



APPLICATION NOTE

THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

Product Family: PC-LKD-DEV

Number: AN-LKD-008

Subject: Introduction to the use of Lookout Direct

Date Issued: 09-16-2004

Revision: Original

PURPOSE

This application note is intended to give new users of Lookout Direct the necessary understanding of the product to begin creating projects and interfacing with the PLC(s).

EQUIPMENT NEEDED

1) At least one Directlogic PLC, matching versions of Directsoft and Lookout Direct software (both should be 4.x), and programming cables.

Some suggestions before we begin:

- Make sure you have the latest versions of Directsoft and Lookout Direct installed before beginning. You can go to www.hosteng.com to get the latest builds. If you have a version of Directsoft older than 4.x, you will need to upgrade to 4.x before starting.
- Make sure the PLC you are using has up to date firmware.



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

What is Lookout Direct?

Lookout Direct is a SCADA software package. SCADA stands for Supervisory Control and Data Acquisition. Basically these types of software are intended to run on a centrally located PC which is then connected to the PLCs running the actual processes. Lookout provides the following features:

- User management via security levels
- Data acquisition and display
- Historical data collection
- Trending of historical data
- Ability to manipulate data in the control PLCs from Lookout screens

Lookout Direct has many other features, but these are the most common uses.

Lookout Direct (LKD) does require that the hardware key be connected to your parallel port or USB port, depending on which version of the hardware key you received. The parallel port keys are beige for a development/runtime key and red for the runtime only key. The USB keys are green for the development/runtime and red for the runtime only. LKD will run as a demo for one hour and will allow projects with up to 4 IO points during that time. This application note may still be followed by customers using the demo version of LKD.

Getting started

The first thing you need to do is get LKD installed. This should be a straightforward procedure. It is **HIGHLY** recommended you install LKD to the default directory, particularly if you will have LKD and Directsoft installed on the same PC. LKD and Directsoft will share a directory labeled Directsoft4 on your computer.

Once you have LKD installed, you can launch it from the desktop icon (if installed) or from START/PROGRAMS/DIRECTSOFT4/LOOKOUT TOOLS/LOOKOUT. If you receive a key error, you either don't have the key installed or you may have problems with the drivers for key detection. You can get the latest drivers for the sentinel keys here:

<http://www.safenet-inc.com/support/files/Ssd5421.zip>

You should also set the LOOKOUT CITADEL SERVER service to MANUAL under administrative tools and services for Win2000 and XP.

OK, enough annoying administrative details, let's run the software. Once open you can select FILE and NEW. For now just leave the process name as PROCESS1 and press OK. Since LKD needs at least one panel to display in RUN mode, it next asks us what we want to call the first panel, let's leave it at the default PANEL1 for now.



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

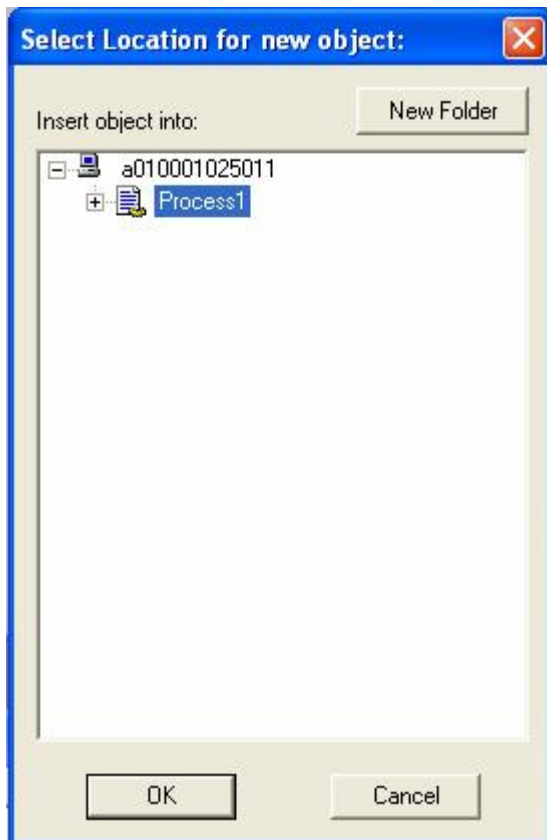
These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

The PLC connection

Alright, we have a blank process and a blank panel now. The first thing you need to do in an LKD project is to create a driver object. The driver object is the object that defines the device you are talking to. This is what tells LKD what the addressing in the slave device will be. Select OBJECT from the main toolbar and then select CREATE. You'll get a list of the categories of things you can create. There is also a button labeled CATEGORIZE. For now leave it selected, this will help you keep the device types separated until you are more familiar with them.

You should see a category named DRIVERS, double click it. You should now see a list of all the available drivers for LKD. Notice there is quite a bit more here than just the Automationdirect PLCs. Go ahead and select Directlogic and press OK. You may see some familiar progress bars flash across the screen if you have existing links defined in your Directsoft application. This is because LKD uses the same communications server as Directsoft. We'll cover the advantages of this in a few moments.

The software is likely now asking you what process you want to put the driver object in. Get used to this. Anytime you create a new object LKD is going to want to know where you want to put it. Just leave it at the default PROCESS1 and select OK.

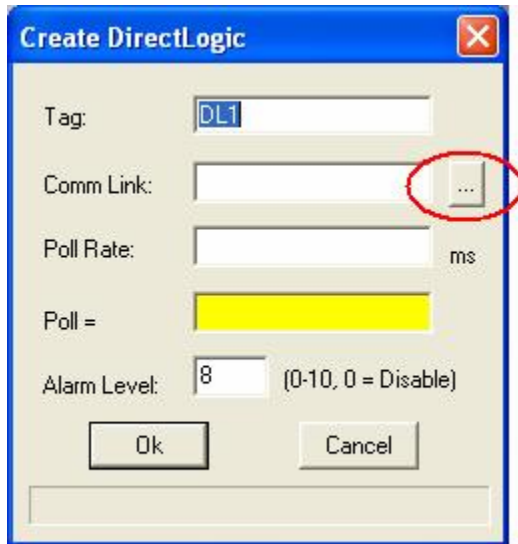




THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

OK, this next dialog box needs some details explained.



The tag is the name of the driver object. Either leave it at the default or choose a name that will be easy for you to identify as the driver object.

The COMM LINK is the name of the comm link which is specifying the comm resource (ethernet, serial port) for the driver object to use to talk to the PLC. We'll select this in just a second.

The POLL RATE is the time period for the driver object to wait between polling the PLC in milliseconds. Leave this alone for now.

The POLL = field can be pointed to a logical (on/off) expression to enable/disable the driver object under certain conditions. Leave this alone for now.

OK, back to our example. Do you see the button with three dots to the right of the COMM LINK? Press it. You should get a familiar screen showing any currently defined links from Directsoft. As mentioned before, LKD uses the same link information as Directsoft, so if the link is defined there, we can simply select it here.

