

**EXCELERATED**



## Course Catalogue

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**DeviceNet \* Robots \***

**Ethernet \* VFD \* Mill \***

**GuardLogix \* Lathe \***

**Conveyors \* PLCs \***

**Troubleshooting \***

**CNC \* Welding \***

**ControlLogix \***

SUMMER  
2017

**Hello,**

Welcome to The Excelerated Learning Institute.

You've heard of The Learning Curve, but are you familiar with The Forgetting Curve? Well, while The Learning Curve describes how quickly your gray matter grasps new information, the forgetting curve depicts how your brain's ability to retain that data decreases with time. Doctor Hermann Ebbinghaus, the first to discover The Learning & Forgetting Curves, proved how quickly retention drops after a new learning experience.

In production, this exponential loss of information costs time on the floor. When learning a new task, you're pioneering a pathway through your brain. The more you travel this trail, the stronger your neural pathways become making it easier to recall the data in your head.

At ELI, our goal is for you and your team to not only learn, but retain this information for when you need it. Our instructors average 30+ years of experience and work hand-in-hand with our team of developers and designers to provide you with the most advanced and cutting edge learning strategies and curriculum.

Our proven teaching methods, based on learning models such as The ADDIE Process and Bloom's Taxonomy, mark the before and after ELI stamp on your company's performance.

Take a look at what we have to offer.

-Team ELI

We are the best at what we do, so you can be the best at what you do.

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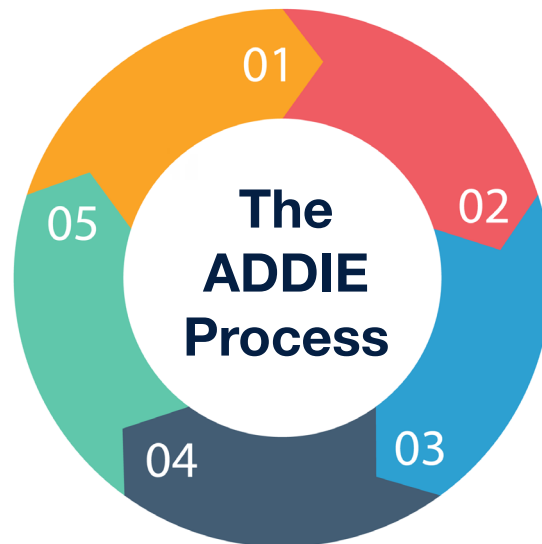
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Our instructional designers and training developers at The Excelerated Learning Institute utilize the ADDIE Process as a **5-phase** method for developing our courseware. This Process serves as a flexible guide to support performance tools, which allow constant evaluation during the development of the curriculum (E-learning, how-to videos, student guides, etc.). Any phase can be modified at any moment to suit the needs of our learners. We like to keep it dynamic.



**1. Analysis** - The first phase in which the instructional challenge of the course is detailed. The objectives are established and issues, such as learner skill level, are also identified.

**2. Design** - In this phase we define the Blueprint, learning objectives, content, assessments, excercises, subject matter analysis, instruments, lesson planning and media selection.

**3. Development** - Our instructors, designers and developers collaborate and build the courseware called for in the Blueprint including the design, motion graphics, as well as the integration of any eLearning technologies.

**4. Implementation** - Delivery and conduct of the training.

**5. Evaluation** - The model highlights the importance of evaluation and feedback throughout the entire life-cycle of the training and shows the importance of gathering and distributing information between phases.

# Bloom's Taxonomy

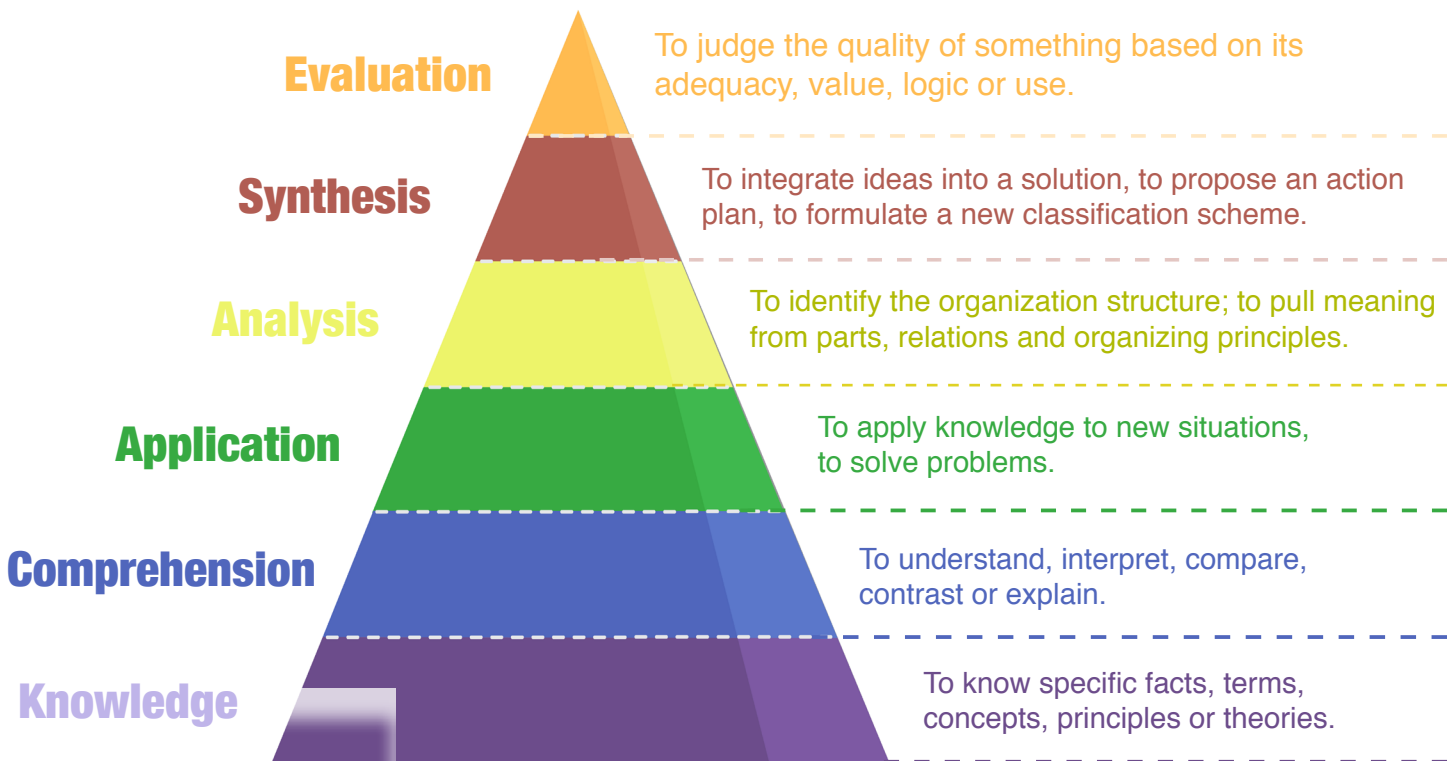
ELI utilizes many different learning models including Bloom's Taxonomy, which takes us up a 6-tiered pyramid plan for maximizing your capacity to learn.

**Knowledge** begins with recall, especially that of specific methods and processes.

**Comprehension** refers to a deep understanding as to make use of the material being communicated. **Application** refers to the use of abstractions in concrete situations.

