

# Wonderware DAServer 1.0 for Mitsubishi Ethernet User's Guide

Invensys Systems, Inc.

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# Welcome

The Wonderware DAServer for Mitsubishi Ethernet is a Microsoft Windows application that allows client applications access to the following Mitsubishi Electric Programmable Logic Controllers (PLCs):

- A-Series
- QnA-Series
- Q-Series

## Documentation Conventions

This documentation uses the following conventions:

Convention	Used for
Initial Capitals	Paths and filenames.
<b>Bold</b>	Menus, commands, dialog box names, and dialog box options.
Monospace	Code samples and display text.

## Technical Support

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

Before you contact Technical Support, refer to the relevant section(s) in this documentation for a possible solution to any problem you have. If you need to contact technical support for help, have the following information ready:

- The type and version of the operating system you are using. For example, Microsoft Windows XP, SP1.
- Details of how to recreate the problem.
- The exact wording of the error messages you saw.
- Any relevant output listing from the Log Viewer or any other diagnostic applications.
- Details of what you did to try to solve the problem(s) and your results.

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



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# Chapter 1

## Getting Started

The DAServer is one component of a software system that connects your software application with information on the factory floor.

This DAServer documentation covers only the information you need to configure and run the DAServer component; see the documentation that comes with the related components for details on their operation. You can find installation instructions in a help file on the distribution CD.

User interaction with the DAServer is provided through the DAServer Manager. You use the DAServer Manager to configure, activate, and troubleshoot the DAServer. The DAServer Manager is located in the System Management Console (SMC). For more information, see Finding Your DAServer in the SMC on page 15.

This documentation describes some of the features of the DAServer Manager. See the DAServer Manager User's Guide to find more information on:

- Global parameters
- Configuration sets
- Time zone features
- Icon definitions
- Activation/deactivation
- Configuring as a service
- Importing/exporting device items
- Standard diagnostics

You can troubleshoot problems with the DAServer using the Arcestra Log Viewer, a snap-in to the SMC. See the Log Viewer help file to find information on:

- Viewing error messages.
- Determining which messages are shown.
- Bookmarking error messages.

You may also be able to troubleshoot problems using your client application, such as the Wonderware InTouch HMI software. The client application can use system device items to determine the status of nodes and the values of some parameters. For more information on system items, see Standard System Items on page 49.

## Before You Begin

Before configuring the DAServer, you need to verify the following items:

- A PC is set up with the necessary network cards, and connected to the necessary networks.
- The Windows administration account has been created or identified.
- The DAServer and any other Wonderware software such as the DAServer Manager is installed with the proper licenses. For more information, see the License Utility documentation on the distribution CD.
- The client software is installed.
- The device(s) is/are connected (networked) and, if necessary, programmed.

Before configuring the DAServer, you should know:

- The device network configuration and addresses.
- Which data items are needed for the client application.
- The device name/topic name/group name.
- The desired update intervals.

## Supported Client Protocols

Client applications connect to the DAServer using OPC and DDE/SuiteLink. For more information, see the protocols guide that is included with the distribution CD.

## Supported Device Protocols

The DAServer can connect to the Mitsubishi Ethernet PLCs using TCP/IP or UDP using the Mitsubishi A/Q Series protocol.

## Supported Devices

You can use Mitsubishi Electric A-Series, QnA-Series, and Q-Series devices.

References in this documentation to the Q-Series devices also apply to the QnA-Series.

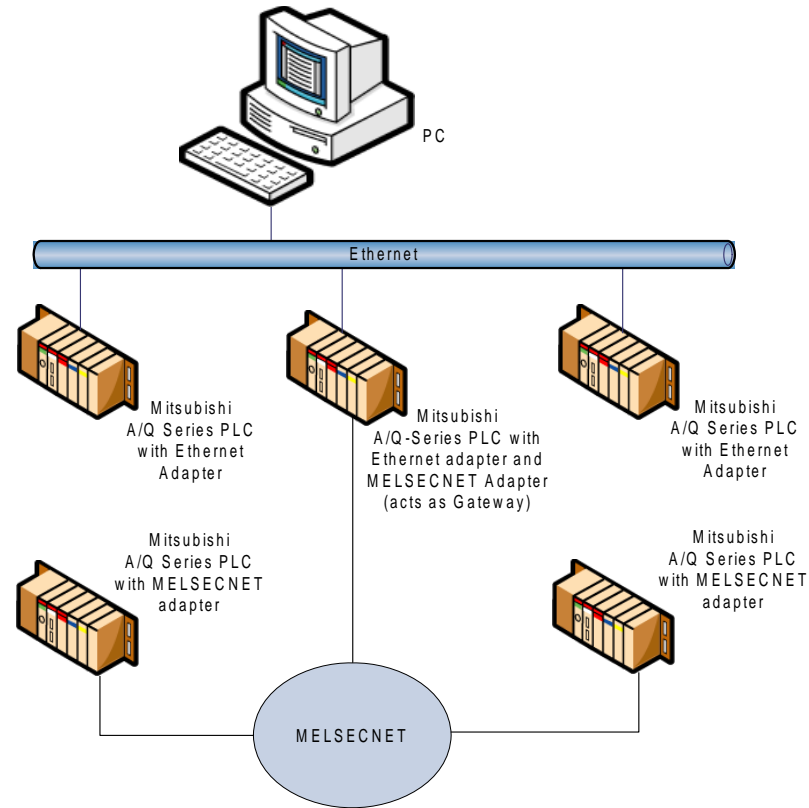
## Supported Topologies

This DAServer supports A-Series devices that use the AJ71E71 communications card, Q-Series devices that use the QJ71E71 communications card, and QnA devices that use the AJ71QE71 communications card.

A-Series devices can be connected by Ethernet directly to a PC, or they can be on a sub-network. A sub-network consists of an A-Series device on the main network that relays messages using Melsecnet-II to A-Series devices on the sub-network.

An A-Series device can only relay messages to a single directly-connected sub-network.

Q-Series devices, in addition to supporting devices connected on a local Ethernet network, support more complicated networks. Q-Series devices can relay messages to multiple, possibly remote, sub-networks.



For more information, see The ID Parameter on page 23.

## Windows Firewall Considerations

If the DAServer runs on a computer with a firewall enabled, there is a list of application names or port numbers that must be put in the firewall exception list so the DAServer can function correctly.

By default, the DAServer installation program makes the required entries in the firewall exception list. If you do not want the installation program to make entries in the firewall exception list, you must add the entries manually. For information on how make entries in the firewall exception list, see your firewall or Windows security documentation.

Whether you let the install process add the entries, or add them manually, the following applications must be put in the firewall exception list on the computer running the DAServer:

- aaLogger.exe
- DASAgent.exe
- dllhost.exe
- mmc.exe
- OPCEnum.exe

Whether you let the install process add the entries, or add them manually, the following port numbers must be put in the firewall exception list on the computer running the DAServer:

- 5413 a TCP port for slssvc.exe
- 445 a TCP port for file and printer sharing
- 135 a TCP port for DCOM
- 5000 a UDP port for DASMTEthernet
- 5001 a TCP port for DASMTEthernet
- TCP & UDP ports configured in the PLC for use with this DAServer, other than the standard ports 5000 & 5001

The following applications must be in the firewall exception list on the computer where the DAServer Manager is installed:

- aaLogger.exe
- dllhost.exe
- mmc.exe

The following port numbers must be in the firewall exception list on the computer where the DAServer Manager is installed:

- 445 a TCP port for file and printer sharing
- 135 a TCP port for DCOM

Un-installing the DAServer does not remove the firewall exception list entries. You must delete the firewall exception list entries manually. For more information on how to do this, see your firewall or Windows security documentation.

## Checklist for Setting up a DAServer

If you are setting up a DAServer for the first time, perform the following tasks in the order listed:

- 1 Review the items described in the “Before you Begin” section. See *Before You Begin* on page 10.
- 2 Locate the DAServer in the System Management Console (SMC). See *Finding Your DAServer in the SMC* on page 15.
- 3 Configure the global parameters. See the *DAServer Manager User’s Guide*.
- 4 Add a channel. See *Adding a Channel* on page 17.
- 5 Set the channel parameters. See *Setting Channel Parameters* on page 18.
- 6 Add a device. See *Adding a Device* on page 21.
- 7 Set the device communication parameters. See *Setting the General Parameters* on page 22.
- 8 Add one or more device groups. See *Adding a Device Group* on page 31.
- 9 Add device items. See *Managing Device Items* on page 35.
- 10 Activate the DAServer. See *Activating/Deactivating the DAServer* on page 44.
- 11 Access data from the client, including specifying device item references. See *Accessing the Data in Your DAServer* on page 47 and *Setting the Item Reference* on page 37.
- 12 Troubleshoot any problems. See *Troubleshooting* on page 71.

## Finding Your DAServer in the SMC

Each DAServer is identified by a unique name. The name for the Wonderware DAServer for Mitsubishi Ethernet is: ArchestrA.DASMTEthernet.1. On the computer where the DAServer is installed, it can be found in the local node of the default group of the DAServer Manager.

