

Triangle MicroWorks, Inc.

SCADA Data Gateway  
Quick Start Guide

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# SCADA Data Gateway Quick Start Guide

## 1. Quick Start

### 1.1 Quick Start Introduction

**Note:** To use this Quick Start / Tutorial you will need to obtain the Triangle MicroWorks Protocol Test Harness. If you do not already have this product a 21-day evaluation can be downloaded from [www.TMW-USA.com](http://www.TMW-USA.com).

The Triangle MicroWorks' SCADA Data Gateway (SDG) software is delivered as a self-installing executable file (SDGVmn.exe where m is the major release and nn is the minor release). Starting with this file, follow the steps below to install and configure the SDG software. After these steps have been completed, the SDG will operate under the following *default*, "quick-start" operating conditions:

- The SDG will act as an IEC 60870-5-101 Master device.
- The SDG will communicate over a TCP/IP loop back communication channel: '127.0.0.1'.
- The SDG will communicate with a single remote IEC 60870-5-101 Slave Device (running in the TMW Test Harness) at Link Address 3.
- The SDG will collect data from, and issue commands to, a common address of ASDU 4.
- The SDG will present all collected data points as available OPC tags.
- An OPC Client will be started to view the data in the SDG.

To install the SDG application, perform the following steps:

1. Execute the delivered installation executable and follow the directions provided. The installation directory will be created automatically if it did not previously exist. If a previously licensed version of the SDG application was installed on this workstation, the previous version should not be removed and this version should be installed into the same directory, overwriting the previous version.
2. All SDG documentation is delivered in Adobe PDF format. In order to view the documentation you will need to install the Adobe Acrobat Reader if you have not done so already. You can download this reader from <http://www.adobe.com/products/acrobat>.
3. If the SDG is automatically registered as an OPC Data Access and an OPC Alarm and Event server at installation time.
4. Execute "**TMWgtway.exe**." This can be done from the command line or using the 'SCADA Data Gateway' option from the Start Menu. If this is the first time the SDG application has been run on this workstation the application will install an evaluation license good for 21 days. Before this period expires you should obtain a permanent license as described in the licensing section of the Manual.
5. If you need to run the included OPC client applications the OPC Data access components need to be installed. The following will accomplish this: Select "Programs/Triangle MicroWorks/SCADA Data Gateway/Install OPC 2.0 Data Access Components" from the start menu.

**Note:** Operating conditions are set and preserved by the **TMWgtway.ini** and the **TMWgtway.csv** file. To modify or to add to the default operating conditions described above, please reference the Manual.

**Note:** A point-mapping file (**TMWgtway.csv**) may be used to:

- Define command points or assign logical OPC tag names to collected data points
- Create new data points that are logical or arithmetic combinations of one or more other data points

- Map data points between Master and Slave SDG Components (to allow the SDG to operate as a data concentrator or a protocol converter)