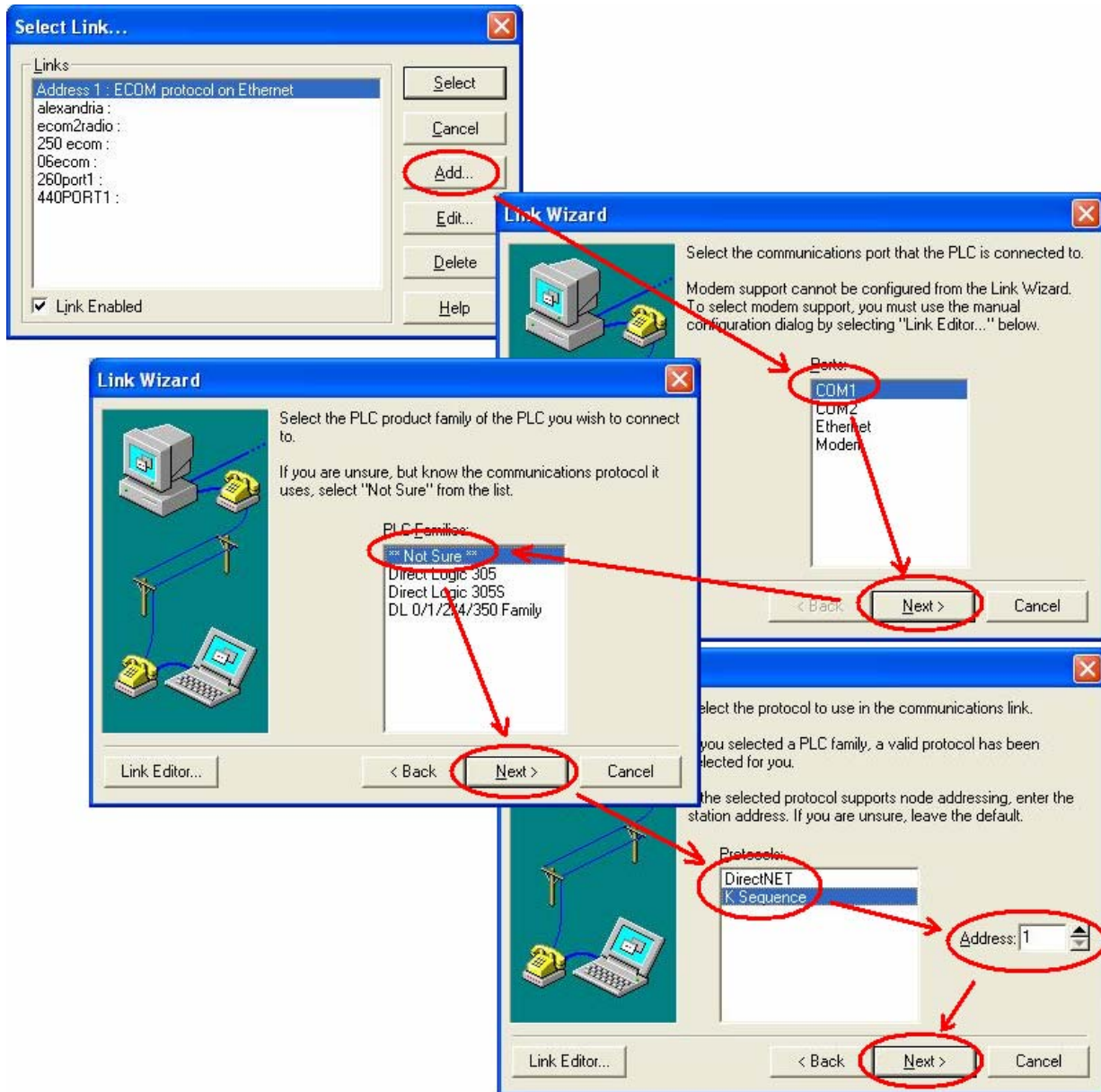
If you have a link you have already been using with Directsoft to program your PLC, select it now. If the comm server saw that this link was 'active', meaning the PLC responded when the comm server started, this will be indicated by the LINK ENABLED check box in the lower left corner. Then press SELECT, the name of the link you selected should now appear in the COMM LINK box on the driver object definition dialog box. Press OK to accept the driver definition.



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

If you did not have a link to choose in the 'select link' window you will need to ADD a new one. Press ADD, then select the connection type and hit next, select the PLC type or ethernet protocol (depending on the link type selected) and press next, select the protocol and address or select the appropriate ethernet device from the list (depending on the link type selected) and hit next, enter a name for the link and select finish. You should then see the new link in the 'select link' window, select it and press SELECT. Press OK on the driver definition dialog to accept the driver settings.

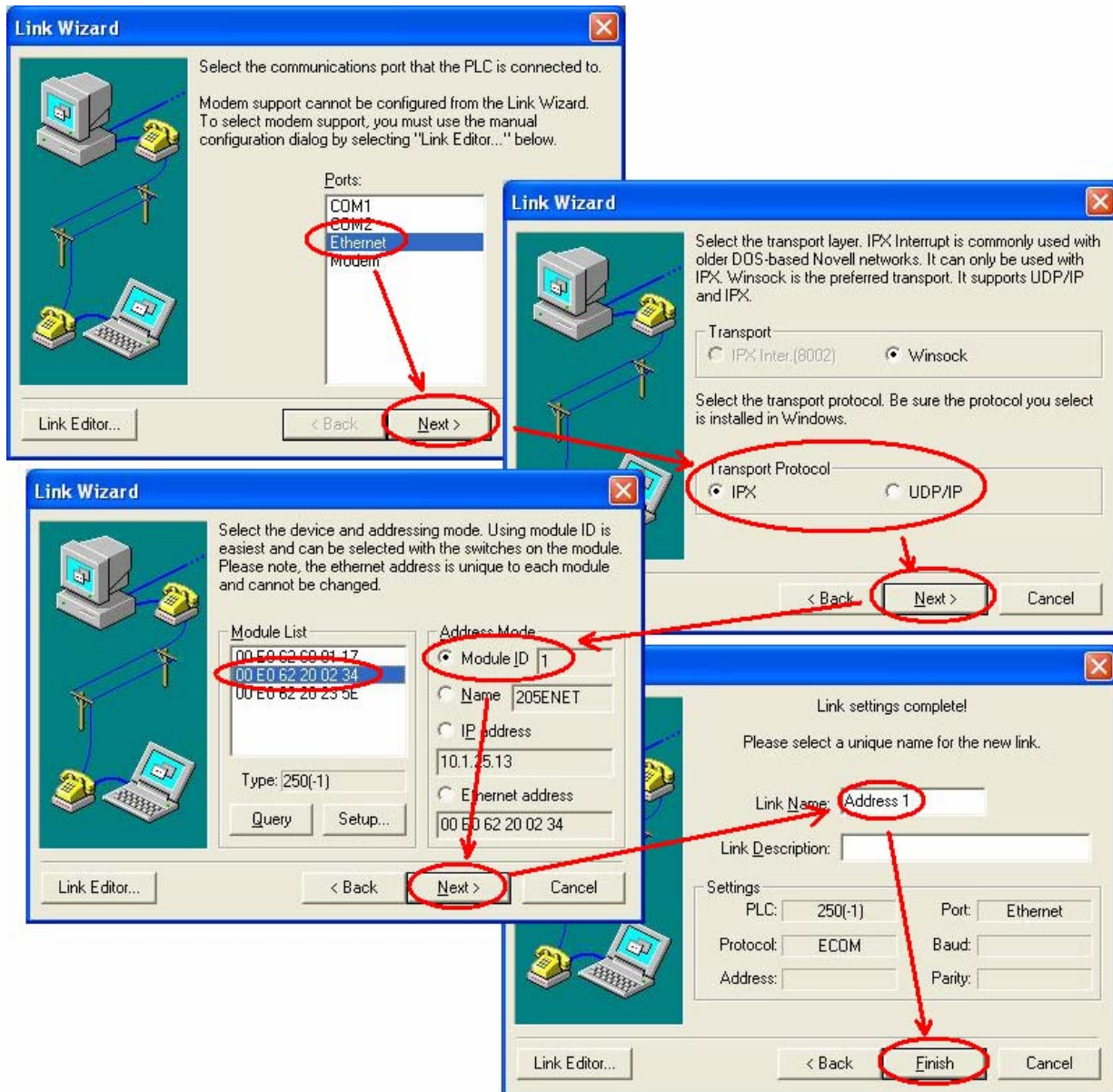




THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

Or



We should be back to our blank PANEL1 screen at this point.



