

iLON100 SOAP /XML to LONWorks Device Driver Guide

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Rev 1 - March 10, 2003

Rev 2 – April 15, 2004

Rev 3 – August 3, 2004 – LON_MAP.INI is for user-customized conversion of STATE Descriptors.

Rev 4 – October 17, 2005 - .NET Framework required on SCADA node, Scan time 10 seconds, Timeout 5000 ms

1. iLON100 SOAP/XML Ethernet Device Communications

1.1 Introduction to iLON100 driver to LONWORKS devices

Advantech WebAccess SCADA Node can use a SOAP/XML interface over Ethernet to an i.LON™ 100 Internet Server to communicate to LONWORKS devices. The SCADA node does not require LNS to communicate to the iLON100 because it is using XML (similar to using html). The Advantech WebAccess iLON100 driver sends a request to the iLON100 and the opens the XML file returned by the iLON100 to extract the data. The user does not need to know anything about SOAP or XML. The driver is configured using the addresses of the NVLs in the iLON100.

Note – a copy of LNS and LonMaker are required to configure the iLON100 and the LONWORKS devices. These can be on a separate PC and are not required to be on the SCADA node.

The Advantech WebAccess iLON100 device driver can read local data points (NVL), external data points (NVE) and constant data points (NVC).

1.1.1 NVL

It is recommended to use the NVL parameters (local data points) in the iLON100. This provides faster communications and better throughput. This requires nvi and nvo to be created in the LonMaker configuration tool. The iLON100 then generates the NVL from the nvi and nvo. These NVL include some default network variables on an i.LON100 functional block which a generated automatically. But most dynamic network variables from devices on the LONWORKS network that you will want to read and write must be bound to Local data points using the LonMaker tool in order to send or receive information on the LONWORKS network.

1.1.2 NVE

The use of NVE (external data points) is not recommended. The NVE are constantly scanned and slow down response. Because NVE points are explicitly polled or poked they consume no network variable resources on the referenced devices but at the expense of increased network traffic.

You can use the iLON100 as a Remote Network Interface to your LonMaker configuration tool. This allows you to configure the iLON100 and attached LONWORKS devices over an Ethernet connection.

Recommended Echelon Manuals are:

i.LON™ 100 Internet Server User's Guide - 078-0196-01A - describes how to configure the i.LON 100 Internet Server and how it can be connected to a LONWORKS network and devices.

LonMaker User's Guide - 078-0168-02G - Describes how to use the LonMaker tool, which can be used to connect the i.LON 100 functional blocks to a LONWORKS network.

i.LON 100 Quickstart Guide - This document describes how to install the i.LON 100 Configuration Plug-in, how to connect the i.LON 100 hardware, and how to configure the i.LON 100's IP information using the Web interface.

1.1.3 Overview of Steps to configure iLON100 communications

1. Optionally, verify the **IP address** of the iLON100 using the HyperTerminal program in Windows and a 9-pin RS232 null modem cable. This may save a lot of guess work.

This uses the DB-9 serial port, a null-modem cable and Windows HyperTerminal program. Set the communications parameters on the terminal emulator to 9600-8-N-1 and turn flow control off.

2. Connect to the iLON100 using Internet Explorer 6.0 (Service Pack 1).
3. Login. Default user: ilon default password: ilon.
4. Download and install the iLON 100 configuration utility if prompted.
5. Confirm RNI is enabled on the Security page if you will use the LON100 in the LonMaker configuration tool. Optionally enable RNI.

Note - RNI is not needed by Advantech WebAccess.

6. Configure the iLON100 (i.e. add a iLON100 Shape to a LonMaker Drawing) using the LonMaker configuration utility.
7. Create network variables in the LONWORKS devices attached to the iLON100 using the LonMaker configuration utility.
8. Use the LonMaker Configuration Utility to browse the list of NVL and NVE parameters. Record these NVL and NVE data points for use as the address in Tags and Blocks in Advantech WebAccess. It is recommended to use NVL data points if possible.
9. Configure Advantech WebAccess Project and SCADA Node.

10. Configure an API Port and iLON100 device.
11. Configure Tags and Blocks in Advantech WebAccess using the NVL and NVE as address.

1.1.4 .Net Framework required on SCADA node

The SCADA node reads the SOAP/XML files from the iLON100 using Microsoft's .NET Framework. You can download the .NET Framework from <http://support.microsoft.com>. Version 1.1 of the .NET Framework has been tested with Advantech WebAccess.

1.2 Connect to the iLON100 device

If you can connect to the iLON100 using Internet Explorer and LonMaker, you can skip this section. Use this section only if you can not connect to the iLON100 or cannot connect via the LonMaker configuration tool.

1.2.1 Verify iLON100 configuration using HyperTerminal

It is recommended to use the serial interface between a PC and the iLON100 to confirm the configuration settings, especially the **IP address** of the iLON100.

You can skip this step if you are sure you know the IP Address of your iLON100.

This is a temporary connection! It is used to save a lot of guess work later (i.e. guessing the IP Address).

The i.LON 100 server contains a console application. This application allows you to set basic parameters such as the IP address, subnet mask.

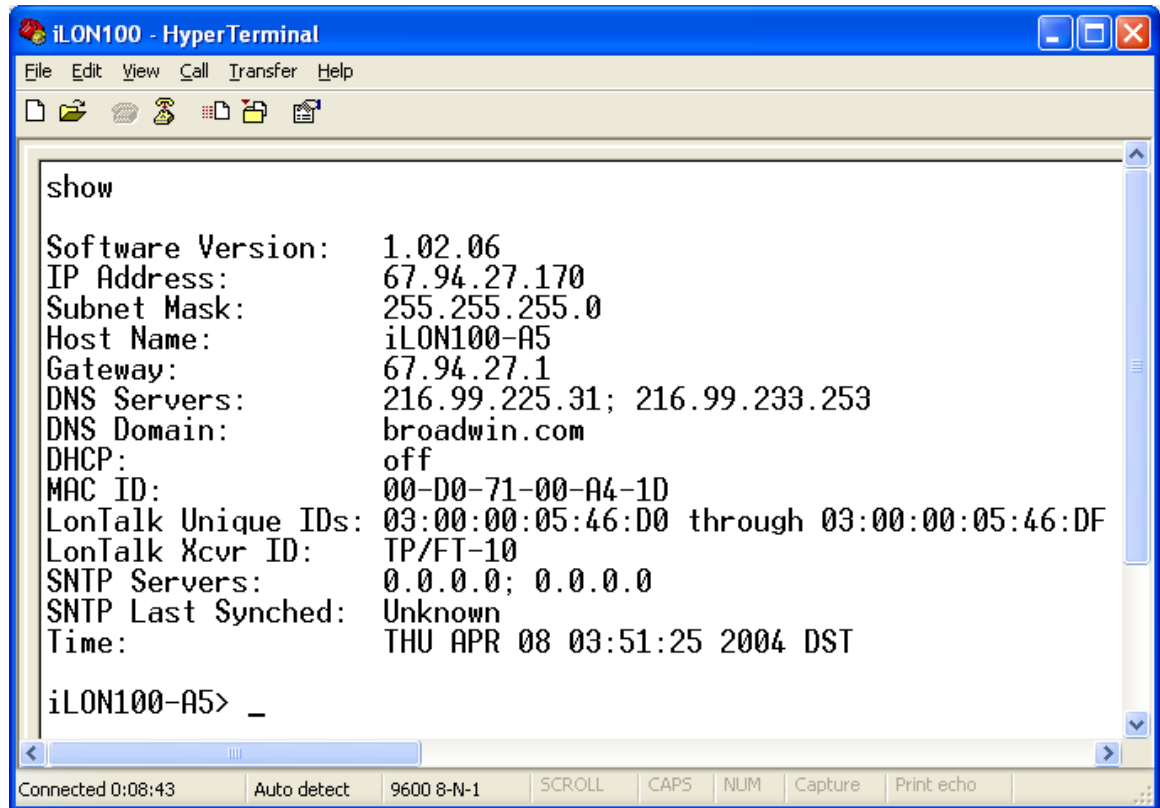
The DB-9 is designed to be used with a **DB-9 null-modem crossover cable** with **female connectors on both ends** that connects the i.LON 100 server and an available COM port on a computer running the terminal emulation program.