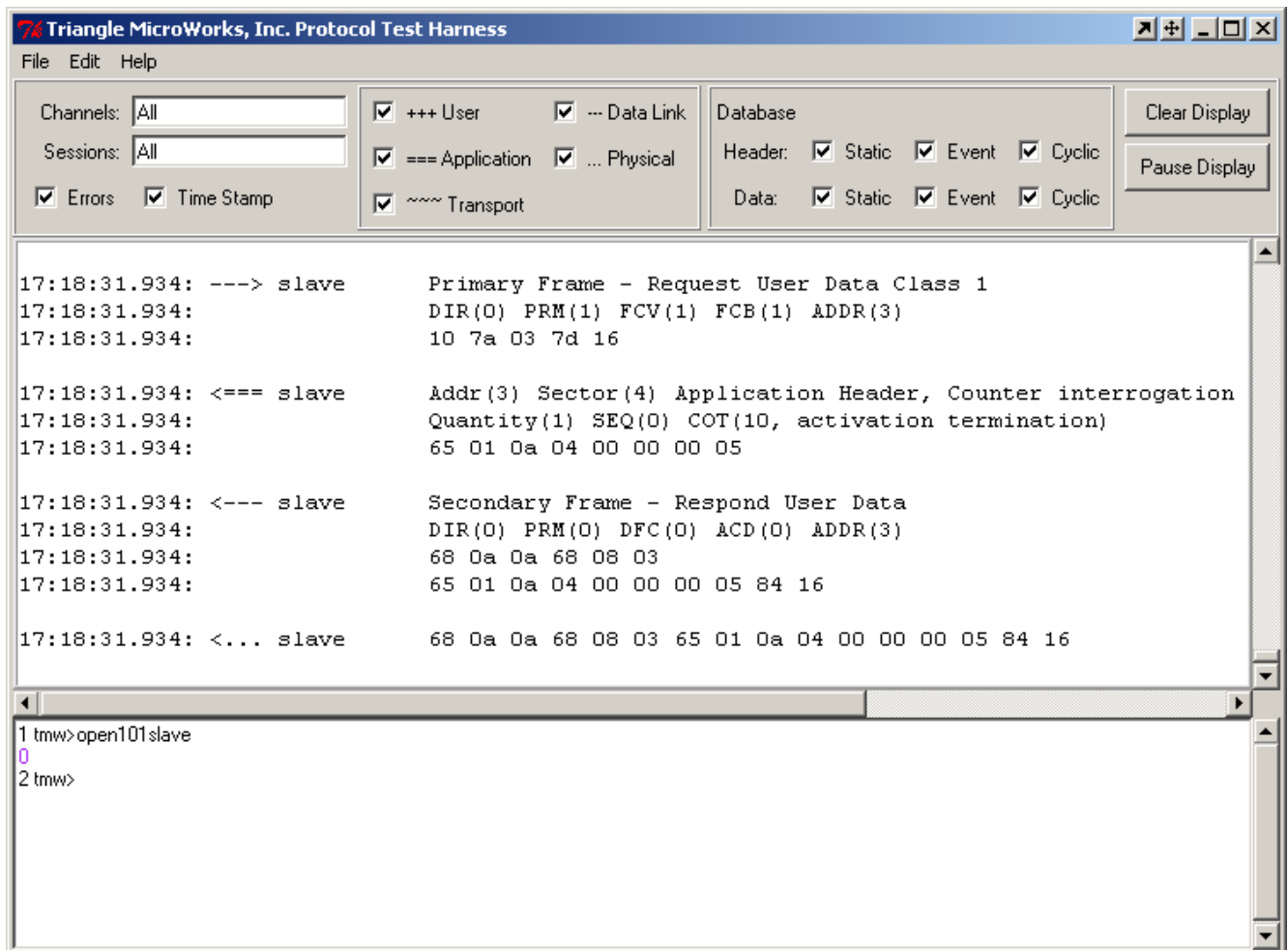
To create or modify a point mapping file, please refer to the Manual.

The SCADA Data Gateway is a communication protocol driver, and it provides the values that the protocol transmits over the wire. For example, it does not perform conversion of normalized and scaled values in IEC 60870-5-101 to the equivalent floating point representation. However, this conversion can be done in the SCADA Data Gateway through an equation, as described in the Manual.

### 1.2 Quick Start Tutorial

This section guides you through a simple SDG configuration. It shows how create a SDG configuration with an IEC-60870-5-101 Master. This configuration will be connected to the Protocol Test Harness, which will be running an IEC-60870-5-101 Slave.

Before configuring the SDG, start the Protocol Test Harness and enter the command 'open101slave' in the bottom panel.

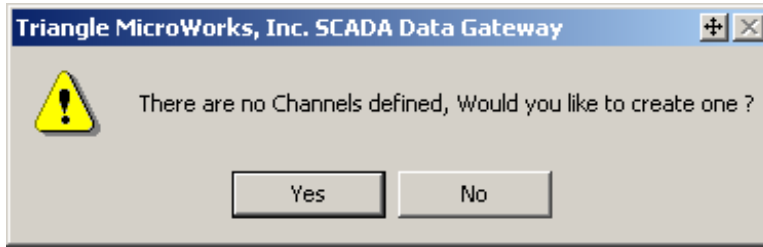


This starts an IEC 60870-5-101 Slave sessions on the Test Harness. This session will later communicate with the SDG 101 Master.

