nanodac™ EtherNet/IP Guide

Contents

Introduction

This guide is designed to illustrate how to set up the nanodac™ to work with a control/compact logix PLC from Allan Bradley using the EtherNet/IP protocol.

You need to have:

1) A nanodac™ recorder/controller
2) EtherNet/IP option enabled in the nanodac™

Configuration of the EtherNet/IP protocol needs to be done via iTools. You can connect to the nanodac™ via two options:

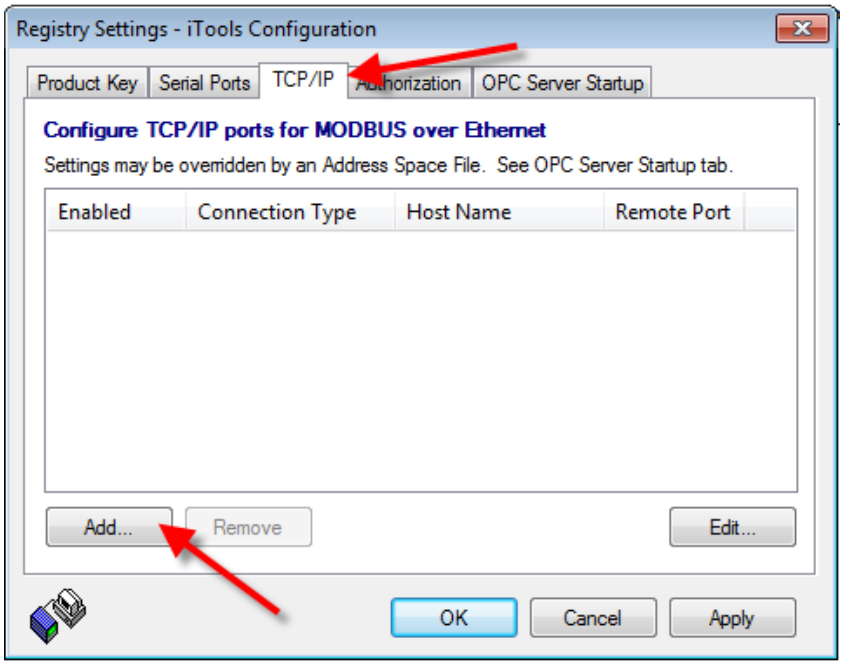
1) Configuration clip (sold separately, P/N CPI101000000)
2) Ethernet port (RJ45, standard on nanodac™)

Assuming these conditions are met, you can now proceed in the configuration the EtherNet/IP option in the nanodac™

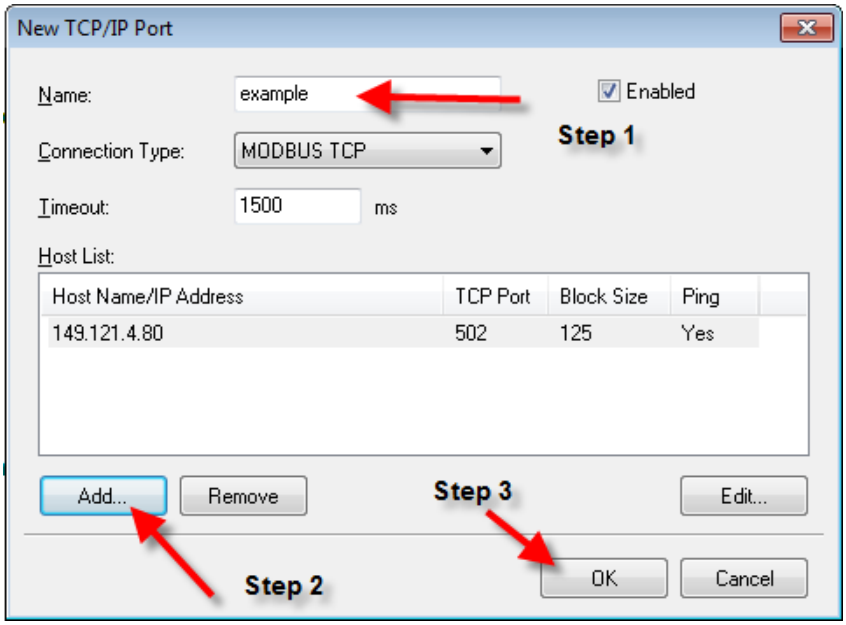
iTools

Setting up nanodac™ for use in iTools (via Ethernet TCP/IP)

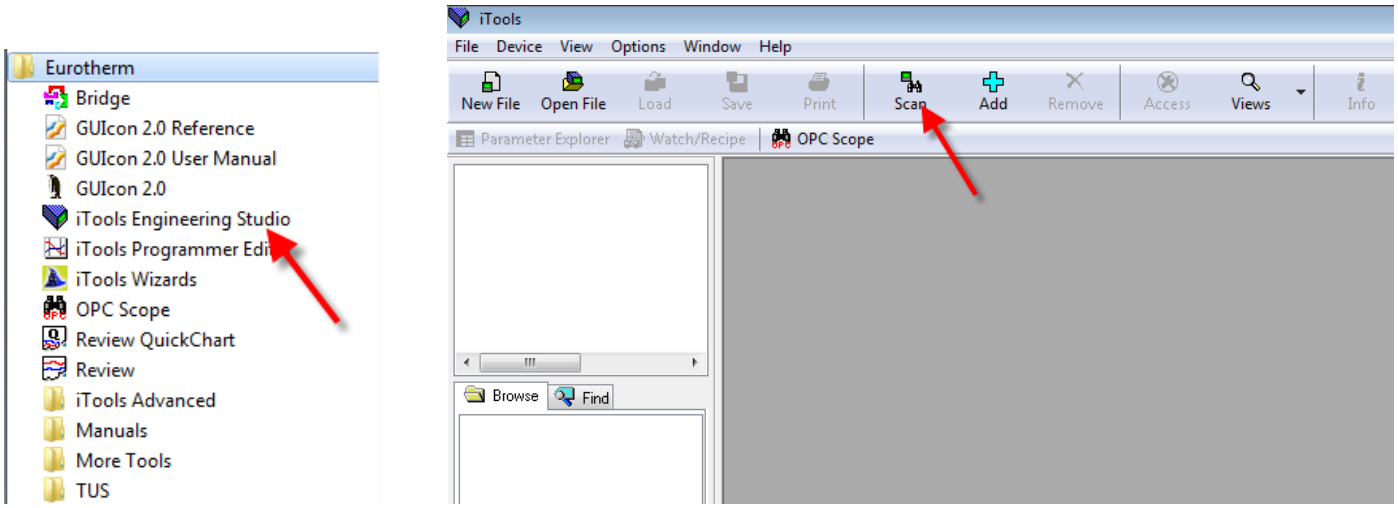
Using the Ethernet port on the back of the nanodac™ is simple to use but you will need to add a TCP/IP port within iTools in order for it to recognize the nanodac. Simply go to your Control Panel, then click on the iTools icon.