1. Connect a **DB-9 null-modem crossover cable** with **female connectors on both ends** to a Windows PC RS-232 serial port and the iLON100 port (labeled CONSOLE).
2. Start Windows HyperTerminal program on the PC.
Start -> Programs -> Accessories -> Communications -> HyperTerminal
3. Enter a name for the New Connection, e.g. iLON100.
4. Select a Com Port, usually COM1.
5. Set the communications parameters on the HyperTerminal terminal emulator to 9600-8-N-1 and turn flow control off.
Baud: 9600
Bits: 8

Parity: None
Stop Bits: 1
Flow Control: None

6. Type: SHOW

7. A list of including the IP Address, subnet should appear.



```
iLON100 - HyperTerminal
File Edit View Call Transfer Help

show

Software Version: 1.02.06
IP Address: 67.94.27.170
Subnet Mask: 255.255.255.0
Host Name: iLON100-A5
Gateway: 67.94.27.1
DNS Servers: 216.99.225.31; 216.99.233.253
DNS Domain: broadwin.com
DHCP: off
MAC ID: 00-D0-71-00-A4-1D
LonTalk Unique IDs: 03:00:00:05:46:D0 through 03:00:00:05:46:DF
LonTalk Xcvr ID: TP/FT-10
SNTP Servers: 0.0.0.0; 0.0.0.0
SNTP Last Synched: Unknown
Time: THU APR 08 03:51:25 2004 DST

iLON100-A5> _

Connected 0:08:43 Auto detect 9600 8-N-1 SCROLL CAPS NUM Capture Print echo
```

8. To modify the IP address, type **ipaddress address**.
For example, ipaddress 67.94.27.170.
This command is valid only when DHCP is turned off.
9. To modify the subnet mask, type **subnetmask address**.
For example, subnetmask 255.255.255.0.
This command is valid only when DHCP is turned off.
10. To modify the gateway address, enter **gateway address**.
Enter 0.0.0.0 to specify no gateway.
For example, gateway 67.94.27.1.
This command is valid only if DHCP is turned of
11. To modify the host name of the iLON100, type **hostname name**.
For example, hostname ilon100-A5.
12. To PING another IP host, type **ping address**.
13. To turn DHCP OFF, type **disable DnsServerViaDhcp**
and **disable DnsDomainViaDhcp**

14. To enable Web Server, type **enables Web**.

Refer to section The DB-9 Console Port and The i.LON 100 Console Application in the Echelon **i.LON™ 100 Internet Server User's Guide** - 078-0196-01A for more information including the pin-out description of the null-modem cable and a list of all Terminal commands.

The HyperTerminal connection is useful to maintain to watch what happens when the iLON100 reboots. It can be maintained simultaneously with the Ethernet connection. Some settings in the iLON100 require changing back and forth between IP Addresses and the HyperTerminal is useful in determining which IP the iLON100 is using.

1.2.2 Connect to iLON100 via Web Browser

Internet Explorer 6.0 with Service Pack 1 is required to connect to the iLON100 using a web browser.

You will be prompted to download and install iLON100 configuration software the first time you connect to the configuration page of the iLON100. Alternatively, you can install this from the root directory of the i.LON 100 CD and double-click Setup.exe.

The Remote Network Interface (RNI) is not needed by Advantech WebAccess (it uses the SOAP XML interface). But LonMaker needs the RNI to configure the iLON100, the devices attached to the iLON100 and to bind the iLON to NVI and NVO data points in the LonWorks devices (which become NVL or NVE points in the iLON100).

1. Connect the i.LON 100 Internet Server's 10/100Base-T Ethernet port to a Ethernet hub or switch (TCP/IP network) that can communicate with your computer or use an Ethernet cable to connect the i.LON 100 server to your computer directly (the i.LON 100 Internet Server's Ethernet port is auto switching, so you can use a straight-thru Ethernet cable, though a crossover cable will still work).
2. Start Internet Explorer 6.0 (Service Pack 1 required).
3. type the ip address of the iLON100. The factory default is 192.168.1.222. The actual IP address can be discovered using the SHOW command from HyperTerminal in section 1.2.1 above.

Hint – to use the factory default, private IP Address

1. Open the Windows Command Prompt (Start -> Run -> type cmd -> enter)
 2. Enter the following command (this is the exact text of the command):
`route add 192.168.1.0 mask 255.255.255.0 %COMPUTERNAME%`
-

4. Select Configure.
5. The default username and password are:
user: ilon
password: ilon
6. Select **Yes** to install and run iLONApps.cab . This will download and install the iLON100 configuration utility.

This step is skipped if you have already installed the iLON100 configuration utility software.

7. Select **Setup**.
You may have to login again.
(default is user: ilon pw: ilon).
8. Usually the TCP/IP property page. You can modify the TCP/IP settings here.
9. Select **LonWorks**.
You may have to login again.
(default is user: ilon pw: ilon).
10. On the Security page, confirm the **Enable RNI** is checked. If not go to next section to do a Security Reset and enable RNI.
11. Select **Reboot**. This page will allow you to Reboot the iLON100 later if you need to do a Security Reset and enable RNI.
DO NOT REBOOT THE iLON100 YET.

1.2.3 Security Reset and enable RNI

If the Security Page shows that RNI is enabled or you are using LONMAKER without the RNI, you can skip this step.

The Security Web page of the i.LON 100 Internet Server can be modified only after performing a security access reset. This Security Web page allows you to enable using the iLON100 as a Remote Network Interface to the LonMaker configuration tool.

The RNI is not needed by the Advantech WebAccess driver.

However, at some point you must bind data points from LONWORKS devices to the iLON100 using LONMAKER. Using the iLON100 as an RNI is one alternative.

To ensure maximum security, Echelon recommends disconnecting the computer and i.LON 100 server from the local area network before performing a security access reset.

A security access reset of the i.LON 100 Internet Server requires physical access to the i.LON 100 server hardware.

1. Remove the i.LON 100 server from the TCP/IP network and attach it to the computer using an Ethernet cable or a local server hub. This step is optional, but is likely to be necessary since performing a security access reset will temporarily reset the i.LON 100 server's IP address to 192.168.1.222.
2. Press and hold the service pin on the i.LON 100 server. This button is big enough to a ballpoint pen and is labeled SERVICE.

3. Reboot the i.LON 100 server while still holding down in the service pin.

This can be done from the Reboot Web page (see Reboot, in this preceding section 1.2.2)

Or by pressing and releasing the **Reset button** with a paper clip (this is a small hole just big enough for a paper clip, just below the Output LEDs as described in Chapter 2 of Echelon ***i.LON™ 100 Internet Server User's Guide*** - 078-0196-01A).

4. **Continue holding the service pin.**

5. In approximately 10 seconds, all the LEDs on the i.LON 100 server will **flash, continue holding the service pin.**

6. Approximately 30 seconds from when the reboot began, the service LED located next to the Service PIN will **illuminate solid orange.**

Release the service pin until the Service LED is solid orange.

If the HyperTerminal is connected, you can watch the reboot process.

