



Kepware Technologies

LinkMaster Connectivity Guide

August, 2010
V1.000

©Kepware Technologies

Table of Contents

1.	Overview and Requirements	1
2.	Using LinkMaster as an OPC Client	1
2.1	Connecting to a Server with LinkMaster	2
2.1.1	Starting LinkMaster	2
2.1.2	Browsing and Connecting to a Server	2
2.2	Creating a Link Group	4
2.2.1	The Link Group Icon	5
2.3	Creating Link Items for the Link Group	5
2.3.1	Adding Links with Drag and Drop.....	5
2.3.2	Adding Links Manually	7
2.3.3	Adding an Input to the Link Item.....	8
2.3.4	Adding an Output to the Link Item.....	10
2.3.5	Adding Scaling to a Link Item	12
2.3.5.1	About the Link Item Scaling Page.....	12
2.4	Verifying the Link	13
2.5	Saving and Closing the Project	13
3.	Using LinkMaster as an OPC Server.....	13

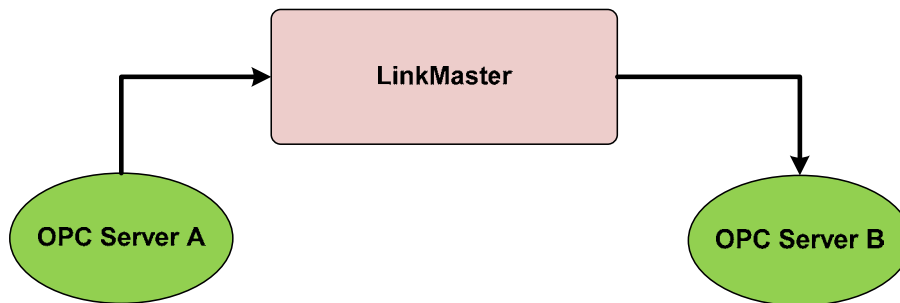
1. Overview and Requirements

This guide will demonstrate how to establish a connection between the KEPServerEX OPC Server and Kepware's LinkMaster OPC Bridge. Users must complete the following before continuing with the tutorial:

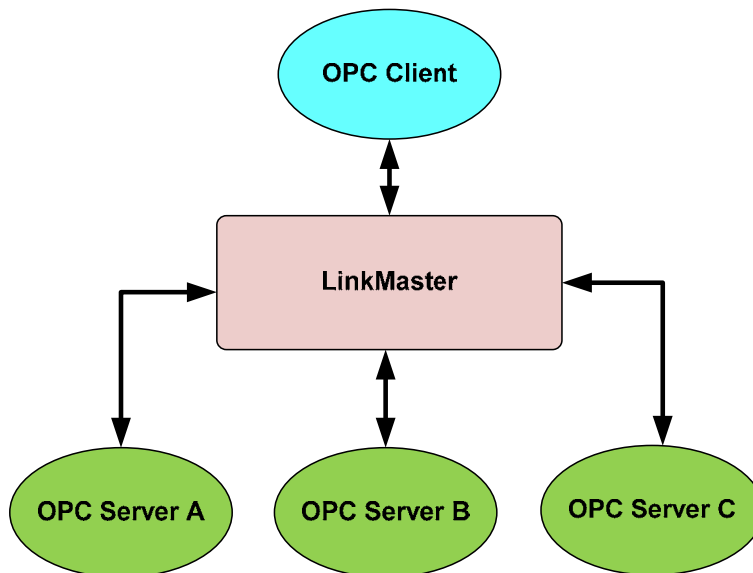
- Configure the server project. Users may either select the appropriate driver and settings or run the **Simulation Driver Demo** that is included with KEPServerEX. The Simulation Driver Demo project will be used for all examples in the tutorial.
- Start KEPServerEX and load the Simulation Driver Demo project. Once the server project has been loaded, open the Runtime menu on the main menu bar and verify that the server project has been connected.

2. Using LinkMaster as an OPC Client

LinkMaster is an OPC DA Client and an OPC DA Server. It can be used to bridge data between devices in the same server or between different servers.



LinkMaster can also be used as a data concentrator by connecting to multiple OPC Servers and providing a single OPC Server interface to other OPC Clients.