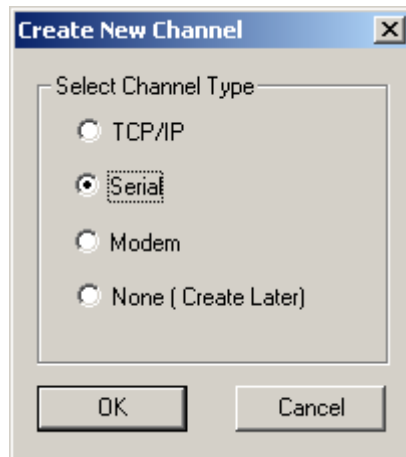
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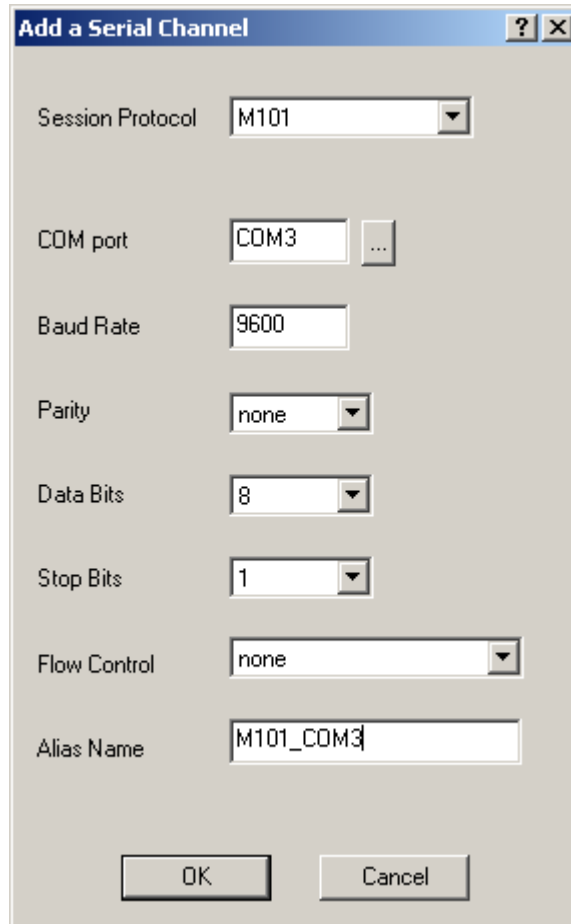
When there is no INI file in the SDG installation directory (typically “C:\Program Files\Triangle MicroWorks\SCADA Data Gateway”), the following dialog box is displayed. Answering **Yes** to this dialog box will step the user through a series of dialog boxes that will create a simple SDG configuration.



After answering **Yes** to the previous dialog box, the following dialog box is displayed to allow the Channel Type to be selected. In this example a Serial Channel is selected.



The serial channel needs to be configured by filling in the appropriate fields. In this example, we modified the COM Port to “COM3” and created an Alias Name of “M101\_COM3”. Note that the Session Protocol is set to M101, although any protocol could have been selected.



The image shows a dialog box titled "Add a Serial Channel". It contains the following configuration fields:

- Session Protocol: M101
- COM port: COM3
- Baud Rate: 9600
- Parity: none
- Data Bits: 8
- Stop Bits: 1
- Flow Control: none
- Alias Name: M101\_COM3

At the bottom of the dialog box are two buttons: "OK" and "Cancel".

After configuring the Channel definition, a Session needs to be defined. The SDG will display a session dialog box according to the protocol defined for the channel. The following dialog box illustrates the IEC-60870-1-101 Master Session configuration dialog box.

**Add a M101 Session for Serial Channel index 0**

Session Configuration

Controlled Station Link Address: 3

Application Layer

ASDU COT Size: One Octet

ASDU Address Size: Two Octet

Originator Address: 1

ASDU IOA Size: Two Octet

Absolute Response Timeout: 60000

Incremental Response Timeout: 30000

Link Layer

Link Mode: unbalanced

Link Max Retries: 2

Link Confirm Timeout: 15000

Link Address Size: One Octet

Class 2 Poll Delay: 500

Class 2 Pending Delay: 0

Class Pending Count: 100

Class 1 Poll Delay: 0

Class 1 Pending Delay: 0

Class 1 Poll Count: 20

OK Cancel

In this example, we used the default values in the session dialog box for all parameters.

