data Source (1). The mapped Historian tags are derived from the .usf file which maps the UHH data with the Historian tags. Refer to "Alarm Database <AlarmDb>" on page 19, or for a full explanation of the .usf file, refer to the section "Understanding the .usf File" on page 14.
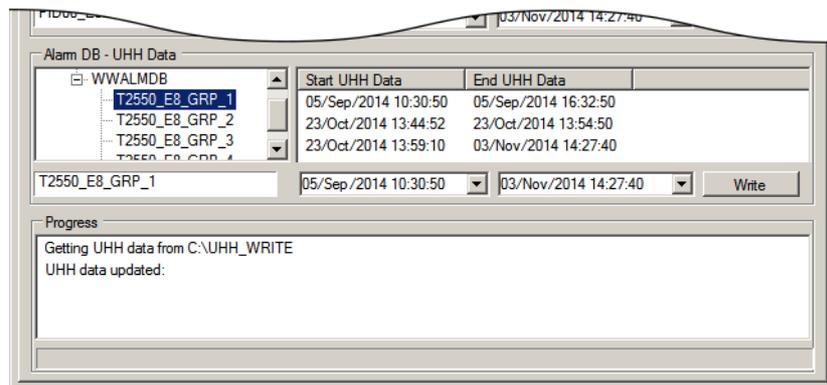
The mapped Alarm Groups can be selected by clicking in the tree view in the left hand pane. There are three node types:

○ Alarm Databases – This selects all alarm groups in all Alarm Databases. Two types of alarm databases are supported: WWAlmDb (Wonderware Alarm Database) and AlarmSuite.

○ <Alarm Database name> – This selects all alarm groups in the named Alarm Database.

○ <Alarm Group name> – This selects the single named alarm group in the named Alarm Database parent node.

The list view in the right-hand pane indicates the time range of the selected alarm groups in the UHH data source. The display is dependent on the node selected in the left-hand pane (detailed above):

○ Alarm Databases – Lists each Alarm Database, and for each database, displays the earliest and latest UHH times. Double-clicking on a database in this list automatically selects it in the tree view on the left.

○ <Alarm Database name> – Lists all the alarm groups in the Alarm Database, and for each alarm group, displays the earliest and the latest UHH times. Double-clicking on an alarm group in this list automatically selects it in the tree view on the left.

○ <Alarm Group name> – For the selected alarm group, lists the time range of each contiguous set of UHH data.

6. The selected node in section (4) and its associated time range is displayed in section 6 of the window. The start and end times may be edited either by typing directly into the **Start** and **End UHH Data** fields, or by selecting from the drop-down calendar.

Clicking the **Write** button will write data over the specified time range to the selected alarm group. Prior to writing, a confirmation box is displayed as a confirmation, as shown in the following figure:
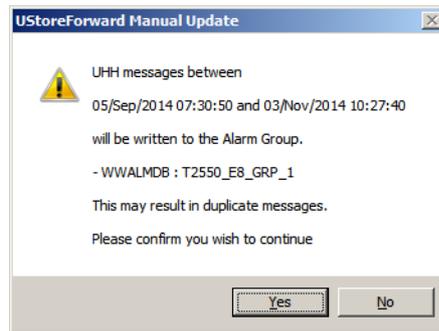
7. **Progress** section. This section comprises of two windows: a log and a progress bar.

Depending on the size of the UHH data, some operations may take some time to complete. The progress bar increments each time:

○ a file has been copied when retrieving data from UHH files, and

○ a tag or alarm group has been processed when writing data.

The log window outputs messages to indicate the start of the operation in progress and when it has been completed. It also outputs error or warning messages. All messages appearing in the log window are also written to the UStoreForward logger prefixed with the words, *Manual Update*.

Note: A warning message of *NO UHH DATA* will be shown if an attempt to write to a tag or alarm group where no UHH data exists. This can occur when multiple items have been selected, for example, when an Historian server has been selected and there are only UHH files for some of the tags or alarm groups.

Store and Forward Menu Commands

File Menu

The file menu enables the control of an individual application file using the following commands.