You do not need to install the DAServer Manager on the same computer as the DAServer. When you access the DAServer remotely, you will not find the DAServer node under the local node. You must locate and identify the DAServer on a computer in one of the node groups.

### To find the DAServer

- 1 On the Start menu, click **Programs**. Navigate to the Wonderware folder that contains the System Management Console and then click **System Management Console**.
- 2 In the **System Management Console**, expand **DAServer Manager**.
- 3 Locate the group with the node **ArchestrA.DASMTEthernet.1**





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# Chapter 2

## Managing Channels

Channels are the communications link between the DAServer and devices. You must create a channel node before you can add device nodes. You may create up to 256 channels.

Before you add you a channel, you need to organize and define the topology of the devices being connected.

When you add a channel, the DAServer gives the channel a default name. You may change this name to a name that represents how the network is organized. Channel names cannot have spaces.

A channel has two parameters.

- The adapter card the channel is to use to communicate with devices
- The write/read duty cycle

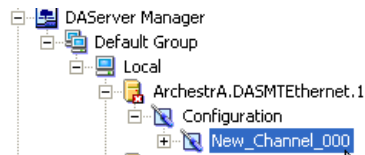
### Adding a Channel

The first step in specifying the network between the DAServer and a device is to add a channel. After you add a channel to the hierarchy, you can add device nodes.

To add a channel

- 1 In the DAServer Manager, navigate to the **Configuration** node.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer.

- 2 Right-click **Configuration** and click **Add Channel Object**. The console tree shows a new node with a default channel name selected.



- 3 Type a new name and then press Enter.

## Renaming a Channel

Changing the channel name prevents clients from registering data using the old name. Data for existing queries is set to bad quality. Try not to make changes to parameters like the channel name after you have developed a large client application.

**To change an existing channel name**

- 1 In the DAServer Manager, navigate to the channel.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer and then expand **Configuration**.
- 2 Right-click the channel and click **Rename**.
- 3 Type the new name and press Enter.

## Setting Channel Parameters

The channel parameters consist of the adapter and the write/read duty cycle.

### Selecting the Adapter

If there are devices connected to multiple adapters, you may want to specify which adapter a channel uses. Remember, devices are tied to channels. Use **Default** if you have a single active network connection. If there are multiple network cards, select the card connected to the subnetwork on which the PLCs are located.


You can assign an adapter to multiple channels. However, a channel can have only one adapter.

Spreading your devices over several channels may improve DAServer performance. The performance benefit depends on the message traffic of your network.

The network adapter specifies the Network Interface Card (NIC) the DAServer should use when accessing devices on the channel.

You can change the adapter parameter when the DAServer is active. Changing the adapter parameter when the DAServer is active may disrupt network communications.

#### To select the adapter

- 1 In the DAServer Manager, navigate to the channel.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer and then expand **Configuration**.
- 2 Select the channel. The right pane shows the channel parameters.
- 3 In the **Adapter** list, click the appropriate adapter.
-  4 Click the **Save** icon.


## Setting the Write/Read Duty Cycle

The duty cycle allows you to control the ratio of write operations to read operations. The ratio is always based on one read for every one to ten writes. The default duty cycle is ten. This means ten writes occur for each read operation.

If your application is doing a large number of continuous writes and you need to ensure that reads are processed in a timely fashion, you may want to reduce the duty cycle. If you set the duty cycle to 1, a single read operation occurs for every write operation. If there are no write operations to perform, reads are processed as needed.

This write/read duty cycle overrides the transaction to subscription ratio global parameter.

#### To set the write/read duty cycle

- 1 In the DAServer Manager, navigate to the channel.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer and then expand **Configuration**.
- 2 Select the channel. The right pane shows the channel parameters.
- 3 In the **Write/Read Duty Cycle** area, enter a number.
-  4 Click the **Save** icon.

## Deleting a Channel

If your computer hardware or the network connection between the computer and devices changes, it may be necessary to delete a channel.

When you delete a channel, all nodes below the channel are also deleted. If a client application requests new data from a deleted channel or from a node on a deleted channel, the request is rejected. Data for existing queries is set to bad quality.

### To delete a channel

- 1 In the DASServer Manager, navigate to the channel.
  - a Expand **DASServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DASServer and then expand **Configuration**.
- 2 Right-click the channel and click **Delete**.
- 3 Read the warning and then click **Yes**. The channel node and all nodes (devices) below it in the hierarchy are deleted.

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# Chapter 3

## Managing Devices

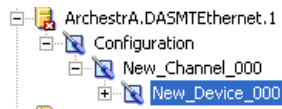
A device communicates with a DAServer and may connect to other devices or I/O points. You set the communication parameters the DAServer uses to communicate with a device.

### Adding a Device

You must add a device to the hierarchy before creating device items. A device name cannot contain spaces.

To add a device

- 1 In the DAServer Manager, navigate to the channel node.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer and then expand **Configuration**.
- 2 Right-click the channel node and click **Add Device Object**. The console tree shows a new node with a default device name selected.



- 3 Type a name and press **Enter**.

## Renaming a Device

You can change the device name while the DAServer is active. After the device name is changed, client applications using the old name cannot register data with the DAServer. Data for existing queries is set to bad quality. Try not to make changes to the device name after you have developed a large client application.

The device name cannot contain spaces.

### To change an existing device name

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer, expand **Configuration**, and then expand the channel.
- 2 Right-click the device whose name you want to change and then click **Rename**.
- 3 Type a name and press Enter.

## Setting the General Parameters

Use the general parameters to specify the device model, ID, and whether to enable data collection.

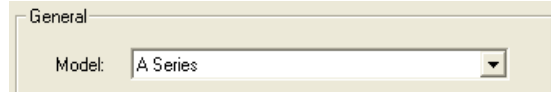
### Assigning a PLC Model to the Device

You can only change the model selection if there are currently no client applications connected to the device.

#### To assign a PLC model to a device

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer, expand **Configuration**, and then expand the channel.
- 2 Select the device.

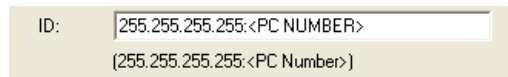
- In the right pane, click the **Parameters** tab. This is shown with the device name followed by the word “Parameters.”



- In the **Model** list, click the model.
- Click the **Save** icon.

## The ID Parameter

The ID parameter specifies the network address of the device.



The Wonderware DAServer for Mitsubishi Ethernet supports A-Series and Q-Series devices. Each type of device uses a special ID format.

### The A-Series ID parameter

The A-Series ID is an IP address and a PLC CPU (PC) number.

The DAServer can communicate with A-Series devices on an Ethernet network or a MelsecNet-II sub-network. The MelsecNet-II sub-network must be directly connected to an A-Series device on the Ethernet network, and it must be the only sub-network on the device.

When you specify the ID of a device directly connected via Ethernet, the IP address is the address of the device, and the PC number is always 255.

When you specify the ID of a device on a sub-network, the IP address is the address of the relay device and the PC number is the PLC CPU (or station) number of the target device on MelsecNet-II.

The ID is specified as **YYY.YYY.YYY.YYY:XXX**

- YYY designates a device IP address. Each YYY byte is in the range of 0 to 255.
- XXX designates the PC number of the device and can be in the range of 0 to 64, or 255 for a device on a local network.

### The Q-Series ID parameter

Q-Series devices can relay messages to multiple, possibly remote, sub-networks. Q-Series devices require a network number parameter to be included in the ID. This number specifies on which network the device resides. The network number is configured in each communication module in each device. If your network topology includes more than two network levels, you need to configure routing tables to direct the message traffic.

The Q-Series ID is a device IP address, network number, and PLC CPU (PC) number.

When you specify the ID of a device on a local network:

- the IP address is the address of the device.
- the network number is the network number for the device. Alternatively, you can set the network number to 0.
- the PC number is the PC number for the device. Alternatively, you can set the PC number to 255.

When you specify the ID of a device on a sub-network:

- the IP address is the address of the relay device.
- the network number is the network number for the device, not the relay device (parent node).
- the PC number is the number for the device. PC numbers on a network (or sub-network) must be unique. However, the same PC number can be used on different sub-networks.

The ID is specified as `YYY.YYY.YYY.YYY:Nzzz:XXX`.


- YYY designates a device IP address. Each YYY byte is the range of 0 to 255.
- N can be upper or lower case.
- zzz designates the network number of the device and is in the range of 0 to 255. 0 is used for a local connection.
- XXX designates the PC number of the device and is in the range of 0 to 64; 255 is used for a local connection.

### Setting the ID Parameter

You can change the ID parameter at any time. This change takes effect immediately. This may affect communications with the device.



#### To set the ID


- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer, expand **Configuration**, and then expand the channel.
- 2 Select the device.
- 3 In the right pane, click the **Parameters** tab. The tab appears with the device name followed by the word “Parameters.”
- 4 In the ID box, type the network address.
-  5 Click the **Save** icon.

