

H. RSLinx Communication Software

RSLinx is a windows based communication software package developed by Rockwell Software to interface to all of the Rockwell and A-B industrial control and automation hardware. RSLinx comes in a variety of different flavors including

RSLinx-Lite – PLC Programming software communication interface.

RSLinx-OEM – Provides DDE capability for Rockwell DDE capable software.

RSLinx Professional – Provides DDE capability to and DDE capable software.

RSLinx-Gateway – Communication network bridging, routing, and OPC server.

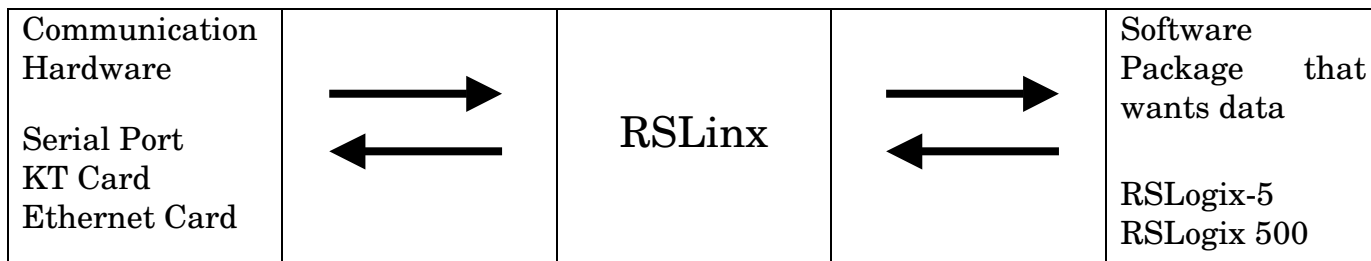
RSLinx SDK – Software Development Kit includes the OEM version.

In actuality, all of the RSLinx software packages are the same. What differentiates the software packages from one other is the copy protection software key for RSLinx. If you run RSLinx without a software key the software operates in the Lite mode. If you have a key the software operates in the mode that the software key authorizes it to run in.

This appendix is going to explore the capabilities of RSLinx-Lite. However, the driver configurations sections are applicable to all uses of RSLinx.

H.1 RSLinx Role

RSLinx is the intermediary between the communication hardware and the software package that needs data from the communication hardware.



For RSLinx to function it must be configured to use the communication hardware interface of your choice. Choosing the correct communication hardware interface requires a thorough understanding of the device that is to be communicated with. In the case of communicating with a PLC it is important to understand the communication capability of the specific PLC that is being used. Different types, models and revisions of PLCs have different communication capabilities.

For the purposes of this discussion and the following examples I am going to focus on the PLC hardware; specifically the PLC-5 and the SLC-500 processors. By focusing on the PLC hardware we can concentrate on the following communication hardware choices.

1. Serial – Using the serial port on a PC to the serial port on a PLC.
2. KT-Card – Use one of the many types of KT card to talk DH+, DH-485, or ControlNet.
3. Ethernet – Use Ethernet to communicate to an Ethernet capable processor.

H.2 RSLinx Serial Driver Configuration

The A-B serial driver uses what is called the DF1 protocol to provide PC to PLC, point to point, communications. The keys to being able to implement a serial connection from your programming PC to the PLC are;

1. Having a PLC capable of serial communication
2. Having a properly configured cable to connect the serial port of the programming PC to the serial port of the processor.

A-B PLCs capable of direct serial communication include;

- All Enhanced PLC-5 processors. Channel 0 is a 25 pin serial port.
- SLC-5/03, 5/04, and 5/04 processors. Channel 0 is a 9 pin serial port.
- ControlLogix 5550 processor. Channel 0 is a 9 pin serial port.
- Micrologix processors have a Mini-Din serial port.

H.2.1 Serial Cable pinouts

The serial communication cable is the other critical piece of the puzzle. All of the proper cables can be purchased directly from A-B or made based on the following configurations.

SLC 5/03, 5/04, 5/05 and ControlLogix Serial cable pinouts		PLC-5 Enhanced Processor Serial Cable Pinouts	
SLC-500 Chan 0 9 Pin Female	Computer Serial 9 Pin Female	PLC-5 Chan 0 25 Pin Female	Computer Serial 9 Pin Female
DCD 1	1 DCD	GND 1	
RXD 2	3 TXD	TXD 2	2 RXD
TXD 3	2 RXD	RXD 3	3 TXD
DTR 4	6 DSR	CTS 4	7 RTS
COM 5	5 COM	COM 7	5 COM
DSR 6	4 DTR	DCD 6	1 DCD
RTS 7	8 CTS	RTS 5	8 CTS
CTS 8	7 RTS	DSR 8	4 DTR
NC 9		DTR 20	6 DSR

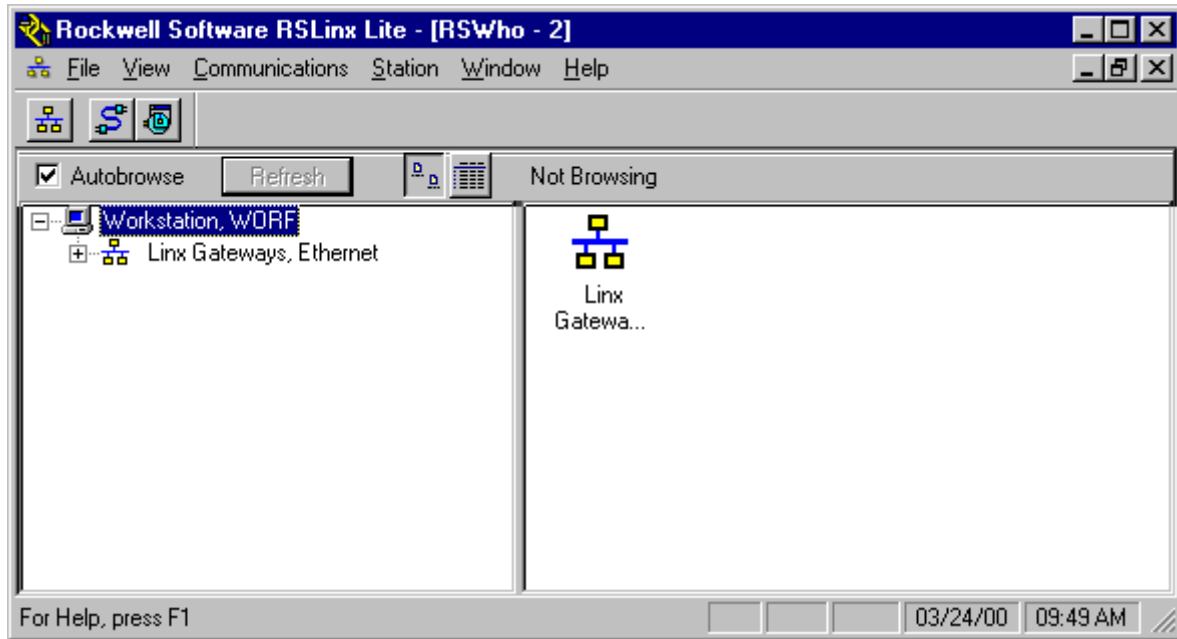
Figure H-1 slc500.dsf

Figure H-2 plc-5-serial.dsf

At this time I do not have the pinout configuration for the MicroLogix processors. Furthermore, the Mini-Din connector that they use is much more difficult to find. So I would recommend purchasing the cable for the MicroLogix from A-B.

H.2.2 RSLinx Configuration

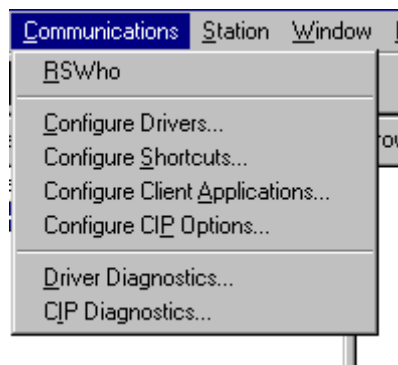
Once a physical serial connection is in place between our programming PC and the PLC the next step is setting up RSLinx to use the serial connection. Start up RSLinx and the following screen or one similar should appear.



The only driver currently configured in RSLinx is the default driver the Linx Gateways, Ethernet driver. This driver is always present and cannot be removed. This driver is used to communicate over Linx Gateways to other communication networks.

