

WorkstationST* Mark* V Ethernet Global Data (EGD) Instruction Guide

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Document Updates

Revision	Location	Description
A	Throughout the doc	Format changes

Acronyms and Abbreviations

EGD	Ethernet Global Data, a control network and communication protocol
DA	Data Access
OPC	A standard for data exchange in the industrial environment

Related Documents

Doc #	Title
GEI-100829	WorkstationST Mark V Feature GSM Server
GEH-6700	ToolboxST* User Guide for Mark Controls Platform
GEH-6759	WorkstationST Mark V Feature System Guide
GEH-6760	WorkstationST GSM 3.0 Application Guide

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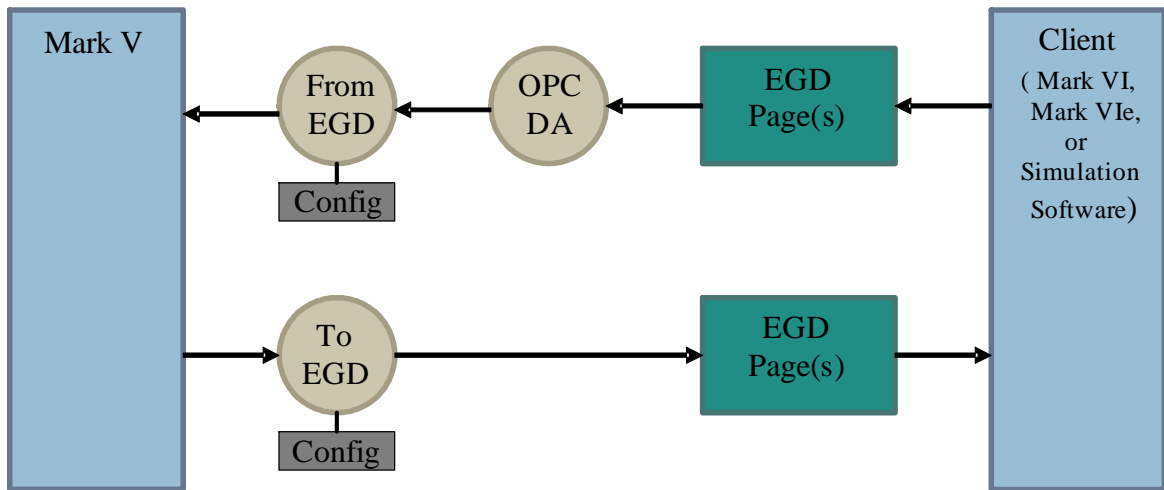
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1 Overview

The Mark V communicates using GE's ARCNET®. However, new generation Mark VI and Mark VIe controllers, along with current simulation software, communicate over Ethernet Global Data (EGD). To support bidirectional real-time data exchange between Mark V and EGD Pages the following components were added to the WorkstationST application:

- Taking high-speed EGD pages and transmitting the data to a Mark V controller to act as the Mark V inputs
- Taking high-speed Mark V data and exposing it on EGD pages
- Rescaling Mark V values (16 bit integers) with the goal of seamless communication across all controller types (Mark V, Mark VI, Mark VIe) and simulation software

The following figure shows the flow of EGD between the Mark V controller and Mark VI/VIe controller.



2 Data File Configuration

The Mark V controls EGD software package contains two programs, *ToEGD* and *FromEGD*. *ToEGD* periodically requests data from the Mark V controller, scales the values to IEEE floating points, and then transmits them on an EGD page. *FromEGD* requests data from the OPC® DA server, which is receiving broadcasted EGD pages, scales the values to 16-bit integers, and writes them to the Mark V controller. However, to know what signals to request, each program has its own user-defined configuration data file containing transmit parameters along with the list of points, or signals. This document defines and explains the format of the two data files.

The *ToEGD* data file consists of a number of sections, with each section defining one EGD page that is processed. Each section consists of a collection of parameters that define special aspects of that page (such as the desired period of transmission) along with the list of signals included in the page. The names used for the input and output side of the page processing default to being the same, but can be overridden if the signal names in the EGD pages do not match the signal names in the Mark V controller.

The *FromEGD* data file consists of a number of sections, with each section defining one list that is processed. Each section consists of a collection of parameters that define special aspects of that list (such as the desired period of transmission) along with the list of signals included. The names used for the input and output side of the list processing may be the same (denoted by an asterisk), but can be overridden if the signal names in the OPC DA server do not match the signal names in the Mark V controller.