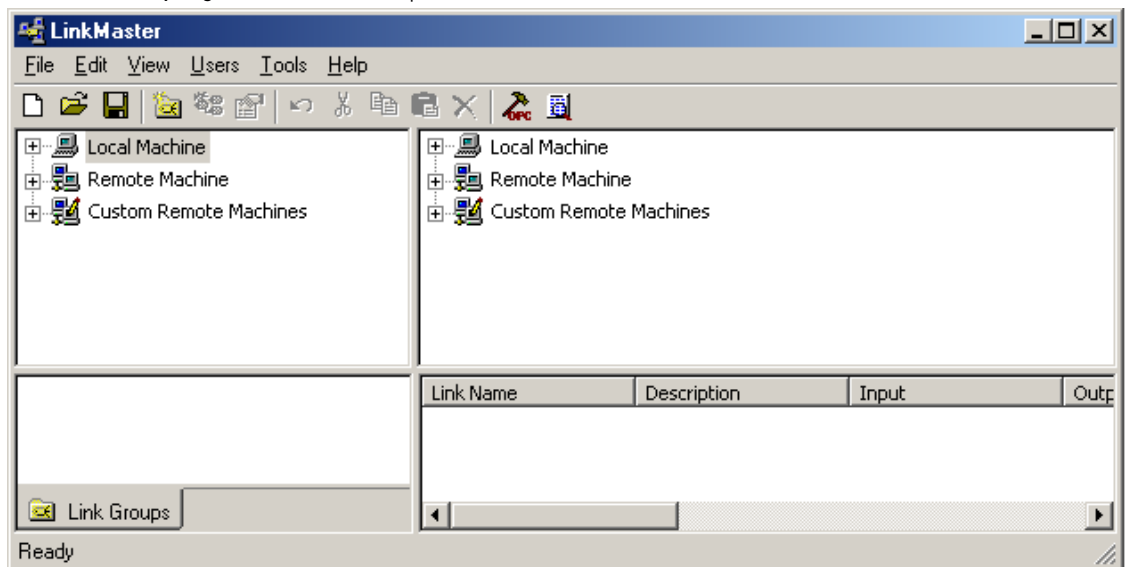
2.1 Connecting to a Server with LinkMaster

The following instructions describe how to create a LinkMaster project to bridge two devices in one OPC server. The same process can be used to bridge different servers on the same PC or on multiple PCs.

Note: The information presented in this guide is also available in the LinkMaster help file.

2.1.1 Starting LinkMaster

1. To start LinkMaster, double-click on the LinkMaster desktop icon. Alternatively, click **Start | Programs | Kepware Products | LinkMaster**. Then, select **LinkMaster**.
2. LinkMaster will open to a new project the first time it starts. After that, it will open to the last project that was created and saved successfully. To start a new project, click **File | New**.

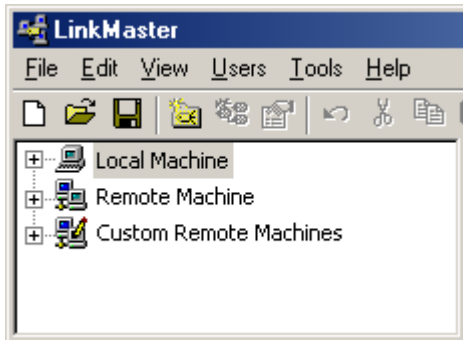


2.1.2 Browsing and Connecting to a Server

For information on locating the server that contain the items that will be placed in the links, refer to the instructions below.

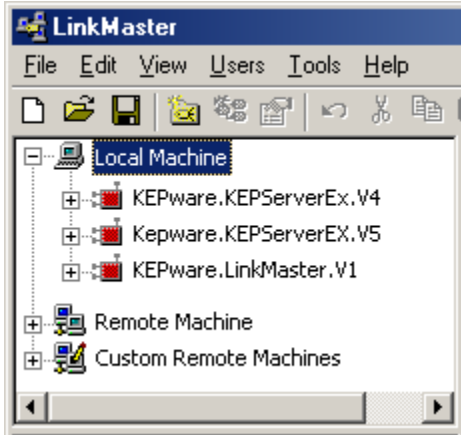
Note: This example browses the Local Machine, but users can easily browse a Remote Machine. To do so, either click on the Remote Machine's expand icon or simply double-click on it.

Important: Browsing for and connecting to servers requires that DCOM be properly configured on all PCs involved in the OPC process.



1. To start, click to expand the **Local Machine** or **Remote Machine**.

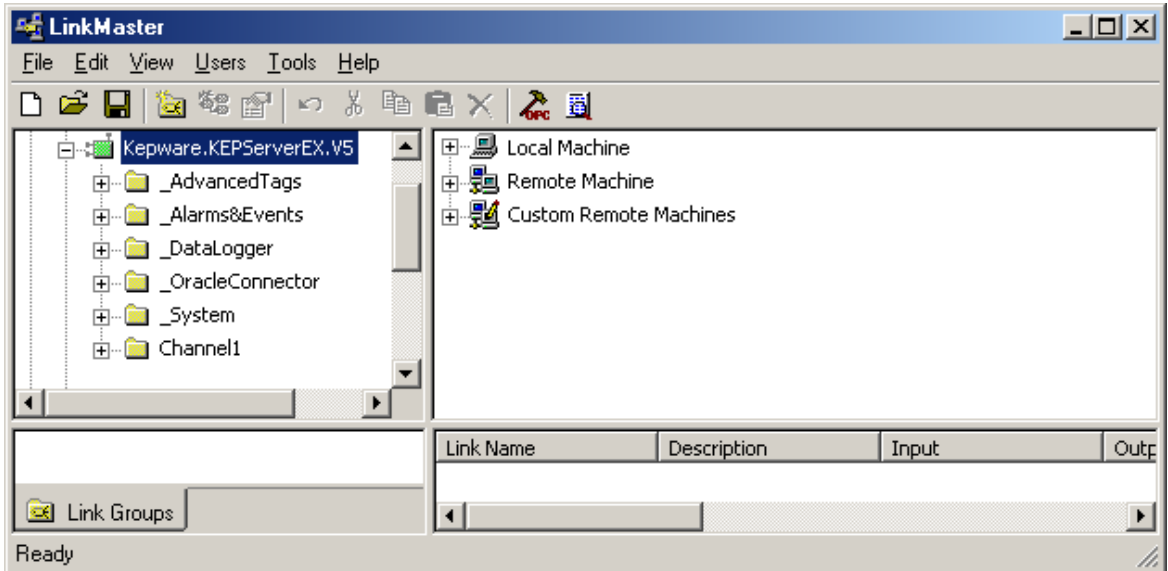
Note: It will take a few seconds for LinkMaster to browse for and return a list of all the available OPC servers. For Remote Machines, users must select the PC running the server for which it is looking. To do so, browse the network. For more information on Custom Remote Machines, refer to the LinkMaster help file.