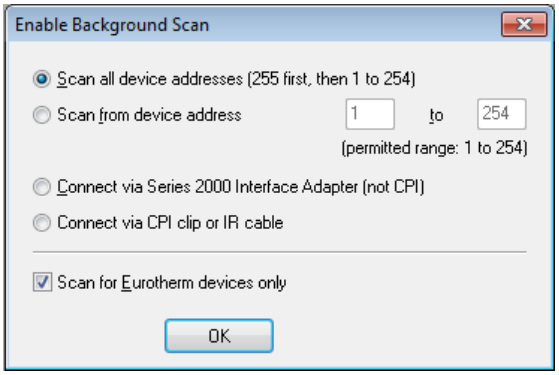
Click on the TCP/IP tab, then click Add…



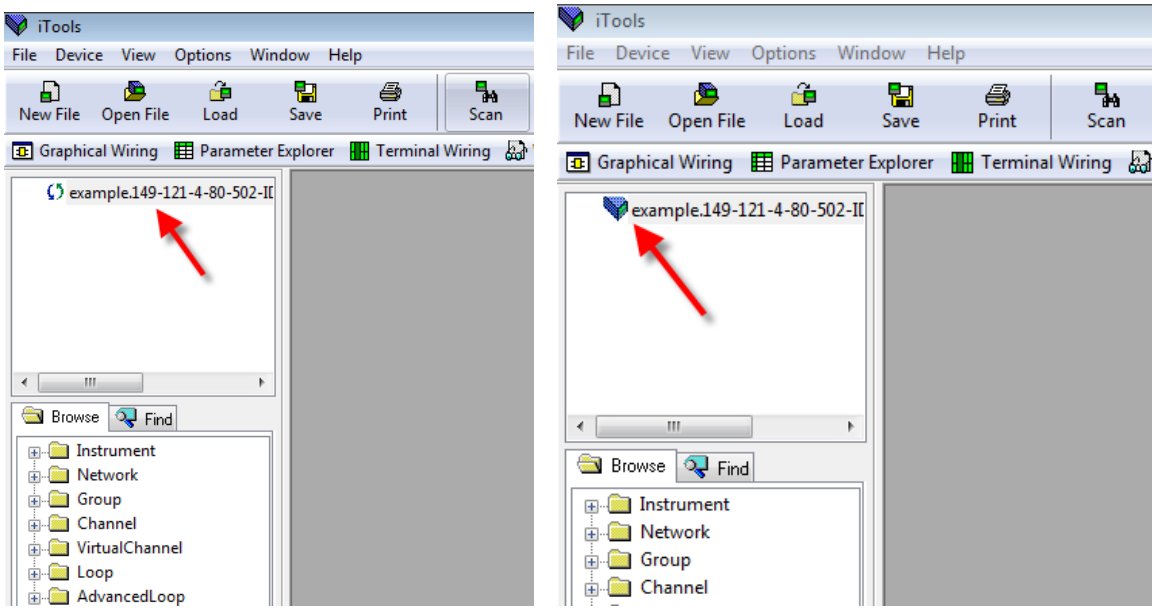
(1) Enter a name for your nanodac, (2) click on Add… to assign the IP address of the nanodac, and (3) click OK
After completing, you can exit out of the configuration, now load iTools, and then click on “Scan”



Be sure to choose the first option; “Scan all device addresses (255 first, then 1 to 255)”



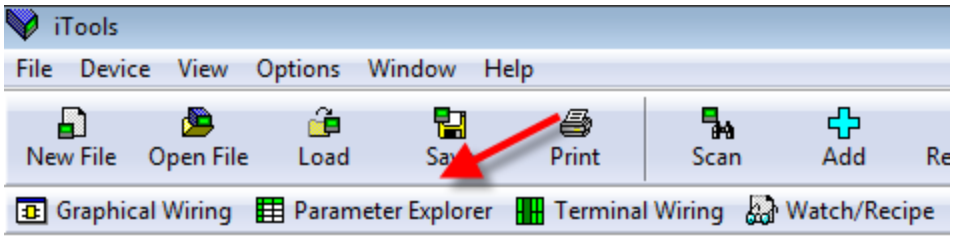
After about 5-10 seconds, you will see the device pop up in the left hand side. The icon next to the name indicates its synchronizing.



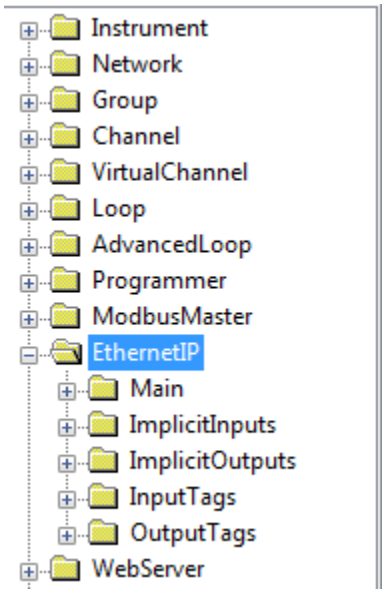
Once you see the “book” icon, this means it’s fully synchronized and you cannot fully edit the configuration. Be advised that the first time you connect the nanodac™ via iTools, it could take upwards of a minute to synchronize.