## Enabling Data Collection

The enable data collection parameter allows you to control the active state of this device. By default, device communications are enabled.

After a device is disabled, no communications with that device are attempted. In response to client application requests, the quality attribute of the device’s data is marked as bad with a sub-status indicating that it is out-of-service and write operations are not accepted. This means that the device is not usable.

#### To enable data collection

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer, expand **Configuration**, and then expand the channel.
- 2 Select the device.
- 3 In the right pane, click the **Parameters** tab. The tab appears with the device name followed by the word “Parameters.”
- 4 Select the **Enable Data Collection** check box.
-  5 Click the **Save** icon.

## Setting the Protocol Parameters

The device protocol parameters consist of the communication timeouts, the communication parameters, and the word order for 32-bit data types.

### Setting the Communication Timeouts

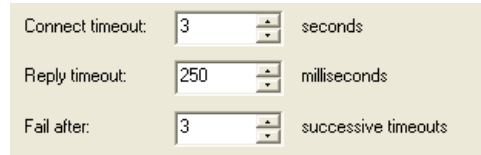
You can set three communication timeouts: connect timeout, reply timeout, and fail after.

- The connect timeout is the time that the DAServer waits for a connection to be made with a device. Depending on the network load, the connect time varies with each connection attempt. The default setting is 3 seconds. The valid range is 1 to 60 seconds. For heavily loaded or slow networks, set the connection time out to a larger value.
- The reply timeout is the time the DAServer waits on a response from the device before giving up and going on to the next request. Longer timeouts only affect performance if a device is not responding. The default setting is 250 milliseconds. The valid range is 50 to 9999 milliseconds.
- The fail after parameter determines how many times the DAServer sends a communications request before the request fails and the device is in error. The valid range is 1 to 10 retries. The default is 3 retries.

#### To set the communication time out values

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer, expand **Configuration**, and then expand the channel.
- 2 Select the device.


- 3 In the right pane, click the **Parameters** tab. The tab appears with the device name followed by the word “Parameters.”



Connect timeout: 3 seconds

Reply timeout: 250 milliseconds

Fail after: 3 successive timeouts

- 4 In the **Protocol** area, type or select values for the **Connect timeout**, **Reply timeout**, and **Fail after** boxes.
-  5 Click the **Save** icon.

## Setting the Communication Parameters


The IP protocol defaults to UDP. The port number defaults to port 5000 for UDP, and port 5001 for TCP.

Each device on a sub-network must be assigned a unique port number.

If you decide to not use the default ports, or you did not allow the installation to automatically add the default port numbers to the firewall exception list; you will need to manually add the port numbers to the firewall exception list. For more information, see *Windows Firewall Considerations* on page 12


To set the communications parameters

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the **DAServer**, expand **Configuration**, and then expand the channel.
- 2 Select the device.
- 3 In the right pane click the **Parameters** tab. The tab appears with the device name followed by the word “Parameters.”



IP Protocol: UDP

Port Number: 5000

- 4 In the **IP Protocol** list, click the protocol to use.
- 5 In the **Port Number** box, type the port number.
-  6 Click the **Save** icon.

## Specifying Word Order for 32-bit Data Types

Each register in the PLC contains 16-bits. A 32-bit value uses two consecutive registers.

For a 32-bit value with the Most Significant Bit (MSB) in the low address, check the low-order word first parameter.

For a 32-bit value with the MSB in the high address register, un-check the low-order word first parameter.

The low-order word first parameter is checked by default.

As an example, if register 1 has a value of “00BC,” and register 2 has a value of “614E.” When the low-order word first parameter is checked, the DAServer extracts a 32-bit value to form “00BC614E.” This is equivalent to the decimal value 12345678. When the low-order word first parameter is not checked, the DAServer extracts the 32-bit value with register 2 as the MSB. The resulting 32-value is “614E00BC.” This is equivalent to decimal value 1632501948.

### To change the low-order word first parameter

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer, expand **Configuration**, and then expand the channel.
- 2 Select the device.
- 3 In the right pane click the **Parameters** tab. The tab appears with the device name followed by the word “Parameters.”



Low-order word first

- 4 Select the **Low-order word first** check box to specify that the first word is the low word.



- 5 Click the **Save** icon.

## Configuring Time Synchronization for Q-Series Devices

You can have the DAServer synchronize a clock of a Q-Series device with the clock of the host computer. This feature is not available on A-Series devices.

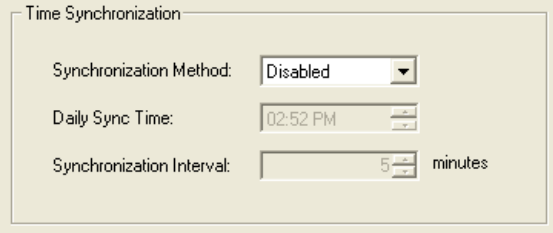
You have two ways of scheduling the synchronization: interval and daily.

- Interval synchronization is done periodically. You enter the number of minutes between synchronizations. The interval can be from 5 to 1440 minutes (24 hours). For example, if you enter 240 minutes, the DAServer sets the device date and time every 4 hours.
- Daily synchronization is done once per day and you specify the time. The time specified is always local time. The daily synchronization time can be affected by changing to and from daylight savings time. When switching from standard time to daylight savings time, if the daily synchronization time is between 2 AM and 3 AM, synchronization is skipped. When switching from daylight savings time to standard time, if the daily synchronization time is between 1 AM to 2 AM, synchronization is triggered twice.

Synchronization can be disabled, which is the default.

### To set the time synchronization parameter

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer, expand **Configuration**, and then expand the channel.
- 2 Select the device.
- 3 In the right pane click the **Parameters** tab. The tab appears with the device name followed by the word “Parameters.”



The screenshot shows a dialog box titled "Time Synchronization" with three configuration options:

- Synchronization Method:** A dropdown menu currently set to "Disabled".
- Daily Sync Time:** A time selection field currently set to "02:52 PM".
- Synchronization Interval:** A numeric input field set to "5" with the unit "minutes" to its right.

- 4 In the **Synchronization Method** list, click the method to use and then configure the additional details:
  - If you selected **Daily**, type or select the time in the **Daily Sync Time** box.
  - If you selected **Interval**, type or select the number of minutes between synchronizations in the **Synchronization Interval** box.



- 5 Click the **Save** icon.

## Deleting a Device

Deleting a device removes the node and all device group and device item information. Deleting a device is not reversible. If you make a mistake, you must re-enter the device information. New requests for data that use the device name are rejected. Data for existing queries is set to bad quality.

### To delete a device

- 1 In the **DAServer Manager**, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the **DAServer**, expand **Configuration**, and then expand the channel.
- 2 Right-click the device and then click **Delete**.
- 3 Read the warning and then click **Yes**.

---

# Chapter 4

## Managing Device Groups

Device groups are labels used by client applications when accessing the DAServer. The device group update interval determines how often the DAServer polls the device and sends data to the client application. If you configure multiple device groups with different update intervals, the client application can receive data at various intervals.

Small update intervals mean fast turnaround for data changes and a high overhead because a large amount of data is moving. Large update intervals mean slow turn around for data changes and a low overhead because not as much data is being passed to the client application.

For DDE/SuiteLink clients, the device group is the same as the DDE/SuiteLink topic. DDE/SuiteLink clients require that at least one device group be created for each device.

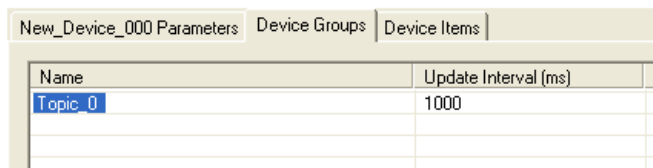
For OPC clients, the device group equals the OPC access path. The DAServer has a default device group for each device, and this device group cannot be deleted. If you are using OPC client applications, creating a device group is optional.

### Adding a Device Group

Device groups allow you to specify an update interval for a set of device items. The device group does not contain any device items; the linkage is made when the client makes a request.

**To add a device group**

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the **DAServer**, expand **Configuration**, and then expand the channel.
- 2 Select the device.
- 3 In the right pane, click the **Device Groups** tab.
- 4 Move the pointer over the columns, right-click, and click **Add**. A **Name** field is selected with a default name.



Name	Update Interval (ms)
Topic_0	1000

- 5 Type a name and press Enter. The **Update Interval** field defaults to 1000. The unit is in milliseconds (ms). A device group is added.



- 6 Click the **Save** icon.

## Renaming a Device Group

Changing the name of an existing device group requires that any client queries using the device group be changed. Requests for data accepted by the DAServer before the change are not affected.

**To change a device group name**

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the **DAServer**, expand **Configuration**, and then expand the channel.
- 2 Select the device.
- 3 In the right pane, click the **Device Groups** tab.



- 4 Move the pointer over the name or the box containing the name to be changed. Right-click the name and then click **Rename**. The name is selected.