2. Locate the Program ID of the server that will be connected. Then, click to establish a connection.

Note: The icon next to the Program ID changes from red to green in order to indicate that the connection is good.

3. Next, expand the server connection to display the channels and devices that are currently configured.



Note: Users can connect to multiple servers at one time, using one or both of the browse panes to do so.

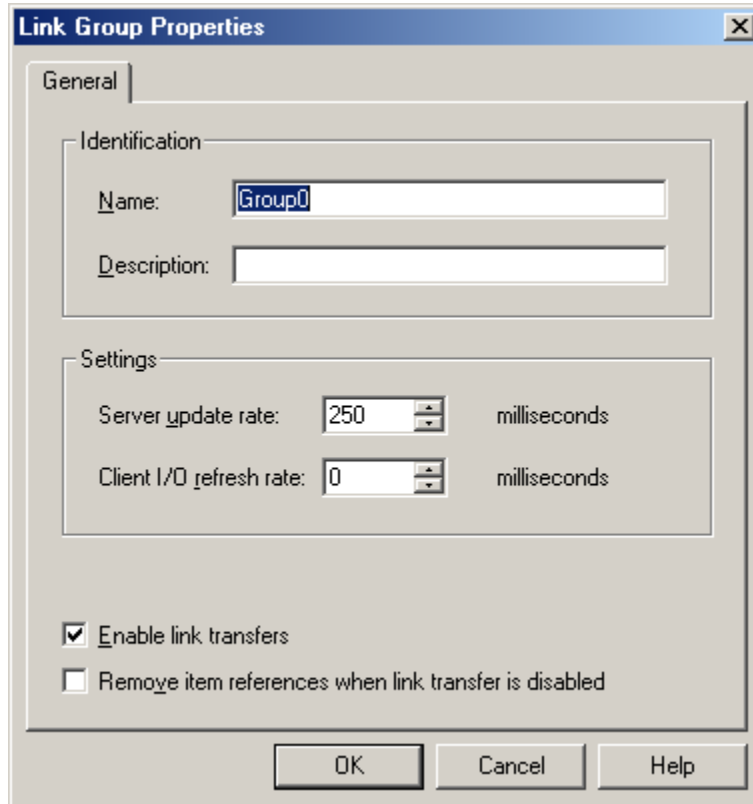
2.2 Creating a Link Group

Once connected to at least one server, users can start defining data links. For more information, refer to the instructions below.

1. To add a new link group, click **Edit | New Link Group**.

Note: Users can define as many link groups as needed within a single project.

2. In this example, the default settings are acceptable. In the **Link Group Properties**, click **OK**.



Descriptions of the parameters are as follows:

- **Name:** This parameter is used to enter the string that will represent the data available from this group. Each link group name must be unique and cannot exceed 80 characters in length. For more information on the proper format of a Link Group's name, refer to the LinkMaster help file.
- **Description:** This parameter is used to enter a string of up to 64 characters in length.
- **Server Update Rate:** This parameter is used to enter the desired value in milliseconds. The Server Update Rate equates to the group update rate of the server and dictates the rate at which the OPC server will poll its connected devices. If the device's data changes from one poll to the next, users can send the changed data back to LinkMaster in a data change event. The default setting is 250 milliseconds.




- **Client I/O Refresh:** This parameter is used to enter the desired value in milliseconds. This setting is used to force an update for the inputs of all links in the LinkGroup. As an Asynchronous Read, all items will be returned regardless of whether they have changed since the last poll. Furthermore, all items will be written to the Link Outputs. The default setting is 0 milliseconds.

Note: Writing from a high speed input to a low speed output can overload the write queue of the target OPC sever. This setting also overrides the normal polling done by the target server, and forces a read of the device being polled. If used, it is recommended that this setting be set to a different rate than the Server Update Rate.

- **Enable Link Transfers:** This parameter is used to select whether to turn on or turn off writes for the group. This setting can also be set through a client by accessing the group's "_Enabled" system tag. The default setting is enabled.
- **Remove item references when link transfer is disabled:** This parameter is used to select whether to remove the input and output item references when link transfers are disabled. This essentially stops the polling of the inputs. The default setting is disabled.

2.2.1 The Link Group Icon

Link groups are located in the lower-left pane of the LinkMaster user interface. Each Link Group is displayed with an icon that will indicate the Link Group status by changing color. Descriptions are as follows:

- The group is running without errors when the icon is green .
- One or more items in the group are in error when icon turns gray .
- The group's link transfers have been disabled when the icon is red .

Note: LinkMaster's error log contains detailed messages on the error conditions for each Link Item.