For IEC 60870-5 protocols, the sector must be configured after the session configuration is complete.

**Add a Sector for session index 0**

Sector Address: 4

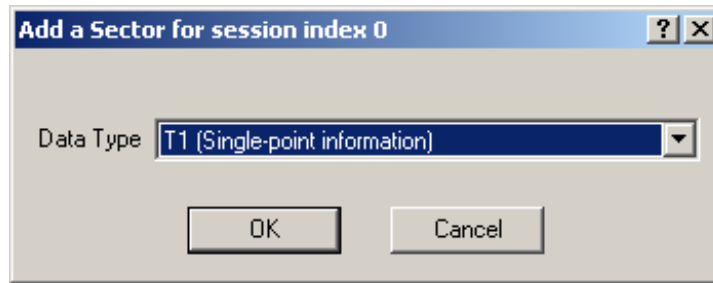
EOI Action Mask: 7

Online Action Mask: 0

OK Cancel

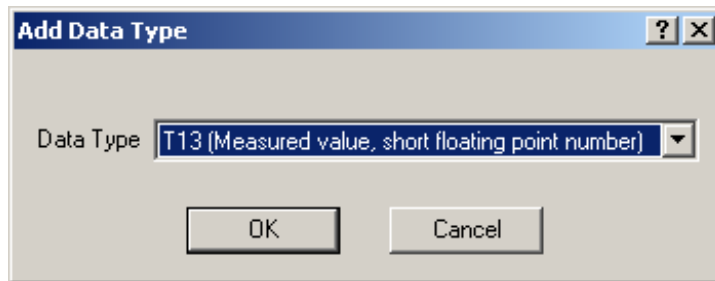
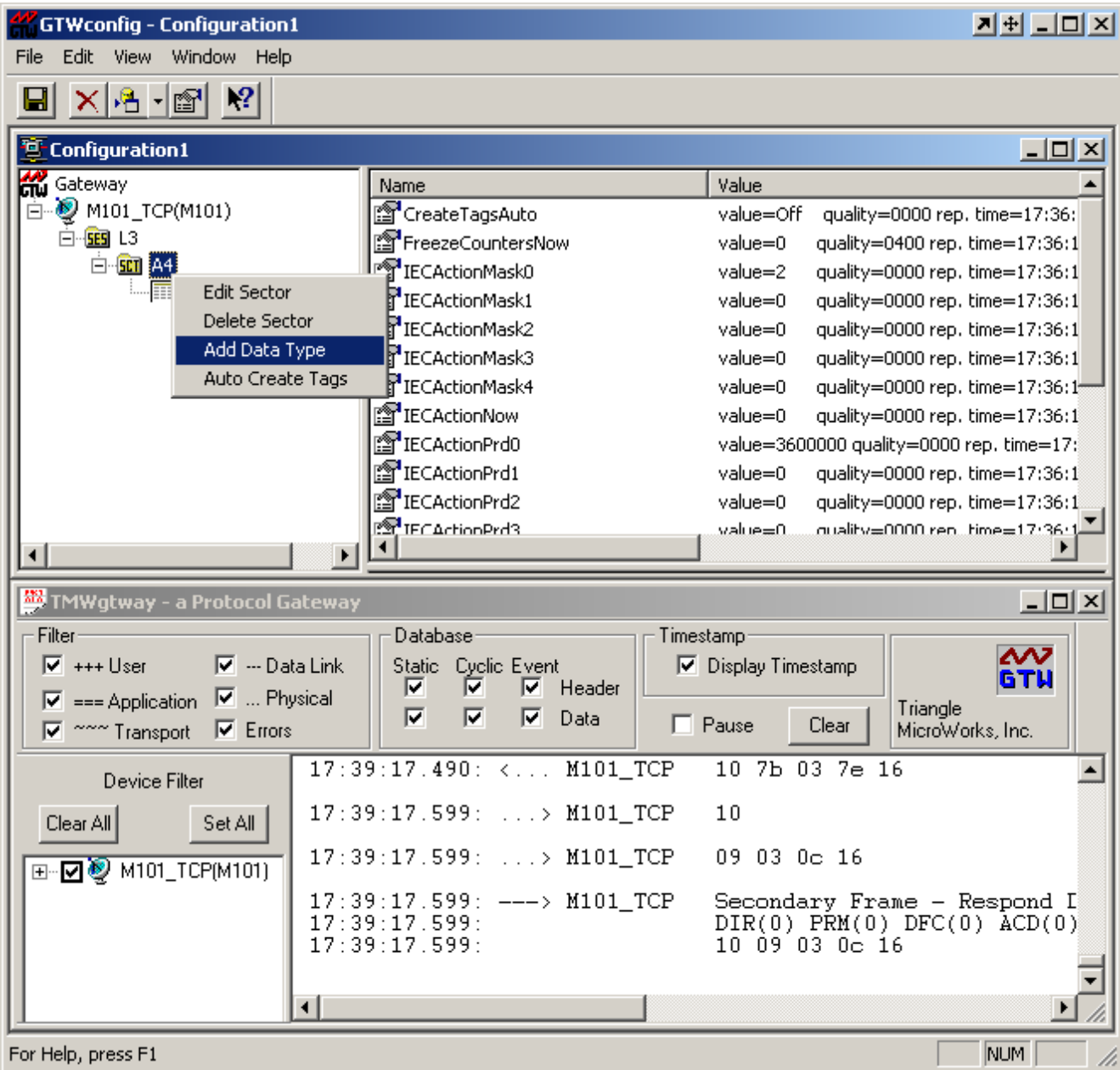
Note that in this example, the Sector Address was changed to 4. (The Test Harness example 101 Slave uses Sector 4 by default).