2.1 ToEGD.DAT File

Each unit to be used needs a configuration file containing the EGD parameters and a list of points for each EGD page to be produced. Because of the limitations of the Mark V controller, a maximum of 100 points will be allowed per EGD page with a maximum of 32 pages.

Comments are supported in the points section of the data file (after the point definitions) and are denoted by a semicolon. The parameter section cannot include comments after the parameters values, but comment lines can be included. Everything on a line after a semicolon will be ignored.

The file should be an ASCII file as the definitions of all the contents of this file were defined using ASCII standards. The following is an example of a single EGD page with seven points that will continually be transmitted at the set period.

```
[EGD 1]
@PERIOD = 16
@SIGNATURE = 1.1
@PRODUCERID = 192.168.100.1
@DESTINATION = 192.168.255.255

: <EGD Location> <Data type> <Point name> <EGD point name> <Eng units> <Gain> <Offset> <Desired eng units>
0 REAL TNH "s"
4 REAL TTOM "Deg F"
8 REAL TNH (RPM) "s" 36 0 "RPM"
12.0 BOOL L4 ; Master Protective
12.1 BOOL L52GX
12.2 BOOL L1X
12.3 BOOL L94X
```

2.1.1 TOEGD.DAT Example

EGD Parameters

The first section of the data file contains the parameters needed to create and send the EGD page.

- **[EGD n]** The first line of every EGD page defined in the data file must be *[EGD n]*, where n is the Exchange ID of the page, between 1 and 32.
- **@PERIOD** The amount of time in between requests to the Mark V controller for the user-defined signals in the data file. This parameter is in Mark V CPU ticks, which is 32 ticks per second. For example, to request data from the Mark V controller at 2 Hz, the period must be 16.
- **@SIGNATURE** The signature is used to keep track of changes in the format of an EGD page. The format is: *M.m*, or, *MajorRevision.MinorRevision*, where the major revision is incremented for changes that render the page non-backwards compatible, such as truncation of data. The minor revision is incremented for backwards compatible modifications, such as adding more points to the end of the list.
- **@PRODUCERID** The producer ID is the IP address of the device producing the EGD page. In the case of ToEGD, the producer ID should be the IP address assigned to the External Device created in the ToolboxST application.
- **@DESTINATION** The industry standard IP addressing specifies the 192.168.x.y range as being a collection of Class-C addresses. This means that the subnet broadcast mask should be 255.255.255.0, and the broadcast address on the PDH would be 192.168.201.255.

Network	Base Address	Subnet Mask	Broadcast Address
UDH	192.168.101.0	255.255.255.0	192.168.101.255
PDH	192.168.201.0	255.255.255.0	192.168.201.255

Point Information

This section of the data file lists each point and their respective fields for processing.

- **EGD Location** The byte or bit location of the point. Bit-packed logics are supported (Byte.bit). The location of the point must coincide with the point data type. For example, a REAL is 4 bytes, and must increment the max location by 4. Logic signals, or BOOLS, are a bit, and must increment the max location by 0.1.
- **Data Type** The EGD data type of the point. For the beta, only BOOLS and REALs are supported.
- **Point Name** The name of the point to retrieve from the Mark V controller. This name must correspond with a signal in the Mark V controller.
- **EGD Point Name** The optional point name to be displayed on the EGD page. If supplied, the EGD point name is used when exporting the EGD configuration. Otherwise, it assumes the name of the EGD signal and is the same as the Mark V controller signal.
- **Engineering Units** The engineering units string for scaling (optional for logic signals). Both the English and Metric unit tables are checked for a corresponding set of engineering units. If a match is found, the value is scaled according to that set. The engineering units must be surrounded by quotes.
- **Gain** The optional gain used for scaling the EGD value to a different set of engineering units or *target value* prior to sending it on EGD.
- **Offset** The optional offset used for scaling the EGD value to a different set of engineering units or *target value*, prior to sending it on EGD.
- **Desired Engineering Units** The optional desired engineering units. If this is not specified, the Mark V feature uses the current operating units (English or Metric) to scale the value for EGD. If engineering units are supplied, both the English and Metric unit tables are checked for a corresponding set of engineering units. If a match is found, the value is scaled according to that set. The desired engineering units must be surround by quotes.

2.2 FromEGD.DAT File

Each unit that is to be used needs a configuration file containing the necessary OPC DA server periodic data list parameters and the points for each list. Currently, only 32 lists are supported.

Comments are supported in the points section of the data file and are denoted by a semicolon. However, comments are not supported in the parameters section. Supported comments must be at the end of the line as everything on the line preceding the semicolon is ignored.