New_Device_000 Parameters	
Device Groups	
Device Items	
Name	Update Interval (ms)
Topic 0	1000

- 5 Type a name and press Enter.
- 6 Click the **Save** icon.

## Setting Device Group Data

The device group data consists of one item, the update interval. The update interval specifies the time period in milliseconds between DASServer reads of the device memory. You can specify a number between 0 and 2147483646 (596.52 hours).

### To set the update interval

- 1 In the DASServer Manager, navigate to the device.
  - a Expand **DASServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DASServer, expand **Configuration**, and then expand the channel.
- 2 Select the device.
- 3 In the right pane, click the **Device Groups** tab.
- 4 Move the pointer over interval to be updated. Right-click the interval and click **Modify Update Interval**. The current update interval is selected.


Update Interval (ms)
1000

- 5 Type an interval and press Enter.
- 6 Click the **Save** icon.

## Deleting a Device Group

When you delete a device group, the quality of items being accessed using the device group change to BAD; and the DAServer rejects new requests for data using the device group.

### To delete a device group

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer, expand **Configuration**, and then expand the channel.
- 2 Select the device.
- 3 In the right pane, click the **Device Groups** tab.
- 4 Move the pointer over the device group to be deleted. Right-click the group and click **Delete**.
- 5 Read the warning and then click **Yes**.
- 6  Click the **Save** icon.

---

# Chapter 5

## Managing Device Items

Defining device items provide a more user-friendly way to name data in the device. Defining device items is optional. Use device items to access data in the DAServer and devices connected to the DAServer. Device items consist of two pieces: a name and an item reference. You can specify either from your client.

The device item name is an alternative name for the item reference. It is an “alias” or a label for the data in the device. This label can be used instead of the item reference when you create the client application.

The item reference identifies data in the device. The item reference is a PLC memory reference. Each device’s memory reference can have a different format. For more information, see Item Reference Descriptions on page 49.

The actual item reference can be entered as the device item name. In this case, the item reference value can be left empty.

To provide diagnostic and operational information, the DAServer has several system items that do not access data in a device. They are grouped by function:

- Global system items
- Device-group-specific system items
- Device-specific system items

For more information, see Standard System Items on page 49.

Device item names defined in the DAServer will show up as OPC browsable items.

You can add device items while the DAServer is active, and these new items are immediately available to client applications.

You can make changes to items while the DAServer is active. Changes take effect immediately. OPC clients that are already connected to the item are not affected until they release and re-acquire the item.

For detailed formats for specifying item references, see Item Reference Descriptions on page 49.

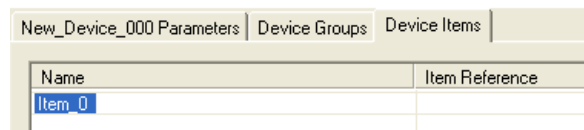
For information on how to subscribe to data items, see Accessing the Data in Your DAServer on page 47.

## Creating Aliases for Item References

The device item name is an alias for the item reference. Device item names can be 256 characters long. Long names may be more explanatory, but your client application may have limited space for displaying names.

To set a device item name

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer, expand **Configuration**, and then expand the channel.
- 2 Select the device.
- 3 In the right pane, click the **Device Items** tab.
- 4 Move the pointer over the columns, right-click and click **Add**. A **Name** field is selected with a default name.



- 5 Type the name and press Enter.
- 6 Click the **Save** icon.

## Renaming a Device Item

Changing a device item name affects new client requests for data. Requests for data already accepted by the DAServer are not affected.

#### To change a device item name

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer, expand **Configuration**, and then expand the channel.
- 2 Select the device.
- 3 In the right pane, click the **Device Items** tab.
- 4 Move the pointer over the name to be changed, right-click and click **Rename**.
- 5 Type the new name and press Enter.



- 6 Click the **Save** icon.

## Deleting a Device Item

Deleting a device item name affects new client requests for data. Requests for data already accepted by the DAServer are not affected.

#### To delete a device item name

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer, expand **Configuration**, and then expand the channel.
- 2 Select the device.
- 3 In the right pane, click the **Device Items** tab.
- 4 Move the pointer over the name to be deleted, right-click and click **Delete**.
- 5 Read the warning and click **Yes**.



- 6 Click the **Save** icon.

## Setting the Item Reference

You must know which memory locations you need and the memory location attributes before entering item references in the DAServer.


For more information, see **Format and Syntax** on page 59.

For tables that list the options for each device type, see Item Reference Descriptions on page 49. (In this case device type does not refer to the model of PLC.)

#### To set an item reference

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer, expand **Configuration**, and then expand the channel.
- 2 Select the device.
- 3 In the right pane, click the **Device Items** tab.
- 4 Move the pointer over the **Item Reference** field to be set, right-click, and click **Rename**.

New_Device_000 Parameters		Device Groups	Device Items
Name	Item Reference		
Item_0	R0004		

- 5 Type the item reference and press Enter.
- 6  Click the **Save** icon.

## Exporting and Importing CSV Files

To facilitate the management of item references (tags) and device item names outside of the DAServer Manager, the DAServer supports the import and export of device item data in a comma separated value (CSV) file. The CSV functions are only available when a device items tab is selected.

#### To export a device item list

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer, expand **Configuration**, and then expand the channel.
- 2 Select the device.
- 3 In the right pane, click the **Device Items** tab.
- 4 Move the pointer over the columns area, right-click, and click **Export**.
- 5 In the **Save As** dialog box, type a file name, select a directory, and press **Save**.


#### To import a device item list

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer, expand **Configuration**, and then expand the channel.
- 2 Select the device.
- 3 In the right pane, click the **Device Items** tab.
- 4 Move the pointer over the columns area, right-click, and click **Import**.
- 5 In the **Open** dialog box, find the file containing the items to be imported, and press **Open**. Items contained in the file are now listed on the **Device Items** tab.

## Clearing All Device Item Names

You can delete all device items that have been created for a device.

#### To clear all device item names

- 1 In the DAServer Manager, navigate to the device.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer, expand **Configuration**, and then expand the channel.
- 2 Select the device.
- 3 In the right pane, click the **Device Items** tab.
- 4 Move the pointer over the columns area, right-click, and then click **Clear All**.
- 5 Read the warning and click **Yes**.
- 6  Click the **Save** icon.





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# Chapter 6

## Managing Your DAServer

After you have configured the DAServer, there are two steps to take before you can access data with your client application.

The first step is to determine what kind of client applications are to be used with this DAServer. If any of your client applications use DDE/SuiteLink, you must configure the DAServer as a service. If only OPC client applications will be used, you can configure the DAServer as a service or as not a service.

The last step is to activate the DAServer. Some client applications can programatically activate the DAServer. If you configure the DAServer as an automatic service, the DAServer is started and activated when the computer on which the DAServer is installed starts up. If you configure the DAServer as a manual service, the DAServer is not started when the computer starts up. Instead, it is started upon the first connection from an OPC client or when activated from the DAServer Manager.

After a DAServer is running as a service (auto or manual), it stays running until explicitly stopped in the DAServer Manager or the computer shuts down.

## Configuring the DAServer as Service

To support DDE/SuiteLink clients, the DAServer must be configured as a service.

To configure the DAServer as a service

- 1 In the DAServer Manager, navigate to the DAServer.
  - Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
- 2 Right-click **Archestra.DASMTEthernet.1** and then click **Configure As Service**.
- 3 Click either **Auto Service** or **Manual Service**.
- 4 Read the warning message and click **Yes**.

## Configuring the DAServer as Not a Service

The DAServer can only be set to run as not a service when the DAServer is in the deactivated state.

To configure the DAServer as not a service

- 1 In the DAServer Manager, navigate to the DAServer.
  - Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
- 2 Right-click **Archestra.DASMTEthernet.1** and then click **Configure As Service**.
- 3 Click **Not a Service**.
- 4 Read the warning message and click **Yes**.

## Archiving Configuration Sets

A configuration set includes the DAServer's global parameters; each channel and its parameters; and each device and its parameters, device groups, and device items. It is a means for you to manage the settings of different DAServer configurations.

The DAServer contains a default configuration set named **dasmtethernet**. This default configuration set cannot be deleted.

You can create multiple configuration sets and switch between them. Archiving, clearing, and switching configuration sets can only be done when the DAServer is deactivated.

Before you create a configuration set, verify that you have saved any changes you made to the global parameters. If you change a parameter and then immediately create a configuration set, the original parameter value is saved as part of the configuration set, not the changed value.



To save a global parameter, click the **Save** icon.

#### To archive a configuration set

- 1 In the DAServer Manager, navigate to the configuration node.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer.
- 2 Click **Configuration**.
- 3 Right-click and click **Archive Configuration Set**.
- 4 In the dialog box, type the configuration set name, and click **Archive**. All the current configuration values are saved to the set.

After you have archived at least one configuration set, you can select it for use.

#### To select a configuration set

- 1 In the DAServer Manager, navigate to the configuration node.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer.
- 2 Click **Configuration**.
- 3 Right-click, point to **Use Another Configuration Set**, then click the desired name.