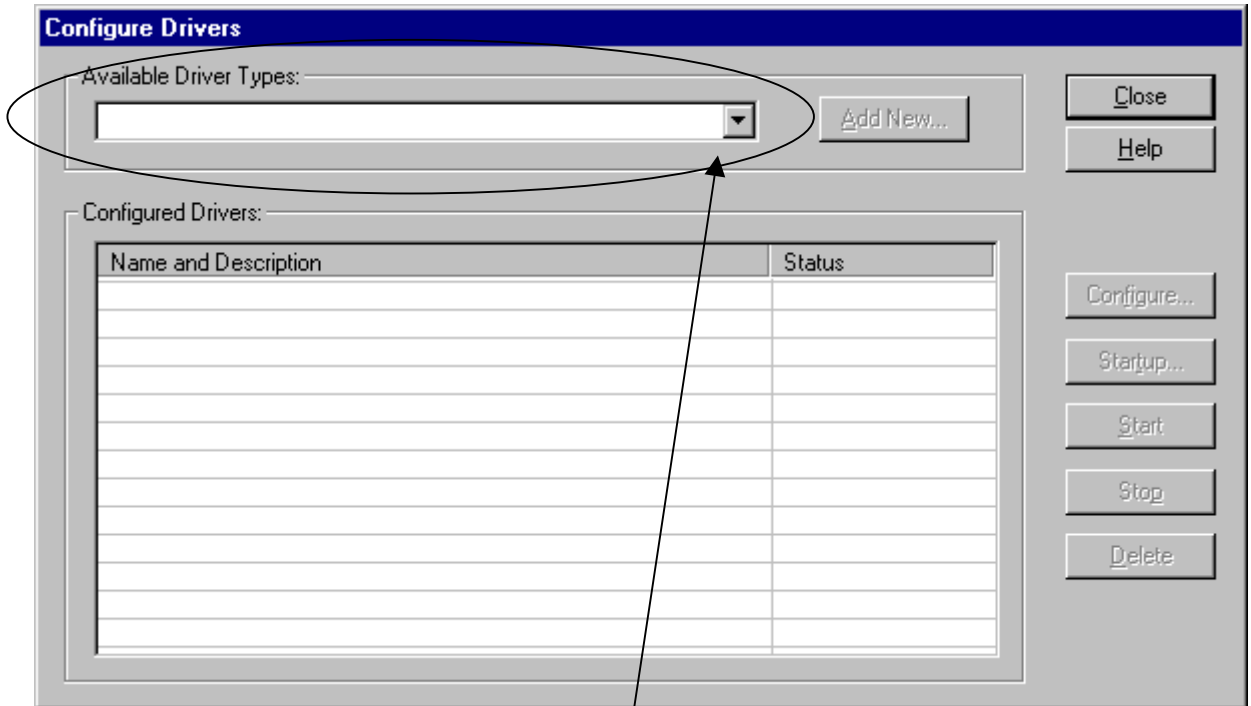
a- Add Driver

To add the Serial driver select the **Communications** menu and the following list of options will appear;

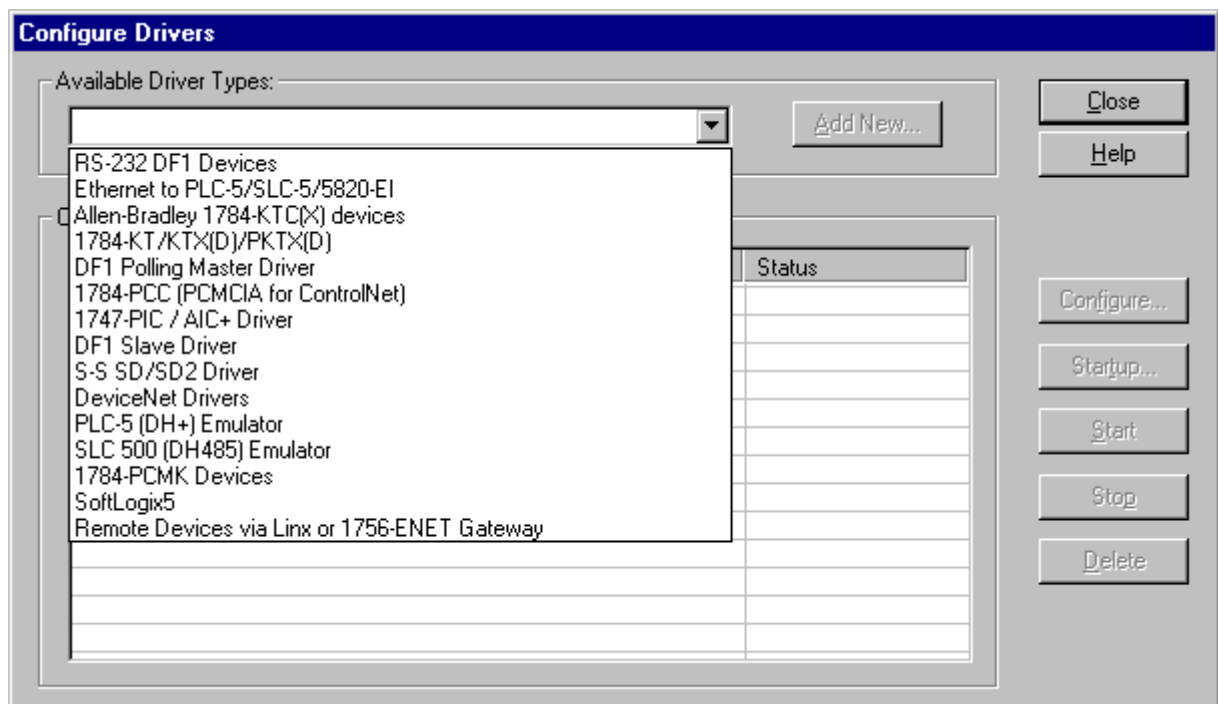


To add the Serial driver select the **Configure Drivers...** menu choice and the Configure Drivers window will open.

The Configure Drivers window is where all new communication interfaces are added, and where existing drivers are configured or reconfigured. In addition, the status of existing drivers can be verified from this window. The Configure Drivers window is initially empty and looks like the following;



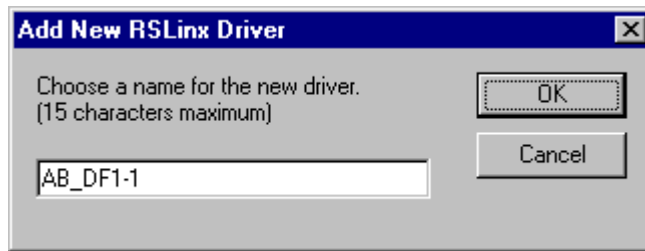
To begin the process of adding a serial driver the first thing to do is click on the drop down arrow for the Available Driver Types list box. This will open the available drivers list box showing all of the possible available drivers.



The serial driver is the RS-232 DF1 Devices choice in the list box. Select the RS-232 DF1 Devices choice by clicking on it with the mouse. The RS-232 DF1 Devices entry should now appear in the list box as shown below;

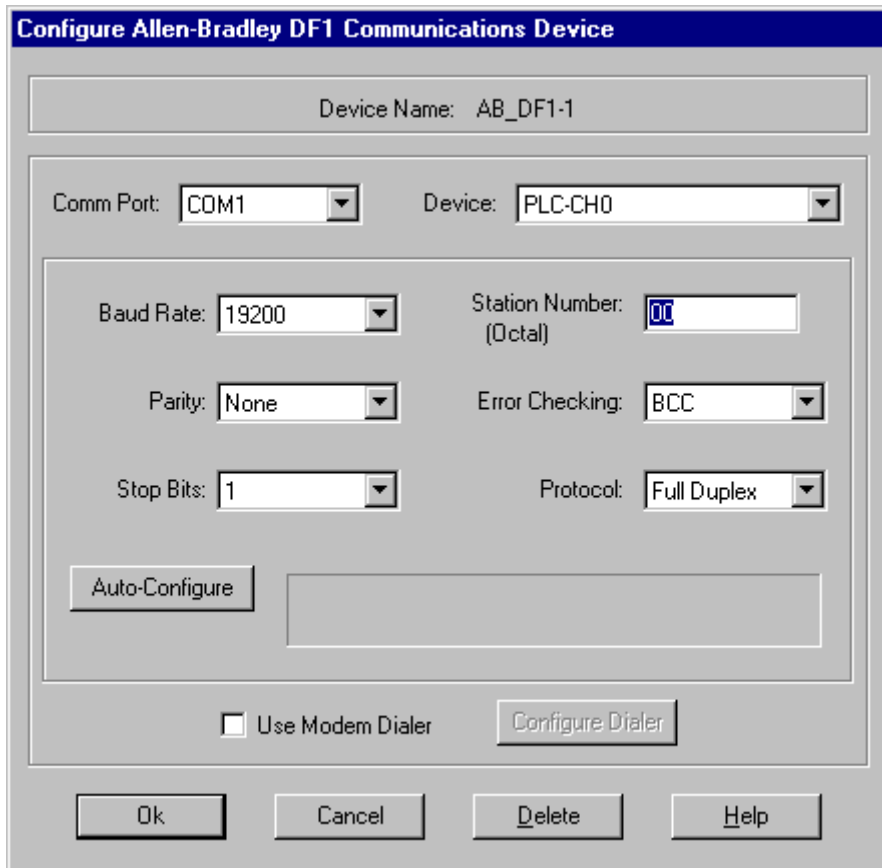


Click on the **Add New...** button and the Add New RSLinx Driver dialog box will appear prompting you to enter a name for the driver.



b- Configure Driver

The default name will be AB_DF1-1. This name is perfectly fine but if you want to change the name, you can enter any name up to 15 characters in length into the dialog box. To accept the name click on the **OK** button. The Configure Allen-Bradley DF1 Communications Device window will now appear.



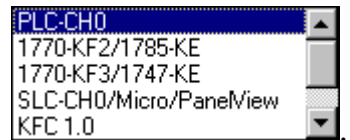
The Configure DF1 Communications Device window is where all of the critical communication configuration information is entered pertaining to the serial port settings on the Programming PC. The first two (2) entries, Comm Port, and Device



refer to hardware.