**Analysis** represents the breakdown of a communication into its parts so that the relative hierarchy of ideas is clear and the relationships between the ideas expressed are explicit. **Synthesis** is the combining of those parts to form a whole. **Evaluation**

is the perceived value of the material and methods for their given purposes.

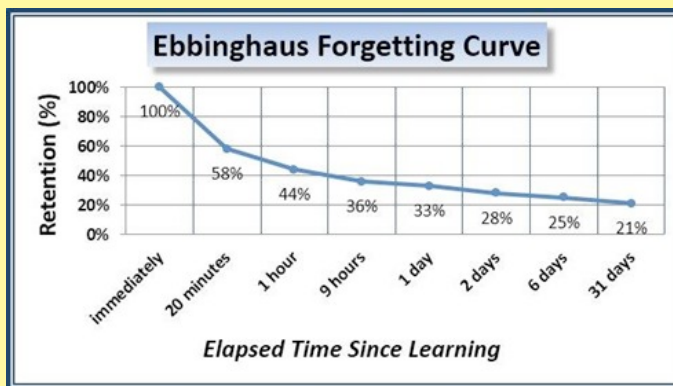


# Hermann Ebbinghaus & The Forgetting Curve

Hermann Ebbinghaus was born in Barmen, Germany in 1850 and is best known for his research on the topic of memory. The world remembers him as the man who coined the term 'the learning curve' and by extension – 'the forgetting curve'.

**The Forgetting Curve** supports one of the seven kinds of memory failures: Transience – the process of forgetting, which occurs with the passage of time.

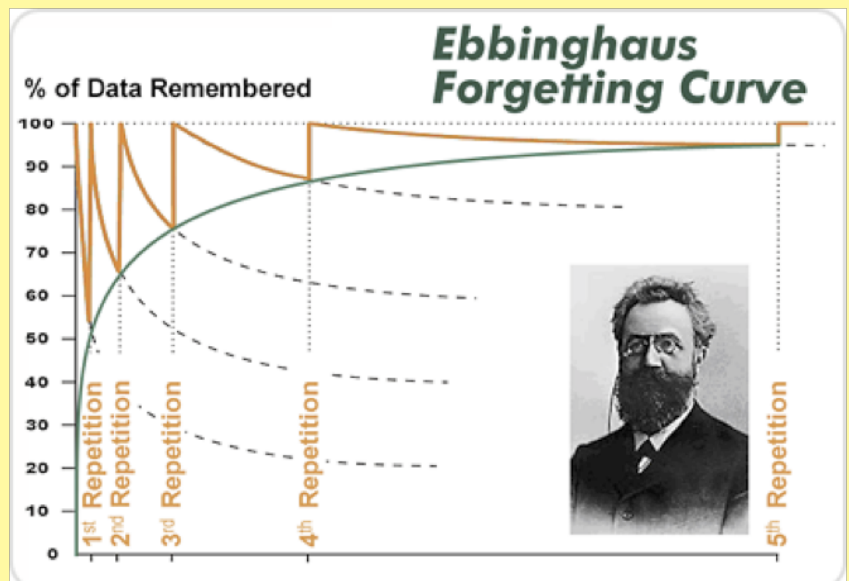
At ELI, we know that when it comes to the workplace, it is essential to remember all of your training. Once the memory of a process begins to fade, the overall efficiency of the company decreases costing the company unnecessary losses.



In the industrial environment, the simple "use it or lose it" phrase rings true. In fact, in one manufacturing plant study, some tradesmen were only able to recall 40% of a given class after 90 days. Although 40% is much higher than the original forgetting curve it still needs improvement. During the same manufacturing study after the first refresher training going to the second, the learners were able to recall 70-80%. We expect higher numbers for the third refresher training!

Thankfully, there is a solution. Simply put, the scheduling of refresher training based on needs of our learners is essential.

For example, if a skilled trades person were assigned to an area using PLCs, then naturally every 90 days, they would require refresher training on the basics. This way the neural pathways for the curriculum are reinforced.



# The Solution

**E-Learning**, or electronic learning, is a phenomenal tool to help people remember their training thus increasing their value and efficiency in the workplace. Whether you are refreshing your memory or learning something for the first time, your goals should easily be met in a matter of minutes with the help of our E-Learnings.

At ELI, our E-Learnings embody three main components: the Pre-Test, the Lesson, and the Post-Test.



**The Pre-Test** is used to determine how well people remember the information presently. Scores on the pre-test will be used to determine how often E-Learning lessons should be taken. The lower the pre-test scores, the more often these lessons should be given, and vice versa.

**The Lesson** is the main component of our E-Learning curriculum, which delivers all information needed to succeed not only on the post-test, but in the workplace as well. This is why E-Learnings are designed in the first place!

**Post-Test Passing** is mandatory for completing the E-Learning process. Using the knowledge learned from the lesson, one must answer the questions and achieve a passing score. Failing the post-test simply means the learner must retake the entire lesson and Post-test until earning a passing grade.

We know that E-Learning is the only a piece of the educational puzzle necessary for adults to perform. When attacking the Forgetting Curve, it is one of the best tools available to keep a person's memory updated and very cost effective.

In order to increase your learning curve, **we recommend:**

A DeviceNet 40-Hour Class, followed by three individual weeks of e-learnings on the same subject. Upon completing the class, a training program begins where the learner takes refresher training on the subject every 90 days.

Keep production at peak performance, cut downtime by troubleshooting faster and let us customize a plan for you.

# Message from the President and Education Manager

**W**ith 30 years of experience, Excelerated Learning Institute has never had a clearer vision of the company it wants to be, where it wants to go, and how it wants to get there. The goal is simple – to educate skilled trades and engineers in the automotive industry using all the educational tools available to keep jobs in America.

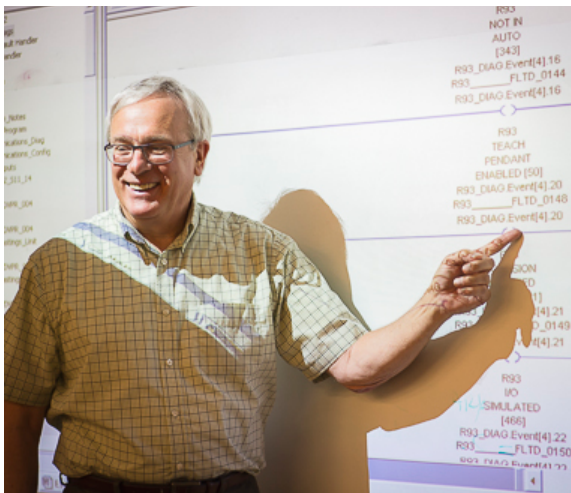
What does that mean? It means taking all our experience, education, and talent, passing it on to adult learners of all ages.

Once a learner takes our forty hour core classes they are encouraged to sign up for our E-Learning and take the same material covered in the hands on portion, the next three weeks, then every ninety days after that. We also offer professionally produced videos, customized curriculum, and ninety-day hands-on refresher classes for the most important parts of any technology. How did we come by this? Just take a look at our web page under the **Team** and look at the experience we have not only on manufacturing floors keeping machinery running but also in education.

Bottom line: We want to make a difference.

See you in the class or at the plant.