The i.LON 100 Internet Server will now be in security access mode. When the i.LON 100 server is in security access mode, its IP address, subnet mask, and gateway are temporarily changed to 192.168.1.222, 255.255.255.0, and 192.168.1.222, respectively, they are changed back to the values specified on the Setup and Security Web pages once the i.LON 100 server exits security access mode (i.e. when the i.LON 100 server is rebooted). This IP address change may place the i.LON 100 server on a subnet that your computer cannot communicate with. In order to communicate with the i.LON 100 server after a Security Access Reset, you can either modify your computer's IP configuration to place it on the 192.168.1.* subnet.

7. In Internet Explorer, enter <http://192.168.1.222>.

8. Select **Security**. The Security Web page opens.

9. Log in.

default user: ilon

default password: ilon

10. The Security Web page opens.

iLONTM 100
INTERNET SERVER

POWERED BY **ECHOLON**

SETUP **ALARMING** **DATA LOGGING** **SCHEDULING** **HELP** **HOME**

Security

Property	Value
FTP user name	ilon
FTP password
Re-enter password

Property	Value
<input checked="" type="checkbox"/> Enable FTP	
<input checked="" type="checkbox"/> Enable RNI	
<input checked="" type="checkbox"/> Enable web server *	
<input type="checkbox"/> Enable remote dial-in	
<input type="checkbox"/> Enable Telnet	

Property	Value
<input checked="" type="radio"/> Raw MD5 authentication key	00:00:00:00:00:00:00:00:00:00:00:00:00:00:00:00
<input type="radio"/> Text secret phrase	

* = Reboot required if changed

11. Check **Enable RNI**.
12. Press **SUBMIT**.
13. Select **Reboot**. The Reboot page opens.
14. Select the **Reboot** button.
15. Select Yes.
16. The iLON100 will reboot. It can take a couple minutes. If the HyperTerminal is connected (section 1.2.1), you can watch the reboot process.
17. If you configured an IP Address (other than factory default) the iLON100 will revert to the IP Address you configured.
18. Enter the IP Address of the iLON100. Login to confirm you can connect. You may have to physically reconnect it to your network hub or switch.

1.3 Configure iLON100 in LonMaker

1.3.1 Install latest version of Echelon software

1. To configure and commission the iLON 100, it is recommended to download and install the latest software from Echelon at <http://www.echelon.com/downloads>

LNS Service Pack 8 or later is required.

LonMaker for Windows version 3.13 (Service Pack 3) or later is required.

iLON100 software Version 1.02.06 (Service Pack 2) or later is required.

You must install the LNS Service Pack before the LonMaker Service Pack.

2. Install the iLON100 software.

Open the root directory of the i.LON 100 CD and double-click Setup.exe. Follow the installation prompts to install the i.LON 100 software.

1.3.2 Setup a Network Interface

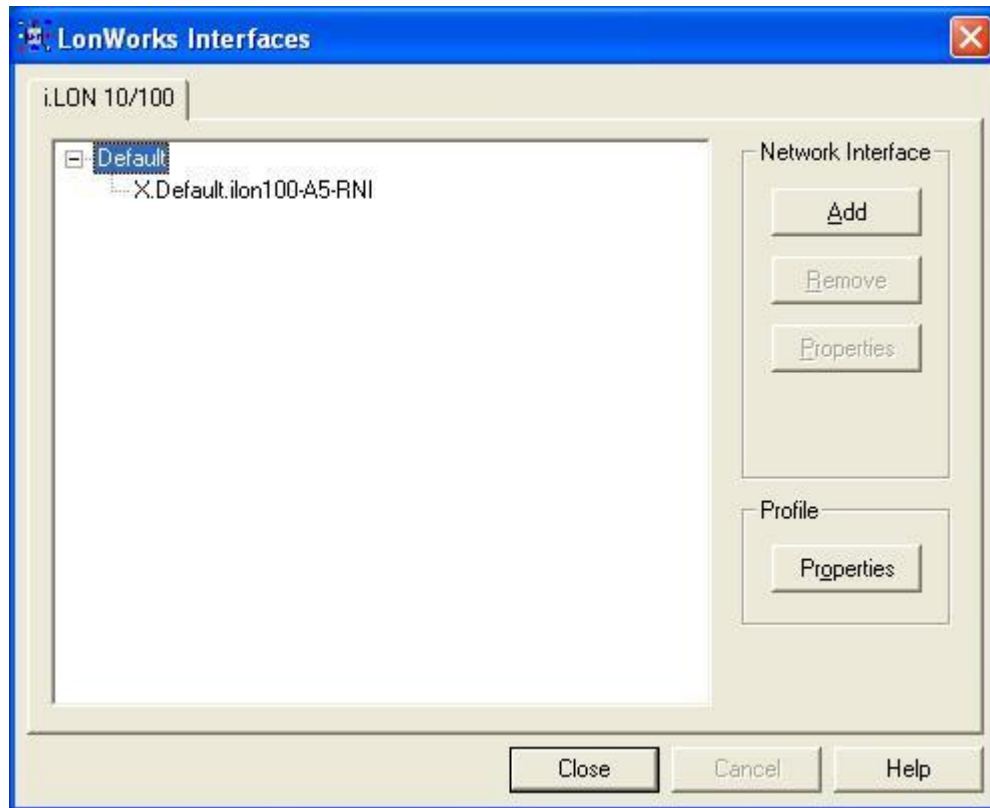
This was tested using the iLON100 as a Remote Network Interface (RNI) to LonMaker.

If you plan on attaching to a network, you must define and configure your network interface before starting the LonMaker tool.

It may be possible to configure the iLON100 using other network interfaces such as the i.LON10, PCC-10, PCLTA-10, PCLTA-20, PCNSI, SLTA-10, or PL-SLTA, but these have not been tested at Advantech.

To configure a Remote Network Interface (RNI) using the iLON100 in LNS on the PC with LonMaker, follow these steps:

1. Open the **Control Panel**.
In Windows 2000 :Start -> Settings -> Control Panel.
In Windows XP :Start -> Control Panel.
2. Open the **LonWorks Interfaces** control panel application.



3. Select **Add**.
4. Enter a **Name** for the interface. This will be used in the LonMaker utility to identify this iLON100.
5. Under the **General** tab, enter the **Hostname** of the iLON100 (use the SHOW command in section 1.2.1).
6. Enter the **DNS suffix** of the iLON100 (use the SHOW command in section 1.2.1).
7. Select the Address/Port tab.
8. Enter the IP Address and TCP Port of the iLON100 (use the SHOW command in section 1.2.1).
9. Select OK.

1.3.3 Start LonMaker and Create a LonMaker Drawing

To create a new LonMaker network design, follow these steps:

1. If this is the first time you are running the LonMaker tool, shut down any virus detection software before starting. Once you have opened LonMaker for the first time, you can run virus protection software without any problems.

2. Open LonMaker for Windows.

Start -> Programs -> Echelon LonMaker for Windows -> LonMaker for Windows

The LonMaker Design Manager appears.

3. Click **New Network** to open a new network design.

A warning may appear asking you if you want to enable macros. You must enable macros to use the LonMaker tool..

4. **Visio** starts and the Naming window appears.

5. Network Wizard Opens.

6. Enter a **Network Name**.

It must be unique to all the LNS networks on this computer. The network design name can be up to 17 characters (and may include embedded spaces). The network name is not case sensitive (i.e. you must not create two networks with names that differ only in capitalization).

Network Database Path specifies the directory containing the LNS network database. The LonMaker tool automatically updates this field.

Network Drawing Path specifies the directory containing the LonMaker drawing and the filename of the top-level drawing file. The LonMaker tool automatically updates this field.

Network Description contains a description of the network design being created. This field is optional and has no effect on network operation.