The file should be an ASCII file as the definitions of all the contents of this file were defined using ASCII standards. The following is an example of a single periodic data list with 7 points that will continually be requested from the OPC DA server and written to the Mark V controller at the set period.

```
[LIST 1]
@PERIOD= 1000
@SENDALL = 0
@PREFIX = "SIM1."

; <Point name> <Mark V name> <Eng units> <Gain> <Offset> <Desired eng units>
  TNH      *          "°"
  ITXM     *          "Deg F"
  RPM      TNH      "°"      36      0      "RPM"
  L4       *
  L52GX    *
  L1X      *
  L94X     *
; Master Protective
```

2.2.1 FROMEGD.DAT EXAMPLE

Periodic Data List Parameters

The first section of the data file contains the parameters needed to create and send the EGD page.

- **[List n]** The first line of every list defined in the data file must be *[List n]*, where n is the list number between 1 and 32.
- **@PERIOD** The amount of time in between writes of the signals to the Mark V controller in milliseconds. For example, to send a list once per second, set the period to 1000.
- **@SENDALL** This parameter is not fully implemented for the beta. The value should stay at 0, meaning that all signals will be sent for every message
- **@PREFIX** The name of the device that produced the signals in the list. This parameter is used to retrieve the signals from the OPC DA server. By default, the prefix is the name of the unit (denoted by @PREFIX = ""). The prefix must include the separator (a period) between the prefix and the point name. For example, if the prefix is, *SIMI*, the parameter must be @PREFIX = "SIM1."

Point Information

This section of the data file lists each point and their respective fields for processing.

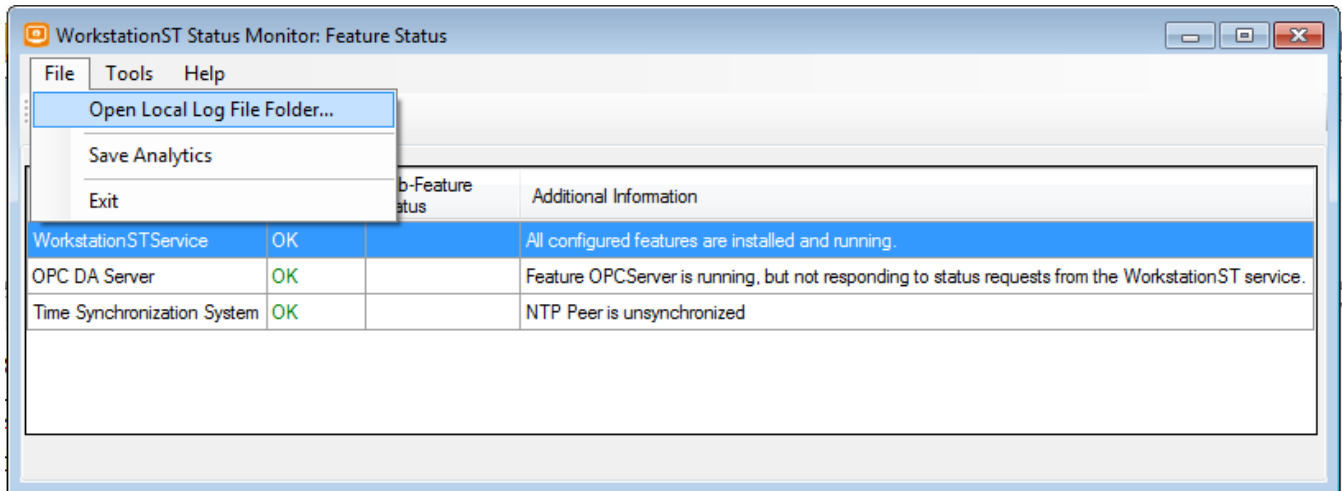
- **Point Name** The name of the point found in the OPC DA server.
- **Mark V Name** The name of the point found in the Mark V controller. If the name is the same as the name found in the OPC DA server, use an asterisk.
- **Engineering Units** The engineering units string for scaling (optional for logic signals). Both the English and Metric unit tables are checked for a corresponding set of engineering units. If a match is found, the value is scaled according to that set. The engineering units must be surrounded by quotes.
- **Gain** The optional gain used for scaling the OPC DA value to a different set of engineering units or, *target value*, prior to sending it to the Mark V controller.
- **Offset** The optional offset used for scaling the OPC DA value to a different set of engineering units or, *target value*, prior to sending it to the Mark V controller.
- **Desired Engineering Units** The optional desired engineering units. If this is not specified, the Mark V feature uses the current operating units (English or Metric) to scale the value. If engineering units are supplied, both the English and Metric unit tables are checked for a corresponding set of engineering units. If a match is found, the value is scaled according to that set. The desired engineering units must be surround by quotes.