Navigation

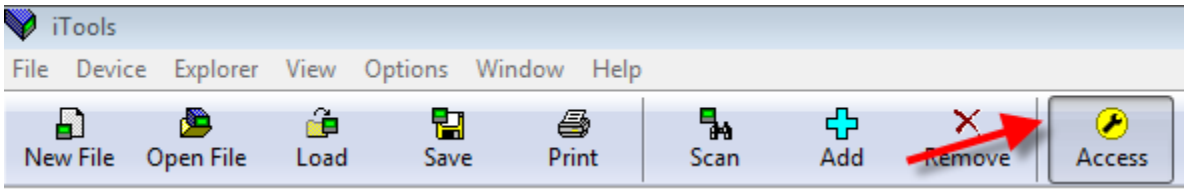
Click on “Parameter Explorer”



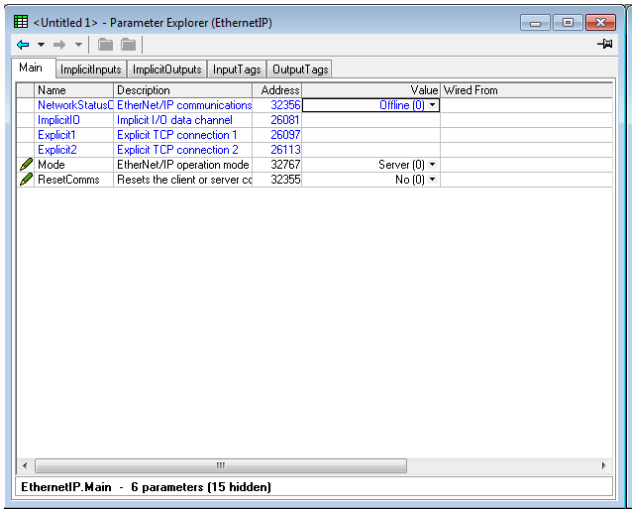
Navigate to **EtherNetIP** on the left hand side

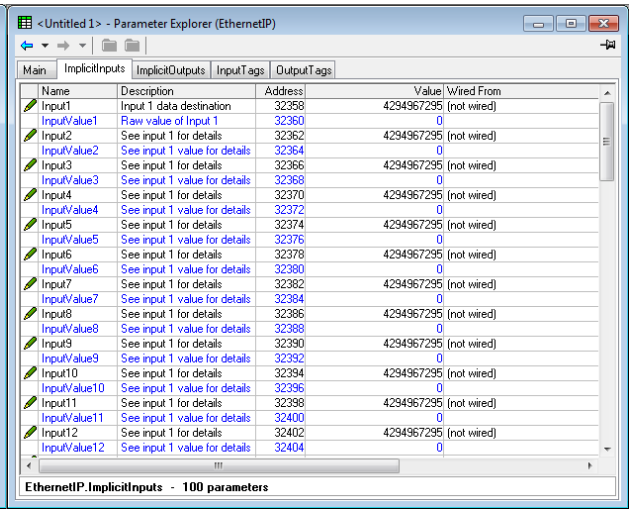


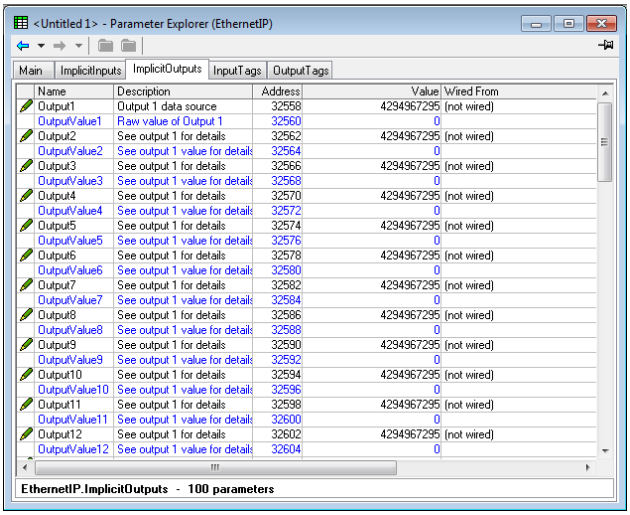
On the right hand side of the screen, you should see all the parameters available to you: Blue color font indicates it is a read only parameter where black indicates it’s a read/write parameter. If you go into Access mode (default password is 100), more parameters will become available to you.



Parameter Explorer:

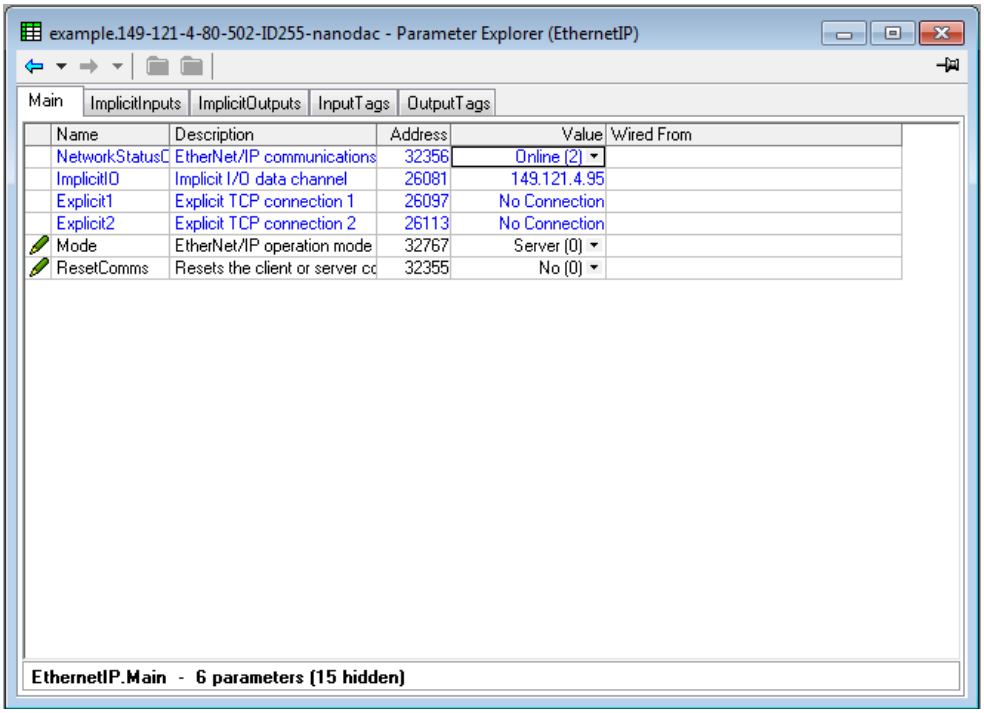






ImplicitInputs and ***ImplicitOutputs*** are available for use when the nanodac™ is configured as a client or server, whereas ***InputTags*** and ***OutputTags*** are available only as a Client(tags). The nanodac™ does not support IOTags as a server!