6. Click **Next**.

The Network Wizard opens the Network Interface window:

7. Set **Network Attached** if the LonMaker computer is attached to the physical network and you wish to communicate with the physical devices. If this option is selected and you have more than one network interface in your computer, select the name of the LNS or LONWORKS/IP network interface under Network Interface Name.

This window appears every time the network database opens using the LonMaker tool unless Skip This Prompt is set and Show All Network Options Screens is cleared on the LonMaker Design Manager window.

8. Click **Next**. The following window opens if the network is attached. If the network is not attached, skip to step 9.

9. This window allows you to select one of the two following management modes: Select **OnNet**.

OnNet — All changes to the LonMaker drawing will immediately be sent to the physical devices on the network; you can see the effect of every change made to the physical devices as

they are made. Select OnNet if you are commissioning an engineered system, or if you are in any phase of an ad-hoc system.

OffNet — Changes to the LonMaker drawing are not sent to the physical devices until the LonMaker tool is placed OnNet, at which point all changes made while OffNet will be implemented. After you have commissioned devices while OnNet, you can work OffNet and still make real-time changes to network variables on an attached network. Changes made to configuration properties, which happen less often, can be made OffNet and are stored in the database until you select OnNet. You can, however, read configuration properties while you are working OffNet. This capability allows you to make many changes rapidly without having to wait for every change to modify the physical devices. You can change the OnNet/OffNet status while the drawing is open. From the LonMaker menu, select Network Properties and the

10. Click **Next**.

11. The **Plug-In Registration window** appears. This window allows you to choose which plug-ins to register for this network.

Be sure to Register the iLON100 Plug-in!

12. Click **Finish** to open a **LonMaker drawing** containing a LNS Network

For more information, refer to the ***Echelon LonMaker User's Guide*** - 078-0168-02G.

1.3.4 Add an i.LON 100 Shape to a LonMaker Drawing

You can add an i.LON 100 server to a LonMaker drawing. This allows you to place the i.LON 100 functional blocks in the drawing and connect the input and output network variables on those functional blocks to other devices in the LONWORKS network.

To add an i.LON 100 shape to a LonMaker drawing, follow these steps:

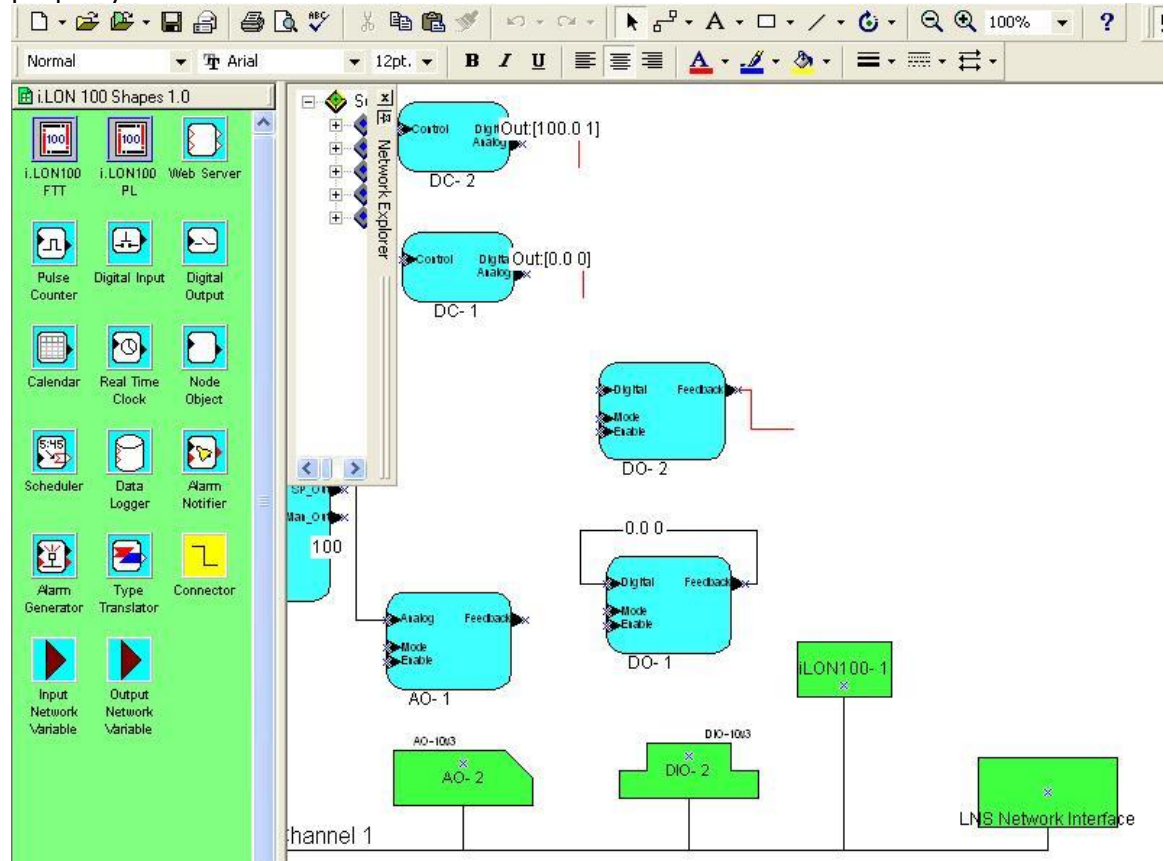
1. Start the LonMaker tool (see section 1.3.3).
2. Open or create a LonMaker network drawing. Be sure to register the Echelon i.LON 100 Configuration Plug-in in the Plug-in Registration window (see section 1.3.3 or the LonMaker User's Guide for more information).
3. Drag the i.LON 100 FTT shape (for the free topology model) or i.LON 100 PL shape (for the power line model) from the i.LON 100 Shapes stencil to the LonMaker drawing.

The New Device Wizard opens.

3. Step through the New Device Wizard as described in the LonMaker User's Guide. If your i.LON 100 server is connected to the network, you can

commission it just like any other LONWORKS Device. You must commission the i.LON 100 shape in order for dynamic network variables added to the i.LON 100 functional blocks to be propagated to the i.LON 100 hardware.

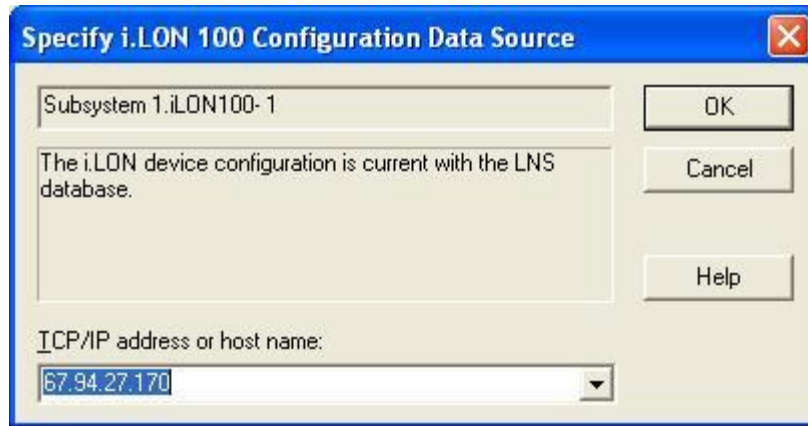
NOTE: If you have trouble commissioning the device on a power line channel due to inability to communicate with the device, you should increase the LonMaker Transmit Timer to at least 512 ms; to do this, open the LonMaker menu, click Network Properties, and then select the Timing tab to set this property.