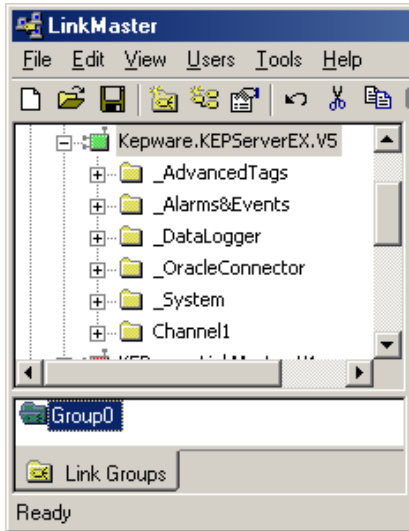
2.3 Creating Link Items for the Link Group

Once a link group has been created, Link Items must be added to it. When Link Transfers are enabled in the Link Group, the item will be requested from the server as soon as it has been added. If the server is not ready, errors will be returned.

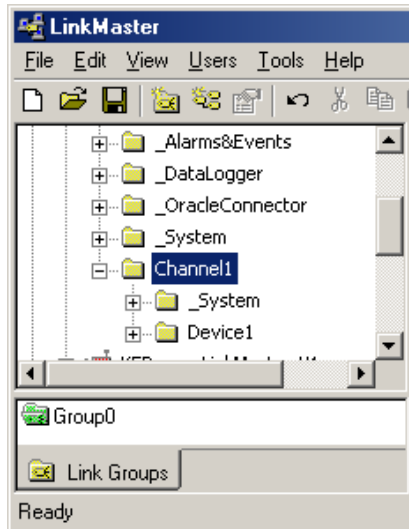
2.3.1 Adding Links with Drag and Drop

To make LinkMaster project creation quick and easy, Link Items can be created through drag and drop. For more information, refer to the instructions below.

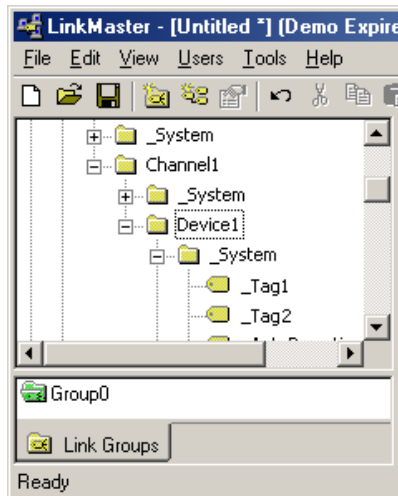
1. To start, select the group to which the link item will be added.



2. Next, expand the channels of the device from which the input item will be taken.

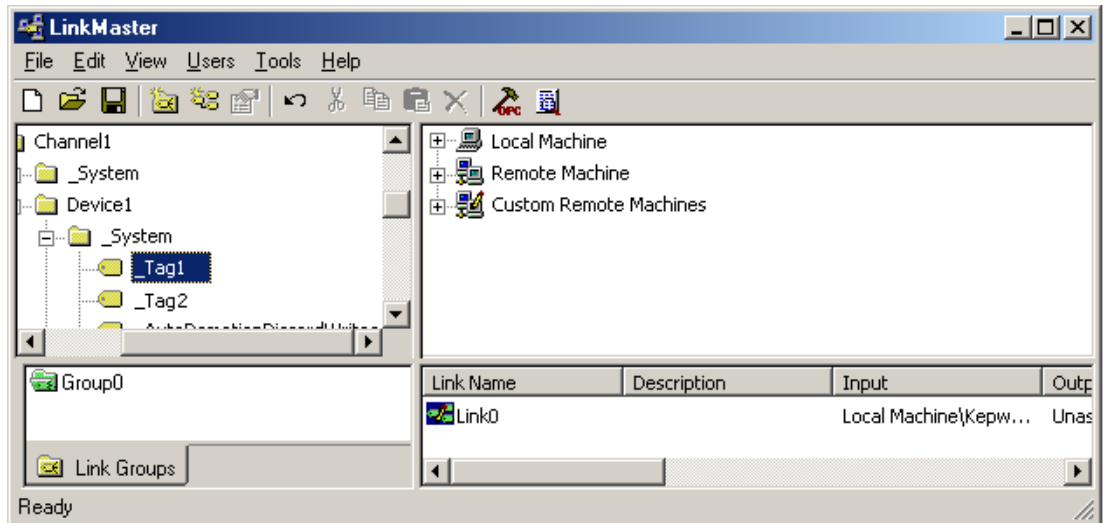


3. Expand the device in order to display the available tags. If the tags are located at the device level in the server, they will now be visible. If the tags are located in tag groups beneath the device, keep expanding until the desired tag is visible.



- Next, browse to the desired tag. In this example, "Tag_1" is selected and will be the input to the link.
- Select the tag with the left mouse button, and continue pressing it while dragging to the Link Item pane. Then, release the mouse button.