Main Tab – Setting up as a Server



As a server, all you need to do is set the "**Mode**" to **Server***. It's up to the settings in your PLC to talk to the nanodac™. "**ResetComms**" simply resets the EtherNet/IP protocol. Please note that any change made will not be saved until the user logs our or the "ResetComms". Its recommend that you only trigger a "*reset comms*" after **ALL** changes are made.

As a server, you need to provide your PLC with Input & Output instances as well as, configuration values. They are as follows:

	Instances	**Size**	
Input	**100**	**50**	**16 bit**
Output	**112**	**50**	**16 bit**
Configuration	**128**	**0**	**16 bit**
RPI (response)	**1000mS (default)****		

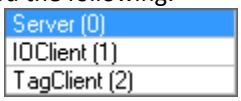
Once a Client device has connected successfully, The NetworkStatusCode should indicate Online(2) and you will see the IP address of the Client that is connected.

Please note that you still need to configure the implicit input and output tables as shown later in the guide.

****It is possible for you to achieve speeds as fast as 125mS however, this speed cannot be guaranteed and can be subject to slip depending upon the load of the nanodac™. If you need a faster response rate, you can go as fast as 125mS. Suggest that you contact technical support for additional assistance.***

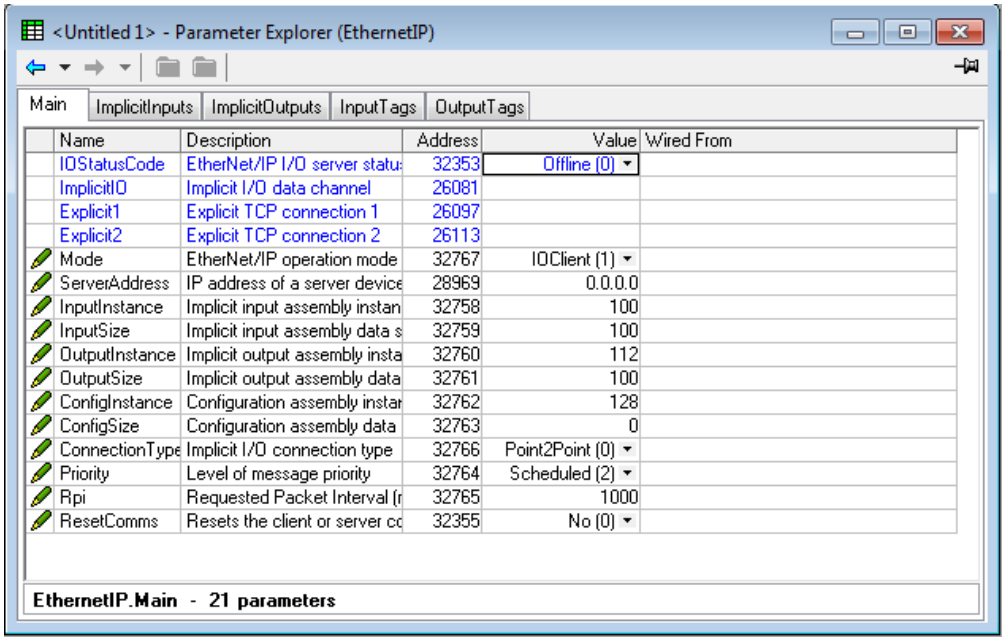
Main Tab – Setting up as a Client

Clicking on the drop down of the "Mode" tab gives you the following:



Client (IO) - The instrument is acting as an EtherNet/IP client device on the network, exchanging implicit IO data with a specified server device.

Client (Tags) - The instrument is acting as an EtherNet/IP client device on the network, exchanging cyclic tag data with a specified server device.



Apply the correct Input, output, configuration instances and sizes and set the Connection type and RPI. This information should be provided by the manufacturer of the EtherNet/IP compatible device you are trying to connect to.

Point to Point (default): The implicit I/O data will be directly communicated between the client and server devices only.
Multicast: All implicit output data from the nanodac™ will be sent to a multicast IP address where a number of clients can register their interest.

The RPI can go as fast as 8Hz or 125mS. ***Please see above notice regarding this speed.***

Implicit Inputs/Outputs

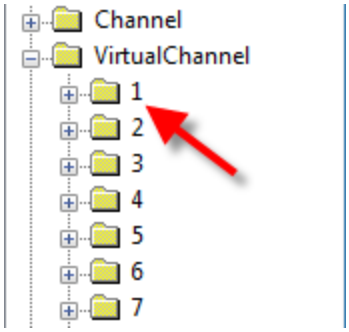
Implicit inputs are inputs into the nanodac™ when in server or client modes.
Implicit outputs are outputs from the nanodac™ when in server or client modes.

When bringing inputs into the nanodac™, you can wire directly from the parameter of choice to the EthernetIP parameter into any other block/tag you desire (i.e. specific tag to trigger an event like auto/manual mode) or you can choose to wire the input directly into a Virtual Channel.

*NOTE - in order to record the value coming into the nanodac™, you must wire to a virtual channel.

Think of a virtual channel as a memory allocation; you have **30** of these in the nanodac™. It can do simple math, totalize, or function as a counter. One of the math functions is **COPY**. As a copy function, its job is to simply **copy** whatever value is wired into its input1 parameter.

To configure a virtual channel expand on the folder called **VirtualChannel** and click on the folder called **1**.