1.3.5 Using the i.LON 100 Configuration Plug-in

Once you have added an i.LON 100 shape to the drawing, follow these steps to start the i.LON 100 Configuration Plug-in:

1. **Right-click** the i.LON 100 device shape or any of its functional blocks.
2. Select **Configure** from the shortcut menu.
3. The **Specify i.LON 100 Configuration Data Source** dialog opens, as shown in the following figure:



4. Enter the IP address of the i.LON 100 server in the TCP/IP Address field.

If you have configured the i.LON 100 to use a port other than 80, you must also specify the port (i.e. 192.168.1.222:8080).

Note: You must be in TCP/IP and LonTalk communication with the i.LON 100 server in order to configure it using the i.LON 100 Configuration Plug-in. The i.LON 100 should always be in sync with the LONWORKS application that opens it (i.e. in the LonMaker tool, you should be connected and OnNet).

1.3.6 Resynchronize the i.LON 100

When you add or remove functional blocks or dynamic network variables, the changes will not be seen by the i.LON 100 server until it is resynchronized.

Resynchronizing has the following effects:

- Adds and removes application instances to make the i.LON 100 Functional Blocks list consistent with the functional block shapes in the LonMaker

To resynchronize the i.LON 100 server with a LonMaker drawing, follow these steps:

1. Click the Resync button in the lower left of the i.LON 100 Configuration Plug-in window. The i.LON 100 Resync dialog opens.
2. Click Go to begin the resynchronization. The dialog lists the changes that will be made to the i.LON 100 server's configuration data. Review the changes.
3. Click Apply to accept the changes and update the i.LON 100 server and the i.LON 100 Configuration Plug-in. Click Continue to accept the changes and update the configuration plug-in, but not the i.LON 100 server; the i.LON 100 server will be updated when you click the OK or Apply button in the i.LON 100 Configuration Plug-in.

Click Cancel to reject the changes.

1.3.7 Creating and Viewing Local Data Points (NVLs)

The i.LON 100 server creates a local data point prefaced with the characters NVL_ for all network variables on the i.LON 100 server. These include all network variables defined in the i.LON 100's static device interface file and all dynamic network variables you create. See the LonMaker User's Guide for more information on creating dynamic network variables.

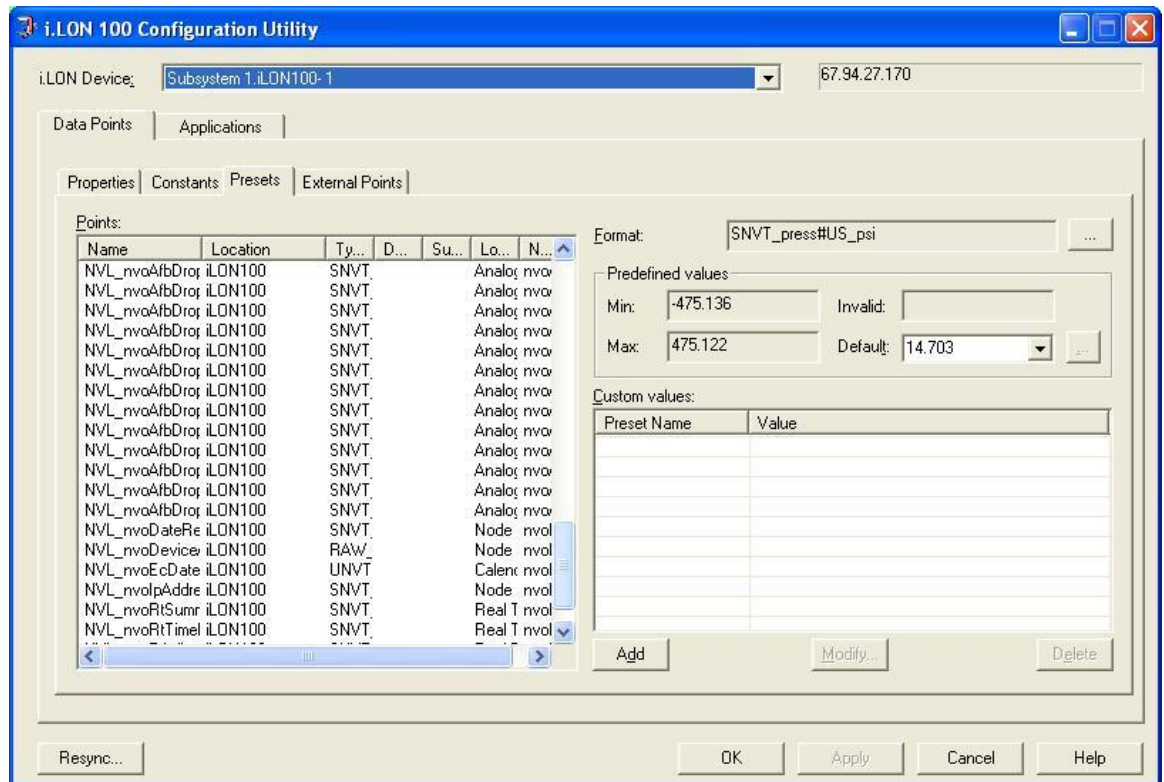
Note: The i.LON 100 device must be commissioned and online and the LonMaker tool must be attached to the network with the i.LON 100 in order to use the i.LON 100 Configuration Plug-in.

Note: The LonMaker tool maintains private information in the Description property of dynamic network variables. It is recommended that this property not be modified by any tools other than the LonMaker tool or the LonMaker browser.

You can manage all local data points on functional blocks that have been defined on an i.LON 100 server using the i.LON 100 Configuration Plug-in. To view local data points (NVLs), follow these steps:

1. Start the i.LON 100 plug-in from the Visio Network Drawing
Right Click on the ILON100 -> Configure
2. Select OK.
3. Select the **Data Points** Tab.

This tab displays all of the data points that exist on defined functional blocks on the selected i.LON 100 Internet Server. Local data points are created for all network variables on i.LON 100 functional blocks in the LONWORKS network, as well as all network variables on the Real Time Clock, Node Object, and Analog Function Block functional blocks, which cannot be configured using the i.LON 100 Configuration Plug-in.



The NVL are used as the address in Advantech WebAccess Tags.

You should record the NVL to use when configuring tags in Advantech WebAccess.

The name of a local data point is **NVL_<network variable programmatic name>**. Using the LonMaker tool, you can find the programmatic name of a network variable by right-clicking the network variable shape, selecting Properties from the shortcut menu to open the Network Variable Properties dialog, and reading the Programmatic Name field of the Description tab. The programmatic name may not be the same as the network variable name. See Network Variable Programmatic Names, in the Echelon iLON100 Configuration Manual, for more information.