To change the parameter values saved in a configuration set, make sure the desired configuration set is shown, then follow this procedure.

#### To change the parameter values in a configuration set

- 1 In the DAServer Manager, navigate to the configuration node.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer.

- 2 Click **Configuration**.
- 3 Change the parameters that you want to change.



- 4 Click the **Save** icon.

Clearing a configuration set returns the parameters to their default values.

#### To clear a configuration set

- 1 In the DAServer Manager, navigate to the configuration node.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer.
- 2 Click **Configuration**.
- 3 Right-click, move the mouse over **Clear Configuration Set**, then left click.
- 4 Read the warning message, then click **Yes**. The parameters are set to the default values.

#### To delete a configuration set

- 1 In the DAServer Manager, navigate to the configuration node.
  - a Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
  - b Expand the DAServer.
- 2 Click **Configuration**.
- 3 Right-click, move the mouse over **Delete Configuration Set**, then select the configuration set to delete.
- 4 Read the warning message, then click **Yes**.

## Activating/Deactivating the DAServer

When you activate the DAServer, it starts communicating and accepting requests from client applications. If a DAServer is configured as an automatic service, the DAServer is started and activated when the computer starts up. Also, a DAServer can be activated by the an OPC client connection request.

#### To activate the DAServer

- 1 In the DAServer Manager, navigate to the DAServer.
  - Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
- 2 Right-click **Archestra.DASMTEthernet.1** and then click **Activate Server**.

Deactivating your DAServer stops it from communicating with client applications.

A DAServer with active OPC clients will not stop until the last OPC client shuts down.

#### To deactivate the DAServer

- 1 In the DAServer Manager, navigate to the DAServer.
  - Expand **DAServer Manager**, expand the node group, and then expand **Local** (or the remote computer name).
- 2 Right-click **Archestra.DASMTEthernet.1** and then click **Deactivate Server**.
- 3 Read the warning message and click **Yes**.

## In-Proc/Out-of-Proc

The DAServer can run as a stand-alone process (out-of-proc) or as part of the client process (in-proc).

When the DAServer is running out-of-proc, it supports requests from both DDE/SuiteLink and OPC client applications. When the DAServer is running in-proc, it only supports OPC client applications.

If the DAServer is running as a service, the icon on the DAServer node in the SMC is yellow. If the DAServer is running as not a service, the icon is white. For more information, see the DAServer Manager User's Guide.

## Hot Configuration

The DAServer allows certain configuration parameters to be changed while the DAServer is active. See the sections about the specific parameters for limitations or constraints.

## Demo Mode

You can install the DAServer without a license. The DAServer will run without a license in Demo mode for 120 minutes. While in demo mode the DAServer checks for a license every 30 seconds. When the 120 minutes has expired:

- the DAServer stops updating items.
- all non-system items will have a Bad quality status.
- new items will be rejected.

After the 120 minutes the DAServer checks for a license every thirty seconds. If a license is not found, the DAServer logs a warning.

You can use the `$$SYS$Licensed` system item to check the status of your license. This item returns true if the proper license is found or the DAServer is in demo mode (the 120 minutes); otherwise, it returns false.

After the DAServer finds a valid license, it logs a message, stops looking for a license, and begins running normally. For more information see the License Utility User Guide.

# Chapter 7

## Accessing the Data in Your DAServer

Client applications read and write to data items that are internal to the DAServer, as well as to the items located in the devices. Client application communication with the DAServer is done using either the OPC, or DDE/SuiteLink protocols. The client application may or may not be on the same computer as the DAServer.

You do not need to create device items in the DAServer for your OPC client applications.

For information on how to specify item references, see [Format and Syntax](#) on page 59. For information on specific address formats, see [Address Descriptions](#) on page 61.

## Accessing Data Using OPC

In order to connect to the DAServer with an OPC client application, you need to be aware of the following six parameters:

- **node name:** The computer name identifying the node where the DAServer is located. Only required for remote access.
- **program name:** ArchestrA.DASMTEthernet.1
- **group name:** An OPC group defined and created by the client. The DAServer device group is used as the OPC access path.
- **device group:** A device group as defined on the DAServer. If omitted, the default device group is assumed.
- **link name:** The hierarchy of nodes names, from the channel node to the device node, separated by delimiters.
- **item name:** The specific data element. This can be the device item name or the item reference.

The combination of the link name and item name form the OPC data path for any OPC client to access DAServer data.

If the item specified is not valid for the device location, the DAServer does not accept the item, returns a bad quality, and generates an error message in the logger.

## Accessing Data Using DDE/SuiteLink

The DDE/SuiteLink address has four fields:

- **node name:** The computer name identifying the node where the DAServer is located. Only required for remote access.
- **application name:** DASMTEthernet
- **topic name:** This is a device group defined for the device.
- **item name:** The specific data element. This can be the device item name or the item reference.

The DDE/SuiteLink topic is the equivalent to the device group.



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# Chapter 8

## Item Reference Descriptions

Item references are used to access system items and to read and write data from devices.

### Standard System Items

System items supply you easy access to DASServer status and diagnostics information. Client applications can read data from them just like ordinary items. However, in most cases the system item values are not directly acquired through the communications layer. System item values are usually generated through internal calculations, measurements, and tracking by the DAS Engine.

System items, like ordinary items, are defined by the following properties:

- **Group** (client group/OPC group): The arbitrary collection of items, not correlated.
- **Hierarchical location** (link name/OPC path. The hierarchical node section of the fully qualified OPC item ID.): The device the item is attached to.
- **Device group** (OPC access path/topic): A collection of items on the same physical location with the same protocol update rate.

For DDE/SuiteLink clients, `$$SYS$Status` always comes from the leaf level of a `DAServer` hierarchy branch, which is the destination PLC node. For OPC clients, `$$SYS$Status` can be accessed at all hierarchy levels. `$$SYS$Status` at the root level of the whole hierarchy tree is always good, as it represents the quality status of the local computer itself. Hence, for practical application, OPC clients should reference `$$SYS$Status` at any hierarchy levels other than the root.

All system items follow the same naming convention:

- All system items start with `$$SYS$`.
- The DAS Engine scans and parses the name for system items.
- Parsing of the name is case-insensitive.

All system items can be accessed through subscriptions to a device group. However, while some system items return data for that device group, others are server-wide.

## Global System Item

The following system item refers to specific information regarding a global condition of the `DAServer`.

System Item Name	Type/Access Rights	Description	Values
<code>\$\$SYS\$Licensed</code>	Boolean/Read	Binary status indication of the existence of a valid license for the <code>DAServer</code> . If <code>FALSE</code> , this item causes the <code>DAServer</code> to stop updating existing tags, to refuse activation of new tags, and to reject write requests in addition to setting quality for all items to <code>BAD</code> . If <code>TRUE</code> , the <code>DAServer</code> functions as configured. All instances have the same value.	RANGE: 0, 1  1: Valid license exists.  0: No valid license exists.

## Device-Group-Specific System Items

The following system items refer to specific information regarding device groups that have been configured in the DAServer.

System Item Name (Type)	Type/Access Rights	Description	Values
\$SYS\$updateInterval	DWord/Read Write	Used to access the currently set update interval. It is the current update interval of the device group in milliseconds. A client can poke new values into this item. The value of zero indicates that non-system items on that topic are not updated (data for these items are not acquired from the device).	RANGE: 1...2147483647  0: Topic inactive, no items are updated. Data acquisition is stopped.  >0: Expected updated interval for the set of all items in the device group.
\$SYS\$maxInterval	DWord/Read	Not supported by this DAServer.	Always returns zero.

System Item Name (Type)	Type/Access Rights	Description	Values
\$SYS\$WriteComplete	Integer/Read Write	<p>Used to access the state of pending write activities on the corresponding device group. On device group creation (adding items to an OPC group), the value of this system item is initially 1, indicating all write activities are complete – no pokes are pending.</p> <p>If values are poked into any items of the device group, the value of this item changes to 0, indicating write activity is currently in progress.</p> <p>If the server has completed all write activities, the value of this item changes to 1 if all pokes were successful or to -1 if at least one poke has failed.</p> <p>If the value of this item is not zero, the client can poke 1 or -1 to it (poke a 1 to clear errors, or a -1 to test a client reaction on write errors).</p> <p>If the value of this item is zero, it cannot be poked.</p>	<p>RANGE: -1, 0, 1</p> <p>1: Write complete (no writes are pending – initial state).</p> <p>0: Writes are pending.</p> <p>-1: Writes completed with errors.</p>

System Item Name (Type)	Type/Access Rights	Description	Values
\$SYS\$ReadComplete	Integer/ ReadWrite	<p>Used to access the state of initial reads on all items in the corresponding device group. The value is 1 if all active items in a device group have been read at least once.</p> <p>If at least one item in the device group is activated, this item changes to 0. It changes to 1 if all items have been read successfully, or to -1 if at least one item has a non-good quality.</p> <p>Poking a 0 to this item resets the internal read states of all items in this device group. This resets this item to 0. If all items are read again after this poke, this item changes back to 1 or -1.</p>	<p>RANGE: -1, 0, 1</p> <p>1: Read complete (all values have been read).</p> <p>0: Not all values have been read.</p> <p>-1: All values have been read but some have a non-good quality.</p>
\$SYS\$ItemCount	DWord/Read	Used to access the number of items in the corresponding device group. This item is read-only.	<p>RANGE: 0...2147483647</p> <p>&gt;=0: Number of items.</p>
\$SYS\$ActiveItemCount	DWord/Read	Used to access the number of active items in the corresponding device group. This item is read-only.	<p>RANGE: 0...2147483647</p> <p>&gt;=0: Number of active items.</p>

System Item Name (Type)	Type/Access Rights	Description	Values
\$SYS\$errorCount	DWord/Read	Used to access the number of all items (active and inactive) that have errors (non-good OPC quality) in the corresponding topic. If the communications status of a device group is bad, all items have errors. This item is read-only.	RANGE: 0...2147483647 >=0: Number of all items (active and inactive) with errors.
\$SYS\$PollNow	Boolean/Read Write	Not supported by this DAServer.	