Cliff Gibbs, President, & Mark Blair, Education Manager

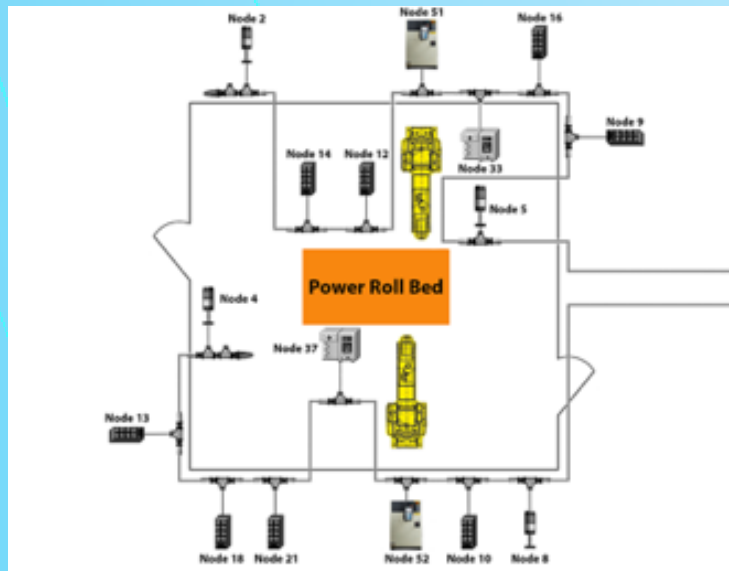


**Cliff Gibbs,  
President**

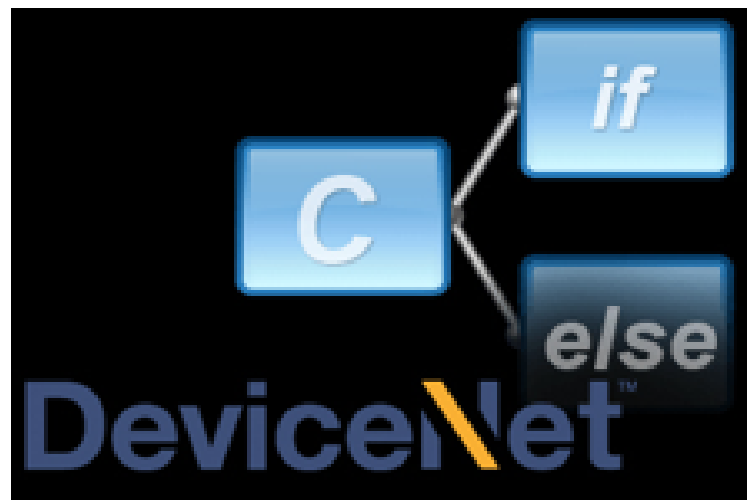


**Mark Blair,  
Education Manager**

# DeviceNet







## Lesson Description

DeviceNet is an open-source, robust, low-cost network system used in the automation industry to interconnect control devices for data exchange. The DeviceNet network is classified as a CAN bus network, whose characteristics are high speed communications using analog signals with diagnostics by the network devices.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe the history and evolution of DeviceNet.
2. Explain how DeviceNet works.
3. Identify the different technologies used by DeviceNet.



## Lesson Description

All DeviceNet networks share the same essential elements for a functioning network. The network itself can be configured in many different ways, but the components and wiring in the panel are often similar.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Identify and locate essential components and wiring of a DeviceNet network.
2. Describe the labeling convention of DeviceNet connectors.



## Lesson Description

Auxiliary power provides power to nodes with outputs, such as an ArmorStart. When it fails, those outputs will not have 24 VDC and parts of the DeviceNet network can grind to a halt.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Define the purpose of auxiliary power on a DeviceNet network.
2. Identify DeviceNet components that utilize auxiliary power.
3. Describe typical DeviceNet components that cause auxiliary power failure.
4. Perform troubleshooting procedures to determine if auxiliary power has failed on the DeviceNet network.



### Lesson Description

The 1756 DNB module has three indicator lights that identify operation and problems:

1. MOD/NET
2. I/O
3. OK

Understanding these indicator lights can help you properly troubleshoot a malfunctioning network.

### Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Identify the different states of the MOD/NET, I/O, and OK indicator lights on the 1756 DeviceNet Bridge.
2. Describe the status of the different states of the MOD/NET, I/O, and OK indicator lights on the 1756 DeviceNet Bridge.
3. Interpret the meaning of the status for the MOD/NET, I/O, and OK indicator lights on the 1756 DeviceNet Bridge.
4. Apply troubleshooting steps to resolve identified issues with the 1756 DeviceNet Bridge.



## Lesson Description

Error Code E#78 occurs when a node that was programmed into the 1756 DNB Scan List is no longer communicating. It always follows Error Code E#72, which is the first indication of a communication problem with a device. After Error Code E#72 occurs, the 1756 DNB will attempt to communicate with the offending node one more time. If communication is not reestablished, then Error Code E#72 becomes E#78.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Recover the DeviceNet 1756-DNB from Error Code E#78: Single Node Failure.
2. Identify troubleshooting methods and correct malfunctions within DeviceNet
3. Utilize the required knowledge to correct potential faults.
4. Understand the equipment's capabilities and how to ensure malfunctions and deficiencies are addressed quickly.



### Lesson Description

Error Code E#78 Multiple Node Failure occurs when nodes that were programmed into the 1756 DNB Scan List are no longer communicating. It always follows Error Code E#72, which is the first indication of a communication problem with a device. After Error Code E#72 occurs, the 1756 DNB will attempt to communicate with the problem nodes one more time. If communication is not reestablished, then Error Code E#72 becomes E#78.

### Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Define Error Code E#78 Multiple Node Failure.
2. Describe how to locate faulty nodes on a DeviceNet network.
3. Perform troubleshooting procedures.
4. Explain the difference between consecutive multiple and random multiple node failures.
5. Recommend solutions of how to recover from Error Code E#78 Multiple Node Failure.



## Lesson Description

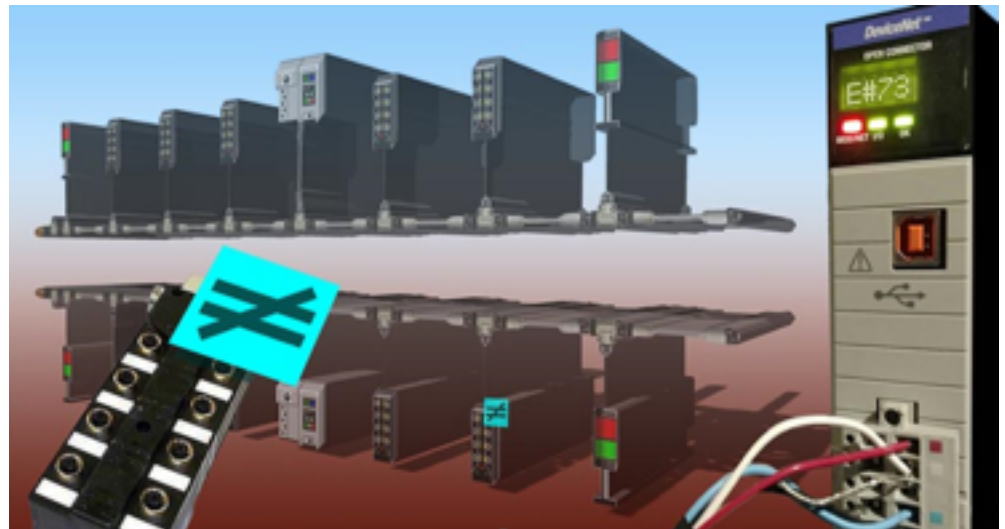
Bus Off is one of the most difficult errors to troubleshoot on a DeviceNet network. Bus Off occurs when the DeviceNet network becomes unstable and stops communicating. However, there is hope! In this lesson is a simple, easy to follow procedure that systematically breaks down the network to determine the root cause of the Bus Off condition.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Define the Error Code E#91 “Bus Off” condition on a DeviceNet network
2. Identify typical causes of an Error Code E#91 “Bus Off”
3. Perform troubleshooting steps to locate the source of the “Bus Off” condition on a DeviceNet network
4. Recommend solutions on how to recover from an Error Code E#91 “Bus Off Condition” on a DeviceNet network.