- **Comm Port:** - refers to the serial communication port being used on the Programming PC. Most modern PCs only have 1 or maybe 2 serial ports. If the serial cable from the Programming PC to the PLC is plugged into the first serial port then the default choice of COM1 is correct. If the serial cable is plugged into a serial port other than COM1 then click the drop down arrow next to COM1 and choose the correct COM port.

- **Device:** - refers to the type and model of the PLC that the other end of the serial cable



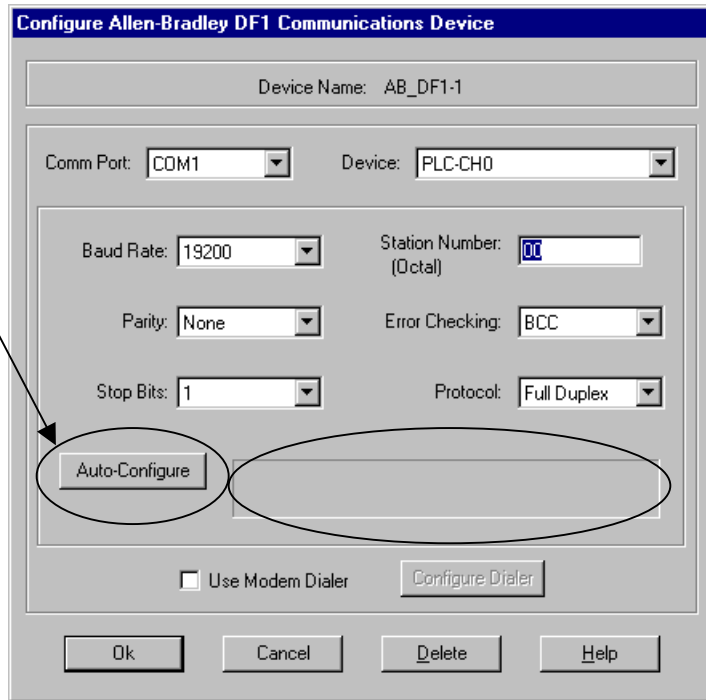
is plugged in to. There is a fairly extensive list of choices here. The following table cross references the listed devices with the real world device.

Device Listed	Real Device
PLC-CH0	Enhanced PLC-5 processor
SLC-CH0/Micro/PanelView	SLC-5/03, 5/04, or 5/05 processor
Logix-5550 Serial Port	ControlLogix 5550 Processor serial port

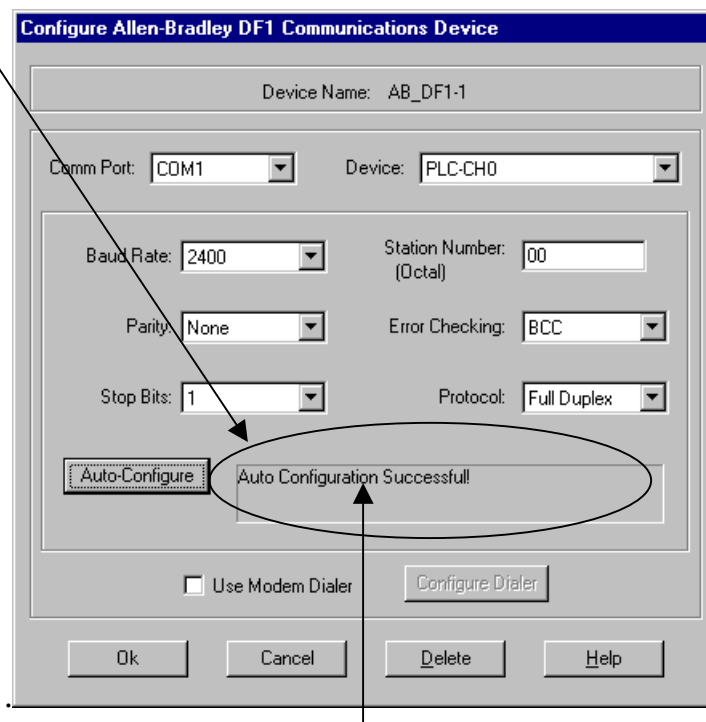
This example is going to use the PLC-5 processor so the correct choice is PLC-CH0. The Auto-Configure button will normally determine what the device is at the other end of the cable. However, if Auto-Configure does not sense the device properly you may have to manually change this setting.

The bottom section of the Configure DF1 Communications Device window pertains to the settings of the serial port on our Programming PC. The most important thing about these serial port settings is that they have to exactly match what the serial port settings on the PLC. If the settings do not match exactly it will be impossible to establish communications between the Programming PC and the PLC. Furthermore, it is almost a given that the default settings shown will not work.


Thankfully the RSLinx software can interrogate the serial port settings on the PLC and change the RSLinx software settings to match. To perform the interrogation, , click on the **Auto-Configure** button.

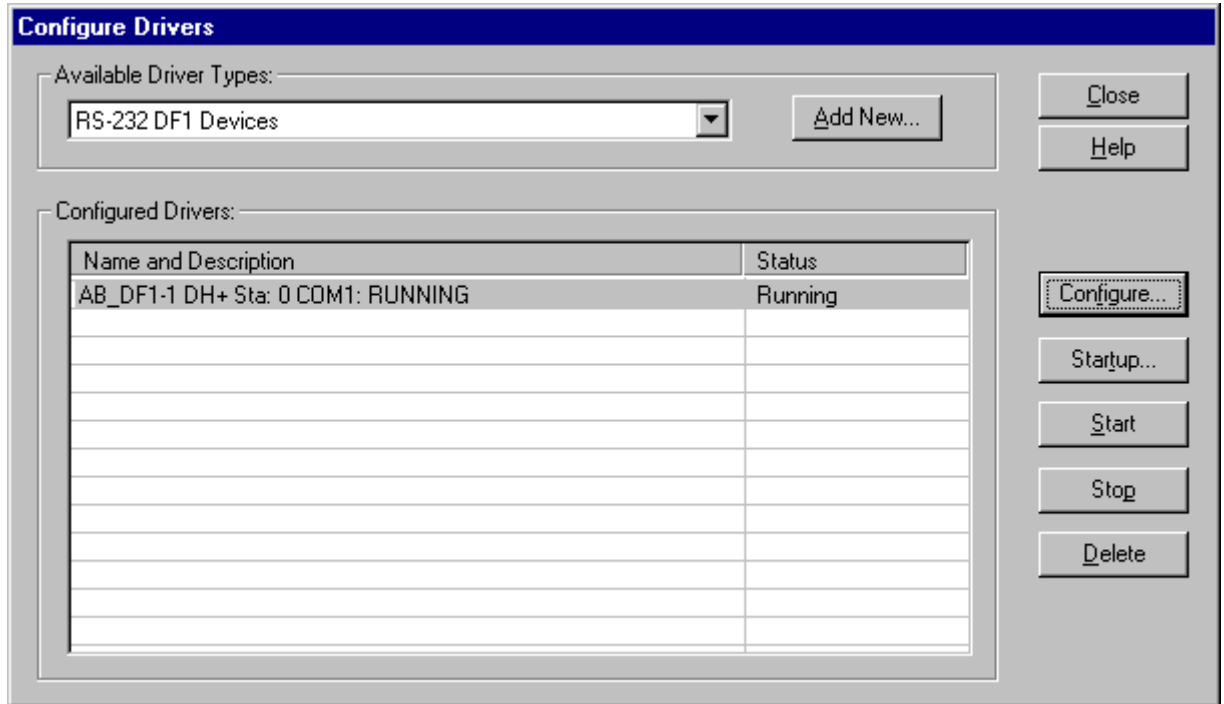



The RSLinx software will now attempt to establish communication with the Processor. In the window next to the **Auto-Configure** button appears status information about the progress of the Auto-Configure. When the auto-configuration process completes the results will appear in this window




In this case auto-configuration was successful and the Baud Rate was found to be 2400.

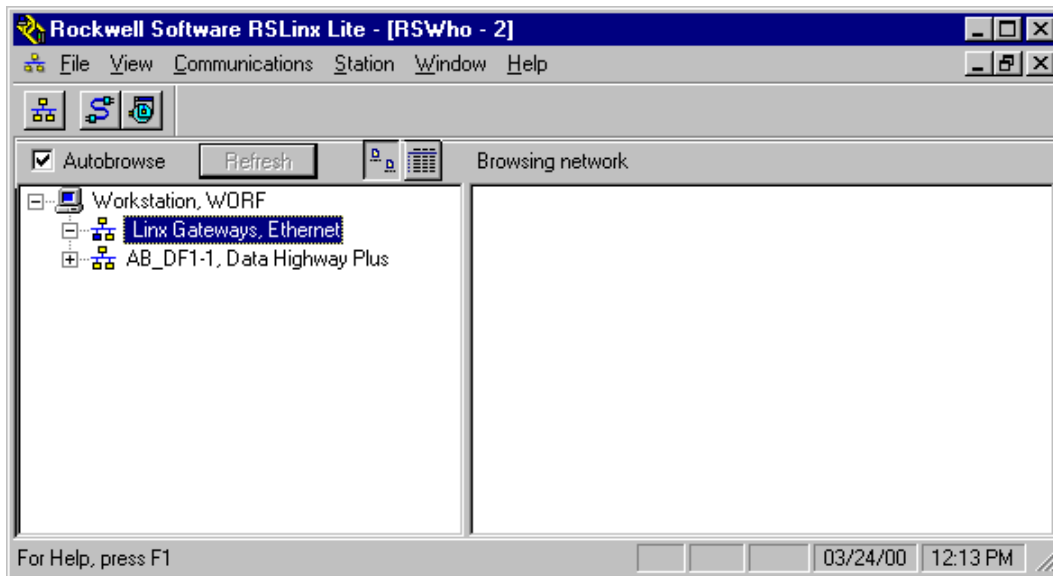
If auto-configuration is successful it will now be possible to establish communication with the PLC. Click the  button and the new DF1 driver will appear in the Configure Drivers window as a Configured Driver with a Status of Running;



If the configuration ever needs to be changed, such as changing baud rate, come back to this screen select the DF1 driver by clicking on it with the mouse⁸ and click the  button. The driver can also be started, stopped, deleted, and its startup mode changed from this window.