## Device-Specific System Items

The following system items refer to specific information regarding the device(s) the DAServer is connected to.

System Item Name (Type)	Type/Access Rights	Description	Values
\$SYS\$Status	Boolean/Read	<p>Binary status indication of the connection state to the device (hierarchy level) the item is attached to. The device group (OPC access path/topic) does not affect the value.</p> <p>The status can be good even if individual items have errors.</p> <p>For DDE/SuiteLink clients, \$SYS\$Status always comes from the leaf level of a DAServer hierarchy branch, which is the destination PLC node.</p> <p>For OPC clients, \$SYS\$Status can be accessed at all hierarchy levels. \$SYS\$Status at the root level of the whole hierarchy tree is always good, as it represents the quality status of the local computer itself. Hence, for practical application, OPC clients should reference \$SYS\$Status at any hierarchy levels other than the root.</p>	<p>RANGE: 0, 1</p> <p>1: DAServer connection to the device is intact.</p> <p>0: Error communicating with the device.</p>

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System Item Name (Type)	Type/Access Rights	Description	Values
\$SYS\$ErrorCode	Longint/Read	Detailed error code of the communications state to the device.  The device group (OPC access path/topic) does not affect the value.	>= 0: Good status (0 is the default state – connected).  >0: is some device state like: connecting, initializing, etc.  <0: Error status (value indicates the error).
\$SYS\$ErrorText	String/Read	Detailed error string of the communications state of the device.  The device group (OPC access path/topic) does not affect the value.	Descriptive text for the communications state corresponding to the error code.

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System Item Name (Type)	Type/Access Rights	Description	Values
\$SYS\$StoreSettings	Integer/Read Write	<p>Used to make the temporary update interval changes via the \$SYS\$updateInterval item permanent. If the client pokes a value of 1 into this system item, the currently set update interval is written to the server's configuration file.</p> <p>The value of this system item clears to 0 after being set, if the configuration file write is successful. If the write fails, then the value is set to -1.</p> <p>If the update interval has been changed via the \$SYS\$updateInterval item and this item is not poked to 1, the DAServer uses the original update interval for that topic the next time it is started.</p> <p>Reading the item always provides 0. Read/Write values are persisted only if the user sets this system item. The values other than this persist only for the life of the DAServer.</p>	<p>RANGE: -1, 0, 1</p> <p>-1: Error occurred during saving the configuration file.</p> <p>0: Read value always if status is OK.</p> <p>1: Persist settings (cleared immediately).</p>

## Supported Data Types

The data type is specified as a suffix in the item syntax. The DAServer supports the following data types.

Data Type	Description
BCD	Two byte packed BCD Value range is 0 - 9999. Behavior is undefined for values beyond this range.
Boolean	Single bit. Boolean device types can be accessed as Short, Word, BCD, Long, DWord, and LBCD. However, the device must be addressed on a 16 bit boundary.
Dword	Unsigned 32 bit value. Bit 0 is the low bit. Bit 31 is the high bit.
Float	32 bit floating point value.
LBCD	Four byte packed BCD value, range is 0 - 99999999. Behavior is undefined for values beyond this range.
Long	Signed 32 bit value. Bit 0 is the low bit. Bit 30 is the high bit. Bit 31 is the sign bit.
Short	Signed 16 bit value. Bit 0 is the low bit. Bit 14 is the high bit. Bit 15 is the sign bit.
String	Null terminated ASCII string support includes HiLo and LoHi byte order selection, and string lengths up to 128 bytes.
Word	Unsigned 16 bit value. Bit 0 is the low bit. Bit 15 is the high bit.

## Format and Syntax

Item references have four attributes:

- **Device Type** defines what the memory location can be used for. Device types include inputs, outputs, link relays, latch relays, and others. For device type limitations, see your PLC documentation. In this case, device type does not refer to the model of PLC.
- **Range** defines the valid addresses. Addresses are usually specified as one or more letters indicating the device type and a number. The number is specified as a hex or decimal value from 0 to an upper limit. Hexadecimal numbers must always start with a valid decimal digit. For example, the offset C3 should be written as 0C3.
- **Data Type** defines which data type the client request can specify when accessing the memory location. Examples are Short, Word, and BCD. For a complete list of valid data types, see Supported Data Types on page 58. The data type is often optional because most memory locations have a default data type.
- **Access** defines what the client may do; some memory locations are read only or write only, others are read/write.

Item references are in the form: address.bit@datatype.

- The address is made up of the device type and range, for example R0.
- Bits within the address can be individually referenced by appending a bit number, for example R0.5 or R0:5. The float data type does not use a bit number.
- Addresses can be accessed using the optional data types by appending the data type after the bit number or address if the bit number is not used. For example R0@Long, R0.5@Long, or R0 L.

For tables showing allowable usage for each memory address, see Address Descriptions on page 61.

## Memory Access

An example of a simple item reference is X020@Word, which references X memory (inputs) on a 16 bit boundary using the Word data type. The 020 is hex. The Word data type is needed because the default data type for X memory is Boolean.

## Bit Access

Individual bits of register device types can be accessed as Booleans. To reference a particular bit, append a bit number .bb (.bit) to the address of the register.

The bit number is always in decimal notation.

- 0 - 15 for Short, Word, BCD
- 0 - 31 for Long, DWord, and LBCD

Examples are as follows:

- D1.0 is the least significant bit of D1
- D1.15 is the most significant bit of D1
- D1.31 is bit 15 of D2

## String Access

The string data type uses a number appended to the address to specify the length of the string in bytes. An example would be DSH020.4, which specifies four bytes starting at address 20. The valid length of a string in D memory is 2 to 128 bytes. The string length must be an even number.

The string length, appended to the address, is always in decimal notation.

## Array Access

All device types can be accessed in single dimension arrays of Short, Word, BCD, Long, DWord, LBCD, or Float formats. The size of the array depends on the data type and device type.

Register device types can be accessed in arrays of up to 254 elements for Short, Word and BCD; and 127 elements for Long, DWord, LBCD, and Floats.

Bit device types can be accessed in arrays of up to 127 elements for Short, Word and BCD; and 63 elements for Long, DWord, LBCD, and Float.

Appending array notation onto a normal item reference creates an array. For example the item D100 [4], is a single dimension array that includes the register addresses: D100, D101, D102, and D103.

## Overriding the Update Interval or Data Type

You can override the update interval on a per-tag basis by appending @[Update Interval] to the address. For example,

- To override just the update interval: R0001@500
- To override both update interval and data type: R0001@500,short

## Support for Wonderware FactorySuite Mitsubishi A-Series Serial IO Server (MelsecA) Syntax

The DAServer supports the long and bit access syntax of MelsecA.

### Support for bit access

Individual bits in registers can be read as discrete tag names into InTouch by appending the bit number to the item name using the following format: Rnn:b@datatype. The DAServer will extract the specified bit (b) (0-15) of the specified register (nn) and return its value to InTouch as a discrete. Adding the data type is optional.

For example:

- R1:0 is the least significant bit of R1
- R1:15 is the most significant bit of R1
- R1:3 is bit 3 of R1

The DAServer supports both “.” and “:” for bit access syntax.

### Support for 32-bit data types

Pairs of registers can be treated as 32-bit signed integers. The reference is created by appending a space and the letter L to the item name.

For example: D0 L

The DAServer supports both “@long” and “L” for 32-bit access syntax.

## Address Descriptions

The address descriptions consist of the device type, its item name; and the allowable range of values, the default data type, allowable suffix values, and allowable access methods.

Some range values are specified as hexadecimal numbers. Hexadecimal numbers must always start with a valid decimal digit. For example, the offset C3 should be written as 0C3.

## A-Series Address Descriptions

The A-Series devices support the following types of devices.