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

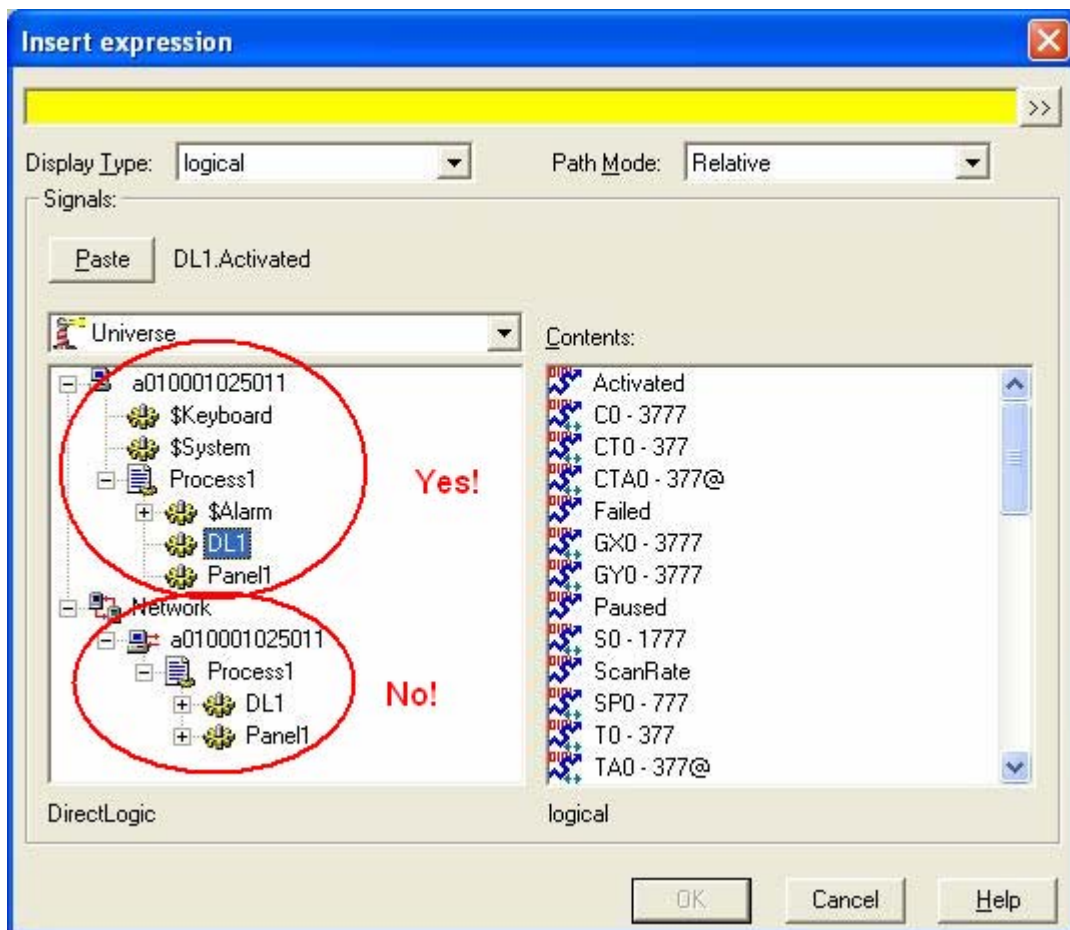
These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

Reading Data from the PLC

Now that we have a driver object defined, we can read data from the PLC or write data to the PLC. First we will cover reading data, as it is the simpler of the two.

In order to read data from the PLC and display it we will use the INSERT EXPRESSION function. Before we start, make sure you have the PANEL1 panel selected. In LKD, if you try to create an object and you do not have a panel selected, the object may get created, but you will not be given an opportunity to create a visual representation for that object.

From the main toolbar select INSERT and then EXPRESSION, you should see this screen:



Notice there are two separate tree structures with pretty much the same data in them. You want to use the upper section ONLY. The lower section is only used for applications where there are multiple LKD PCs sharing data on a network.

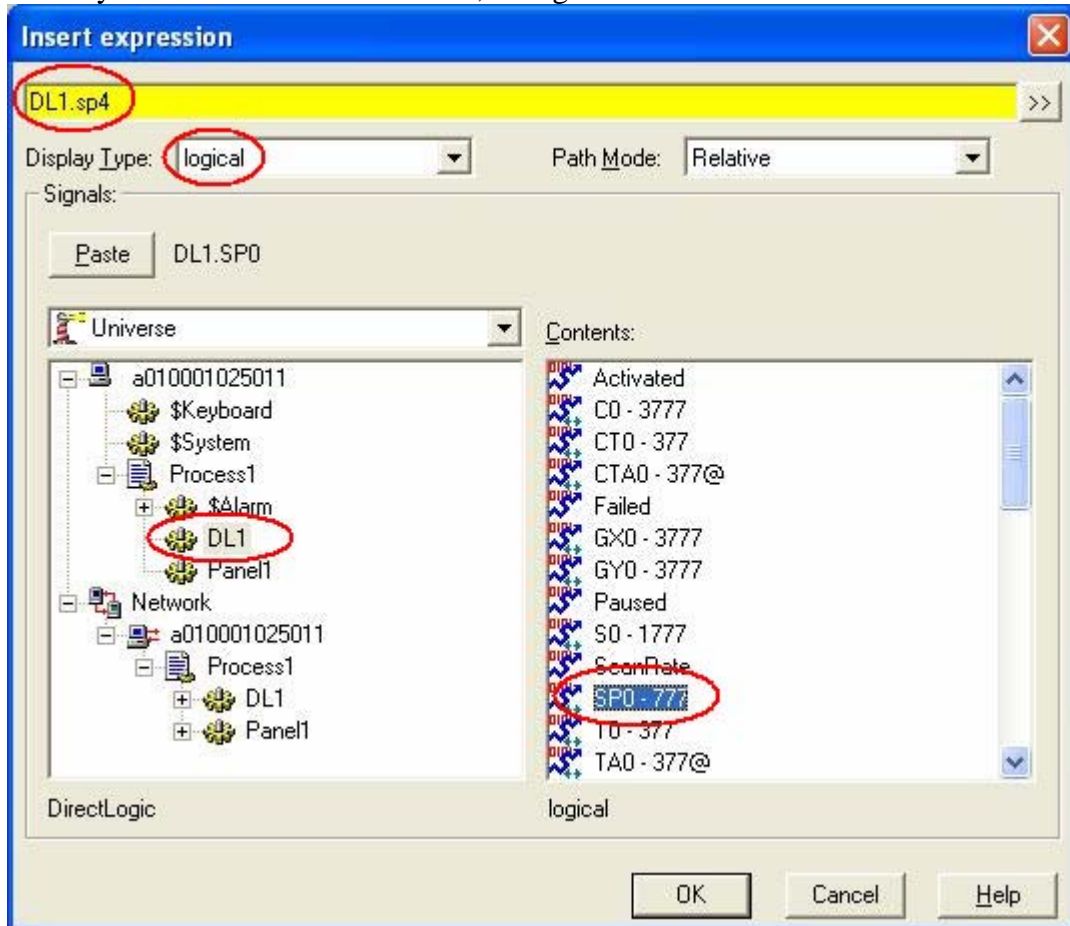
So, assuming you have a PLC connected via the driver object we created earlier, and it is currently in the RUN mode, we should be able to read the SP4 bit as a 'heartbeat' to prove



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

communications. On the 'insert expression' window select the DL1 driver object. In the 'contents' window on the bottom right you should now see ranges for all the data types available in that PLC. Find the SP0-777 range and double-click it. In the yellow bar at the top of the screen you should now see DL1.SP0, change this to read DL1.SP4.