Once the sector (for IEC protocols) or session (for DNP and Modbus protocols) has been configured, data types can be added.

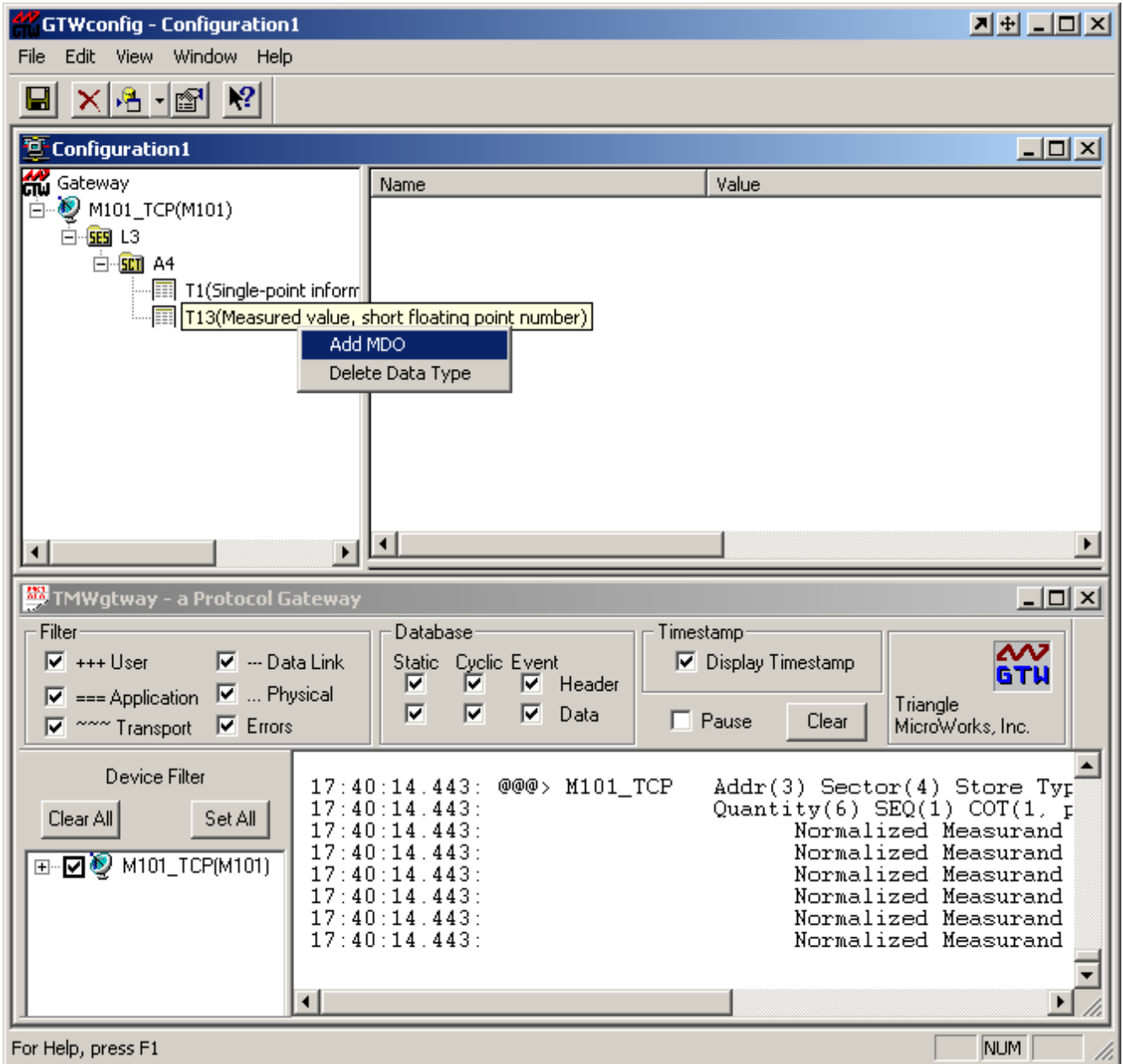


In this example, a Type 1 (Single Point Information) type is added to the sector.

After completing the configuration operation, the main is displayed. At this point, we have a M101 device defined and ready to communicate with a slave device. We can now add another data type (T13) to the sector by right clicking on the sector and selecting Add Data Type, as shown below. .



With the (T13) Data Type defined we can add a MDO to this type.