Device Type	Item Name	Range	Data Type	Supported Suffixes	Access
Inputs	Xn	n=000 to 01FFF(Hex)	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Outputs	Yn	n=000 to 01FFF(Hex)	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Link Relays	Bn	n=000 to 01FFF(Hex)	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Internal Relays	Mn	n=0000 to 8191	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Special Int. Relays	Mn	n=9000 to 9255	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read Only
Latch Relays	Ln	n=0000 to 8191	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Annunciator Relays	Fn	n=0000 to 2047	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Timer Contacts	TSn	n=0000 to 2047	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Timer Coils	TCn	n=0000 to 2047	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write

Device Type	Item Name	Range	Data Type	Supported Suffixes	Access
Counter Contacts	CSn	n=0000 to 1023	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Counter Coils	CCn	n=0000 to 1023	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Step Relays	Sn	n=0000 to 2047	Boolean		Read/Write
Timer Value	TNn	n=0000 to 2047	Short	Word, BCD	Read/Write
Counter Value	CNn	n=0000 to 1023	Word	Short, BCD	Read/Write
Data Registers	Dn	n=0000 to 8191 n=0000 to 8190	Short	Word, BCD Long, DWord, LBCD, Float	Read/Write
Data Register Bit Access	Dn	n=0000.00 to 8191.15 n=0000.00 to 8190.31	Short	Word, BCD, Boolean Long, DWord, LBCD	Read/Write
Data Registers String Access HiLo Byte ordering.	DSHn	n=0000.002 to 8190.002 n=0000.128 to 8127.128	String		Read/Write
Data Registers String Access LoHi Byte ordering.	DSLn	n=0000.002 to 8190.002 n=0000.128 to 8127.128	String		Read/Write
Special Data Registers	Dn	n=9000 to 9255 n=9000 to 9254	Short	Word, BCD Long, DWord, LBCD, Float	Read Only

Device Type	Item Name	Range	Data Type	Supported Suffixes	Access
Data Register Bit Access	Dn	n=9000.00 to 9255.15	Short	Word, BCD, Boolean	Read Only
		n=9000.00 to 9254.31		Long, DWord, LBCD	
Link Registers	Wn	n=0000 to 1FFF (Hex)	Short	Word, BCD	Read/Write
		n=0000 to 1FFE (Hex)		Long, DWord, LBCD, Float	
Link Register Bit Access	Wn	n=0000.00 to 1FFF.15	Short	Word, BCD, Boolean	Read/Write
		n=0000.00 to 1FFE.31		Long, DWord, LBCD	
Link Registers String Access HiLo Byte ordering.	WSHn	n=0000.002 to 1FFE.002	String		Read/Write
		n=0000.128 to 1FBF.128			
Link Registers String Access LoHi Byte ordering.	WSLn	n=0000.002 to 1FFE.002	String		Read/Write
		n=0000.128 to 1FBF.128			
File Register	Rn	n=0000 to 8191	Short	Word, BCD	Read/Write
		n=0000 to 8190		Long, DWord, LBCD, Float	
File Register Bit Access	Rn	n=0000.00 to 8191.15	Short	Word, BCD, Boolean	Read/Write
		n=0000.00 to 8190.31		Long, DWord, LBCD	
File Registers String Access HiLo Byte ordering.	RSHn	n=0000.002 to 8190.002	String		Read/Write
		n=0000.128 to 8127.128			



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Device Type	Item Name	Range	Data Type	Supported Suffixes	Access
File Registers	RSLn	n=0000.002 to 8190.002	String		Read/Write
String Access	LoHi	n=0000.128 to 8127.128			
Byte ordering.					

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## Q-Series Address Descriptions

The Q-Series devices support the following types of devices.

Device Type	Item Name	Range	Data Type	Supported Suffixes	Access
Inputs	Xn	n=0000 to 3FFF (Hex)	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Direct Inputs	DXn	n=0000 to 3FFF (Hex)	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Outputs	Yn	n=0000 to 3FFF (Hex)	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Direct Outputs	DYn	n=0000 to 3FFF (Hex)	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Link Relays	Bn	n=0000 to 3FFF(Hex)	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Special Link Relays	SBn	n=0000 to 07FF(Hex)	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Internal Relays	Mn	n=0000 to 16383	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Special Int. Relays	SMn	n=0000 to 2047	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Latch Relays	Ln	n=0000 to 16383	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Annunciator Relays	Fn	n=0000 to 2047	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Edge Relays	Vn	n=0000 to 2047	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Step Relays	Sn	n=0000 to 16383	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write

Device Type	Item Name	Range	Data Type	Supported Suffixes	Access
Timer Contacts	TSn	n=0000 to 2047	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Timer Coils	TCn	n=0000 to 2047	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Integrating Timer Contacts	SSn	n=0000 to 2047	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Integrating Timer Coils	SCn	n=0000 to 2047	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Counter Contacts	CSn	n=0000 to 1023	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Counter Coils	CCn	n=0000 to 1023	Boolean	Short, Word, BCD, Long, DWord, LBCD	Read/Write
Timer Value	TNn	n=0000 to 2047	Short	Word, BCD	Read/Write
Integrating Timer Value	SNn	n=0000 to 2047	Short	Word, BCD	Read/Write
Counter Value	CNn	n=0000 to 1023	Word	Short, BCD	Read/Write
Data Registers	Dn	n=00000 to 12287 n=00000 to 12286	Short	Word, BCD Long, DWord, LBCD, Float	Read/Write
Data Register Bit Access	Dn	n=00000.00 to 12287.15 n=00000.00 to 12286.31	Short	Word, BCD, Boolean Long, DWord, LBCD	Read/Write
Data Registers String Access HiLo Byte ordering.	DSHn	n=00000.002 to 12286.002 n=00000.128 to 12223.128	String		Read/Write

Device Type	Item Name	Range	Data Type	Supported Suffixes	Access
Data Registers	DSL <sub>n</sub>	n=0000.002 to 12286.002	String		Read/Write
String Access LoHi		n=0000.128 to 12223.128			
Data Register Bit Access					
Special Data Registers	SD <sub>n</sub>	n=0000 to 2047	Short	Word, BCD	Read/Write
		n=0000 to 2046		Long, DWord, LBCD, Float	
Data Register Bit Access					
Link Registers	W <sub>n</sub>	n=0000 to 3FFF (Hex)	Short	Word, BCD	Read/Write
		n=0000 to 3FFE (Hex)		Long, DWord, LBCD, Float	
Link Register Bit Access					
Link Registers	WSH <sub>n</sub>	n=0000.002 to 3FFE.002	String		Read/Write
String Access HiLo		n=0000.128 to 3FBF.128			
Byte ordering.					
Link Registers	WSL <sub>n</sub>	n=0000.002 to 3FFE.002	String		Read/Write
String Access Lohi		n=0000.128 to 3FBF.128			
Byte ordering.					
Special Link Registers	SW <sub>n</sub>	n=0000 to 07FF (Hex)	Short	Word, BCD	Read/Write
		n=0000 to 07FE (Hex)		Long, DWord, LBCD, Float	

Device Type	Item Name	Range	Data Type	Supported Suffixes	Access
Link Register Bit Access	SWn	n=0000.00 to 07FF.15	Short	Word, BCD, Boolean	Read/Write
		n=0000.00 to 07FE.31		Long, DWord, LBCD	
File Register	Rn	n=00000 to 32767	Short	Word, BCD	Read/Write
		n=00000 to 32766		Long, DWord, LBCD, Float	
File Register Bit Access	Rn	n=00000.00 to 32767.15	Short	Word, BCD, Boolean	Read/Write
		n=00000.00 to 32766.31		Long, DWord, LBCD	
File Registers String Access HiLo Byte ordering.	RSHn	n=0000.002 to 32766.002	String		Read/Write
		n=0000.128 to 32703.128			
File Registers String Access LoHi Byte ordering	RSLn	n=0000.002 to 32766.002	String		Read/Write
		n=0000.128 to 32703.128			
Index Registers	Zn	n=00 to 15	Short	Word, BCD	Read/Write
		n=00 to 14		Long, DWord, LBCD, Float	
Index Register Bit Access	Zn	n=00.00 to 15.15	Short	Word, BCD, Boolean	Read/Write
		n=00.00 to 14.31		Long, DWord, LBCD	



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# Chapter 9

## Troubleshooting

You can troubleshoot problems with the DAServer using:

- the Windows Task Manager
- the Windows Performance and Alerts (PerfMon) application also called Performance Monitor
- the DAServer Manager
- the ArcestrA Log Flag Editor
- the ArcestrA Log Viewer.

Your client application may provide the ability to view error messages, monitor the status of requests, and allow you to request data on the status of the DAServer and connected devices. For more information, see your client application documentation.

### Troubleshooting with Windows Tools

Windows has two tools that may be useful in troubleshooting performance problems.

You can find quick verification that the DAServer process is running by looking at the Windows Task Manager. It also provides information on the user, CPU and memory usage of the processes.