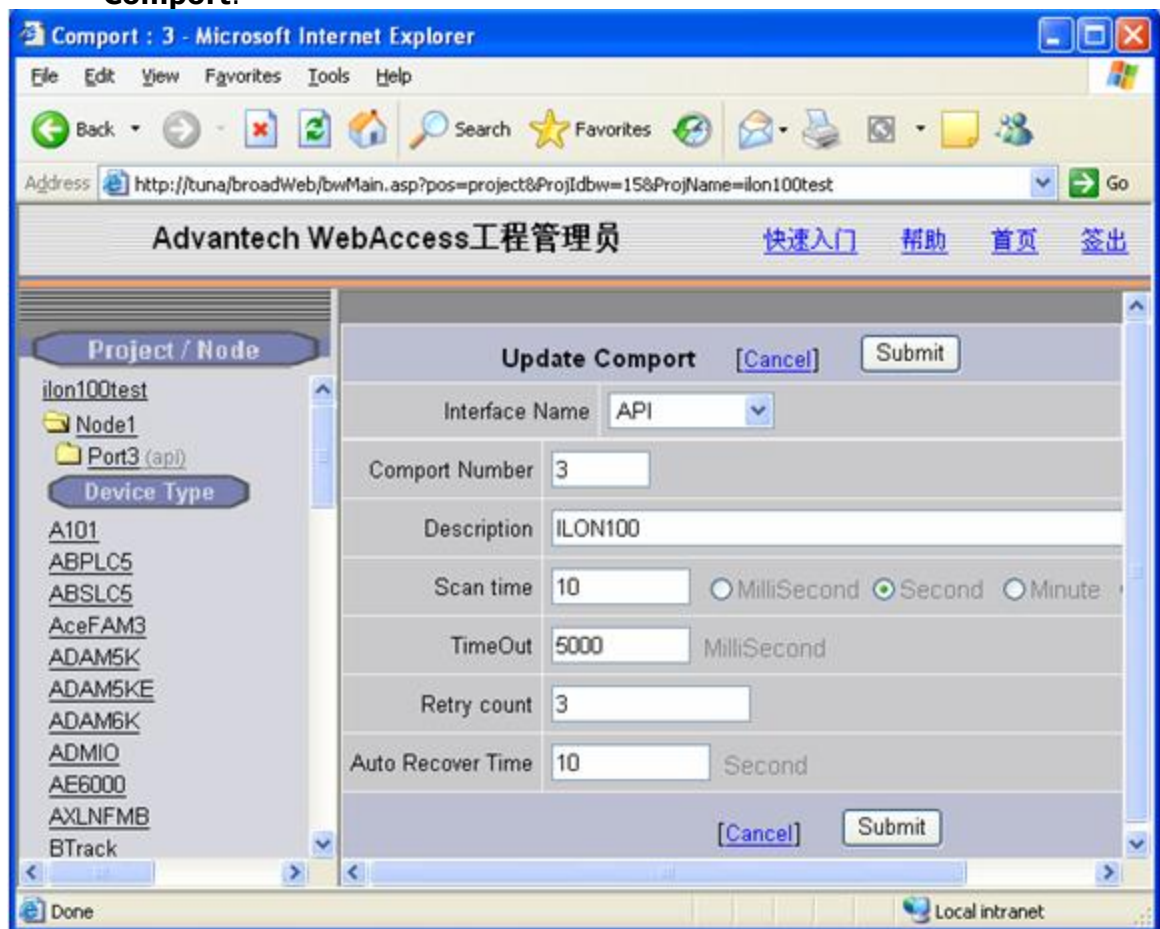
If some of the NVL points seem to be missing, click Resync to resynchronize the i.LON 100 Configuration Plug-in with the i.LON 100 server (see Resynchronizing the i.LON 100 Configuration Plug-in With the LONWORKS Network, in section 1.3.6).

You can sort the data points on this tab by clicking any of the column headings, just as you would in Windows Explorer. You can resize any of the columns by dragging the edges of the column header.

1.4 Configure iLON100 device and Tags in Advantech WebAccess

The steps, in summary, are:

1. Start Internet Explorer **Web Browser**.
2. Enter IP address of the **Project Node**.
3. Use **Advantech WebAccess Configuration**.
4. Open or Create a **Project**.
5. Configure a **SCADA node** (the PC that will connect to the automation hardware).
6. Configure a **Comport** for the SCADA Node that is an **API type Comport**.



7. Configure Scan Time, Timeout, Retry and Auto Recover. All iLONs on this Comport must use the same settings. Although it is recommended to use multiple comports to enable each iLON100 to have a separate thread. See [API Comport Properties](#) in the following section for more information.

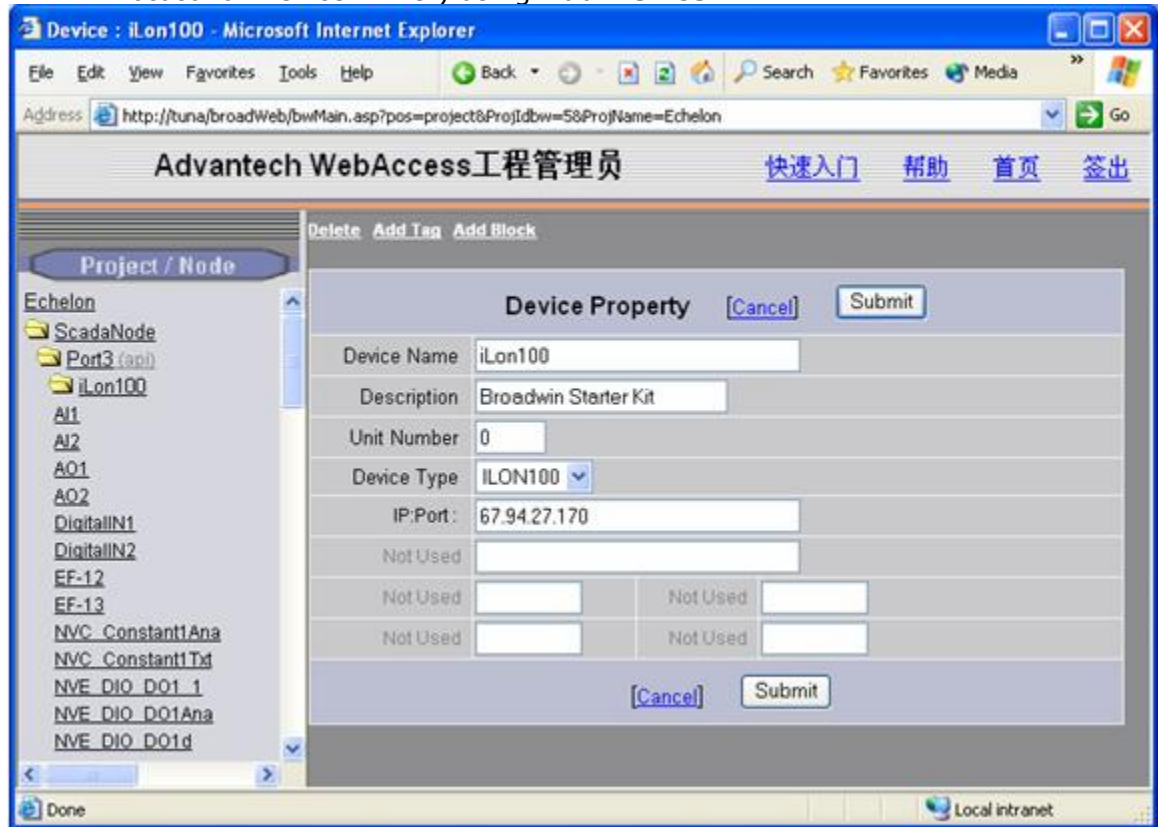
The iLON is not fast. Suggested settings to start with are:
Scan time: 10 seconds