## Lesson Description

This lesson will explain to the learner what Error Code E#73 is and how to use RSNetWorx to identify the node causing it. Step by step procedures will guide the learner through the most efficient process for recovering from Error Code E#73: Hardware Mismatch.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Explain what Error Code E#73 means.
2. Identify the node in RSNetWorx that is causing Error Code E#73.
3. Describe the steps to take in RSNetWorx to resolve Error Code E#73.



## Lesson Description

The NetMeter monitors network traffic through all network connections on its connected computer. The NetMeter displays real-time graphics for downloading and uploading speeds. It logs network traffic and provides daily, weekly, monthly, and summary traffic reports. The NetMeter sends alerts when the network exceeds a certain amount of bandwidth usage.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe a NetMeter and its purpose.
2. Explain the meaning of outputs shown on the NetMeter graphic display.
3. Determine the health of a DeviceNet network using the NetMeter.



## Lesson Description

The eNetMeter and its associated NetAlytix software provide an excellent way to monitor the health of a DeviceNet network. This lesson shows how to enable a computer running the NetAlytix software to communicate with the eNetMeter and monitor DeviceNet.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Establish communication with a DeviceNet network and a computer running NetAlytix software.
2. Interpret the meaning of the eNetMeter indicator lights.
3. Configure the power supply for the eNetMeter to operate correctly on a DeviceNet Network.



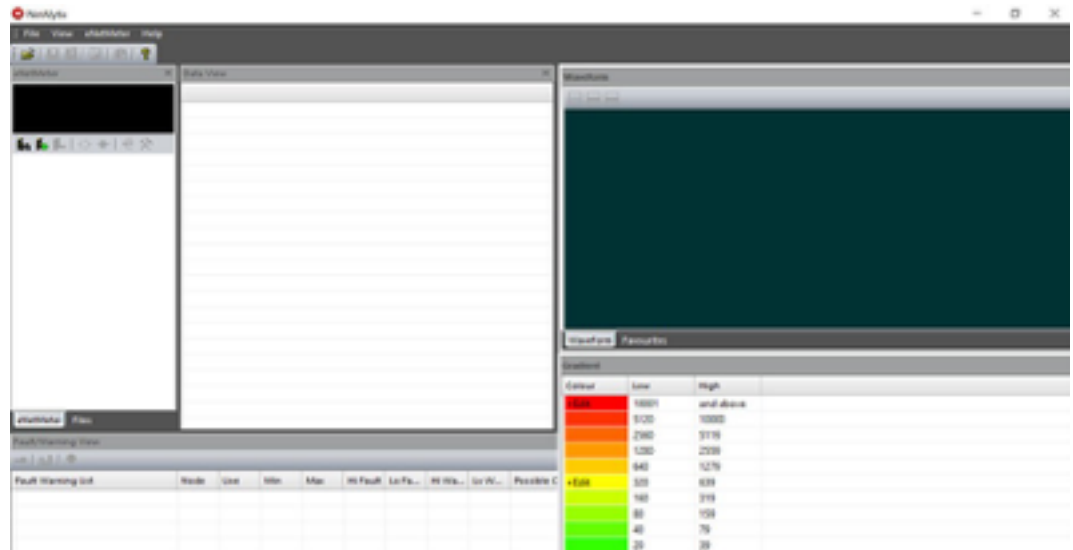
## Lesson Description

The eNetMeter and its associated NetAlytix software provide an excellent way to monitor the health of a DeviceNet network. This lesson takes you through the steps to monitor the DeviceNet network on a computer running NetAlytix software.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Connect the eNetMeter to a DeviceNet network.
2. Select and install the eNetMeter in order to monitor DeviceNet in WWWreal time with NetAlytix software.



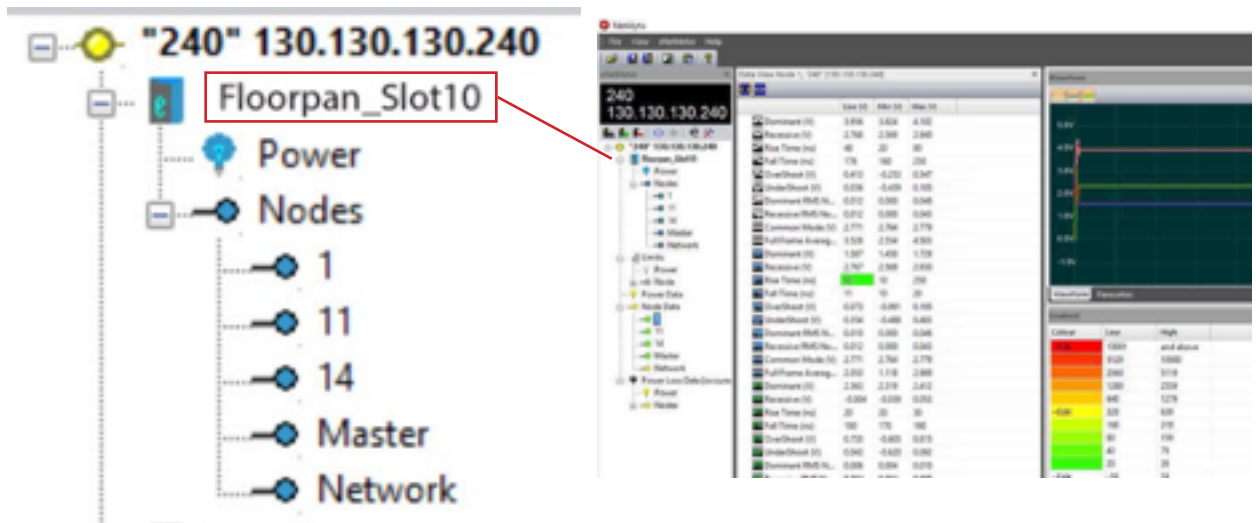
## Lesson Description

The eNetMeter and its associated NetAltyx software provide an excellent way to monitor the health of a DeviceNet network. This lesson describes the various windows which make up the NetAltyx software and explains the basics of how to interpret the data contained within them as the eNetMeter monitors DeviceNet in real time.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Identify the various information windows contained within the NetAltyx software.
2. Describe what type of data is displayed in each window.
3. Perform basic troubleshooting of a DeviceNet network using an eNetMeter and its associated NetAltyx software.



## Lesson Description

One of the most useful features of the NetAllyx software is the ability to export a baseline report of current DeviceNet conditions and compare that report to future conditions over time. This lesson will show the learner how to export a report, then import it later and compare future readings to the saved data.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe a baseline report and its purpose.
2. Demonstrate how to import and export baseline reports.
3. Use Compare and Difference modes in NetAllyx to identify any changes over time to the health of a DeviceNet network.