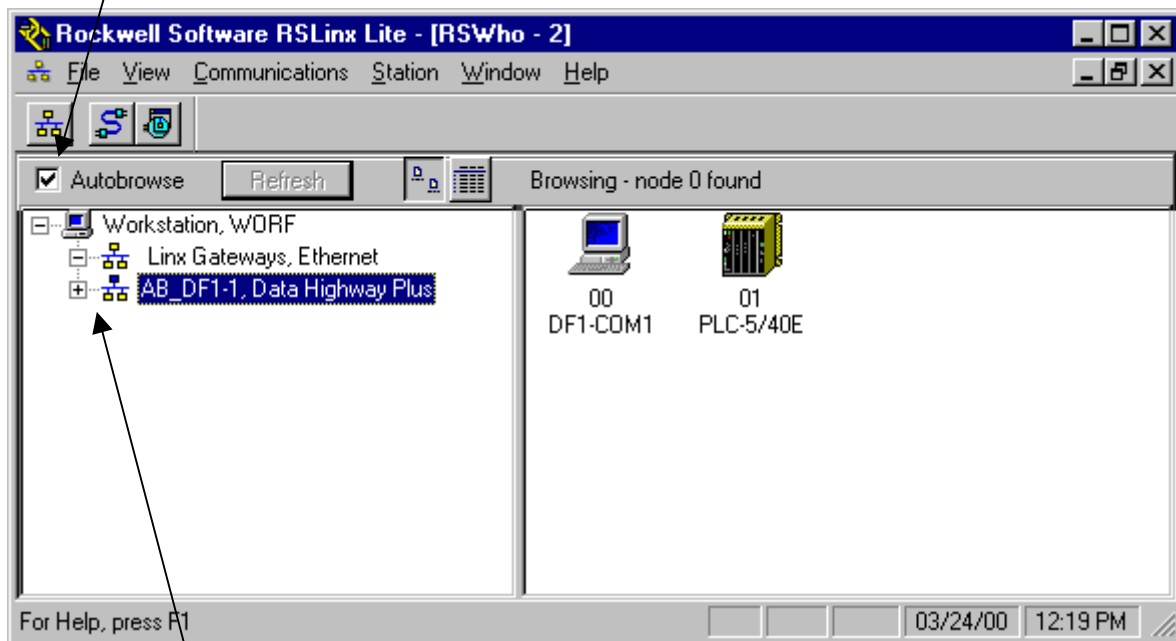
c- Success

With the DF1 driver now running and seemingly working correctly click the  button and the Configure Drivers Window will close and we will be back to the RSLinx window with the new driver showing below the Linx Gateways Ethernet driver.

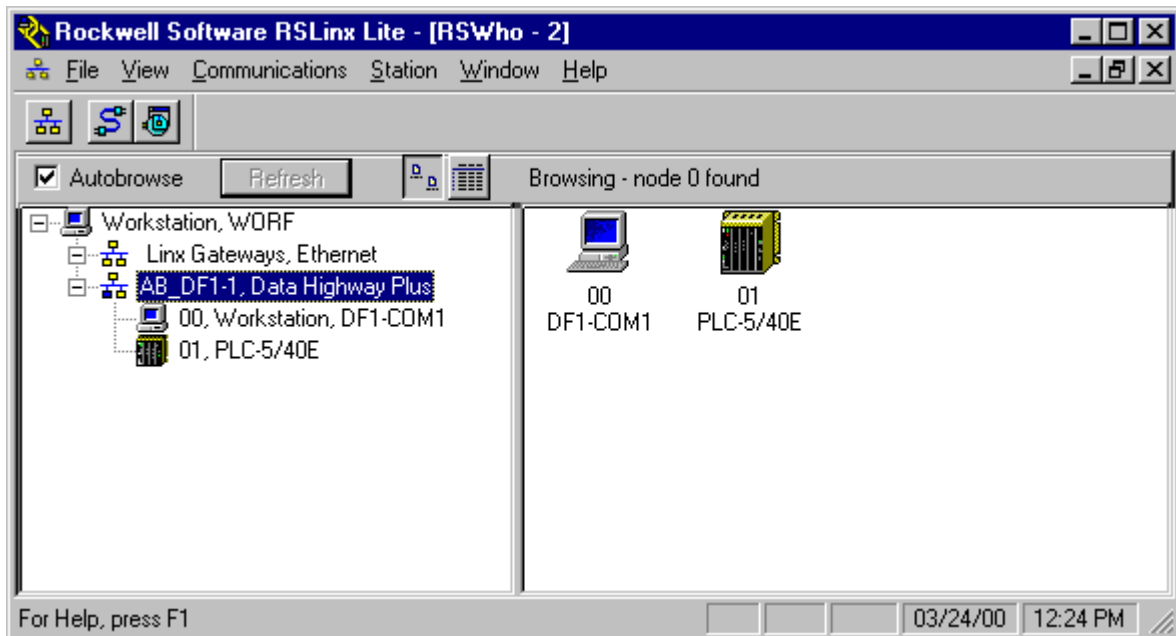


d- Browsing

If the Autobrowse box is checked and the AB_DF1-1 driver is selected by clicking on it with the mouse⁸ the current connected devices will appear in the right hand pane of the window.



By clicking on the + sign next to the AB_DF1-1 driver the DF1 devices can be browsed in an explorer type tree arrangement.



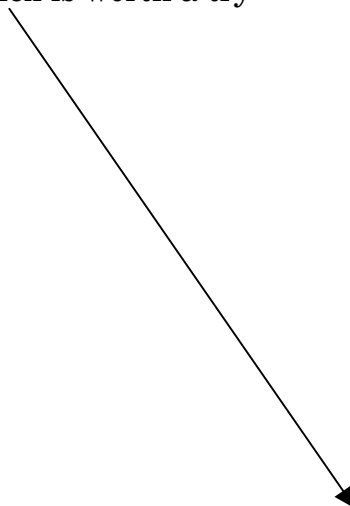
RSLinx can also provide diagnostic information on each device and on the driver by right clicking on the device and choosing the diagnostic menu choice.

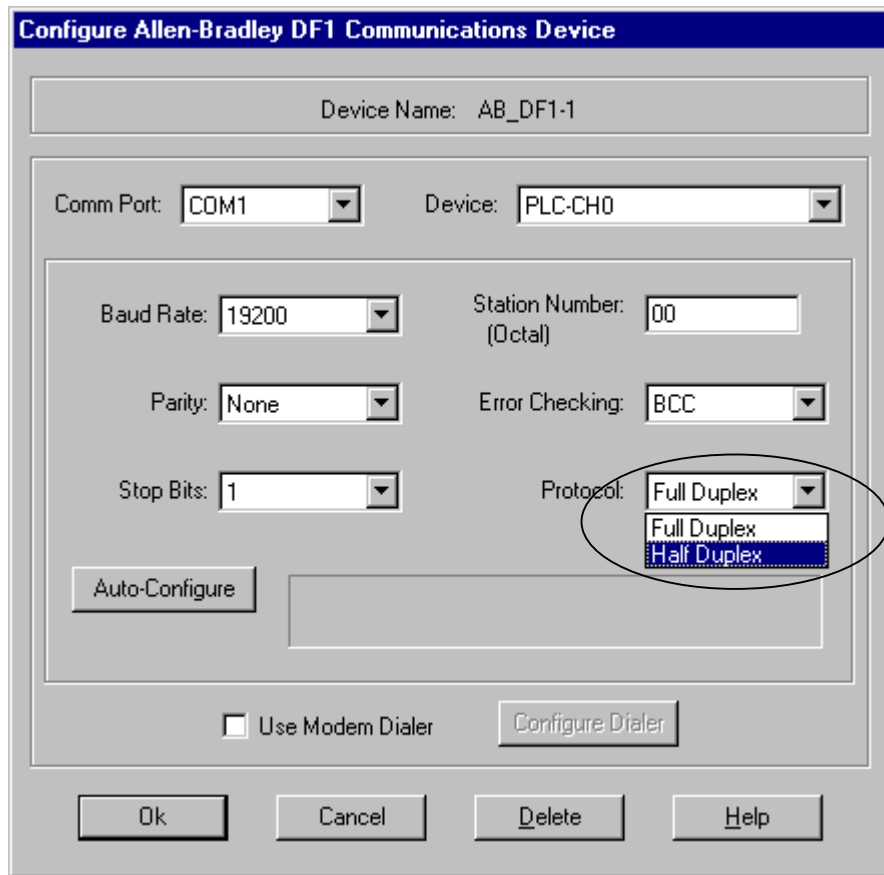
e- Troubleshooting configuration

If auto-configuration comes back as unsuccessful some troubleshooting will need to be performed.