Menu option	Description
Validate USF	Used to validate the content of the .USF files. The result is displayed in a window, and also written to the log.
Validate CXT	Used to validate the content of the UStoreForward.USX file. The result is displayed in a window, and also written to the log.
Create new CXT	Used to create a new UStoreForward.USX file. This deletes any existing context information.
Validate gaps CXT	If gaps are older than the value configured in the **Gaps max age** field, then the gaps are removed from the UStoreForward.USX file and are automatically placed in a UStoreForwardGaps.USX file and are no longer processed.
Create new gaps CXT	Used to create a new UStoreForwardGaps.USX file. This deletes any existing context information.

View Menu

The Log Window command displays the log file associated with the project.

Service Menu

The Service menu controls whether the Store and Forward application runs as a service.

Menu option	Description
Install (Reboot and startup)	Used to install the Store and Forward tool as a service. On successful installation, a window prompts the user to perform a PC reboot to automatically start the service. Refer to "Installing Store and Forward as a Service" on page 39 for detailed installation instructions.
Uninstall	Used to uninstall the Store and Forward tool as a service.
Stop	Used to stop the Store and Forward tool as a service.

Installing Store and Forward as a Service

To install Store and Forward as a service, select **Install** from the **Service** menu. A window opens allowing configuration of the appropriate service account as shown in the following figure. Initially, this window is disabled and shows a warning to prevent configuration of Store and Forward as a service is Operations Server is running, or to be run on the same PC.

To continue, click the **Yes** button, and complete the fields with the appropriate information.
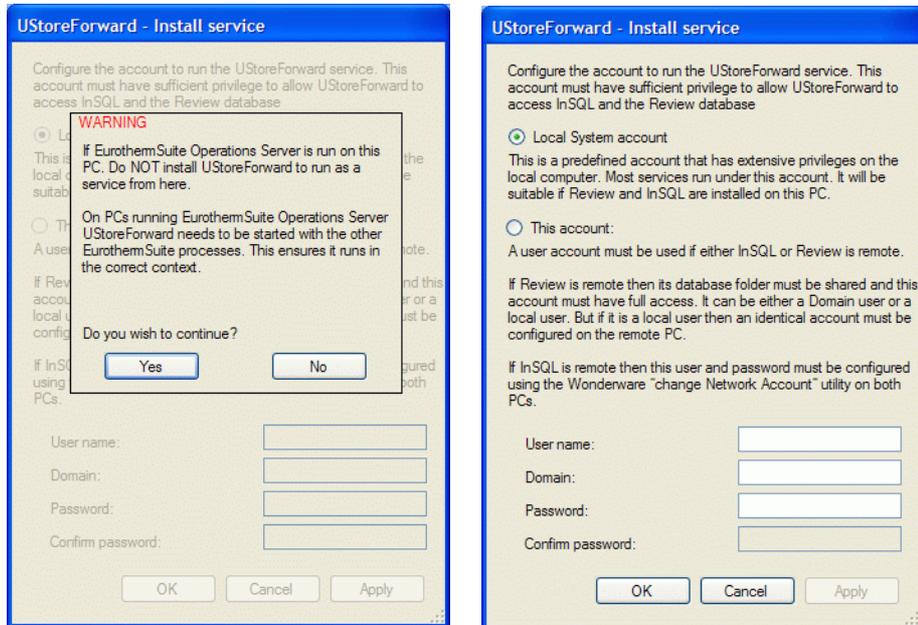
Store and Forward Context File

The Store and Forward process stores its context data in the UStoreForward.usx file with reference to the example shown in "Appendix B - Example USX File" on page 44. This file is private to the process and in normal circumstances should not be edited. However, it is easily examined using a standard text editor, for example, Notepad. There are instances where it may be useful to edit the file, for example, to force Store and Forward to push data for a specified period of time.

Note: Time specified in the .usx file is UTC, and not local time.

The UStoreForward.usx file contains an XML element to store the context data for each database <AlarmDb> and <InSQL>.

Each item that is being written has an <Item> element, which includes an attribute to identify the item; this could be a Wonderware Historian (InSQL) tag or an alarm group.

Within an <Item> there is a <Span> element which always contains a <Start> and <End> element, which record the time of the earliest and latest data written to the item.

The <Span> element can also contain a <Gaps> element which contains one or more <Gap> elements. The <Gap> elements record where gaps in the data have been detected. A gap can be one of two types: either it is missing data, or it identifies filled data.

Deleting the .usx File

If the .usx file is deleted it is automatically recreated. However, all the existing context data is lost, causing Store and Forward to rewrite all available data to the alarm databases.