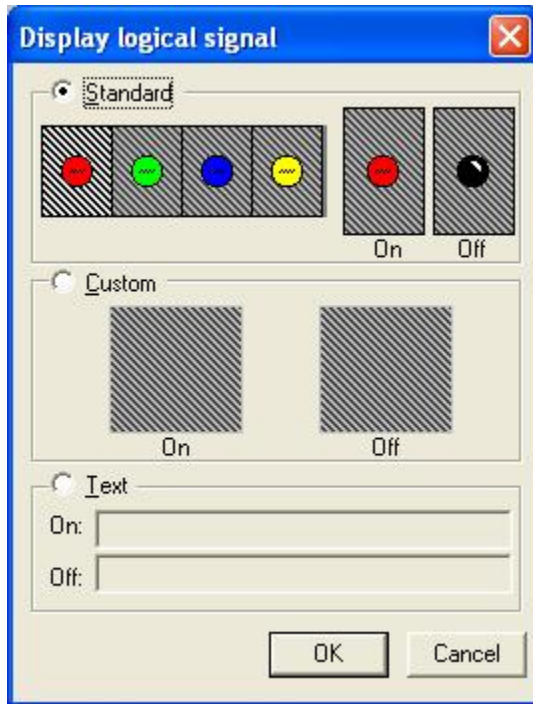




THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

Press the OK button and you should see the 'display logical signal' window. This window is asking you to select what the indicator for SP4 will look like. You can go with the standard lights, or select something custom from LKD's enormous library. For now just select the default.



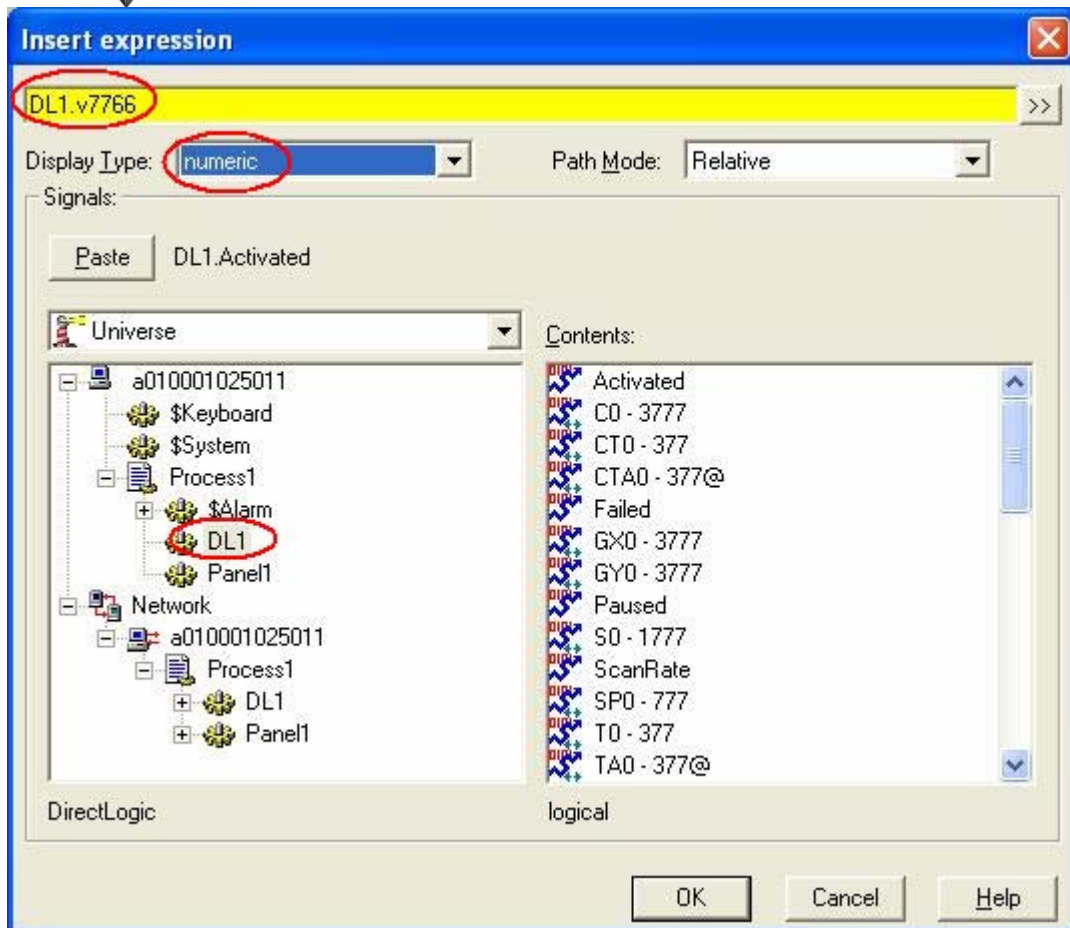
At this point you should see a light blinking red/black on your screen.

Now let's add a register value. Again, use INSERT and EXPRESSION, point to your driver object but this time just click in the yellow bar and type in DL1.V7766, make sure the 'display type' is numeric and press OK. In this case since this is a numeric value, LKD wants to know how to format it for display, for now leave this at the defaults and press OK again. You should now have a numeric display showing incrementing numbers, it's probably also sitting on top of your SP4 indicator as all new objects get placed in the center of the screen. Move it over so you can see both.



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.



Now V7766 is the number of seconds on the clock in the PLC (if it is a PLC with a clock) so it should be counting 0-59. But it isn't. That's because LKD defaults to DECIMAL format for V locations. The clock data in the PLC, like most data in our PLCs, is in BCD format...so the numbers don't match. Right click on the numeric display and select 'Object Properties.' This is the method for editing any devices you created using INSERT EXPRESSION. Now change the expression to DL1.V7766:B. Make sure it is a colon and not a semicolon. Press OK, you should now see the timer counting correctly from 0-59.

So to recap, anytime you want to DISPLAY a value from the PLC on a LKD panel you use INSERT/EXPRESSION, select the driver object and tag, select an appropriate graphic and/or format, and place the completed device on the screen.



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

Writing Data from Lookout Direct to the PLC

While every installation of LKD is going to read data from the PLC, most will also need to write information back to the PLC. In LKD the procedure for writing values to the PLC is a two-step procedure. First we must create the control device, and then we tie the location we want to control in the PLC to that object.

First let's do some simple on/off control. So the first thing we need to do is create a switch. Select OBJECT then CREATE and select the CONTROL category and find SWITCH. When you press OK LKD is going to ask which process to put this control in, place it in PROCESS1 (the default). Next LKD will ask us what we want to call this switch, just leave it default for now and press OK. Now select what we want the switch to look like and press OK. You could also specify a graphic just like you could for the indicator we made earlier. Arrange the switch on the screen someplace.