## Lesson Description

Network reports are one of the simplest and most effective ways to have a last resort backup file documented. When you generate a network report, it collects all the data from your entire network, with every piece of information that you will need. This is usually only pulled out as a last resort for reference when mapping data, or when rebuilding a destroyed network.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe a network report and what it is for.
2. Identify the necessary steps to generate a network report from RSNetWorx.
3. Print the network report.
4. Save the network report.



```

$ Description: RightSight 420F Photoelectric Sensors Ser A, 1.0f
$ Last Changes: 2.0f   Par  10/30/05   Cfg Assy added, updated naming, vendor name,
$                                     2D Assy added, diagnostic enumeration, data types
$ Note: !!! Not compatible with old .det files !!!
$
$ Edit History:
$      1.0f   837   3/26/98   Created
$      1.02  Par  6/26/98   Updated with changes from NET
$      1.03  Par  10/28/98   Updated for Winnetworks alpha 2.50 parms 9,10,13,14,17 data type
$      1.05  Par  10/01/03   Help update/formatting, data types, bin
$      1.04  Par  05/17/05   Assy section added, Device Classification section
$      2.0f   Par  10/30/05   Cfg Assy added, updated param naming, vendor name, help,
$                                     2D Assy added, diagnostic enumeration, conformant data types, baudrate param
$
[File]
DescText = "RightSight 420F Photoelectric Sensor EDS File";
CreateDate = 07-30-2005;
CreateTime = 12-00-00;
ModDate = 10-10-2005;
ModTime = 11-00-00;
Revision = 2.0f; $ EDS revision.
HwswURL = "http://www.ab.com/networks/sw/06/0001000000000000.edf";

[Device]
VendCode = 0001;
VendorName = "Rockwell Automation/Allen-Bradley";

```

## Lesson Description

Electronic Data Sheets are simple text files used by network configuration tools to help you identify products and easily commission them on a network.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Define what and how Electronic Data Sheets are used on a DeviceNet network.
2. Discuss how to locate EDS files on the Rockwell Automation website.
3. Identify the catalog number for hardware that is needed to download EDS files.
4. Execute the download of EDS files for use on the DeviceNet network.

```

C:\WINDOWS\system32\notepad
File Edit Format View Help
[File]
DescText = "1756-080 1756 DeviceNet Scanner";
CreateDate = 05-04-2003;
CreateTime = 09:00:00;
ModDate = 08-21-2003;
ModTime = 09:00:00;
Revision = 12.6;
NameURL = "http://www.ab.com/networks/eds/03/001000000000.eds";

[Device]
VendorCode = 1;
VendorName = "Allen-Bradley";
ProdType = 32;
ProdTypeStr = "Communications Adapter";
ProdCode = 34;
PartRev = 32;
PartRevStr = 8;
ProdName = "1756-080";
Catalog = "1756-080";
Icon = "1756net.ico"; $ The Ethernet 1756 image is the same for DeviceNet
1_RSNetworks_0NetTool = "SubCfg_DeviceNetDevice";

[1_Scanner]
MemoryTables = 2; $ 1756
SlaveNode = 1; $ We support SlaveNode
SharedInputs = 1; $ We support SharedInputs
ADR = 0x00000; $ 1 Peg minus small overhead
KeyRevision = 1; $ We support Electronic Keying to the revision level
QuickConnect = 1; $ We support QC
AllInputTablesInRowNode = 1;

[Device Classification]
Class1 = DeviceNet;
Class2 = 1_RSNetworks_1756,1_RSNetworks_Net_Connectable_Module;

[Part]
Part1 = 1_1756_Chassis, "Backplane", "08 00 24 01",1; $ part name must be Backplane for RSLine

```

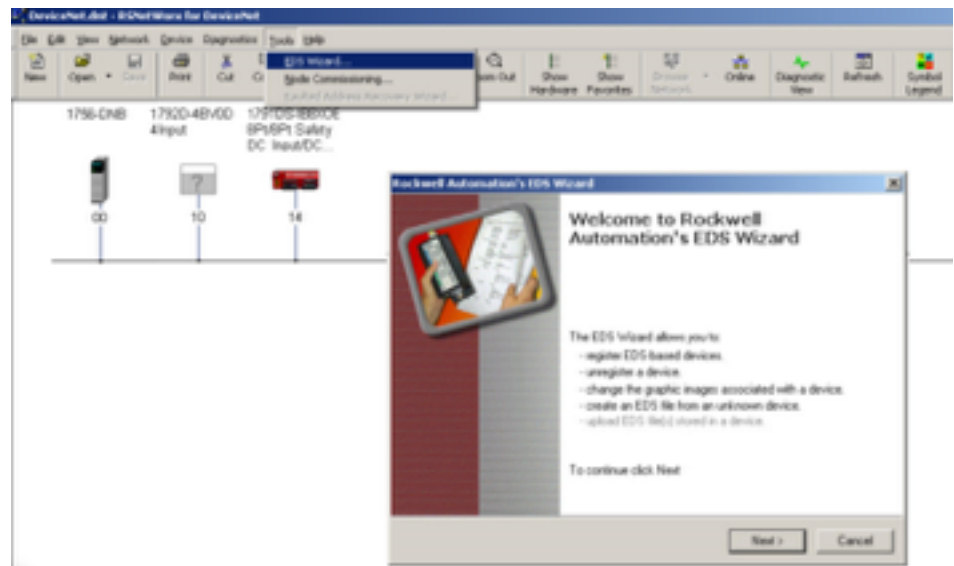
## Lesson Description

Electronic Data Sheets are simple text files that can be installed using Rockwell Automation's EDS Wizard and viewed with Notepad.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Locate the RsLinx EDS Hardware Installation Tool.
2. Describe the steps for installing EDS files using the WRSlinx EDS Hardware Installation Tool.



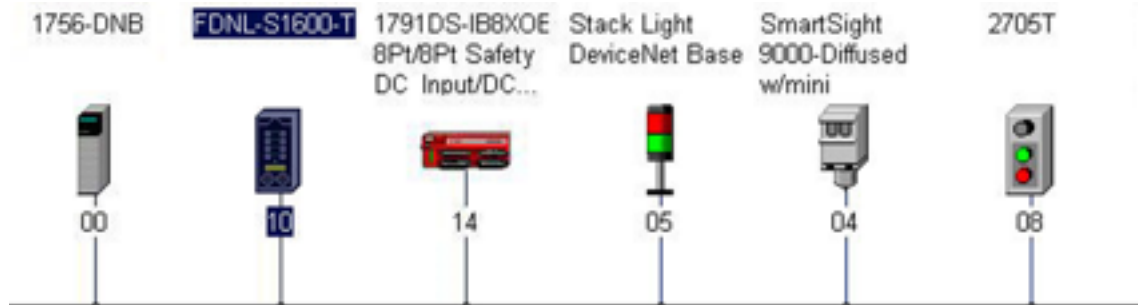
## Lesson Description

RSNetWorx EDS Wizard is software that is used to download and install EDS files, much like installing a print driver for your home computer.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Explain the purpose of the RSNetWorx EDS Wizard.
2. Describe the process for downloading and installing EDS files.