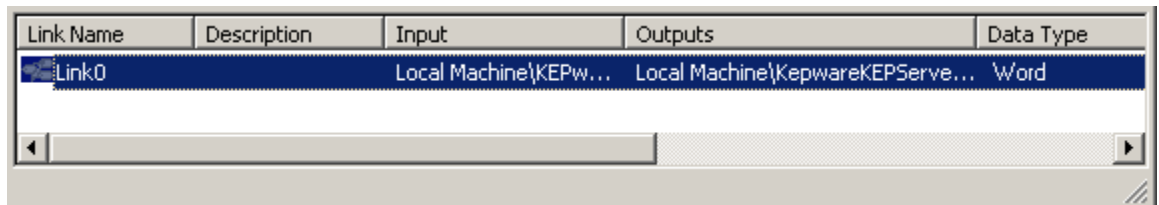
Note: LinkMaster will automatically create a new link with the item as the input. This value will be read from the target OPC server at the rate specified in the Link Group Properties.



- If using LinkMaster to bridge two servers or devices, browse to and select the item to which the input value will be written. This time, drag and drop the item on the link that was just created.


Note: LinkMaster will immediately start writing the changing value to the output item.

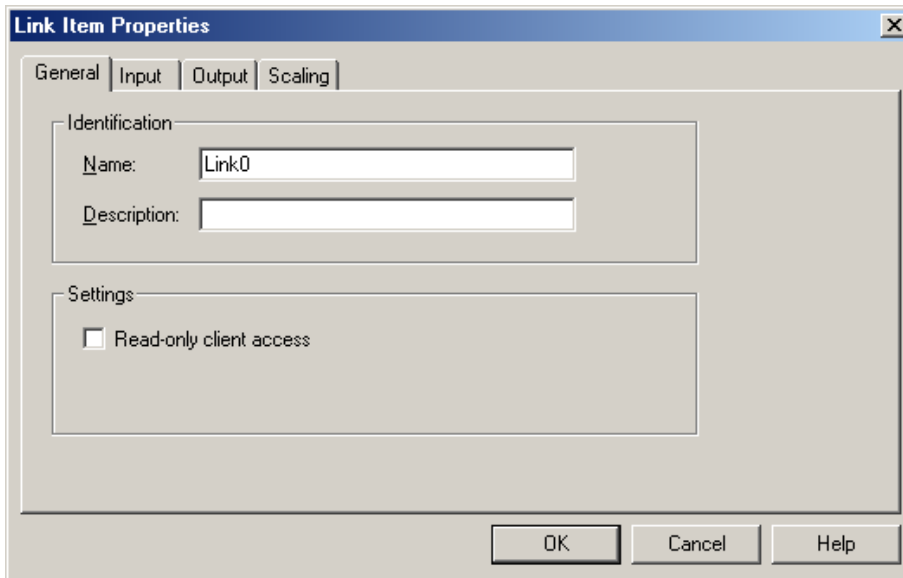
Important: Link items may be manually edited after creation in order to change name, input items, and output items (or to add a description or scaling).



2.3.2 Adding Links Manually

Link Items can also be added to the Link Group manually. For more information, refer to the instructions below.

- To start, select the Link Group.
- Next, add a new link by clicking **Edit | New Link**. Alternatively, click the **New Link** icon .
- The **Link Item Properties** will display the **General** tab. The new link item will be given the next sequential default link name. This name can be changed at anytime.



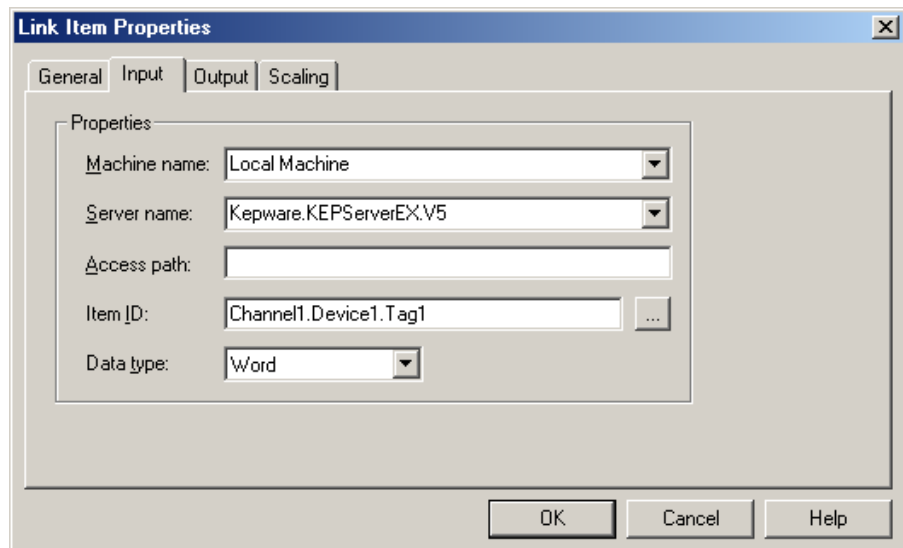
Descriptions of the parameters are as follows:

- **Name:** This parameter is used to enter a string up to 80 characters in length. Link names must be unique to the Link Group. For more information on the proper format of a Link Group's name, refer to the LinkMaster help file.
- **Description:** This parameter is used to enter a string description up to 64 characters in length.
- **Read- only client access:** When selected, this link will be "Read only" or "Read/Write." "Read Only" prevents client applications from changing the data contained in Link Item's input and output tags. When unchecked, this setting will allow client applications to change the link item's value.