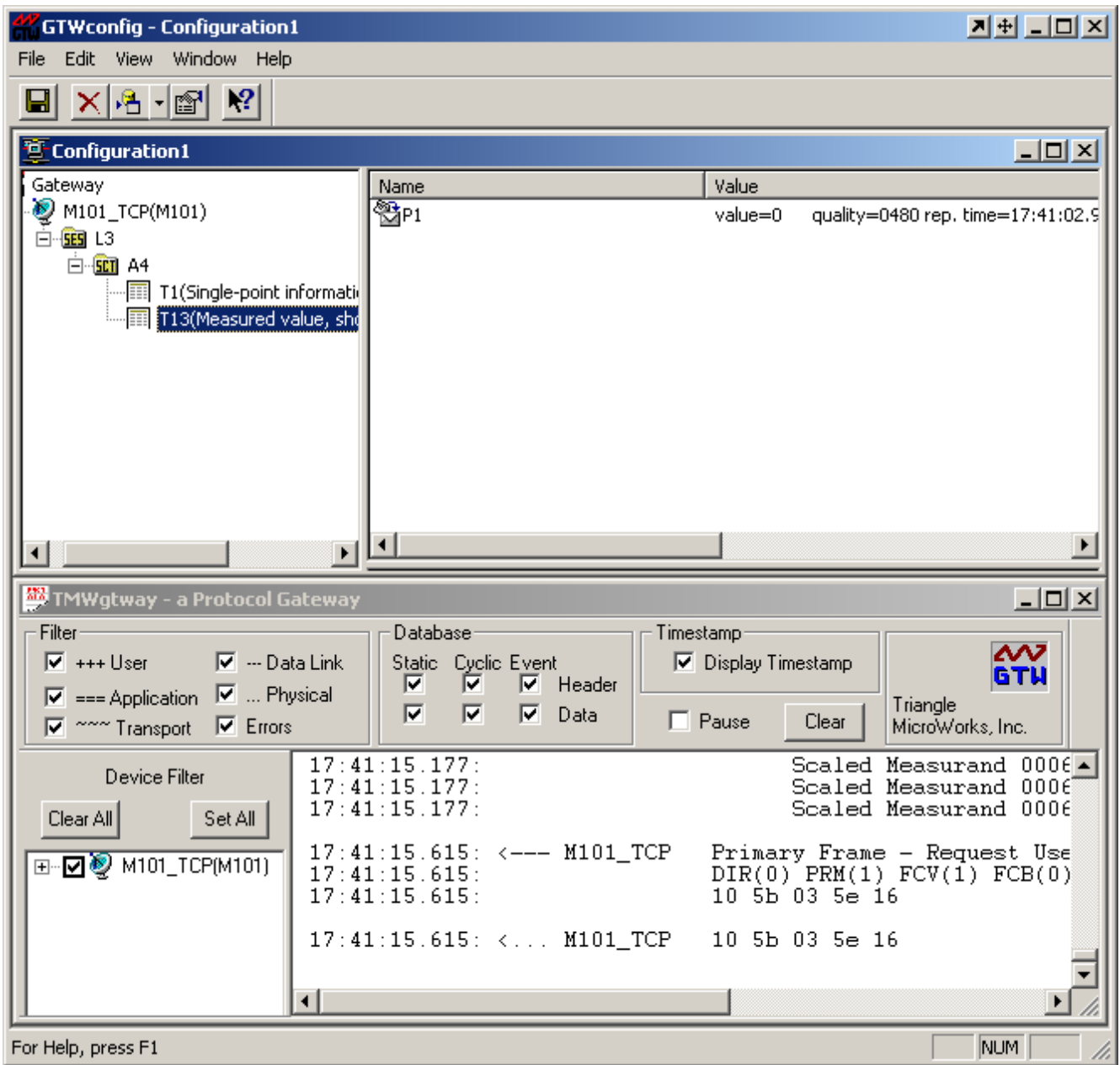


The following dialog box is used to add a MDO to the Data Type.

The dialog box is titled "Add a MDO" and contains the following fields and controls:

- MDO: M101\_TCP.L3.A4.T13.(new point)