- The first thing to check is the serial cable. Is the serial cable plugged in to the Programming PC and the PLC?
- Is the PLC powered up?
- Is the correct Comm Port selected?
- Is the Correct Device selected?

If the answers to the above questions are yes and auto-configure is still not successful then changing the protocol to half duplex is worth a try





Half-Duplex mode is often used if the serial port is connected to an Operator Interface.

H.3 RSLinx KT (DH+) Driver Configuration

The A-B KT driver is generally used when communicating over a DH+ (Data Highway Plus) network. However, the KT driver can also be used with the DH-485 network. For this example, I am going to concentrate on configuring the KT driver to use the DH+ network. The keys to being able to implement a KT connection from your programming PC to the PLC are;

1. Having a PLC capable of DH+ communication
2. Having a KT card of some flavor.
3. Having a properly configured cable to connect the KT card in the programming PC to the DH+ programmer port on the processor or to plug into the DH+ network directly.

A-B PLCs capable of DH+ communication include;

- All PLC-5 processors.
- The SLC-5/04 processor.
- The ControlLogix 5550 processor with a DH+/RIO communication module.

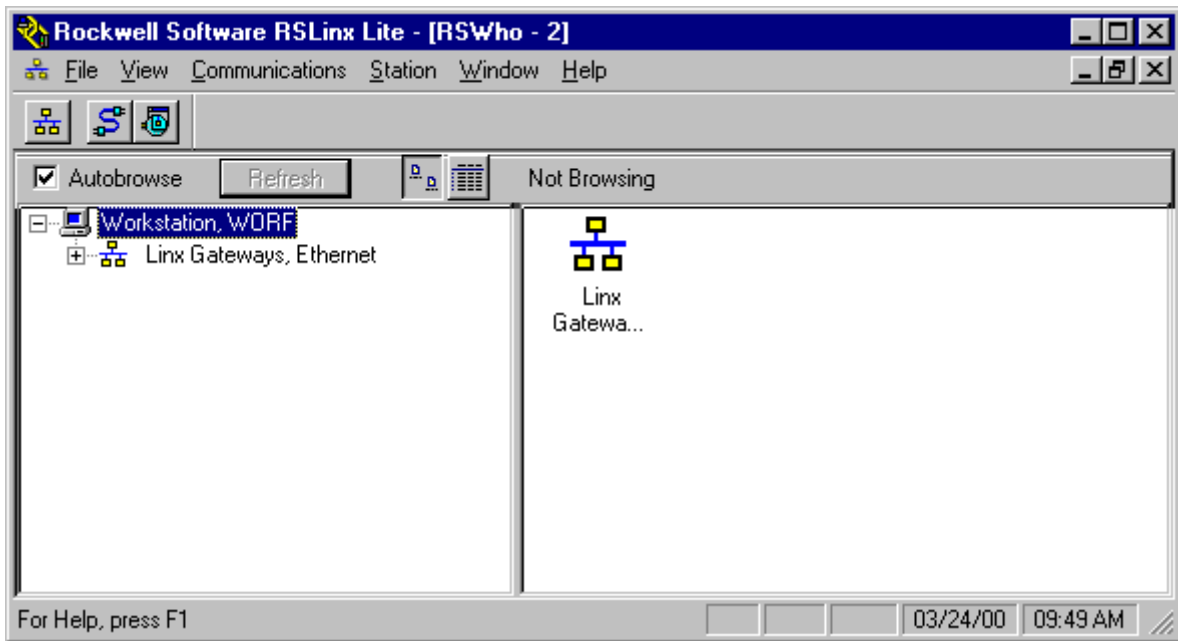
H.3.1 Flavors of DH+ KT cards

The KT card comes in many different models. The table below lists all of the current flavors of the KT card.

Model	Description	Bus
1784-KT	Standard DH+ card.	ISA
1784-KTS	DH+ and RIO	ISA
1784-KTX	DH+, DH-485, and RIO	ISA
1784-KTXD	Two Channel DH+, DH-485, and RIO	ISA
1784-KT2	Standard DH+	Micro Channel
1784-PCMK	DH+, DH-485, and RIO	PCMCIA (PC card)
1784-PKTS	DH+ and RIO	PCI
1784-PKTX	DH+, DH-485, and RIO	PCI
1784-PKTXD	Two Channel DH+, DH-485, and RIO	PCI

H.3.2 RSLinx Configuration

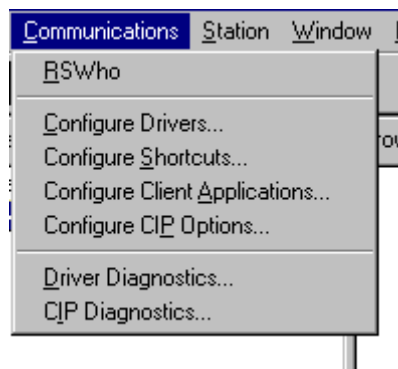
Once a physical DH+ connection is in place between our programming PC and the PLC the next step is setting up RSLinx to use the KT/DH+ connection. Start up RSLinx and the following screen or one similar should appear.



The only driver currently configured in RSLinx is the default driver the Linx Gateways, Ethernet driver. This driver is always present and cannot be removed. As far as I have been able to tell the driver does not do anything and is just a placeholder or a loopback device needed so that the RSLinx software can initialize properly.

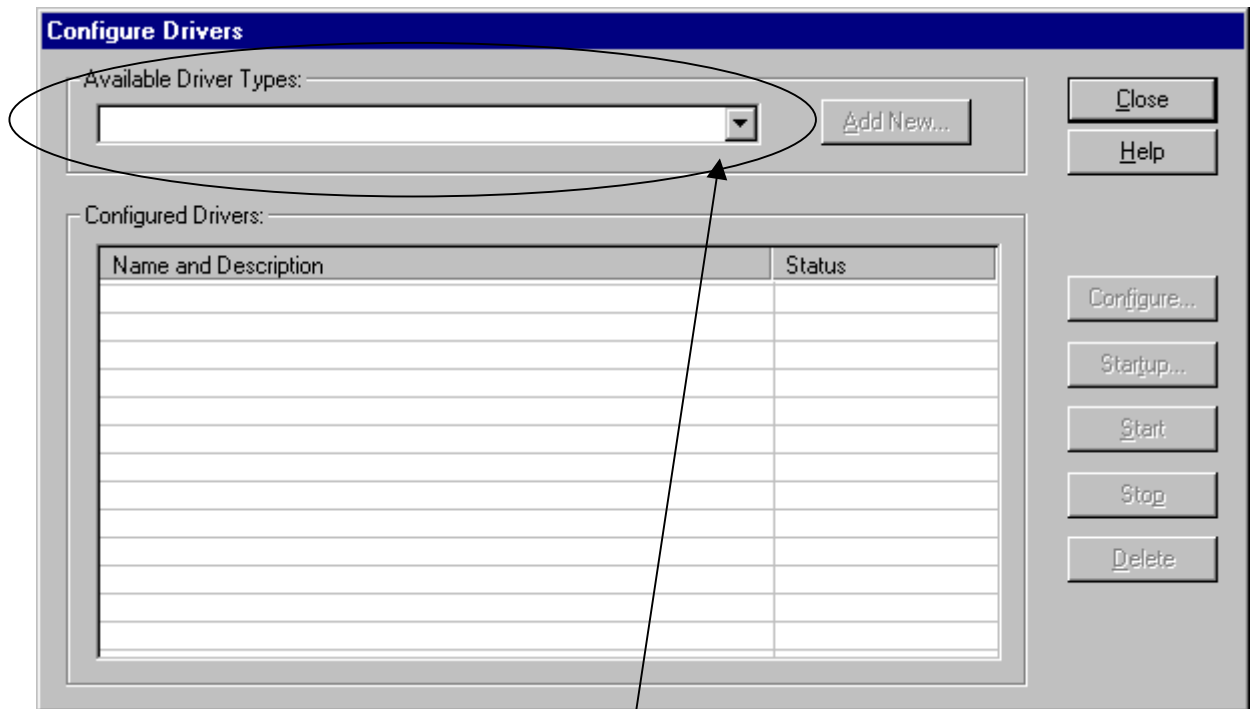
a- Add Driver

To add the KT/DH+ driver select the **Communications** menu and the following list of options will appear;