## Lesson Description

.ico files, or icon files are graphic representations of a device. Icons are created using special graphics software which creates .ico files that are 48 pixels wide by 48 pixels tall. Icons help you quickly identify devices with RSNetWorx for DeviceNet. While you could use one of the default icons, or a completely unrelated icon, icons that relate well to their respective devices are always best.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Explain why icon files are used on RSNetWorx for DeviceNet
2. Describe how icons can show up correctly when installing an EDS file
3. Demonstrate how icons can be selected or changed using the EDS Wizard



## Lesson Description

Control Flash is a software program provided by Rockwell Automation for the purpose of maintaining the firmware revisions of many different types of controllers and communication modules. Control Flash software uses RSLinx software also from Rockwell Automation to communicate on a network such as DeviceNet. This lesson describes the process of “Flashing” a device like the 1756-DNB, and details the caution that must be taken when performing this action.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Explain how to launch ControlFLASH.
2. Navigate through ControlFLASH.
3. Flash modules.



## Lesson Description

RSNetWorx software allows you to configure and view the communications between the 1756 DNB and the DeviceNet network via an ethernet network or in some cases USB. A scan list is created in RSNetWorx for the purpose of communicating between the controller and the nodes on the network. The scan list and the parameters of each node are saved in a .dnt file. When any node is replaced, the saved parameters are available to download to the new device.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Create a scan list utilizing RSNetWorx.
2. Discuss how to upload the configuration of a DeviceNet network and save it to a .dnt file.
3. Describe how to download the parameters saved in the .dnt file to a device that has been replaced.



## Lesson Description

Mapping involves assigning a unique address to each node on the network so they can communicate with the PLC, or Programmable Logic Controller. This lesson takes the learner step by step through process of mapping nodes using RSNetworx for DeviceNet.

## Lesson Scope

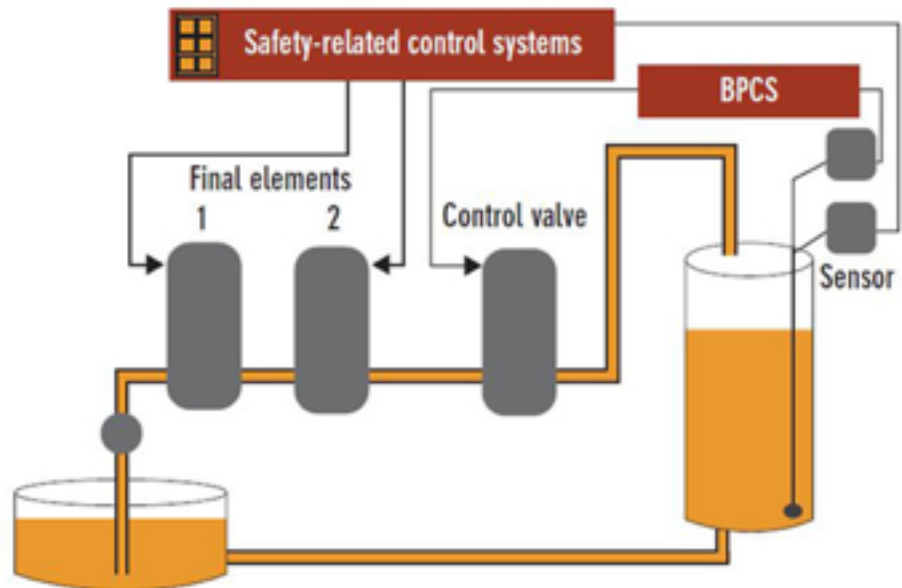
Learners who successfully complete this lesson should be able to:

1. Explain what node commissioning is.
2. Describe the process in RSNetWorx for assigning a unique input and output address to each node.



# GuardLogix





## Lesson Description

The Safety Instrumentation System is designed to be a separate control system that acts independently of personnel or other controls. SIS's are control systems that take the process to a safe state on detection of conditions that may be hazardous themselves, or if no action were taken, could eventually end up in a hazardous situation.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Demonstrate knowledge of safety systems and their origins.
2. Discuss the evolution of the safety system.
3. Explain the difference between standard and safety PLC's.



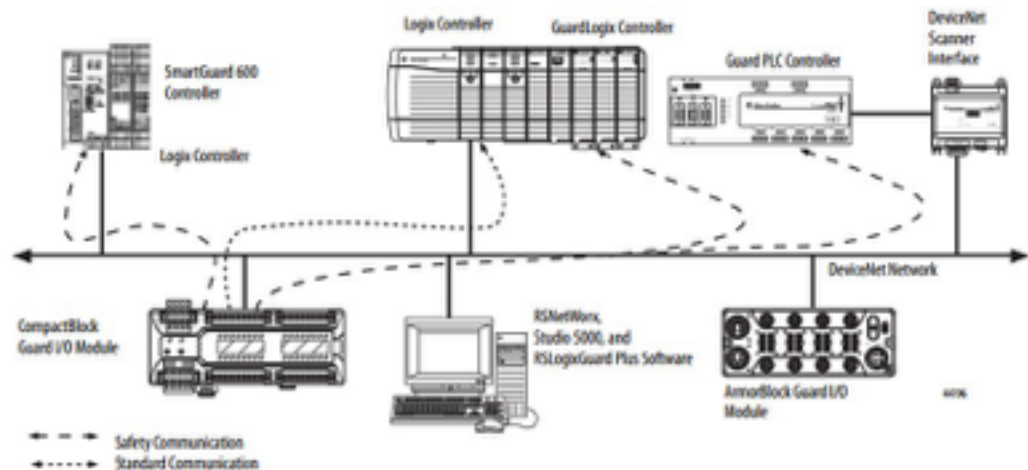
## Lesson Description

The GuardLogix controller isn't just a safety controller, it's a standard ControlLogix processor plus safety features that helps ensure SIL 3, PLe safety control. With its two-processor architecture (1oo2), the GuardLogix system consists of a safety primary and a safety partner processor. A system benefit is that it's still a single project. The safety partner is a part of the system and is automatically configured, with no setup, configuration or download to the safety partner required.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe various functions of a safety PLC and safety processor.
2. Describe the process involved in creating a controller project, setting a password, and monitoring the safety status.



Safety controllers control the safety outputs. Safety or standard PLC controllers can control the standard outputs.

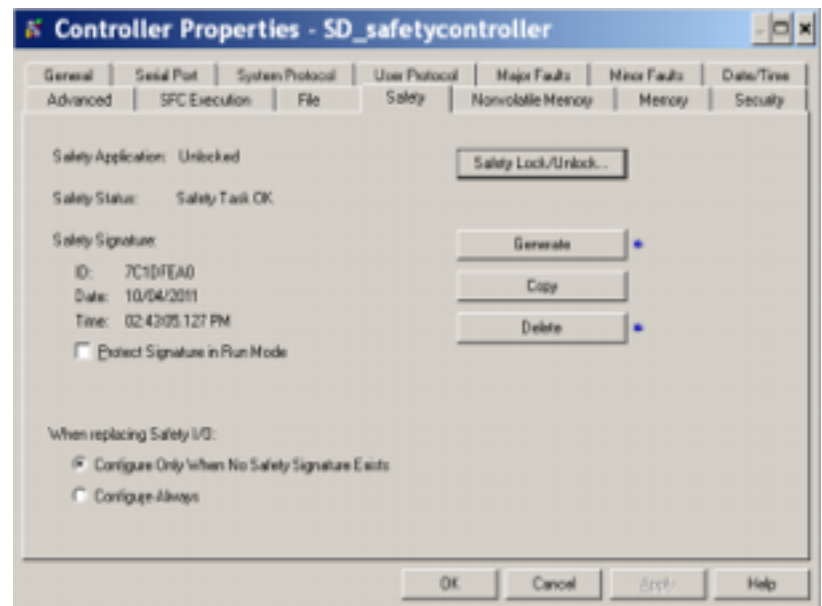
## Lesson Description

This lesson explains the proper procedures for mounting a safety module and how to correctly wire and clean it. The learner will discover how to set the node address using the rotary switches and how to add a module to the I/O configuration tree.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Demonstrate how to properly mount a safety module.
2. Describe how to correctly wire the communication connectors.
3. Explain how to set the node address.
4. Describe how to add a module to the I/O configuration tree..