If you need more information, or need to gather data while not logged in, you can use the Performance and Alerts application. For more information, see the Microsoft Management Console (MMC) help files on the Performance application. The Performance application is one of the administrative tools found in the Windows Control Panel.

## Troubleshooting with the DAServer Manager

The DAServer Manager has information that may be useful in troubleshooting problems. When the DAServer is active, a diagnostic node is present below the configuration node in the console tree of the System Management Console.

Each diagnostic leaf contains information about DAServer activity. For more information, see the DAServer Manager User Guide or Help files.

## Finding Version Information

If you need to contact Technical Support, you may need to supply version information.

**To determine the DAServer Manager version**

- In the DAServer Manager, right-click **DAServer Manager**, and then click **About DAServer Manager**. An about box appears that shows the version and build date of the DAServer Manager.

**To determine version information for DAServer components**

- In the DAServer Manager, select the DAServer name in the console tree. The version information for each DAServer component is shown in the details pane.

## Using the Wonderware Log Viewer

Error messages are created by the DAServer and logged by the Logger. You can view these messages with the Log Viewer. The Log Viewer help files explain how to view messages and how to filter which messages are displayed.

Log Flags are categories of messages. The Log Flag Editor User Guide contains an explanation of the categories. Using the Log Flag Editor, you can specify which log flags the DAServer creates.

**To open the Log Flag Editor**

- 1 In the System Management Console, expand **Log Viewer** and the expand the log viewer group.
- 2 Select **Local**.
- 3 On the **Action** menu, click **Log Flags**.



In general, look at error and warning messages to determine if a problem exists. If you need to determine whether the DASServer is communicating with a device, you can enable the DASSend and DASReceive log flags. From these you can determine whether or not the device is responding.

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**Note** Generating large numbers of diagnostic messages can impact DASServer performance. You should not run in production with any more flags than those set when the DASServer is installed. To troubleshoot you may turn on more flags, but there will be a performance impact. For more information, see the Log Flag Editor User Guide.

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## Basic Log Flags

The basic log flags for all ArchestrA components are:

- **Error:** A fatal error, the program cannot continue. By default set on by logger.
- **Warning:** The error is recoverable. A client called with a bad parameter, or the result of some operation was incorrect, but the program can continue. By default set on by logger.
- **Start-Stop:** Each main component logs a message to this category as it starts and stops.
- **Info:** These are general diagnostic messages.
- **Ctor-Dtor:** C++ classes of interest log messages to this category as they are constructed and destructed.
- **Entry-Exit:** Functions of interest log messages to this category as they are called and return.
- **Thread Start-Stop:** All threads should log messages to this category as they start and stop.

## DAServer Log Flags

Messages created for these log flags are for DAServer common components and contain information about internal DAServer activities.

- **DACmnProtFail:** Some failure occurred in the common components while sending a message, updating an item, or otherwise moving data. Typically, this represents some unexpected behavior in the server-specific DLL.
- **DACmnProtWarn:** Some problem occurred that interfered with sending messages, updating items, or otherwise moving data. Common examples are slow poll, value limiting during type conversion, and transaction timeout messages.
- **DACmnTrace:** Normal processing of client program requests and data movement to and from the server-specific DLL are traced on this log flag. Use this in conjunction with **DACmnVerbose** to get the most information.
- **DACmnVerbose:** Many log flags used by the DAS common components are modified occasionally by **DACmnVerbose**. When **DACmnVerbose** is set, the logging of messages on other log flags includes more information.
- **DACmnSend:** Operations within the DAS Engine DLL that revolve around sending messages to the server-specific DLL.
- **DACmnReceive:** Events surrounding messages that are returned to the DAS Engine by the server-specific DLL, including the blocking and unblocking of hierarchies.

## DAServer-Device Interface Log Flags

Messages created for the following log flags are specific to an individual DAServer and contain information about communications between the DAServer and device.

- **DASProtFail:** An error in the protocol occurred; for instance, device disconnected. The program can continue, and in fact this category is expected during normal operation of the program. Must be set on by the generic DAS code when the DAServer starts.
- **DASProtWarn:** Something unexpected occurred in the protocol; for instance, a requested item with an otherwise valid item name is not supported by this device. Must be set on by the generic DAS code when the DAServer starts.
- **DASTrace:** General diagnostic messages of a protocol-specific nature; for instance, the number of items in a message for a specific protocol, if this number could be useful for optimizing.
- **DASVerbose:** Modifies all other DAS logging flags. When on, other messages may become more verbose, at the developer's discretion.
- **DASSend:** Protocol messages sent to the device are logged to this category.
- **DASReceive:** Protocol messages received from the device are logged to this category.
- **DASStateCat1, DASStateCat2, DASStateCat3, DASStateCat4:** These are general categories for use by the server developer. As DeviceEngine-generated state machines are created by the DAServer, they can be told to log state machine messages to one of the following: DASStateCat1, DASStateCat2, DASStateCat3, or DASStateCat4. These messages will indicate when a state is made the active state, when a state handler is run, when a state handler completes, and when a timeout occurs for a state machine.
- **DASStateMachine:** By default, DeviceEngine-generated state machines created by the DAServer will log to this category, unless specifically told to log to one of the DASStateCatN categories. In addition, general state machine messages are logged to this category. These messages indicate when a state machine is created and deleted.

## Error Message Descriptions

These are the messages specific to the Wonderware DAServer for Mitsubishi Ethernet. When you have the specified log flag enabled, these messages will be generated and logged.

Message	Log Flag	Possible Cause	Solution
Unable to add item "item < item name> with path"	Warning	A tag address has no length.	Reenter the address in the client application.
		A tag address contains one or more invalid characters.	Reenter the address in the client application.
		A tag address references a location that is beyond the range of supported locations for the device.	Verify that the address is correct. If it is incorrect, reenter it in the client application.
		A tag address references a location that is valid for the communications protocol but not supported by the target device.	Verify that the address is correct. If it is incorrect, reenter it in the client application. Verify that the selected model name for the device is correct.
Data Type '<type>' is not valid for device address '<address>'	Warning	A tag address has been assigned an invalid data type.	Modify the requested data type in the client application.
Device address '<address>' is read-only.	Warning	A tag address has a requested an access mode that is not compatible with what the device supports for that address.	Change the access mode in the client application.

Message	Log Flag	Possible Cause	Solution
Device '<device name>' is not responding.	Error	The connection between the device and the host PC is broken. The communications parameters for the connection are incorrect. The named device may have been assigned an incorrect network ID.	Verify the cabling between the PC and the PLC device. Verify that the specified communications parameters match those of the device. Verify that the network ID given to the named device matches that of the actual device.
Unable to write to '<address>' on device '<device name>'.	Error	The connection between the device and the host PC is broken. The communications parameters for the connection are incorrect. The named device may have been assigned an incorrect network ID.	Verify the cabling between the PC and the PLC device. Verify that the specified communications parameters match those of the device. Verify that the network ID given to the named device matches that of the actual device.
Device '<device name>' reported an invalid address or an error for the range <start address> to <end address>, the block has been deactivated.	Error	An attempt has been made to reference a nonexistent location in the specified device.	Verify the tags assigned to addresses in the specified range on the device and eliminate those tags that reference invalid locations.

Message	Log Flag	Possible Cause	Solution
Write to device '<device name>' failed, DIP Switch 7 must be switched ON.	Error	None	The AJ71E71 card must be set to allow writes to occur during run. This is accomplished by setting DIP switch 7 to the ON position.
Winsock initialization failed (OS Error = n)	Error	OS Error Indication: 10091 Indicates that the underlying network subsystem is not ready for network communication.	Wait a few seconds and restart the driver.
		OS Error Indication: 10067 Indicates the limit on the number of tasks supported by the Windows Sockets implementation has been reached.	Close one or more applications that may be using Winsock and restart the driver.
Winsock V1.1 or higher must be installed to use the Wonderware DAServer for Mitsubishi Ethernet.	Error	The version number of the Winsock DLL found on your system is less than 1.1.	Upgrade your version of Winsock to 1.1 or higher.

Message	Log Flag	Possible Cause	Solution
The PC Number for Device 'Device Name' in error	Error	The PC number you have entered for the Device ID is invalid. This may occur if the station you desire to communicate with on MelsecNet is not available. If you desire to communicate with the Local PC the PC number should be 255.	If attempting to communicate with a PC located on MelsecNet then verify the PC number of the desired target PC. If you intend to talk directly to the local PC that contains the Ethernet connection then specify a PC number of 255.
Failed to sync time and date for device '<device>'. Will retry in <time> minutes.	Warning	The driver failed to write time and date data to the PLC.	Verify the cabling between the PC and the PLC device. Verify the specified communications parameters match those of the device. Verify that the network ID given to the named device matches that of the actual device.
Unable to bind to adapter: '<adapter>'. Connect failed.	Error	The operating system could not find an unused port to use for communication with this device.  Network system failure, such as Winsock or network adapter failure.  Other applications have claimed all available ports (possible but unlikely).	Restart the computer and check the network adapter. Check for applications that could be causing conflicts, and shut them down.





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