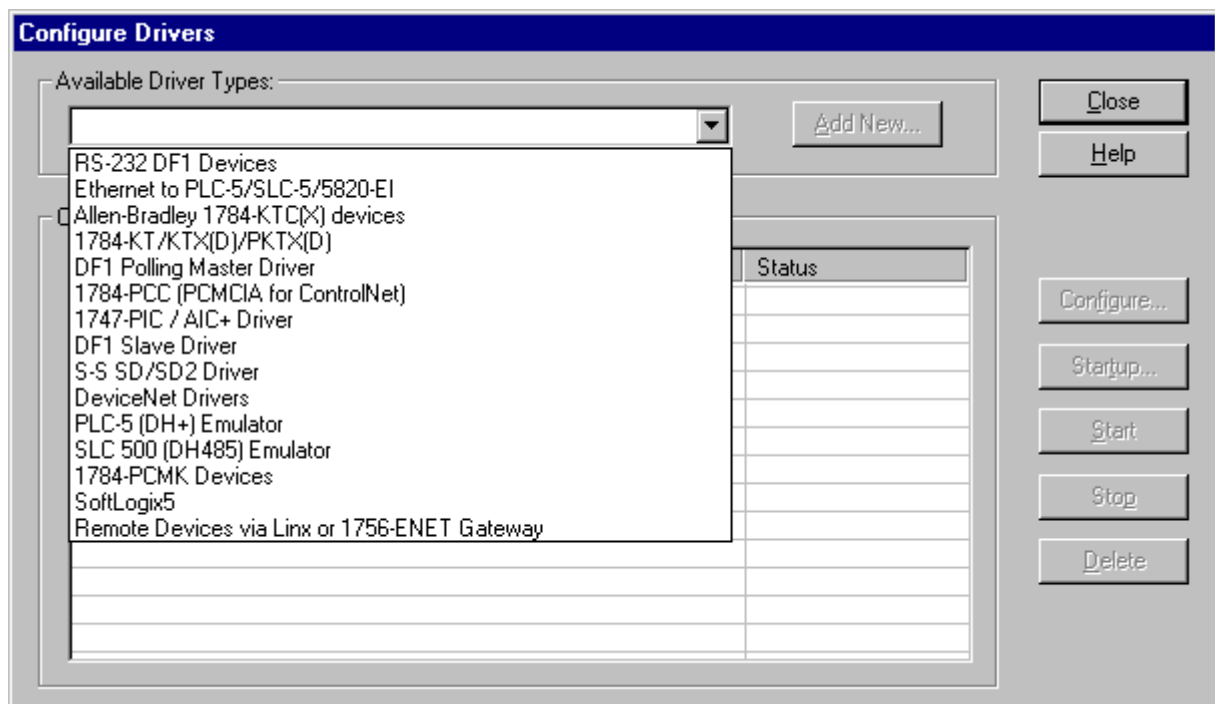


To add the KT/DH+ driver select the **Configure Drivers...** menu choice and the Configure Drivers window will open.

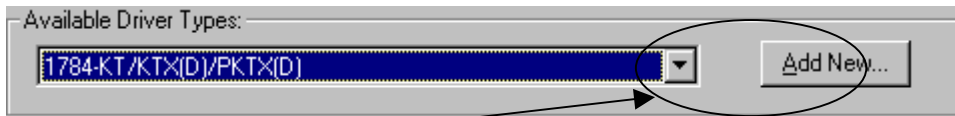
The Configure Drivers window is where all new communication interfaces are added, and where existing drivers are configured or reconfigured. In addition, the status of existing drivers can be verified from this window. The Configure Drivers window is initially empty and looks like the following;



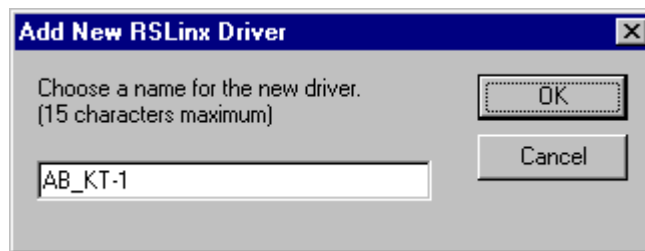
To begin the process of adding a KT/DH+ driver the first thing to do is click on the drop down arrow for the Available Driver Types list box. This will open the available drivers list box showing all of the possible available drivers.



The KT/DH+ driver is the 1784-KT/KTX(D)/PKTX(D) choice in the list box. Select the 1784-KT/KTX(D)/PKTX(D) choice by clicking on it with the mouse. The 1784-KT/KTX(D)/PKTX(D) entry should now appear in the list box as shown below;

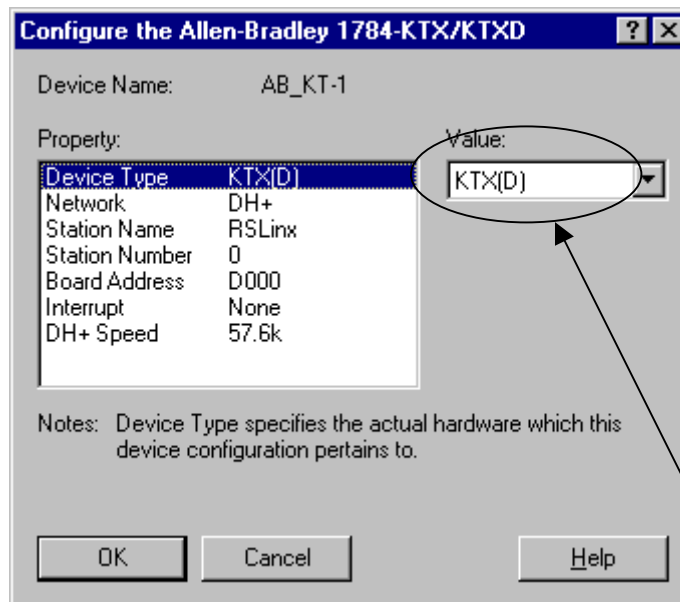


Click on the **Add New...** button and the Add New RSLinx Driver dialog box will appear prompting you to enter a name for the driver.



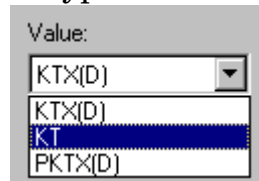
b- Configure Driver

The default name will be AB_KT-1. This name is perfectly fine but if you want to change the name, you can enter any name up to 15 characters in length into the dialog box. To accept the name click on the **OK** button. The Configure Allen-Bradley 1784-KTX/KTXD window will now appear.



The first entry here is the Device Type. The Device Type defaults to the KTX(D). Our example is going to make use of the plain KT card.

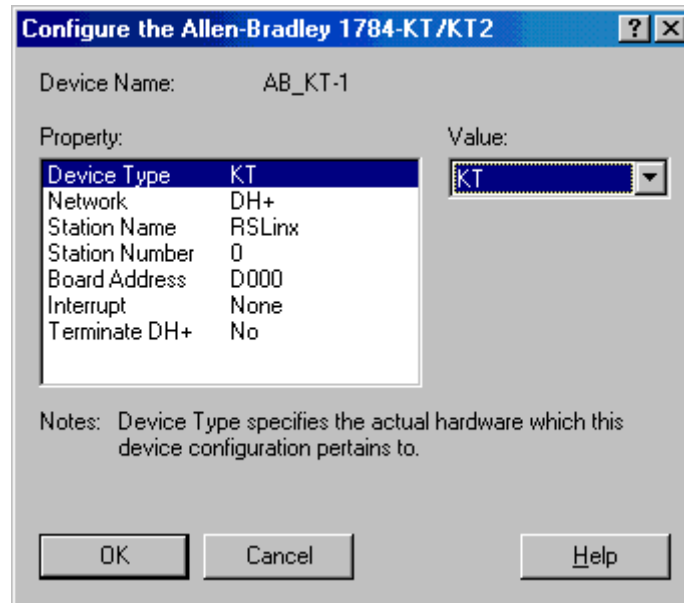
To change the Device Type click the drop down arrow in the Value box. The following



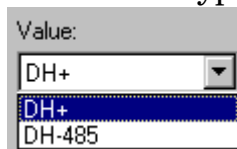
choices will appear.

Select the KT choice. KT will now appear in the value box and in the Device type entry.

Select the KT choice. KT will now appear in the value box and in the Device type entry.



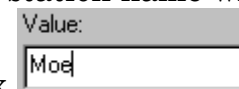
The next entry is Network. The Network type defaults to DH+. However, in the Value



entry are the following options,

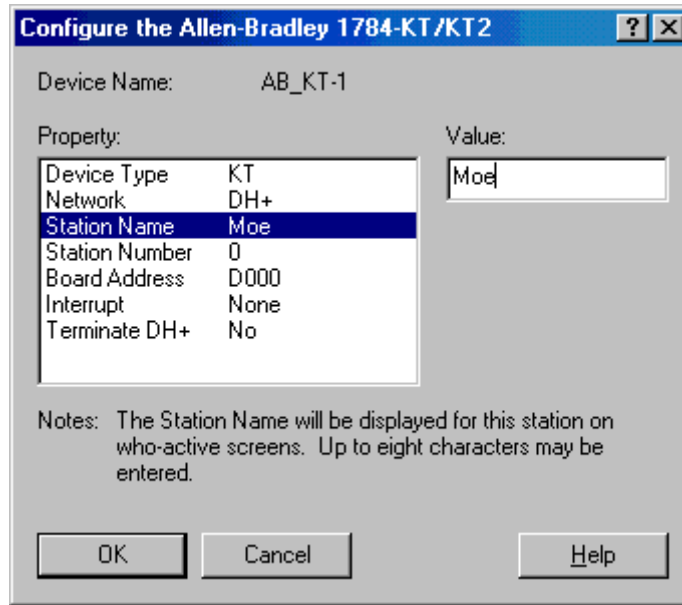
Leave the selection as DH+.