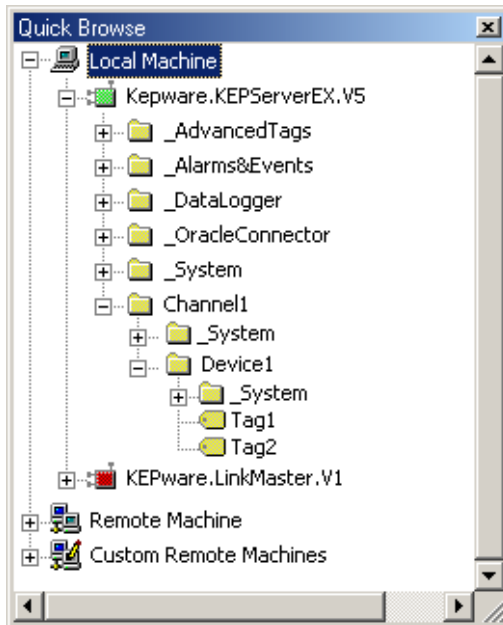
2.3.3 Adding an Input to the Link Item

The Link Item Input is used to define the source of data that will be transferred to one or more output items. This value will be read from the target OPC server at the rate specified in the Link Group Properties. For more information, refer to the instructions below.

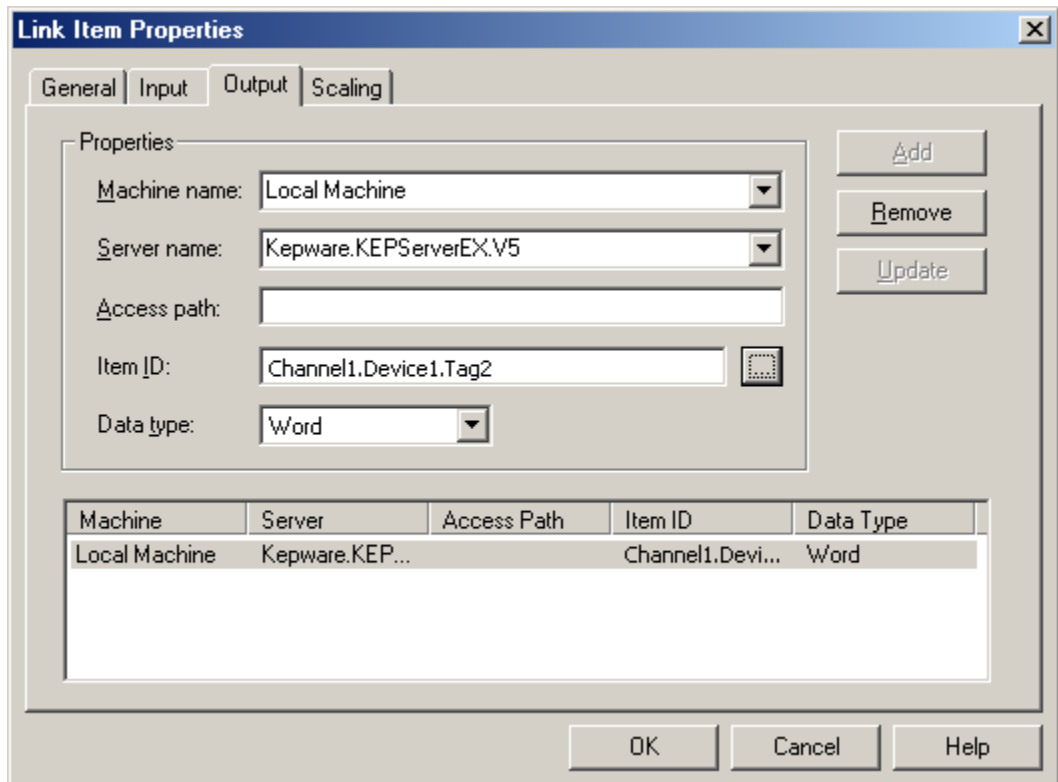
1. In **Link Item Properties**, select the **Input** tab.



2. In **Machine Name**, specify the location of the OPC.
3. In **Server Name**, select the server from the drop-down list.
4. In **Item ID**, either manually type the input tag's Item ID or click the Browse icon to launch **Quick Browse**.



5. In Quick Browse, locate the desired tag and then double-click on it. The Item ID will be written to the Item ID field, and the data type will be changed to match the tag that was selected.



Descriptions of the parameters are as follows:

- **Machine Name:** This parameter is used to enter the local machine or a machine located on the local Ethernet network (if available). If the server is located on the same machine as LinkMaster, leave the setting as "Local Machine."
- **Server Name:** This parameter is used to specify the OPC server that will be the data source. In this example, the input data will be coming from KEPServerEX.
- **Access Path:** This is required by some OPC servers to complete an item's definition. For more information, refer to the OPC server's help documentation.
- **Item ID:** This parameter is used to enter the OPC server item that will reference the data. If the server supports tag browsing, users can select an item by using the Browse feature; otherwise, refer to the server's help documentation for the correct Item Name syntax.
- **Data Type:** This parameter is used to enter the requested data type that should be used when communicating between the OPC server and the OPC LinkMaster. The data type should agree with the size and type of the register or memory location that is being addressed. Supported data types are as follows:

Data Type	Description
Native	Default, as determined by the OPC Server.
Boolean	Single bit.
Char	Signed 8-bit value.
Byte	Unsigned 8-bit value.
Short	Signed 16-bit value.
Word	Unsigned 16-bit value.
Long	Signed 32-bit value.
DWord	Unsigned 32-bit value.
Real	Single precision floating point value (32-bits).
Double	Double-precision floating point value (64-bits).
String	A null terminated character array.