## Lesson Description

The GuardLogix system uses the safety task signature to determine the project's integrity and to let you verify that the correct project is downloaded to the target controller. This lesson shows the learner how to safety lock and unlock the controller and how to generate a safety task signature.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Generate a safety task signature.
2. Safety-lock and unlock a controller.
3. Delete an existing safety task signature.



## Lesson Description

This lesson gives an overview of a Guard I/O module and all its components. The learner is shown how to recover from safety input and output faults.

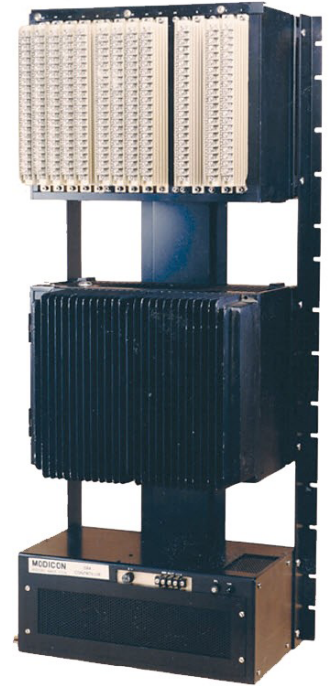
## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe what the 1791-DS Safety Module is and what it is used for.
2. Explain the difference between being On Delay and Off Delay.
3. Explain the process involved in recovering from a detected error.

# ControlLogix





### Lesson Description

This lesson is a history of automated control systems. It describes the control systems used prior to the introduction of the PLC, early examples of the first PLC's, and the evolution of the PLC to modern examples seen on the factory floor today.

### Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe automated controls utilized before PLC's.
2. Identify early PLC pioneers.
3. Explain early PLC models.
4. Describe basic PLC architecture and function.
5. Discuss the introduction of industrial communication protocols.
6. Discuss PLC programming advancements.





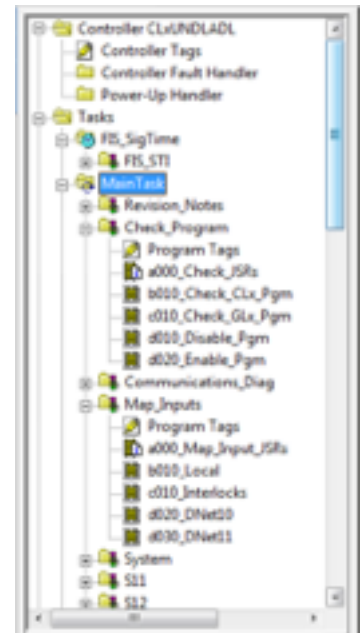
## Lesson Description

A control system is an industrial computer system that is programmed to automatically control processes or machines. A control system receives inputs, generates output information based on the inputs, and sends outputs to the process/machine. A Logix5000 control system is able to utilize multiple controllers, communications networks, I/O modules, and other associated devices to communicate and integrate various control applications. This lesson details the various components of a control system.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe how a Logix5000 control system functions.
2. Explain the modularity and expandability of ControlLogix systems.
3. Explain the types communications networks.
4. Identify the 1756 chassis, backplane, and power supply.
5. Describe the features of the Logix5000 series controllers.
6. Explain the Logix5000 input/output systems.
7. Discuss the programming systems of RSLogix5000 and RSLinx.



## Lesson Description

To configure and program a Logix5000 controller, you use RSLogix5000 software to create and manage a project for the controller. This lesson describes the Controller Organizer Window within the RSLogix5000 software and how to add a new input module to a project.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Discuss the capabilities of the RSLogix5000 programming software.
2. Explain the function of the Controller Organizer Window as a part of RSLogix5000.
3. Demonstrate adding and configuring a new input or output module to a project in RSLogix5000.
4. Explain I/O Addressing parameters.

10110111010101000110101011001000

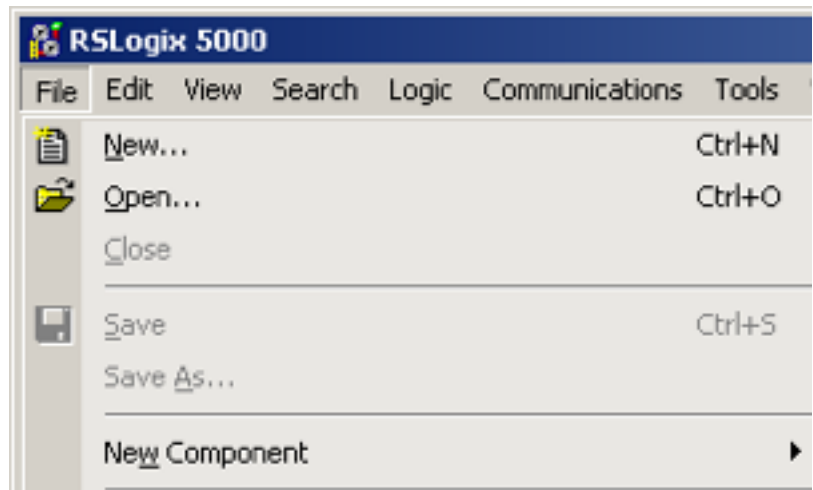
## Lesson Description

A data type is the definition of the size and layout of memory that will be allocated for storage of a tag's data. Each tag must have an assigned data type. This lesson describes the different data types and how they are used.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Explain the definition of a data type.
2. Discuss how data types relate to the controller's memory.
3. Differentiate between the different data type usages—predefined, user-defined, and module-defined.
4. Describe atomic data types.
5. Describe structure data types.



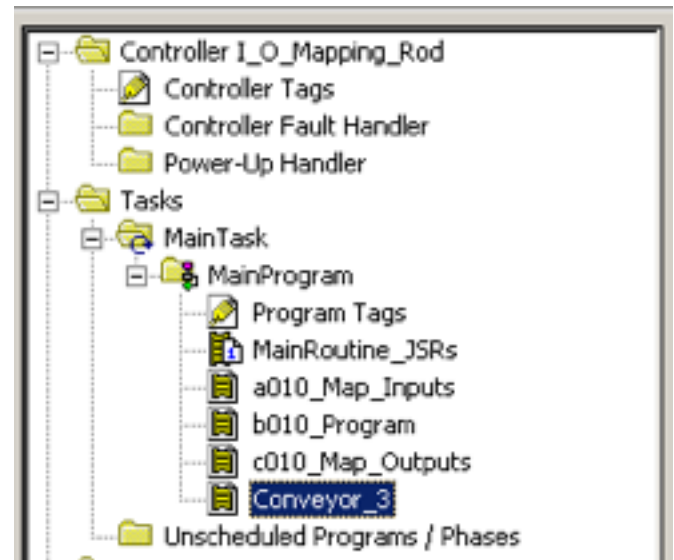
## Lesson Description

This lesson shows how to navigate through the various folders, windows, and commands in the RSLogix5000 software.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe different ways to navigate through RSLogix5000 software.
2. Explain several access keys and keyboard shortcuts.
3. Describe how to navigate the controller organizer and expand folders.