You will get this:

Main | Trend | Alarm1 | Alarm2

	Name	Description	Address	Value	Wired From
	Descriptor	Text string to describe the vir	19200	VirtualChan 1	
	Type	Specifies the type of virtual c	7168	Math (1)	
	Operation	Specifies the operation of the	7169	Off (0)	

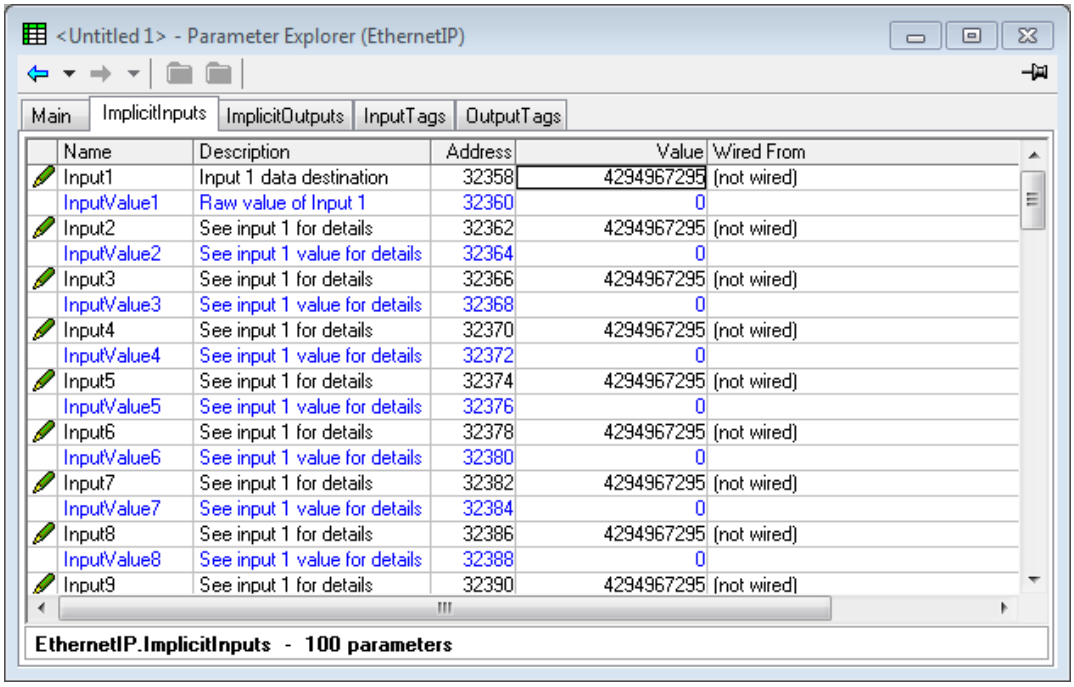
From this point, the virtual channel is set up as a Math function however, it's currently turned off. Let's rename the channel and set its operation to "**Copy**"

Main | Trend | Alarm1 | Alarm2

	Name	Description	Address	Value	Wired From
	Descriptor	Text string to describe the vir	19200	EtherNet/IP Input 1	
	Type	Specifies the type of virtual c	7168	Math (1)	
	Operation	Specifies the operation of the	7169	Copy (11)	
	PV	The process variable (output	288	0.00	
	Status	The PV (output) status	289	Good (0)	
	Resolution	Specifies the resolution/numl	7170	0	
	Units	Units descriptor	19221		
	Input1	Input 1	7175	0.00	

Once complete, you can repeat the process for as many (up to 30) virtual channels as needed.

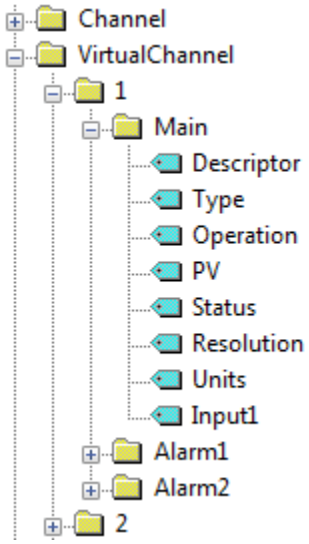
Click back on the **EthernetIP** folder, and then click on the **ImplicitInputs** tab



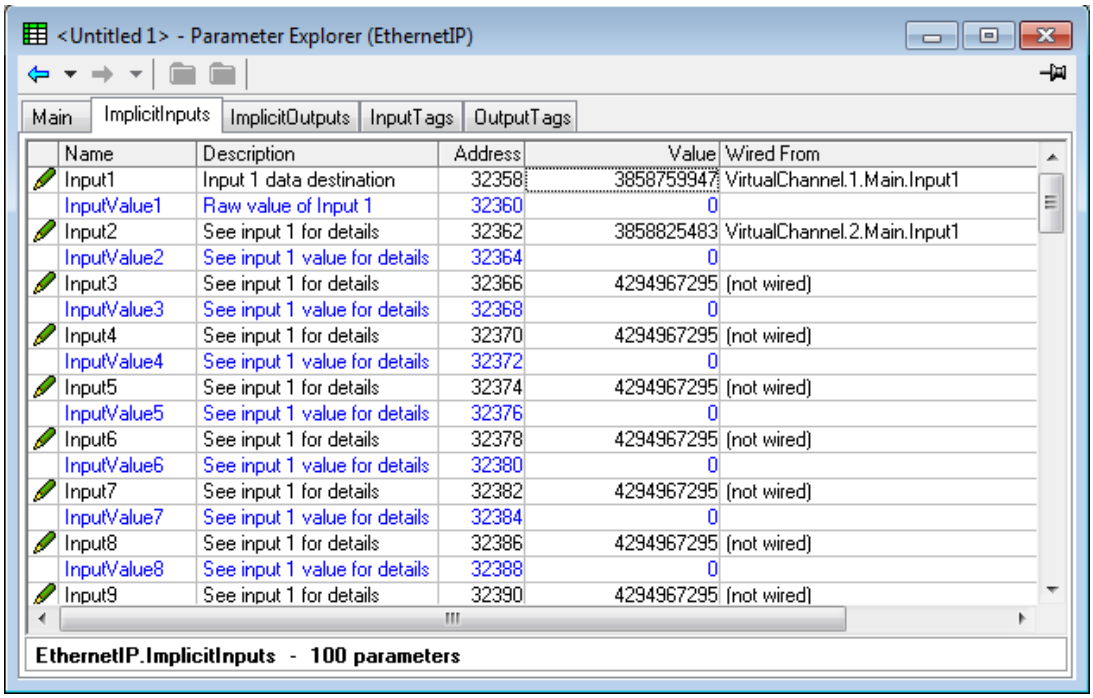
Notice that under the "**Wired From**" section, it shows (not wired). The beauty of iTools is that you can simply drag any tag you want over to this field to "wire" from one parameter to another*. Let's go ahead and wire the first two inputs into virtual channel 1 and 2.