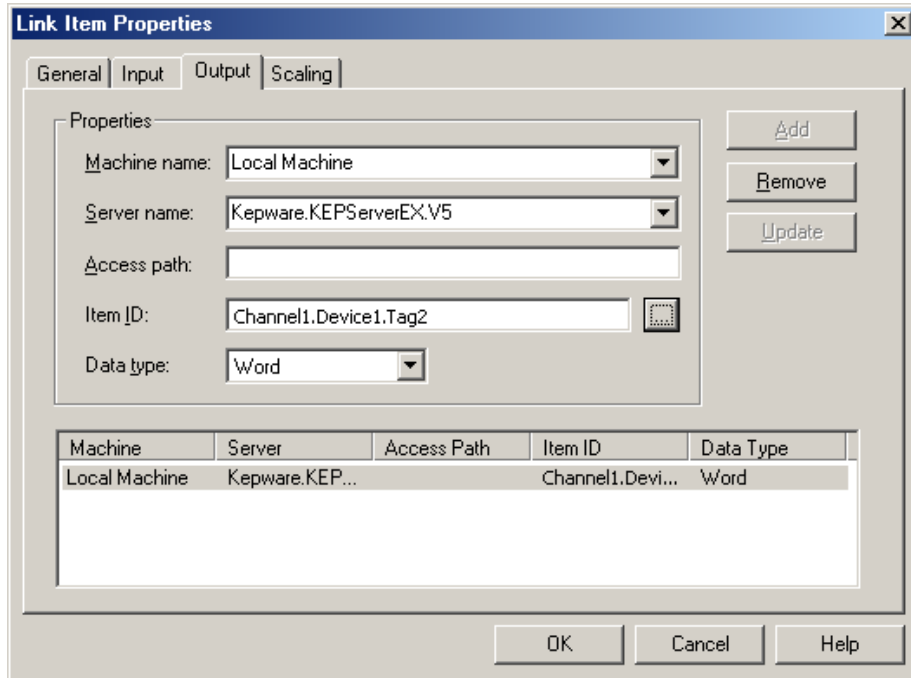
Note: All data types are available as array types.

2.3.4 Adding an Output to the Link Item

Link outputs are used to define one or more OPC items that will be written when the Input item changes. They should not be used if the LinkMaster project is being used to concentrate data into a single source.

1. In **Link Item Properties**, select the **Output** tab.
2. Next, enter the desired item in the Item ID field. Then, click **Add**.

Note: Once finished, click **Update**.



Descriptions of the parameters are as follows:

- **Machine Name:** This parameter is used to select either the local machine or a machine located on the local Ethernet network (if available). If the server is located on the same machine as LinkMaster, leave the setting as "Local Machine."
- **Server Name:** This parameter is used to specify the OPC server that will be the data source. In this example, the Input data will be coming from KEPServerEX.
- **Access Path:** This parameter is required by some OPC servers to complete an item's definition. If unsure of the access path, refer to the OPC server's help documentation.
- **Item ID:** This parameter is used to enter the OPC server item that will reference the data. If the server supports tag browsing, users can select an item by using the Browse feature; otherwise, refer to the server's help documentation for the correct Item Name syntax.
- **Data Type:** This parameter is used to enter the requested data type that should be used when communicating between the OPC server and the OPC LinkMaster. The data type should agree with the size and type of the register or memory location that is being addressed. Supported data types are as follows:

Data Type	Description
Native	Default, as determined by the OPC Server.
Boolean	Single bit.
Char	Signed 8-bit value.
Byte	Unsigned 8-bit value.
Short	Signed 16-bit value.

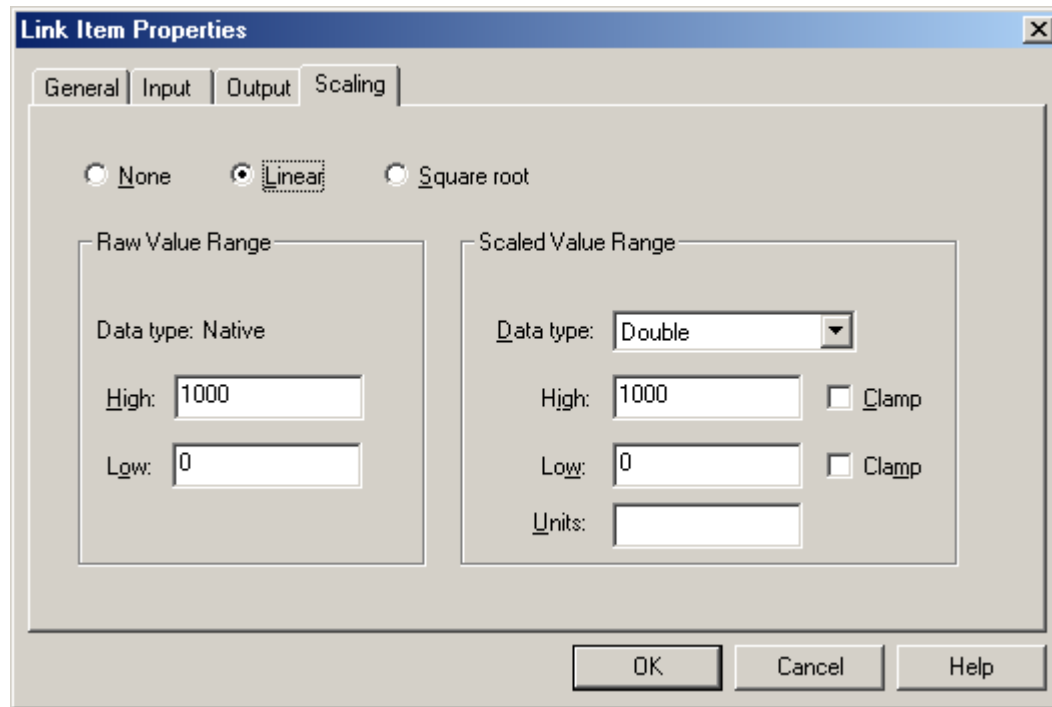
Word	Unsigned 16-bit value.
Long	Signed 32-bit value.
DWord	Unsigned 32-bit value.
Real	Single precision floating point value (32-bits).
Double	Double-precision floating point value (64-bits).
String	A null terminated character array.