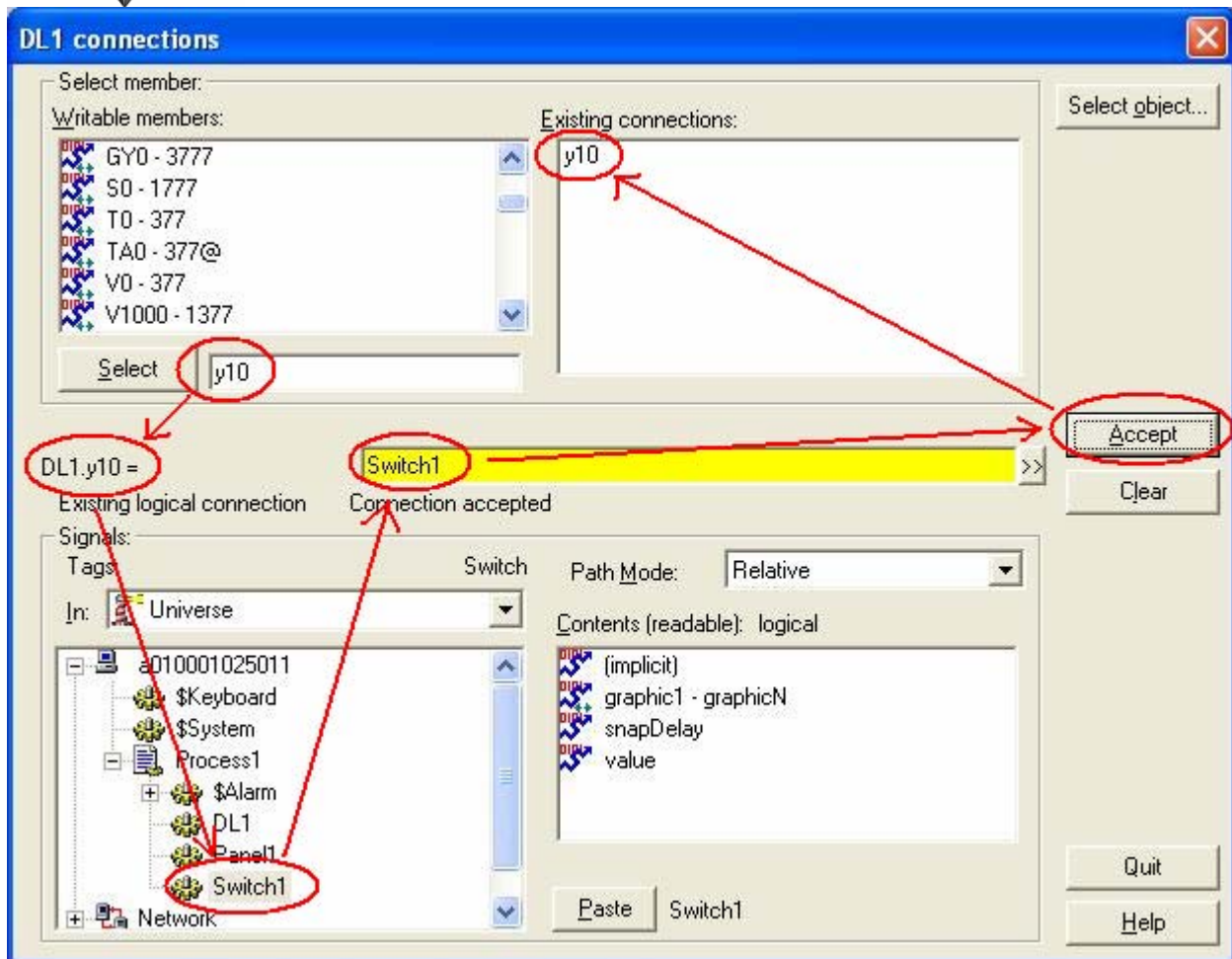
Now press the CONTROL key and SPACEBAR at the same time to change to RUN mode (alternately you can select the EDIT menu option and de-select EDIT MODE). You can now flip the switch back and forth. At this point nothing is going to happen as the switch doesn't control anything yet. Press CONTROL and SPACEBAR again to switch back to PROGRAM mode and let's connect the switch to something in the PLC.

The second part of creating any device that will control something in the PLC is to connect the point in the PLC you want the control device to control to the control device. We do this using EDIT CONNECTIONS. So select OBJECT and then EDIT CONNECTIONS and select the driver object for our PLC. You should see the following screen (some of the data will not be filled in yet).



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.



First, we need to select the point in the PLC we want to control, so enter Y10 in the box next to SELECT and press SELECT. You should see DL1.y10 appear with an = sign on the left and a blank yellow bar in the center of the page. You can either enter the control device for this point directly in the yellow bar, or select it by expanding the process in the window below and double-clicking the control object to make it appear in the yellow bar. Now press the ACCEPT button and you should see a 'Connection Accepted' message and Y10 should appear in the 'Existing Connections' window.

Now go back to RUN mode and try toggling the switch, you should get the output to toggle (unless the PLC code won't let it of course, i.e. keyswitch in RUN, coil defined in code). You could also perform the same test with a C bit.

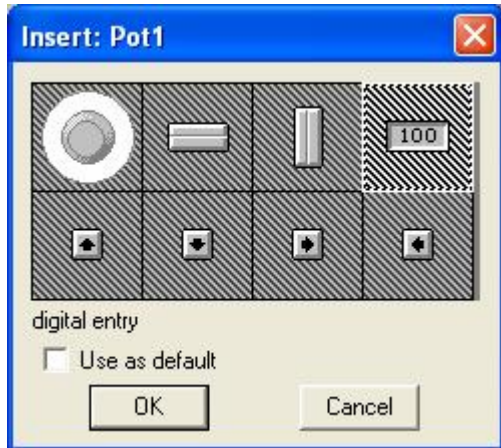
Now let's add a control for a register value. The procedure is identical except we need a control object that targets registers and we need to target a register location instead of a bit. First we need to create the control object so select OBJECT and CREATE and go to the CONTROL category again. The most common control for a register is the POT object, so select POT and press OK. Again, place it in the PROCESS1 process we have been using. LKD is going to then



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

ask you what the parameters of the POT ought to be. Leave these at the default for now and press OK. LKD now wants to know how you want the POT to be displayed, for this example select the top right option which is the box with 100 in it and press OK.