2.3 Error Logs

ToEGD and FromEGD each create log files if there are any errors to report. If the file is not present, then there were no errors to report. The files are named, *ToEGD.LOG*, and, *FromEGD.LOG*, respectively. By default, they are located at *C:\ProgramData\GE Energy\WorkstationST*.

➤ **To view error logs:**

1. From the taskbar notification area, click the **WorkstionST Status Monitor** button to display the **WorkstationST Status Monitor** screen.
2. From the **File** menu, select **Open Local Log File Folder**.



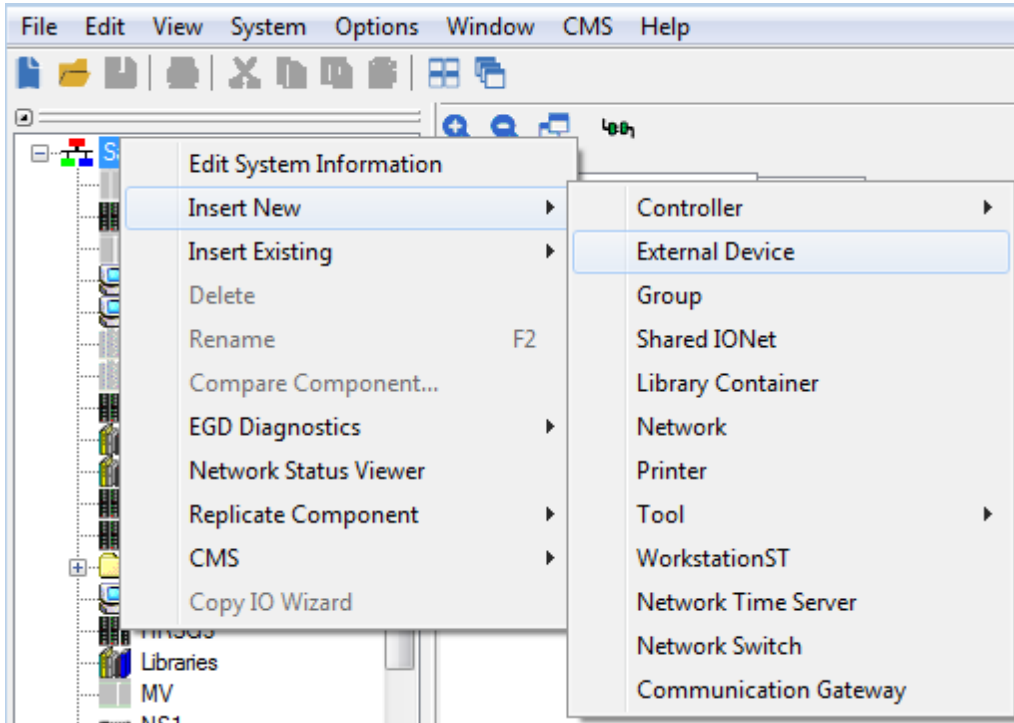
3. Locate and double-click the appropriate **.LOG** file to display the file..