TimeOut: 5000 Milliseconds

Retry: 3

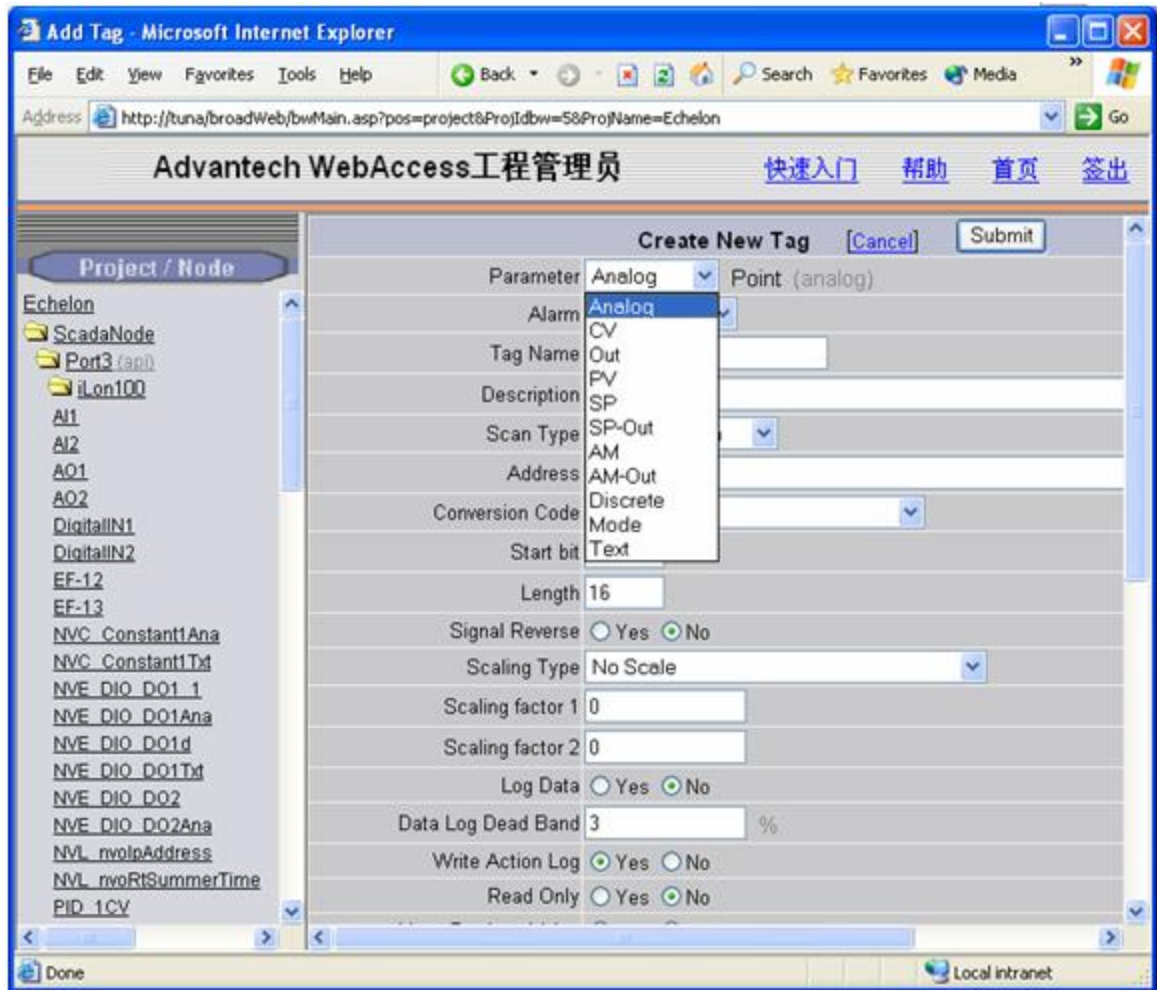
Auto Recover: 60 seconds

8. Configure a **iLON100 Device** (determines the communications Protocol or Device Driver) using **Add Device**



9. Enter the IP Address of the iLON100.

10. Use **Add Tag** or **Add Block** to create tags.



11. Select a Parameter (Analog, CV, Out, PV, SP, SP-OUT, AM, Text, Mode, etc.) to match the type of data to be read or written (Analog Input, Analog Output, Digital Input, Digital Output).

1.4.1 Tag Addresses

12. The **Address** of the data must match the NVL browsed in section 1.3.7. Modify the Address to match the actual NVL_programmatic name.

Examples are:

```
NVL_nciClaInvert_1
NVE_DIO_DI1?NVE,2
NVL_nciClaLocation_2
NVL_nviDIClear[1]
NVL_nvoDIStatus[2]
NVL_nvoAnAlmFlag_096,1
NVE_nvoWindSpeed?NVE
```

The address format for iLon100 is **PointName#FieldName?NVx,n/D='y'**

Where:

n is the n'th element of the data, if the value is the first or the only value, n can be omitted.

D= specifies the delimiter, where y is the delimiter. Default delimiters include all non alphanumeric characters plus space ` `, period '.' and dash '-'. A delimiter must be specified if it is a comma or other alphanumeric character. The delimiter is device dependent and you should refer to device manufacturer. If the return string includes a space (for example Degree C), then a delimiter must be specified or the space will act as a delimiter

The default for Fieldname is UCPTvalue, for NVx is NVL. If you are reading an NVE or NVC, you must specify the fieldname.

To Test, create a tag to the NVL_nvoIpAddress. This address exists in all iLON100.

The screenshot shows the 'Update Tag' configuration window in the Advantech WebAccess interface. The left sidebar lists project nodes, including 'PID_1CV'. The main form contains the following fields and values:

- Tag Type: Point (analog)
- Alarm: No Alarm
- Tag Name: PID_1CV
- Description: Control Variable
- Scan Type: Constant Scan
- Address: NVL_PID_1CV
- Conversion Code: AUTO
- Start bit: 0
- Length: 16
- Signal Reverse: No (selected)
- Scaling Type: No Scale
- Scaling factor 1: 0
- Scaling factor 2: 0
- Log Data: No (selected)
- Data Log Dead Band: 3 %
- Write Action Log: Yes (selected)
- Read Only: No (selected)
- Keep Previous Value: No (selected)
- Initial Value: 0

13. Apply a Tag name.
14. Edit Tags in Project Manager to assign **Alarms, Scaling, Engineering Units**, Description and other features.
15. Press Submit.
16. Download to the SCADA node.

The screenshot shows the Advantech WebAccess Engineering Manager web interface in Microsoft Internet Explorer. The browser address bar shows a URL pointing to a specific project. The page title is 'Advantech WebAccess工程管理员'. On the left, there is a tree view under 'Project / Node' listing various nodes like DigitalIN1, DigitalIN2, EF-12, etc. The main area is titled 'Update Tag' and contains a form for editing tag properties. The form fields include:

- Tag Type: Point (text)
- Tag Name: iLON100IpAddress
- Description: This NVL is on all iLON100
- Scan Type: Constant Scan
- Address: NVL_rvulpAddress
- Conversion Code: AUTO
- Text Length: 31
- Write Action Log: ☒ Yes ☐ No
- Read Only: ☐ Yes ☒ No
- Keep Previous Value: ☐ Yes ☒ No
- Initial Value: (empty text box)
- Security area: 0
- Security level: 0
- Log To ODBC: ☐ Yes ☒ No
- Array Size: 0

At the bottom of the form are 'Cancel' and 'Submit' buttons. The status bar at the bottom of the browser window indicates 'Local intranet'.

1.4.2 API Comport Properties

1.4.2.1 Comport Number

The APU Comport is a virtual comport. There is no need to match that of the physical interface (e.g. COM1, COM2, COM3, etc) on the SCADA Node. It is recommended to use a Port > 3 to avoid conflict with an actual serial port. The iLON100 uses the TCP/IP network card(s) on the SCADA node.

1.4.2.2 Description

This is an optional field used for user reference.

1.4.2.3 Scan Time

This is the time in milliseconds to scan the iLON100. This must match the ability of the LONWORKS network to respond.

If the LONWORKS network and devices can not respond as fast as the SCAN Time entered, Advantech WebAccess will scan at a slower rate.

1.4.2.4 Timeout

Timeout is the time waited before re-sending a communications packet that did not have a reply. Timeout is in milliseconds.

TimeOut specifies how long the software waits for a response to a data request, specifically to wait for a reply from one packet. A recommended value is 3 seconds, longer if the communication device is slow. This is protocol dependent: some protocols do not allow changes in time out.

Combined with Retry count, TimeOut also determines time to consider a device or port as BAD. Timeout is the time to wait since last communication packet sent without a reply. Time is in milliseconds. The slow or poor quality communications require longer timeout. The faster the communications network or device, the shorter the timeout required. Shorter timeouts notify operators of communications failure more quickly.