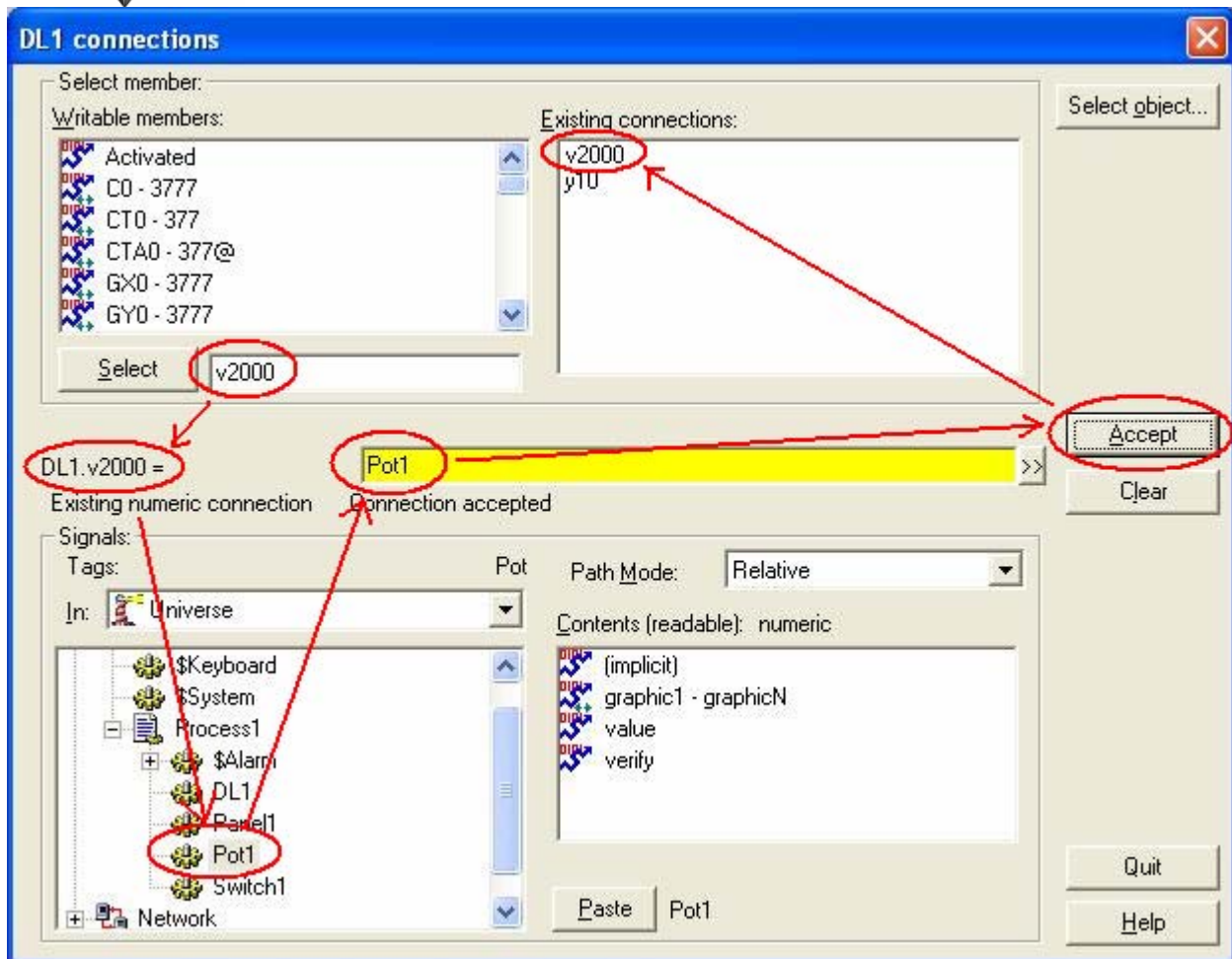


You should see a box with a 0 in it. Now let's connect a value in the PLC to this POT. Select OBJECT and EDIT CONNECTIONS and select the driver object. You should see the following screen (again, some of the data won't be filled in yet).



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.



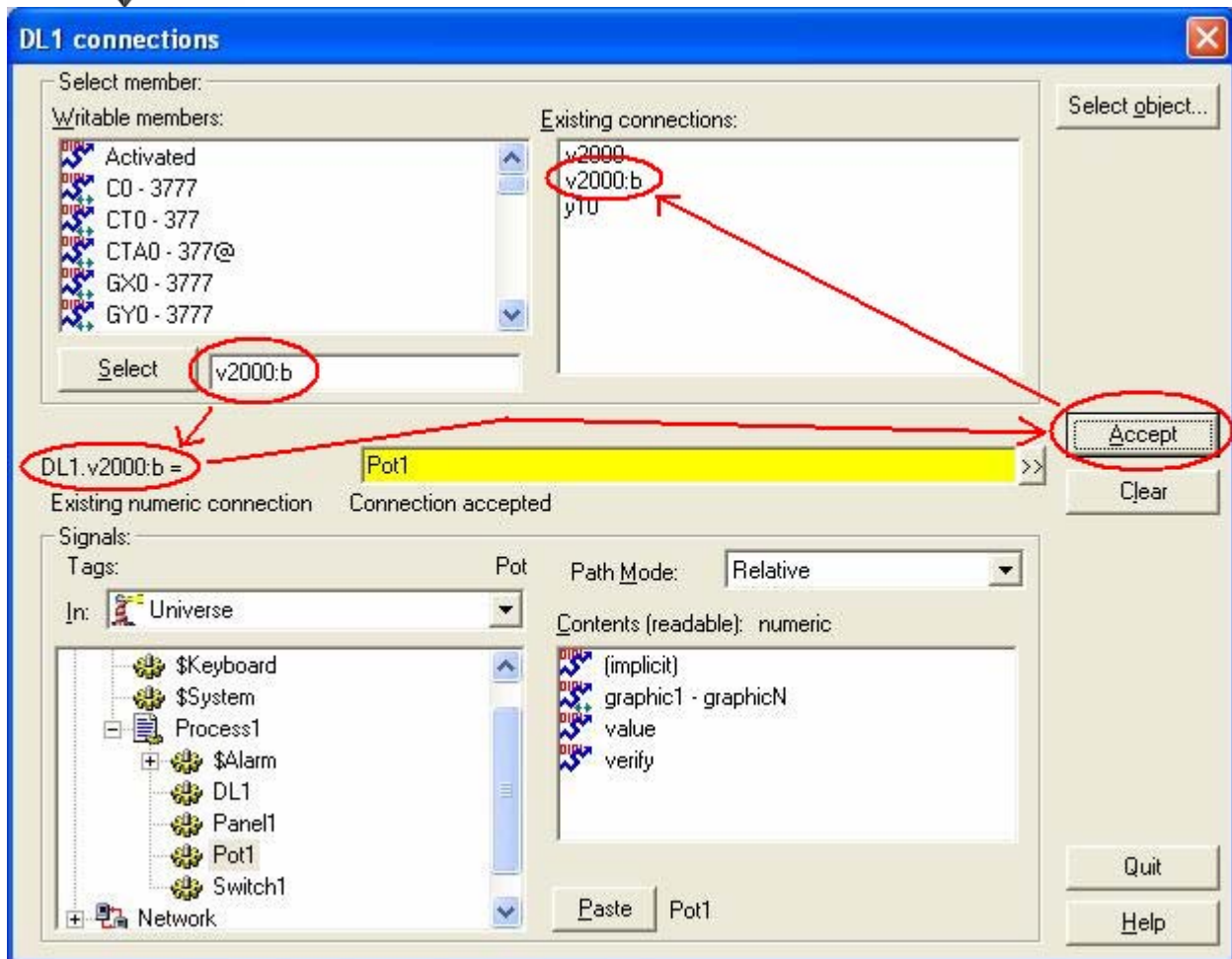
In the box next to SELECT enter V2000 and press select. You should see DL1.V2000 appear on the left with an = sign and a yellow bar appear in the center of the window. You can either enter the POT name in the yellow section or expand the process below and find the POT and double-click it to add it to the yellow bar. Now press accept and you should get a 'Connection Accepted' message and V2000 should now appear in the 'Existing Connections' window. Press QUIT to exit and go to the RUN mode.

If you enter a number from 1-100 it should now show up in V2000 (unless the PLC code won't let it of course, i.e. keyswitch in RUN, OUT V2000 defined in code). If you take a look at the data in the PLC using Directsoft you will notice the data is not in BCD. Remember, without a modifier LKD will assume the data is decimal. Let's look at how to change the POT to write to V2000 as BCD data.



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.