3 Import to ToolboxST

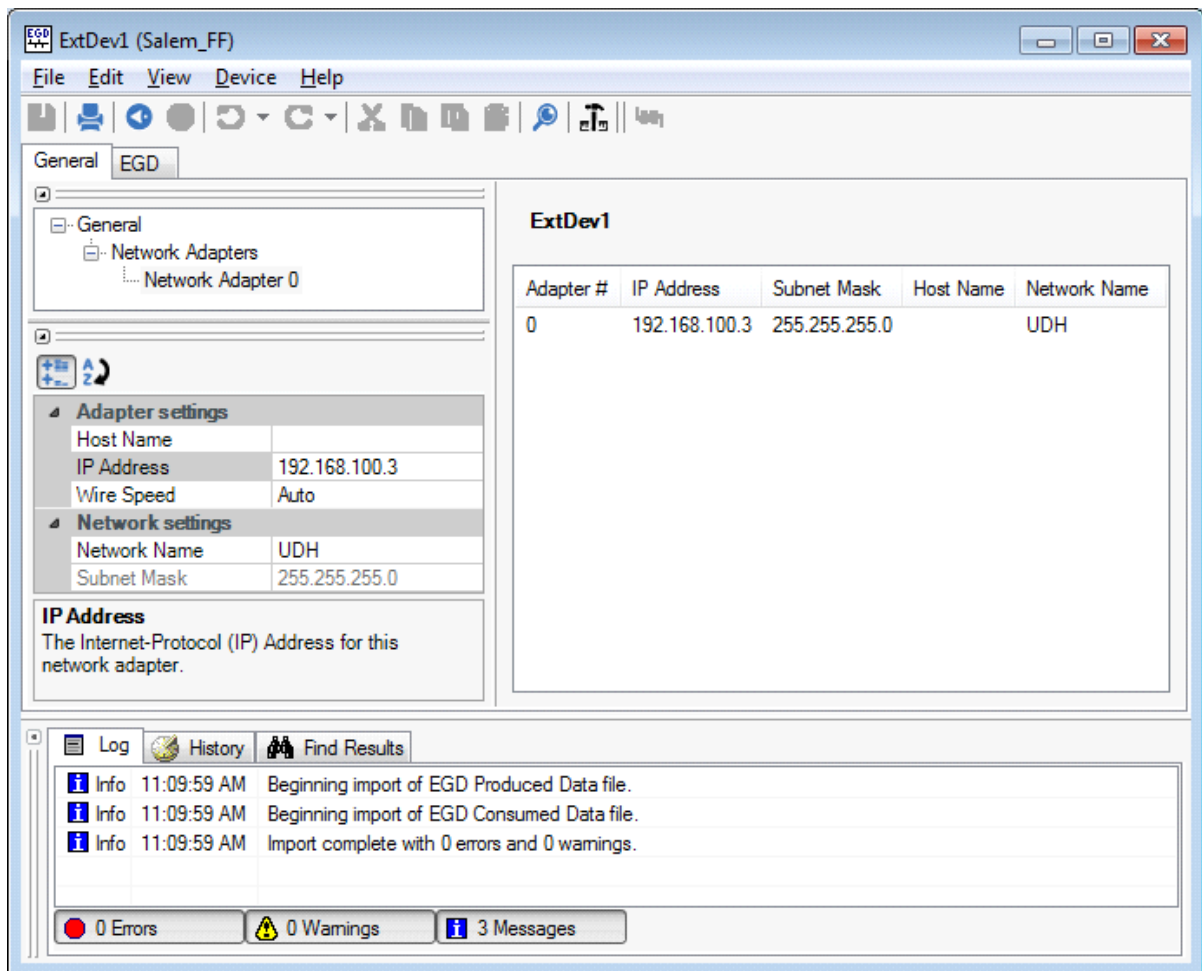
Use the following procedure to import Mark V controller EGD information into the ToolboxST application.

➤ **To import Mark V controller information into the ToolboxST application**

1. From the ToolboxST System Editor **Tree View**, right-click the system item and select **Insert New** and **External Device**.



2. Enter a **Name** for the device and lick **Finish**.
3. From the System Editor **Tree View**, select the new **External Device** and from the **Property Editor**, select **Enable EGD Editor** and set to True.
4. From the System Editor **Tree View** double-click the new **External Device** to display the **Component Editor**.







5. From the **General** tab **Tree View**, select **Network Adapter 0** and from the **Property Editor**, select **IP Address** and enter the correct IP Address.
6. From the **EGD** tab **Tree View**, select **Ethernet Global Data** and from the **Property Editor**, select **Producer ID** and set it to the same Producer ID as in the data file.
7. From the **File** menu, select **Import and Export** and follow the **Import/Export Wizard** to import the EGD configuration. (Refer to the *ToolboxST User Guide for Mark Controls Platform* (GEH-6700), the section, **EGD Editor for External Devices** for additional information.



8. Verify the **Period**, **Signature**, and **Destination Address** match that in the **ToEGD.dat** file.

Note The period in ToEGD.dat is based on CPU ticks in the Mark V controller. Therefore, if the period in ToEGD.dat is set to 32, that would be once per second, or 1000 ms. In the ToolboxST application, the period is in milliseconds and must be configured as such.

9. From the toolbar, click the **Build**  icon to build the device.
10. From the **Component Editor Tree View**, right-click **Referenced Devices**, click **Select Devices**, and from the **Select Devices** dialog box, select the device to consume the Mark V controller EGD data and click **OK**.
11. From the toolbar, click the **Build**  icon to build the device.
12. From the toolbar, click the **Download**  icon to download the device.
13. From the toolbar, click the **Save**  icon to save the configuration.