- Information Object Address:
- Options:
- User Tag Name:
- Description:
- Buttons: OK, Cancel

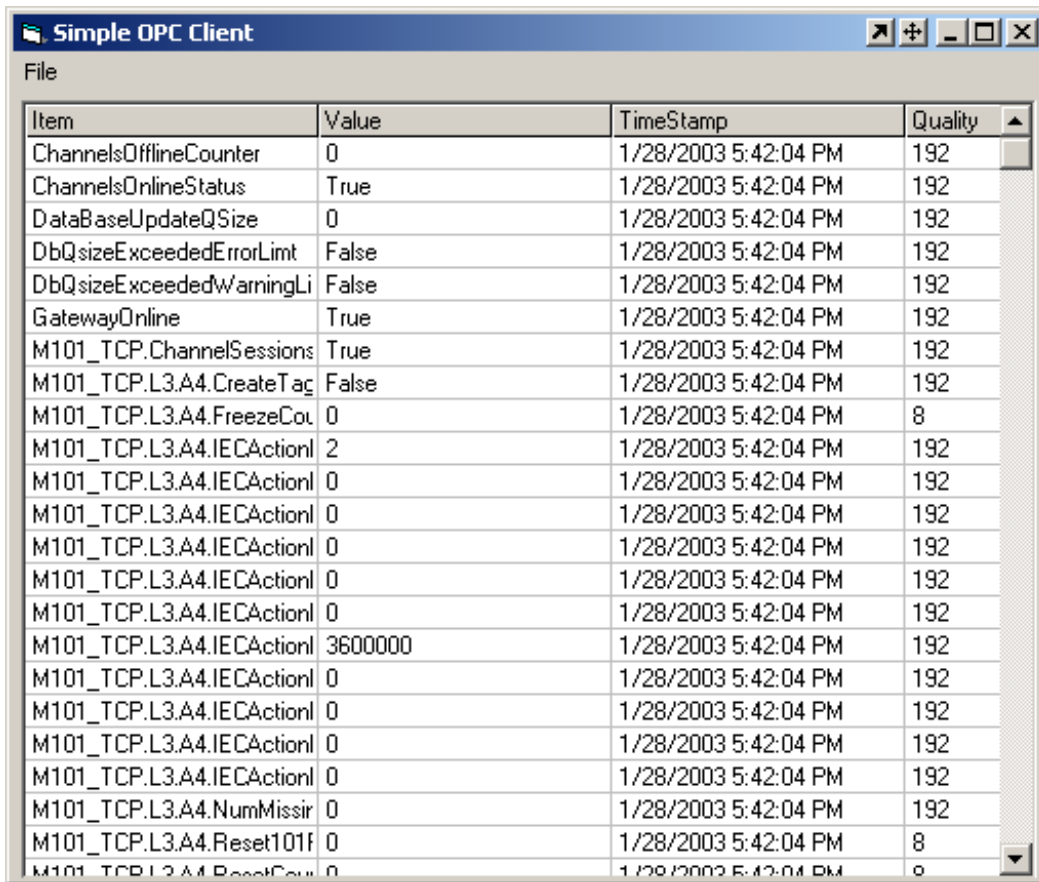
When the configuration is complete, the SDG configuration looks as shown below.