Note that iTools always assumes source to destination, so make sure you wire the correct way around. Select the source and drag to the destination

Expand on Virtual Channel → 1 → Main and you should see something like below:



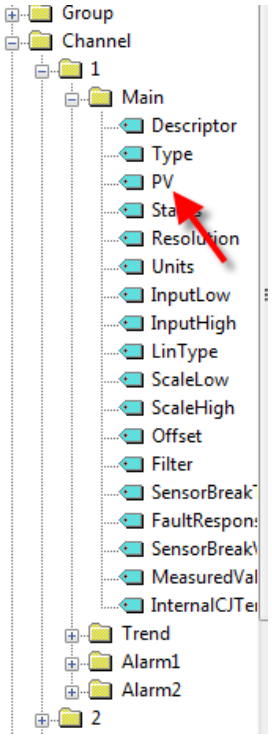
We want to drag the tag called Input1 over to the Input1 field of the Implicit Inputs. Likewise, we will do the same for Virtual Channel 2



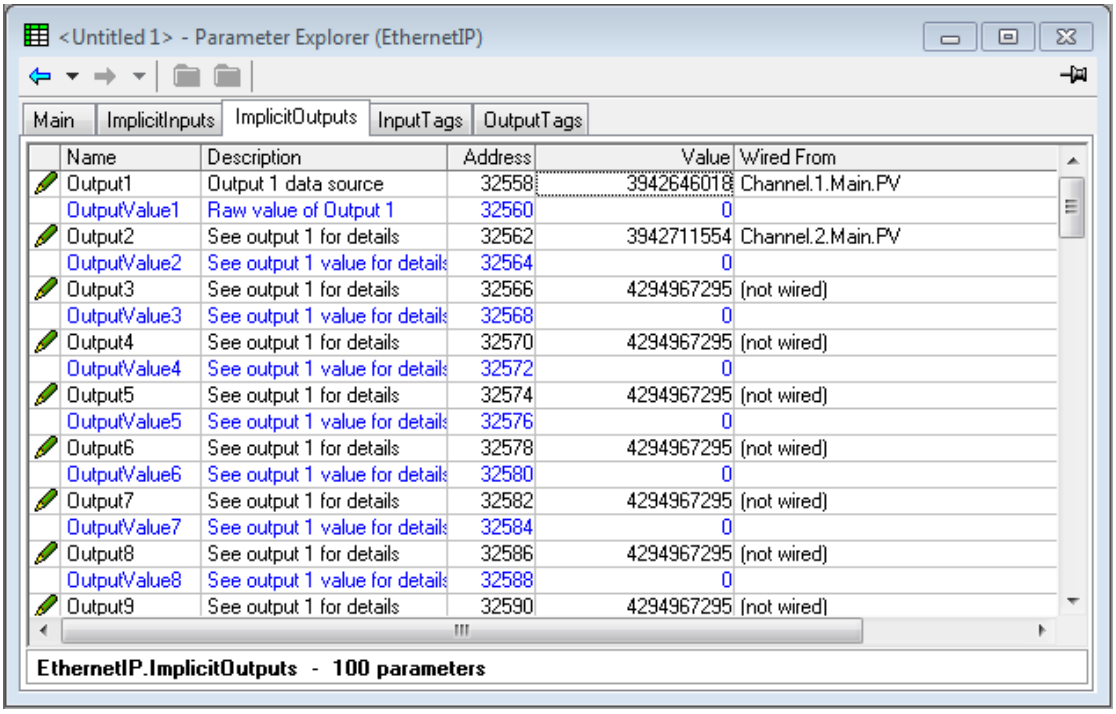
Now once wired you should see the destination show up under the "**Wired From**" section. If this was a live connection and you were transmitting data from the PLC, you would see the Raw* value match what was coming from the PLC.

**** RAW is referring to the value that is coming in to the nanodac prior to any formatting that may be applied once it has followed the connected wire.***

To transmit data to the PLC, we do a similar process. Let's say we want to retransmit channels 1 and 2 to the PLC. Simply expand on Channel → 1 → Main. We want to retransmit the "PV" as such:



Doing so will show the following:

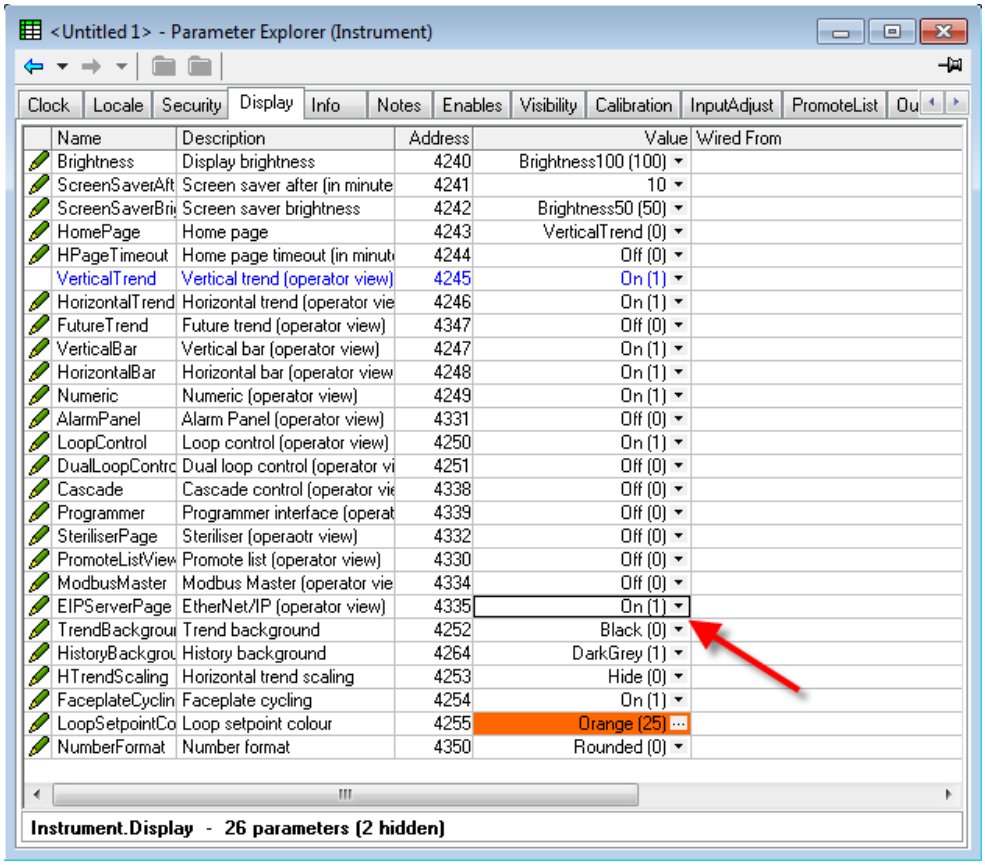


Name	Description	Address	Value	Wired From
Output1	Output 1 data source	32558	3942646018	Channel.1.Main.PV
OutputValue1	Raw value of Output 1	32560	0	
Output2	See output 1 for details	32562	3942711554	Channel.2.Main.PV
OutputValue2	See output 1 value for details	32564	0	
Output3	See output 1 for details	32566	4294967295	(not wired)
OutputValue3	See output 1 value for details	32568	0	
Output4	See output 1 for details	32570	4294967295	(not wired)
OutputValue4	See output 1 value for details	32572	0	
Output5	See output 1 for details	32574	4294967295	(not wired)
OutputValue5	See output 1 value for details	32576	0	
Output6	See output 1 for details	32578	4294967295	(not wired)
OutputValue6	See output 1 value for details	32580	0	
Output7	See output 1 for details	32582	4294967295	(not wired)
OutputValue7	See output 1 value for details	32584	0	
Output8	See output 1 for details	32586	4294967295	(not wired)
OutputValue8	See output 1 value for details	32588	0	
Output9	See output 1 for details	32590	4294967295	(not wired)

Other Items

Showing the EtherNet/IP Operator View:

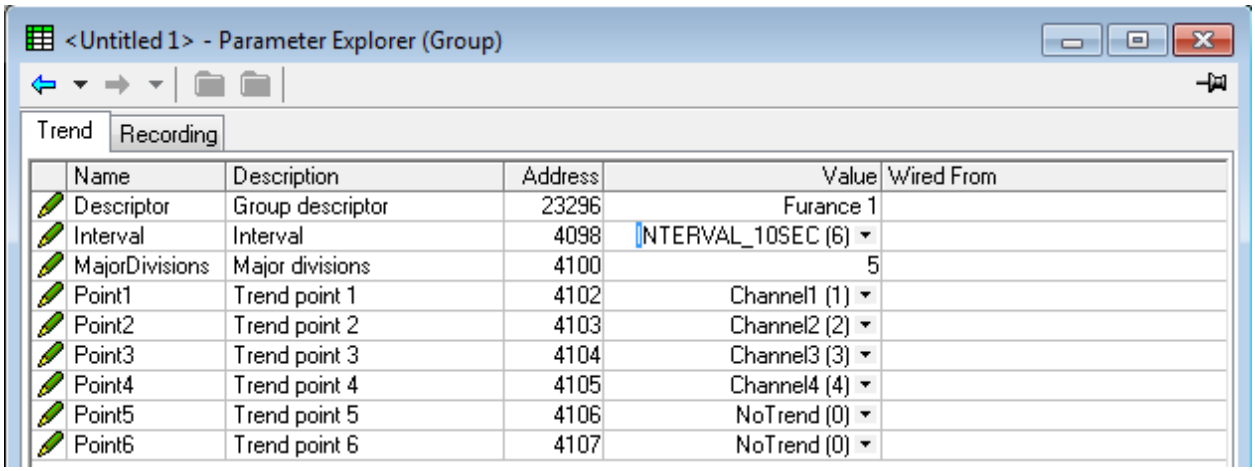
By default, the EtherNet/IP view is turned off however you can quickly turn it back on. Doing so will allow you to view the data coming in and going out to/from the nanodac™ however note that the values displayed on the nanodac™ are only those that have been wired as explained above. Go to the Instrument Folder then click on “Display”



Mentioned previously, in order to record data, you must wire the Implicit inputs to a virtual channel which is set up as COPY. However, if you are not trending the data, you must also tell the nanodac™ if you want to record it.

*NOTE – you can trend up to 6 points. If you trend a point, it will automatically be recorded. You can record up to 34 points!

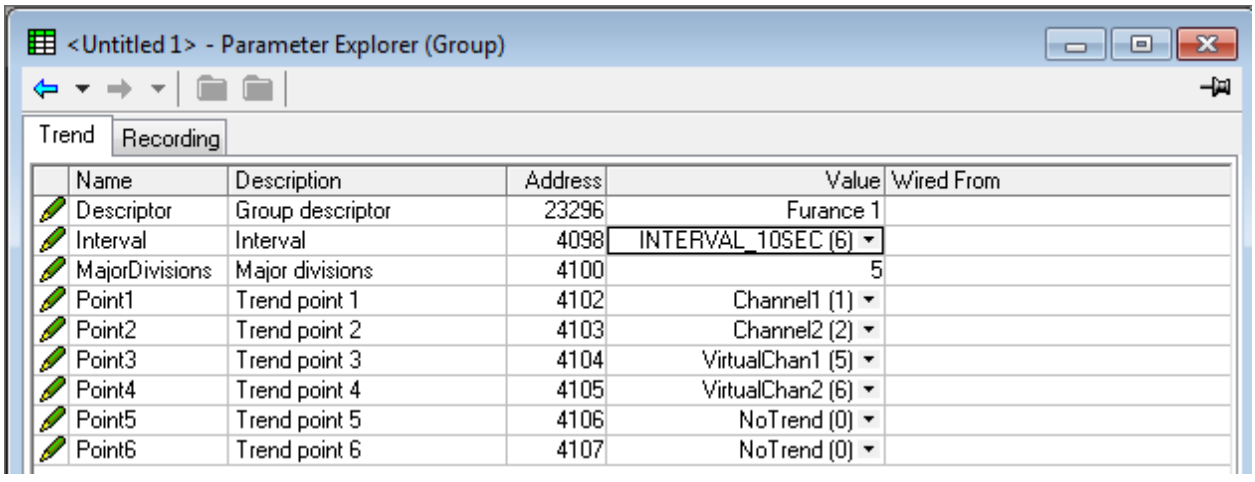
Go to your Group Folder and click on Trend:



From here you can edit the name of the group, the interval at which the nanodac™ updates its trending (125ms to 1 hour) and the 6 points you want to trend. Channels 1 – 4 are selected by default.

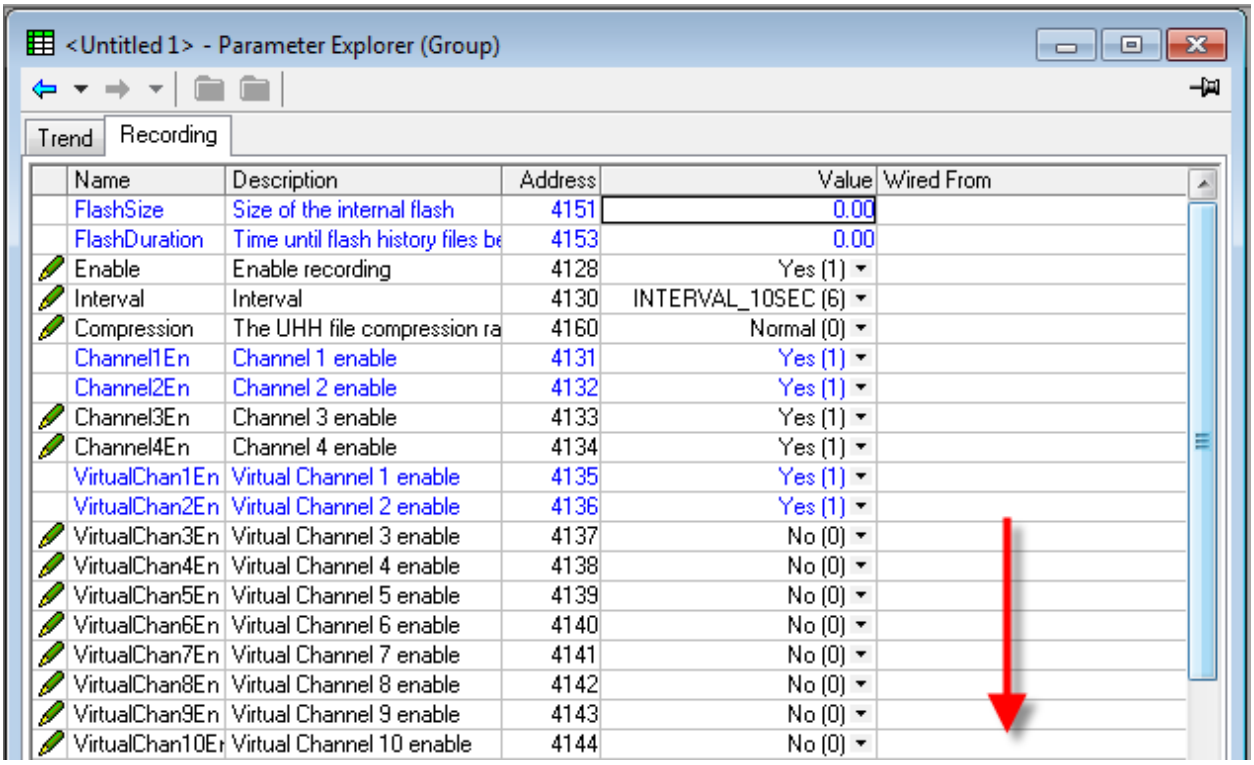
*NOTE – Trending and recording are independent from one another. You can trend at a faster or slower rate than what you record.

We want to trend channels 1 and 2 as well as, Virtual Channels 1 and 2, which is the data from the PLC.



Now, the nanodac™ will trend and record channels 1, & 2 as well as Virtual channels 1 & 2

If you click on the Recording tab you will see the following:



	Name	Description	Address	Value	Wired From
	FlashSize	Size of the internal flash	4151	0.00	
	FlashDuration	Time until flash history files be	4153	0.00	
✎	Enable	Enable recording	4128	Yes (1)	
✎	Interval	Interval	4130	INTERVAL_10SEC (6)	
✎	Compression	The UHH file compression ra	4160	Normal (0)	
	Channel1En	Channel 1 enable	4131	Yes (1)	
	Channel2En	Channel 2 enable	4132	Yes (1)	
✎	Channel3En	Channel 3 enable	4133	Yes (1)	
✎	Channel4En	Channel 4 enable	4134	Yes (1)	
	VirtualChan1En	Virtual Channel 1 enable	4135	Yes (1)	
	VirtualChan2En	Virtual Channel 2 enable	4136	Yes (1)	
✎	VirtualChan3En	Virtual Channel 3 enable	4137	No (0)	
✎	VirtualChan4En	Virtual Channel 4 enable	4138	No (0)	
✎	VirtualChan5En	Virtual Channel 5 enable	4139	No (0)	
✎	VirtualChan6En	Virtual Channel 6 enable	4140	No (0)	
✎	VirtualChan7En	Virtual Channel 7 enable	4141	No (0)	
✎	VirtualChan8En	Virtual Channel 8 enable	4142	No (0)	
✎	VirtualChan9En	Virtual Channel 9 enable	4143	No (0)	
✎	VirtualChan10Er	Virtual Channel 10 enable	4144	No (0)	

Notice that the channels in blue are also the ones being trended. Likewise, because they are blue they cannot be modified. If you would like to add a point simply select the appropriate channel and change from No to Yes.