The next entry is the Station Name. The default station name is RSLinx. I recommend changing the default station name to the name of your programming computer or some other unique location descriptive name. For our example the station name will be Moe. To




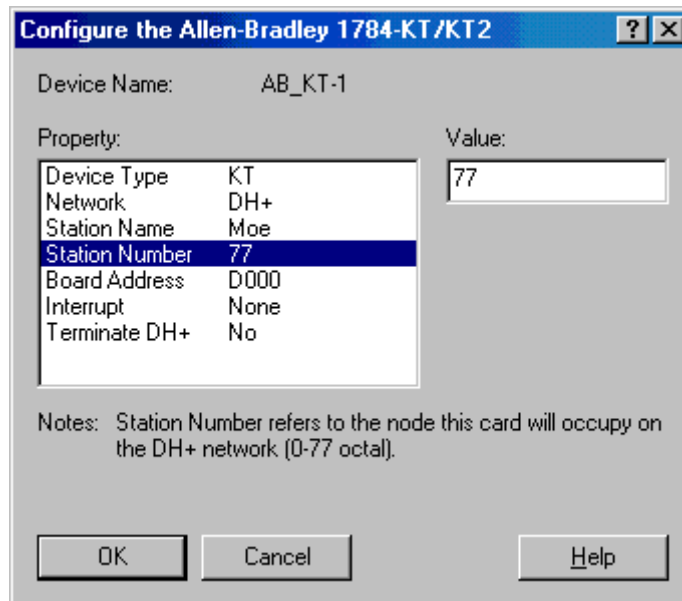
change the Station Name enter a new name in the value box

The station name will now appear as the value entered.



The Station Number is the next entry. The Station Number is the DH+ address of this programming computer on the DH+ network. The DH+ address number entered here has to be unique (No other devices may exist on the network with this address). The default Station Number is 0 or 00 (octal). I do not recommend ever using address 0 because everything defaults to address 0. Instead you need to know what DH+ address numbers are not being used on the DH+ network. I normally assign high numbered address to programming PC (i.e. address 70-77). For this exercise use address 77. To change the

address enter the new address in the Value box, . The new DH+ address will now appear in the Station Number entry;



The Board Address is the next entry. The Board Address is actually set by dip switches on the KT card itself. To set the board address you must know what the dip switches on the board are set for. The image below shows where the dip switches are located on the KT card.



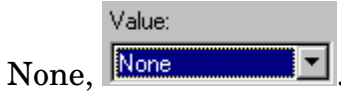
The dip switches on this KT card are set for board address D400. The value D400 must be

Value:
D000
D400
D800
DC00

chosen from the value box. When D400 is chosen the Board Address value will change to reflect the value D400.

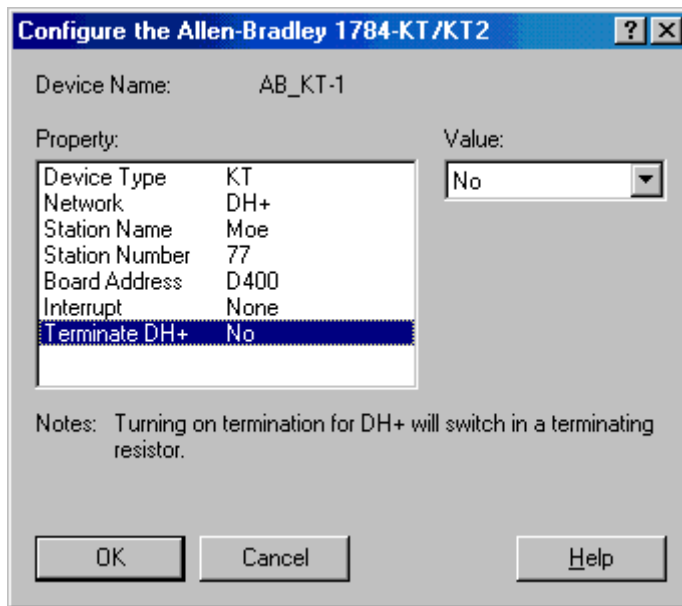
Configure the Allen-Bradley 1784-KT/KT2		?	X
Device Name:	AB_KT-1		
Property:		Value:	
Device Type	KT		
Network	DH+		
Station Name	Moe		
Station Number	77		
Board Address	D400		
Interrupt	None		
Terminate DH+	No		
Notes: This is the memory address of the card. The KT's memory is actually located 300h higher than this setting.			
OK		Cancel	
		Help	


The next entry is the Interrupt. As a general rule the Interrupt value should be left at

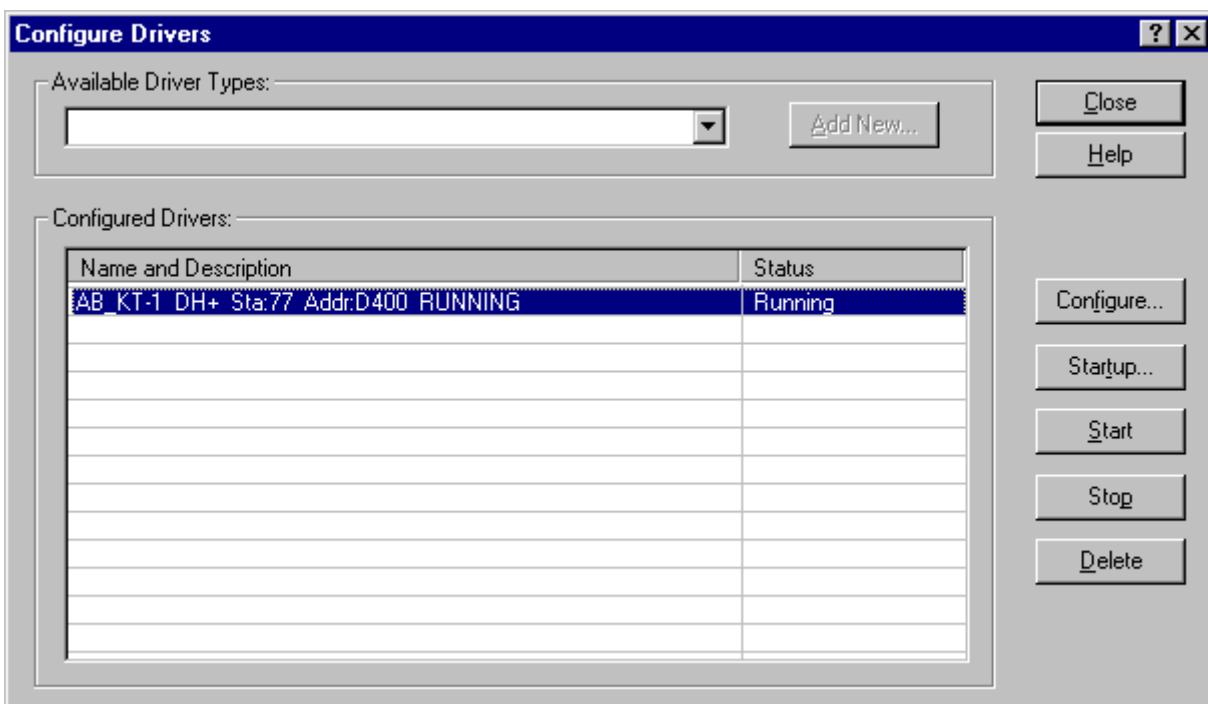


The last parameter to enter is the Terminate DH+ parameter. This value should be left as No unless your programming PC is the last device on the network, will always be on, and you are not using external terminating resistors.

The final settings for all the parameters for this KT card application is shown below.



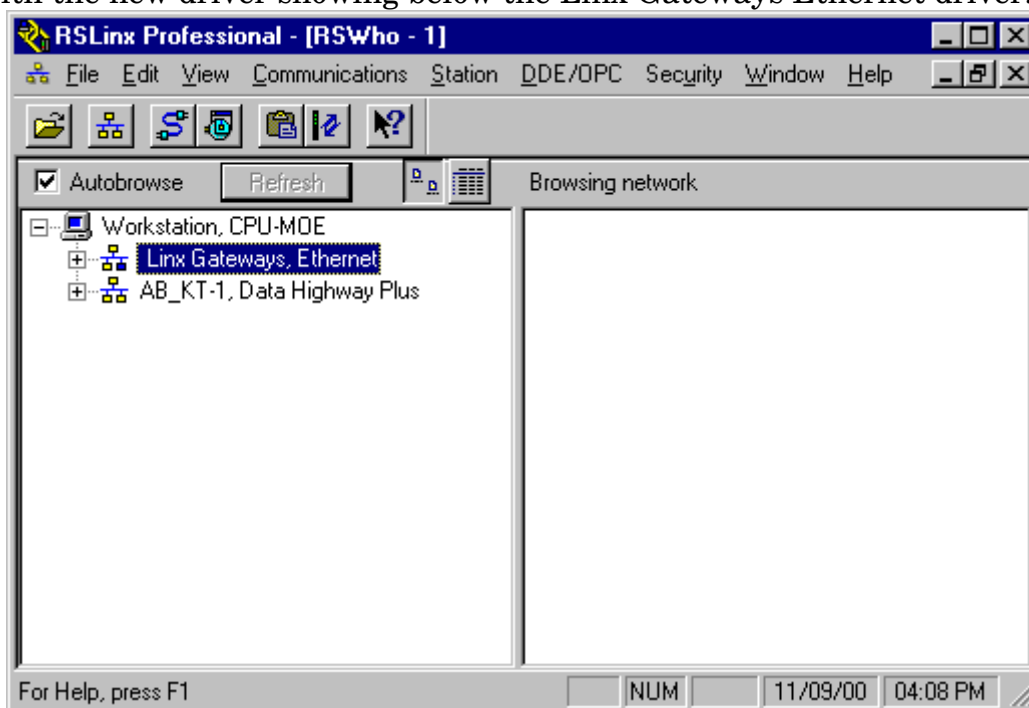
Click the  button and the new KT driver will appear in the Configure Drivers window as a Configured Driver with a Status of Running;



If the configuration ever needs to be changed, such as station number, come back to this screen select the KT driver by clicking on it with the mouse and click the **Configure...** button. The driver can also be started, stopped, deleted, and its startup mode changed from this window.