1.4.2.5 Retry Count

Number of times to retry communications if no reply is received from a device. Combined with Timeout, also determines time to consider a device or port as BAD.

In addition, Indicates the number of times after the first attempt has failed that communication should be attempted before indicating a failure. Specifically, how many times to send a single packet after the field device fails to respond to the first packet. After the retry count is exceeded, all the tags in the packet are marked with asterisks and the next packet of requests is sent. A reasonable value is 3 to 5 times. After this number of tries, the tags in this packet are marked as "fail to respond" (i.e. asterisks) and are disabled. In reality, increasing the number of retries hides failures on the part of the field device to respond to a request. Essentially, increasing the retries gives the field device more chances to reply.

1.4.2.6 Auto Recover Time

Auto Recover Time is the time to wait before attempting to re-establish communications with a BAD device or port.

If communications to the PLC is unusually slow due to hardware, communications or network issues, you might consider increasing this value. If communications to the PLC or RTU fails frequently, you may want to decrease this number in order to have Advantech WebAccess try to re-establish communications sooner.

If communications to the PLC, RTU or device Fails (i.e. exceeds Timeout) Advantech WebAccess will wait the Auto Recover Time before trying to re-establish communications.

2. Custom STATE Descriptors

2.1 LON_MAP.INI

The User can create custom STATE conversions by modifying the LON_MAP.INI file. This applies to Discrete type Tags (i.e. ON/OFF, ST_ON/ST_REQ/ST_OFF). The Advantech WebAccess STATE Descriptor appears on Displays, Alarms and in the Change Dialog Box pushbuttons. These correspond to the tag fields .DESCR0, .DESCR1, .DESCR2, .DESCR3, .DESCR4, .DESCR5, .DESCR6, and .DESCR6.

The user creates pairs of LON STATE Descriptors and Advantech WebAccess State Descriptors.

An Example LON_MAP.INI is as follows:

```
[DEAFULT_MAP]
Total_Item=3
MAP_1=ST_ON,ON
MAP_2=ST_OFF,OFF
Map_3 = 100.0 1,ON

Total_Group = 2

[Group_1]
Total_Item=2
Map_1 = 100.0 1,FAN_ON
Map_2 = 0.0 0,FAN_OFF

[Group_2]
Total_Item=2
Map_1 = 100.0 1,POWER_ON
Map_2 = 0.0 0,POWER_OFF
```

2.1.1 Default Lookup Group (DEFAULT_MAP)

All the STATE conversion will first look into the DEFAULT_MAP section for data from LNS server. If a matched entry has been found, say, "100.0 1", then "ON" will be used to match the point's descriptors to get correct value for the Discrete tags STATE Descriptor. So, instead of using 100.0 1 as descriptor, the operator will see a more friendly descriptor for the tag (e.g. "ON").

```
[DEAFULT_MAP]
```

```
Total_Item=3
MAP_1=ST_ON,ON
MAP_2=ST_OFF,OFF
Map_3 = 100.0 1,ON
```

For iLon driver, "Use Default Lookup Group" conversion code is used for the conversion in the DEFAULT_MAP section. The iLON100 user can edit this section or create another section (Group_1 to Group_10). This section is shared with LNS driver. If you have both device types on a SCADA node, you may want to modify the Default_Map for the LNS and use Group_1 to 10 for the iLON100.

2.1.2 Custom State Descriptors – Group_1 to Group_10

For the iLON100, in addition to the default Lookup Group, users can define Lookup Groups 1 to 10 to define more pairs of state descriptors. These Groups will appear under the conversion code drop-down menu in the Project Manager, Tag Properties for each Discrete Tag in an iLON100 device.

User can modify the LON_MAP.INI file for his own use.

```
[DEAFULT_MAP]
Total_Item=3
MAP_1=ST_ON,ON
MAP_2=ST_OFF,OFF
Map_3 = 100.0 1,ON

Total_Group = 2

[Group_1]
Total_Item=2
Map_1 = 100.0 1,FAN_ON
Map_2 = 0.0 0,FAN_OFF

[Group_2]
Total_Item=2
Map_1 = 100.0 1,POWER_ON
Map_2 = 0.0 0,POWER_OFF
```

In each section, "**Total_Item**" defines number of map entries in the section. A Map entry is a pair of State Descriptors: the LON DESCRIPTOR, Advantech WebAccess DESCRIPTOR

MAP_n=A,B must be defined, when n must be within the range of 1 to Total_Item in the section.

A is the data from device, B is the descriptor defined for Advantech WebAccess Tag. No space is allowed between the comma and B.

Total_Group in [**DEFAULT_MAP**] section defines how many groups are defined for iLon driver only.

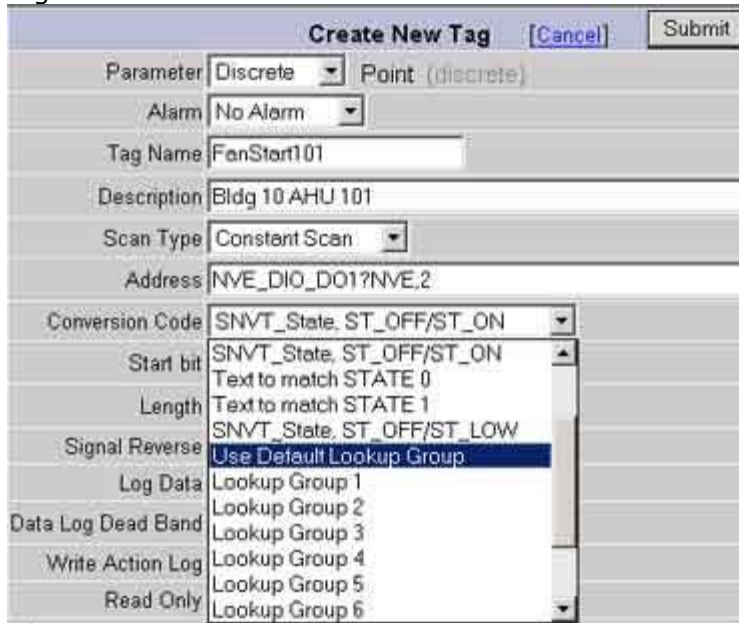
Only the iLON100 deriver users Group_1 to Group_10.

2.1.3 Applying the Conversion Code to a Tag

In configuring the Discrete Tag in Advantech WebAccess to communicate with an iLON 100, the user will see the Default_MAP, Group_1, Group_2, etc. in the drop-down menu for conversion code.

If the user selects Default_Map, only the State_Descriptors in that section will be applied to do the conversion for that tag.

If the user select Group_1 for the conversion code, only those State descriptor pairs in the Group 1 section will be used for the conversion for that tag.



The screenshot shows the 'Create New Tag' dialog box with the following fields and values:

- Parameter: Discrete (selected), Point (discrete) (disabled)
- Alarm: No Alarm (selected)
- Tag Name: FanStart101
- Description: Bldg 10 AHU 101
- Scan Type: Constant Scan (selected)
- Address: NVE_DIO_DO1?NVE,2
- Conversion Code: SNVT_State, ST_OFF/ST_ON (selected)
- Start bit: SNVT_State, ST_OFF/ST_ON
- Length: Text to match STATE 0
- Signal Reverse: SNVT_State, ST_OFF/ST_LOW
- Log Data: Use Default Lookup Group (selected)
- Data Log Dead Band: Lookup Group 1
- Write Action Log: Lookup Group 2
- Read Only: Lookup Group 3

Figure – LON_MAP.INI Groups in Conversion code – Discrete Tag