In addition you can also right click on the Sector, and select 'Auto Create Tags' to automatically create all the Tags available in the Test Harness Slave 101 device.

Optionally, the example OPC Client can now be started to view the data in the SDG. Once connected, the Simple OPC client displays the following window:

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The screenshot shows a window titled "Simple OPC Client" with a menu bar containing "File". Below the menu bar is a table with four columns: "Item", "Value", "TimeStamp", and "Quality". The table contains 20 rows of data, all with a "TimeStamp" of "1/28/2003 5:42:04 PM". The "Quality" column values are mostly 192, with some 8s. The "Item" column contains various system and channel-related parameters.

| Item                       | Value   | TimeStamp            | Quality |
|----------------------------|---------|----------------------|---------|
| ChannelsOfflineCounter     | 0       | 1/28/2003 5:42:04 PM | 192     |
| ChannelsOnlineStatus       | True    | 1/28/2003 5:42:04 PM | 192     |
| DataBaseUpdateQSize        | 0       | 1/28/2003 5:42:04 PM | 192     |
| DbQsizeExceededErrorLimt   | False   | 1/28/2003 5:42:04 PM | 192     |
| DbQsizeExceededWarningLi   | False   | 1/28/2003 5:42:04 PM | 192     |
| GatewayOnline              | True    | 1/28/2003 5:42:04 PM | 192     |
| M101_TCP.ChannelSessions   | True    | 1/28/2003 5:42:04 PM | 192     |
| M101_TCP.L3.A4.CreateTag   | False   | 1/28/2003 5:42:04 PM | 192     |
| M101_TCP.L3.A4.FreezeCol   | 0       | 1/28/2003 5:42:04 PM | 8       |
| M101_TCP.L3.A4.IECAActionl | 2       | 1/28/2003 5:42:04 PM | 192     |
| M101_TCP.L3.A4.IECAActionl | 0       | 1/28/2003 5:42:04 PM | 192     |
| M101_TCP.L3.A4.IECAActionl | 0       | 1/28/2003 5:42:04 PM | 192     |
| M101_TCP.L3.A4.IECAActionl | 0       | 1/28/2003 5:42:04 PM | 192     |
| M101_TCP.L3.A4.IECAActionl | 0       | 1/28/2003 5:42:04 PM | 192     |
| M101_TCP.L3.A4.IECAActionl | 0       | 1/28/2003 5:42:04 PM | 192     |
| M101_TCP.L3.A4.IECAActionl | 3600000 | 1/28/2003 5:42:04 PM | 192     |
| M101_TCP.L3.A4.IECAActionl | 0       | 1/28/2003 5:42:04 PM | 192     |
| M101_TCP.L3.A4.IECAActionl | 0       | 1/28/2003 5:42:04 PM | 192     |
| M101_TCP.L3.A4.IECAActionl | 0       | 1/28/2003 5:42:04 PM | 192     |
| M101_TCP.L3.A4.IECAActionl | 0       | 1/28/2003 5:42:04 PM | 192     |
| M101_TCP.L3.A4.IECAActionl | 0       | 1/28/2003 5:42:04 PM | 192     |
| M101_TCP.L3.A4.NumMissir   | 0       | 1/28/2003 5:42:04 PM | 192     |
| M101_TCP.L3.A4.Reset101f   | 0       | 1/28/2003 5:42:04 PM | 8       |
| M101_TCP.L3.A4.ResetCou    | 0       | 1/28/2003 5:42:04 PM | 8       |

This concludes the Quick Start Guide. Please refer to the Manual for detailed configuration information.