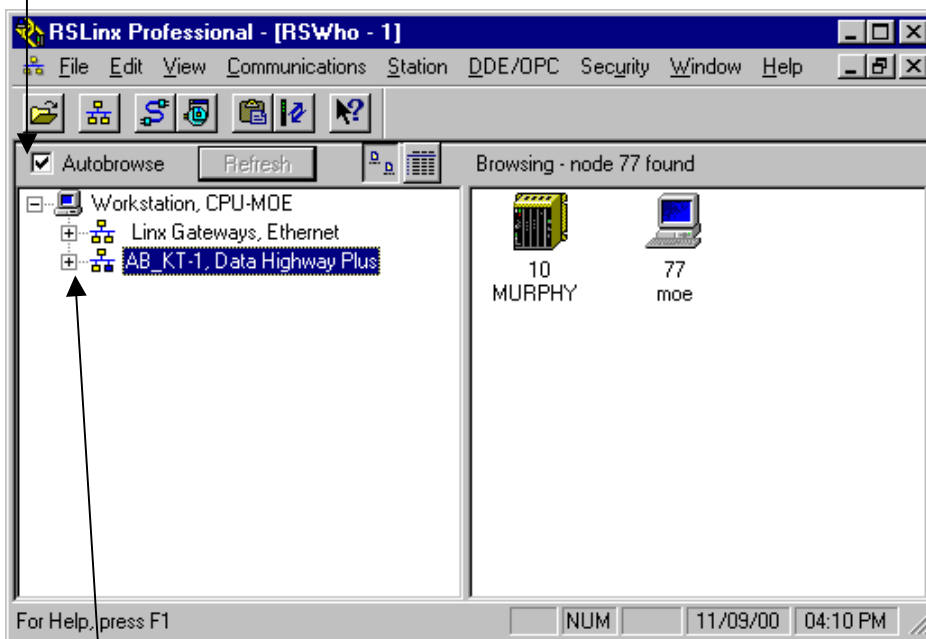
c- **Success**

With the KT driver now running and seemingly working correctly click the **Close** button and the Configure Drivers Window will close and we will be back to the RSLinx window with the new driver showing below the Linx Gateways Ethernet driver.

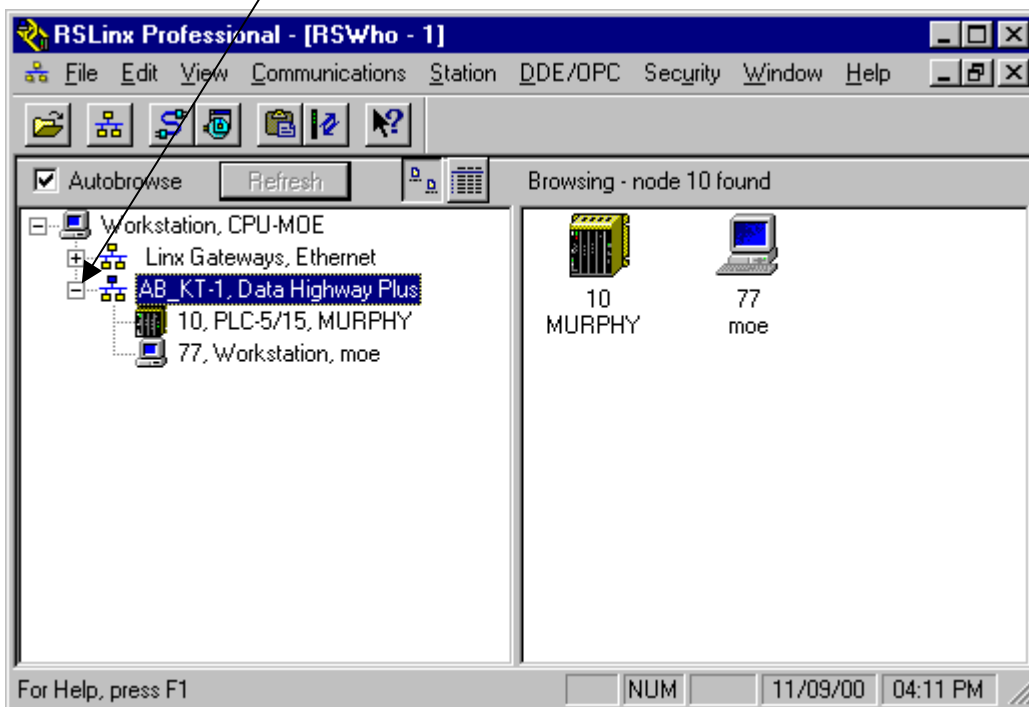


d- Browsing

If the Autobrowse box is checked and the AB_KT-1 driver is selected by clicking on it with the mouse⁸ the current connected devices will appear in the right hand pane of the window.



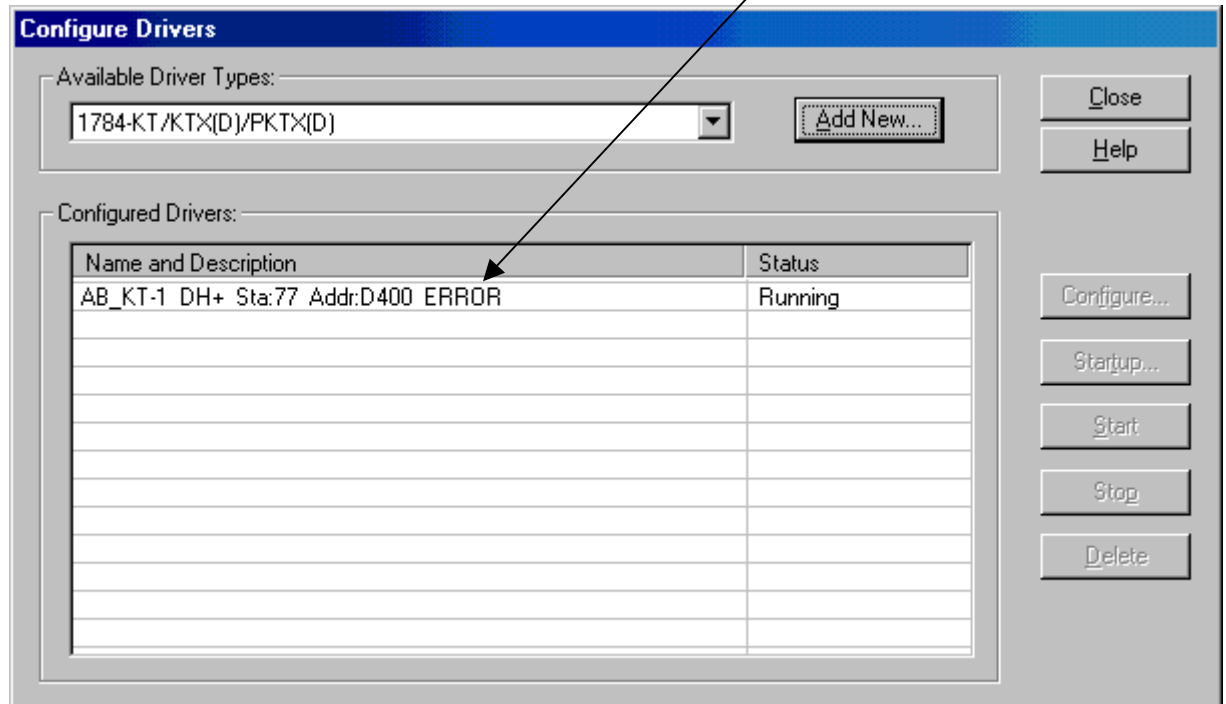
By clicking on the + sign next to the AB_KT-1 driver the DH+ devices can be browsed in an explorer type tree arrangement.



RSLinx can also provide diagnostic information on each device and on the driver by right clicking on the device and choosing the diagnostic menu choice.

e- Troubleshooting configuration

If the KT driver does not appear as running or shows an ERROR indication in the configure drivers dialog window, then you need to go back and review all of the parameters entered.



- Make sure the Board Address setting matches the dip switch settings on the board.
- Make sure the Device Type specified matches the model of KT card that you are using.

H.4 RSLinx Ethernet Driver Configuration

H.5