Removing Gaps

If Store and Forward has detected gaps, these will be stored in the UStoreForward.usx file. On each update cycle, Store and Forward will check to see if data is available to fill the gaps. Currently, Store and Forward has no logic to remove these gaps. If it is known that data for gaps will never be available, they can be deleted from the file.

Appendix A - Example UStoreForward File

This is an example of a .usf file (UStoreForward_SAMPLE.usf).

```xml
<?xml version="1.0" encoding="UTF-8"?>
<!--
This is a sample configuration file for UStoreForward.

UStoreForward will configure itself from all USF files found
in the project folder or its children.
-->
<UStoreForward xsi:schemaLocation="www.eurotherm.com UStoreForward.xsd"
xmlns="www.eurotherm.com" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">

  <!--
  To configure UStoreForward to write UHH messages to the
  alarm databases uncomment the AlarmDb section.

  The Maps section can contain many Map sections. Each
  Map section maps a specific UHH message to a n
  alarm group. The messages are defined by Area <Area>,
  Recording Group <Grp>, and Message Category <Cat>.


  The Message Category is optional. If it is omitted
  all message categories will be mapped. If it is defined
  then only the specified message category will be mapped.
  If more than one message category is required the Cat
  section can be multiply defined once for each category.

  The UHH message categories are identified by the numbers
  below.
```

```
    System messages = 1
    Alarm messages = 2
    Power up messages = 4
    General messages = 8
    Batch messages = 16
    Login messages = 32
    Signing messages = 64
    Audit trail messages = 128
    Annotation messages = 256
    AMS2750D messages = 512
    Uncategorised messages = 0x80000000

The example below shows a single alarm message type mapped
to the Default alarm group.

<AlarmDb>
          <Maps>
                <Map>
                      <UhhMsg>
                              <Area>PJM_NET.0C.temp</Area>
                              <Grp>Grp_T2550_0C_01</Grp>
                              <Cat>2</Cat>
                      </UhhMsg>
                      <AlmGrp>Default</AlmGrp>
                </Map>
          </Maps>
    </AlarmDb>
-->


<!--
To configure UStoreForward to write UHH values to an InSQL server
uncomment the InSQL section.

The Server section is not optional and specifies the name of
the InSQL server.

The Maps sections can contain many Map sections. Each Map section
maps a UHH point defined by a <UhhPt> section, to an InSQL tag
defined by a <InSqlTag> section.

The <UhhPt> section indentifies point Area <Area>, Recording
Group <Grp> and Descriptor <Desc>.

The <InSqlTag> section identifies a tag by its tag name <Tagname>.
```

```
<InSQL>
    <Server>TESTPC03</Server>
    <Maps>
      <Map>
        <UhhPt>
           <Area>PJM_NET.0C.temp</Area>
           <Grp>Grp_T2550_0C_01</Grp>
           <Desc>PID0C_01.OP</Desc>
        </UhhPt>
        <InSqlTag>
           <Tagname>PID0C_01\OP</Tagname>
        </InSqlTag>
      </Map>
    </Maps>
        </InSQL>
  -->
</UStoreForward>
```

Appendix B - Example USX File

This is an example of a .usx file.

```xml
<?xml version="1.0" encoding="utf-8"?>
 <UStoreForward xmlns="www.eurotherm.com">
   <AlarmDb>
     <Item ID="PJM_NET.0C.temp,Grp_T2550_0C_01,2,Default">
       <Span>
         <Start>06/03/2008 07:15:10</Start>
         <End>12/03/2008 12:31:30</End>
         <Gaps>
           <Gap>
             <Start>06/03/2008 08:00:00</Start>
             <End>06/03/2008 09:15:10</End>
           </Gap>
          </Gaps>
       </Span>
     </Item>
   </AlarmDb>
   <InSQL>
     <Item ID="PID0C_01\OP">
       <Span>
         <Start>06/03/2008 07:15:10</Start>
         <End>12/03/2008 12:31:30</End>
         <Gaps>
           <Gap>
             <Start>12/03/2008 12:25:40</Start>
             <End>12/03/2008 12:27:39</End>
           </Gap>
          </Gaps>
       </Span>
     </Item>
   </InSQL>
 </UStoreForward>
```

Scan for local contents

As standards, specifications, and designs change from time to time, please ask for confirmation of the information given in this publication.

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