First we need to get back to edit connections for our driver object, so select OBJECT and then EDIT CONNECTIONS. Now enter V2000 in the box next to SELECT and press SELECT. You should see the existing connection for DL1.V2000. Click in the box next to SELECT and add :B to the V2000 and press SELECT again. You should now have DL1.V2000:B on the left and nothing in the yellow bar. Enter Pot1 or select it from the 'Signals' window and press ACCEPT. Notice that we now have two different connections for V2000. Since both of these are from the same pot and have different formats we really need to get rid of one of them. So to do this select V2000 in the 'Existing connections' window and press the SELECT button. Now press the CLEAR button and then the ACCEPT button. Now we should have only the V2000:B listed in the 'Existing connections' window.

So to recap, anytime you want to control a data point in a PLC from LKD you need to first create the control object using OBJECT/CREATE and then tie the data point in the PLC to that object using OBJECT/EDIT CONNECTIONS.



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

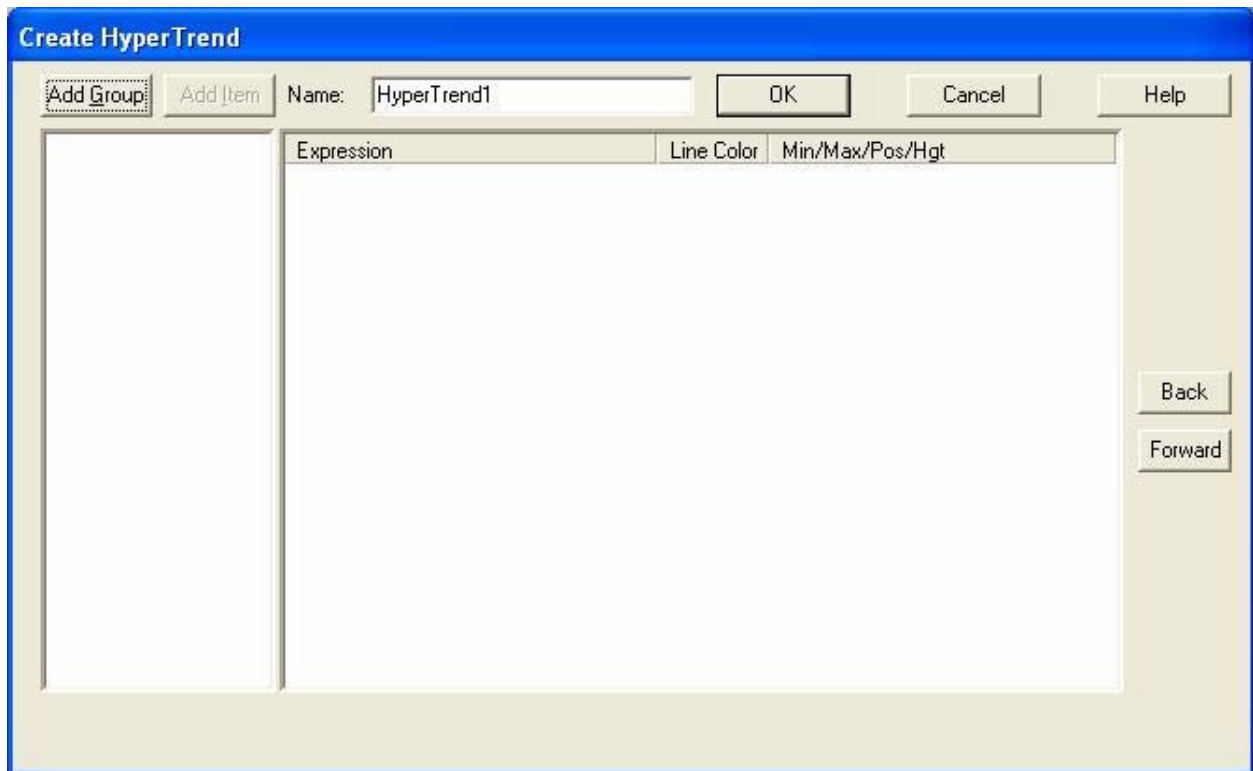
These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

Trending in LKD

Besides reading and writing data to/from PLCs, the most popular use of LKD is to log and display historical data. The most popular object for displaying historical data is the HYPERTREND object. Let's set one up.

First, let's create a new PANEL to put the HYPERTREND on. Select OBJECT, CREATE, double-click the DISPLAY category, select PANEL and press OK.

Now click on the new panel, select OBJECT and then CREATE, double-click the LOGGING category and select the HYPERTREND object and press OK. LKD will ask what process you want to put the PANEL in, just leave this at default and press OK.



Not much here yet, so we need to ADD GROUP first.



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

The 'Add Group' dialog box has a blue title bar with a close button. It contains the following elements:

- Name:** A text field containing 'NewGroup'.
- Paper color:** A color palette with 16 color swatches and a 'More Colors' button.
- Grid color:** A color palette with 16 color swatches and a 'More Colors' button.
- Timeline labels:** A group box containing four radio buttons: 'No labels', 'Horizontal' (selected), 'Horizontal (small)', and 'Vertical'. Below them are 'Vertical (small)' and 'Vertical (small)'.
- Horizontal grid style:** A group box containing two text input fields: 'Major increments' with the value '10' and 'Minor increments' with the value '2'.
- OK** and **Cancel** buttons.
- Trend Width:** A text input field with the value '1:00'.
- Show Button bar:** A checked checkbox.

Just leave everything default for now and press OK. Now that we have added a group, we now have the option to ADD ITEM. So press ADD ITEM.

The 'Add Item' dialog box has a blue title bar with a close button. It contains the following elements:

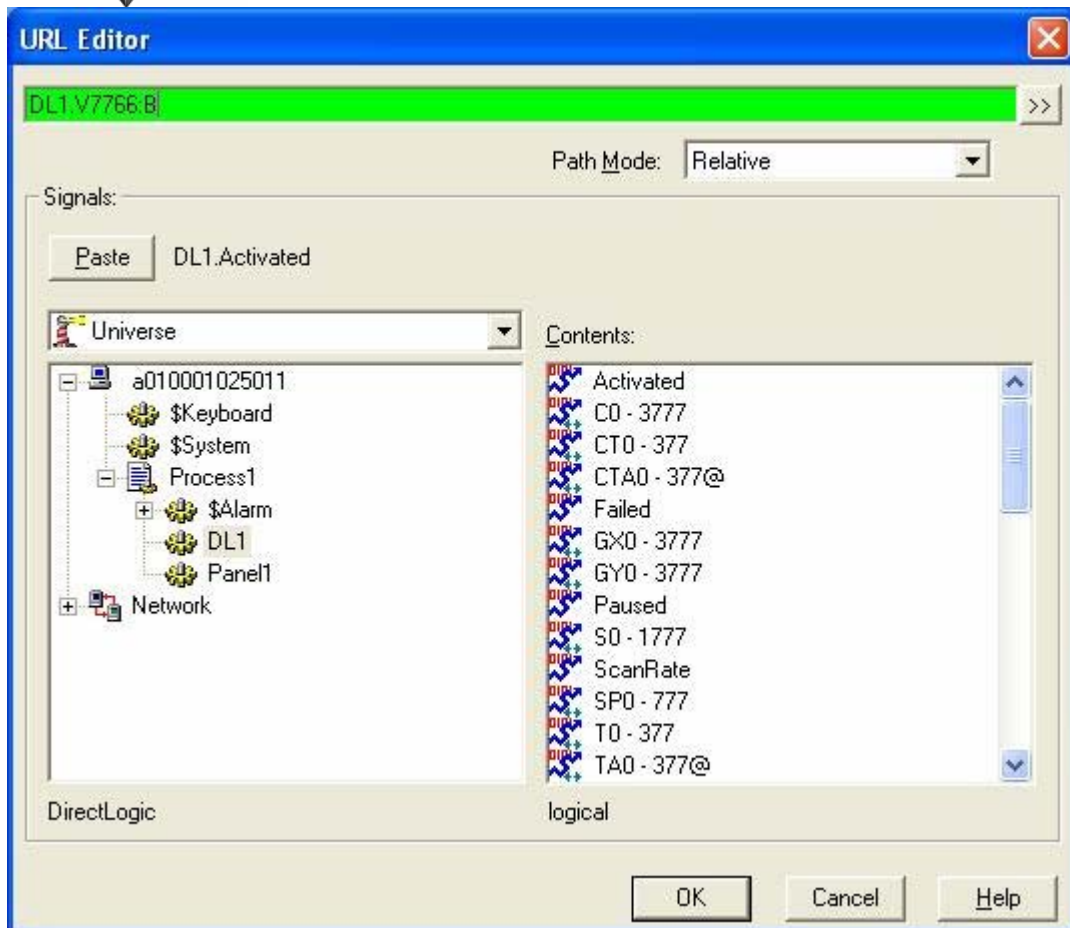
- URL =** A green rectangular area for pasting a URL.
- Numeric minimum or Logical base position:** A text input field with the value '0'.
- Numeric maximum or Logical TRUE height:** A text input field with the value '100'.
- Line color:** A color palette with 16 color swatches and a 'More Colors' button.
- Full-height Logical:** An unchecked checkbox.
- OK** and **Cancel** buttons.