Note: All data types are available as array types.

2.3.5 Adding Scaling to a Link Item

LinkMaster supports Link Item Scaling, which allows raw input data from the server to be scaled to an appropriate range for the Link Output item or client application.

For example, a device that displays a temperature of 75.6 degrees on its panel may return that value as a raw integer of 756 when the temperature is read. The target output, however, may need that value as a floating point number. Scaling would read the raw input and then scale it to a floating point number.



Descriptions of the parameters are as follows:

- **Raw Value Range:** This parameter is used to specify the range of raw data from the server. The valid range depends on the data type of the Link Item. For example, if the data type was Short, the valid value range of the raw value would be -32768 to 32767. The Low and High raw values should match the values specified in the input server or device.

Note: The raw high range must be greater than the raw low range.


- **Scaled Value Range:** This parameter is used to specify the range of the resulting scaled value. The valid range depends on the data type of the scaled value. A scaled value is usually assumed to result in a floating-point value; however, LinkMaster does not make that assumption. The Scaled Value's data type can be set to any valid OPC data type. This provides users the ability to scale from a raw data type (such as Short) to an engineering value with a data type of Long. The default scaled data type is Double.

2.4 Verifying the Link

Once one or more links have been created, they can be verified by reading the data as it changes. To do so, view the link's Raw value. Users can also view the Scaled values, which will be displayed if applied.

Link Name	Desc...	Input	Outputs	Data Type	Raw Value	Scaled Value	Quality	Timestamp
Link0		Local Machine\Kepware.KEPS...	Local Machine\Kepware.KEPServe...	Word	2560	2560	Good	09:47:20:606


2.5 Saving and Closing the Project

To save the project, click **Help | Save**. Alternatively, click the Save icon .

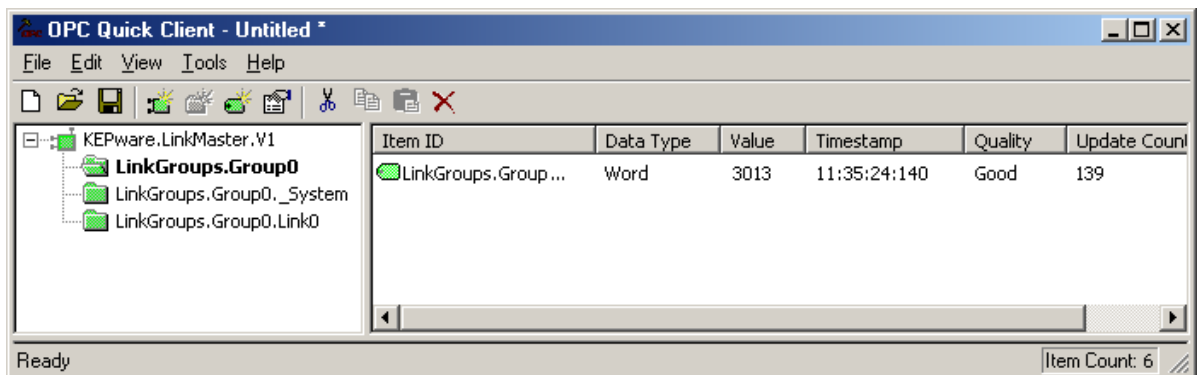
Note: LinkMaster will open to the last project that was created and saved successfully.

3. Using LinkMaster as an OPC Server

LinkMaster can also be used to concentrate the data from multiple servers into a single data source (or to throttle client poll rates). For an example, open

LinkMaster and then click the **Launch OPC Client** icon . The OPC Quick Client will start and automatically generate a project from the groups and items available in LinkMaster.

Note: The OPC Quick Client has several groups that are not visible in the LinkMaster project. These groups contain system-level information specific to the Link Group and Link Item. For more information, refer to the LinkMaster help file.



Item ID	Data Type	Value	Timestamp	Quality	Update Count
LinkGroups.Group...	Word	3013	11:35:24:140	Good	139

Ready Item Count: 6