On this screen we have to use the URL method of selecting a data point. Just right-click in the green bar area and we'll get a familiar screen.



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.



This is the URL selection screen, it works just like the other screens we have used to select data points. You can either enter the data point or select it by expanding the process and driver object. Enter the data point shown DL1.V7766:B and press OK. This is the number of seconds on the clock again.



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

NewGroup	Expression	Line Color	Min/Max/Pos/Hgt
	DL1.V7766.B		Min/Pos = 0 Max/Hgt = 100

OK, this is all that needs to be done here, you could add other data items but for now let's get the one point working. Go ahead and select OK. You should get a HYPERTREND object on your panel. You can stretch it to whatever size and position you want using the corners when the HYPERTREND is highlighted.

There won't be any data on the HYPERTREND yet because we aren't done. The HYPERTREND object doesn't read data from the field device, it reads data from the historical database. What this means is that we **MUST** log data for any points we want to display data for in a HYPERTREND. To do this we need to go to OBJECT and EDIT DATABASE. Expand the process down to your driver object, select it, and press OK.



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

DL1 database

Configured points: V7766:B

Native members: Activated, C0 - 3777, CT0 - 377, CTA0 - 377@, Failed, GX0 - 3777

logical read/write: logical

Alias (optional):

Member: V7766:B

Description:

On: Off:

☐ Invert logical signal

☒ Log to historical database

Lifespan: ☐ Perpetual, ☒ 365 days

Database: Computer: a010001025011, Path: c:\directsoft4\bin\databa:

Existing database entry updated.

Update Delete Select object... Import... Export... Quit Help

Here we can select which data points within the driver object we want to historically log and the parameters for that logging. Enter V7766:B in the 'Member' field, then select the 'Log to historical database' checkbox. At this point you'll get a pop-up asking you what you want to define as far as logging deviations. This allows you to limit the logging of analog values by requiring them to deviate by a certain amount before they get logged. This can save space in the database. Just press the OK button for now.

Set deviation for logged point.

WARNING: Logging this point with a deviation of zero will use much more disk space than necessary. A suggested value has been calculated.

OK Save with deviation set to: 0.001

Cancel Return to database dialog box.

Zero Save with deviation set to 0.0.

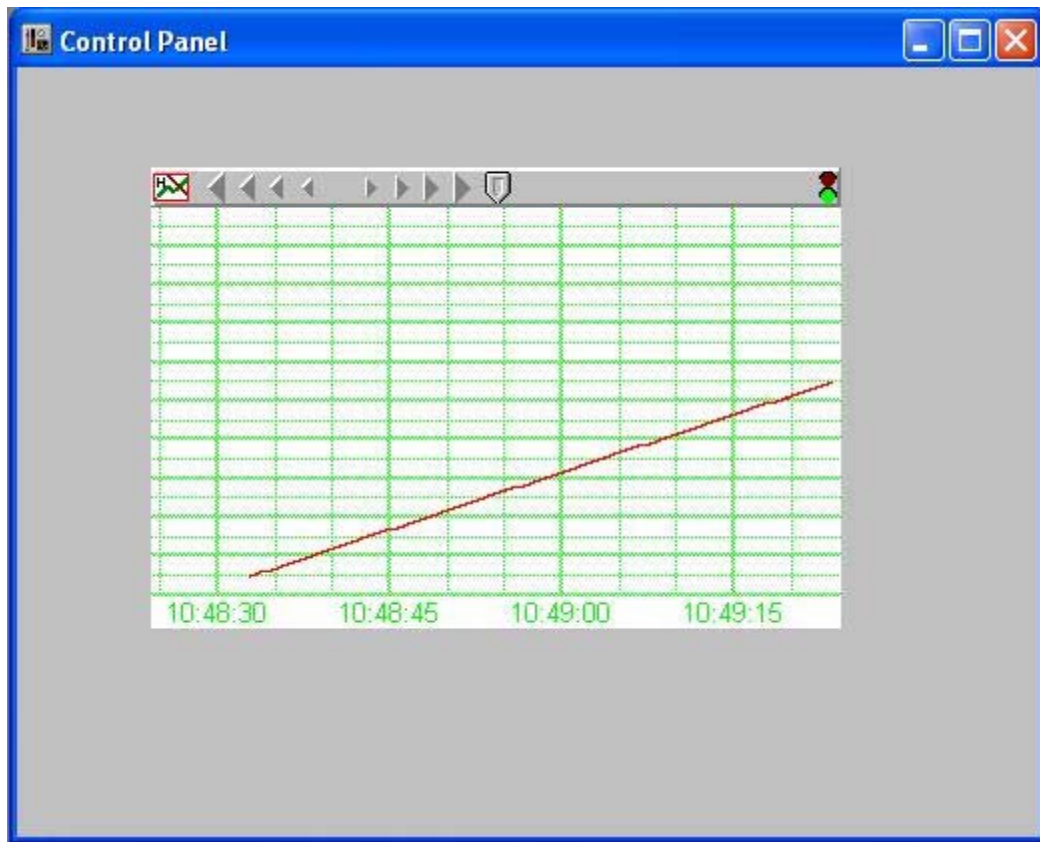
Ignore Save with deviation set to 0.0 and suppress warnings for this session.



THIS INFORMATION PROVIDED BY AUTOMATIONDIRECT.COM TECHNICAL SUPPORT IS PROVIDED "AS IS" WITHOUT A GUARANTEE OF ANY KIND.

These documents are provided by our technical support department to assist others. We do not guarantee that the data is suitable for your particular application, nor do we assume any responsibility for them in your application.

You can change how long you want to keep this data, for this example, but for now just leave it at the default. Now press the 'Save' button (it is labeled UPDATE in the above image as I have already pressed SAVE) and you should see V7766:B appear in the 'Configured points' window indicating we are logging that point. Press QUIT to leave the EDIT DATABASE screen and the HYPERTREND should now be working.



That's about it for the basics. LKD contains an excellent help file. Also, we have several other application notes concerning LKD available for download at:

http://support.automationdirect.com/technotes.html#sw_ld

Technical

Assistance: If you have questions regarding this Application Note, please contact us at 770-844-4200 for further assistance.