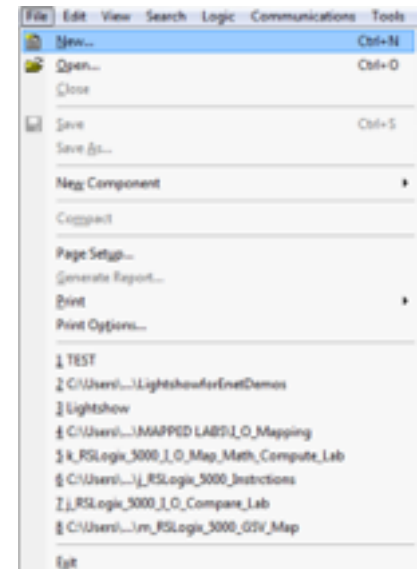
## Lesson Description

This lesson describes standard practices for the structure of a project in RSLogix5000.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Create a subroutine and add a JSR to the main routine.
2. Explain the direction in which the processor scans and executes instructions within routines.
3. Describe AFI's, TND's, JMP's, and LBL's and their uses in the main routine and subroutines.



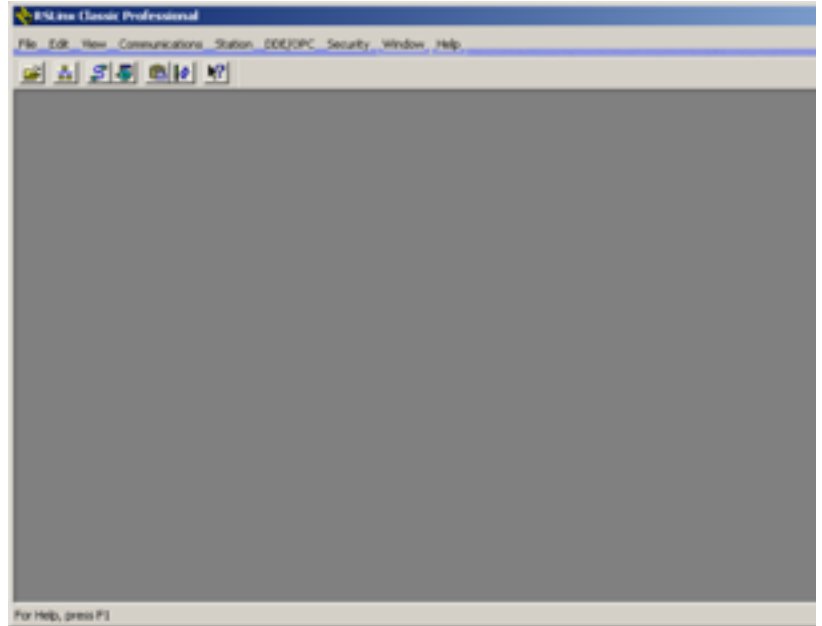
## Lesson Description

This lesson explains how to create a new project within RSLogix5000 and shows the steps for adding a new controller and adding a module to the bus.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe the process of opening RSLogix5000 and creating a new project.
2. Explain the process of changing the revision, name, and security authority of a new controller.
3. Describe the process involved in adding a module to the bus.



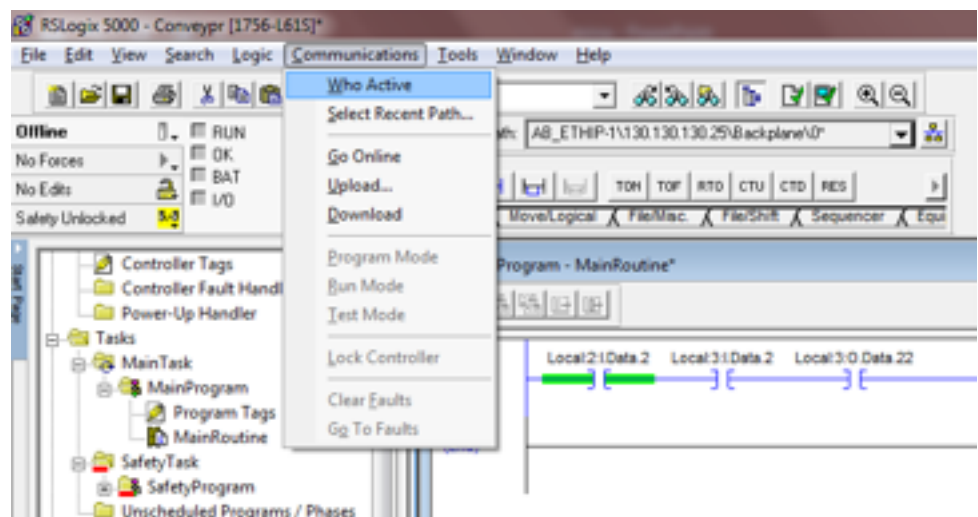
## Lesson Description

Configuring an Ethernet driver with RSLinx will allow communication between any pieces of equipment that have Ethernet built into them. This lesson shows step by step how to configure an Ethernet driver in RSLinx.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Explain the steps involved in configuring Ethernet drivers for RSLinx.
2. Describe the process to add additional IP address entries into RSLinx.
3. Configure Ethernet drivers using RSLinx.



## Lesson Description

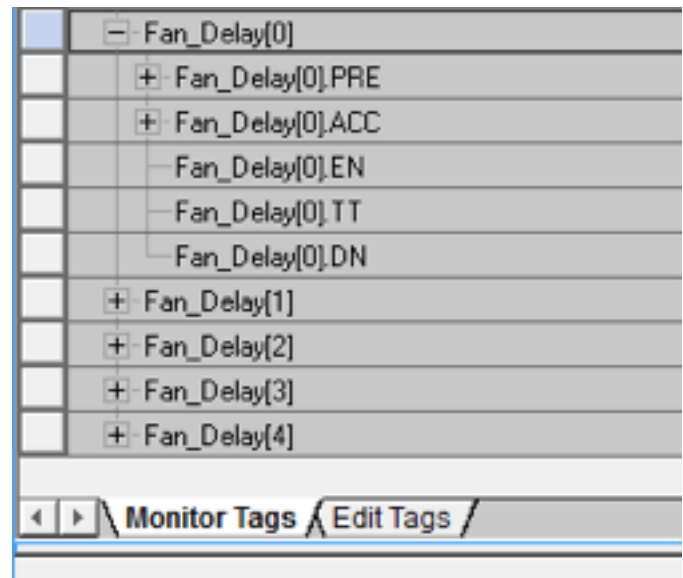
To upload is to transfer a copy of a project file from a controller to a computer over a network. To download is to transfer a copy of a project file from a computer to a controller over a network. This lesson shows the steps for uploading, downloading, and going online with the controller.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Upload and download project files over a network.
2. Go online with the controller.





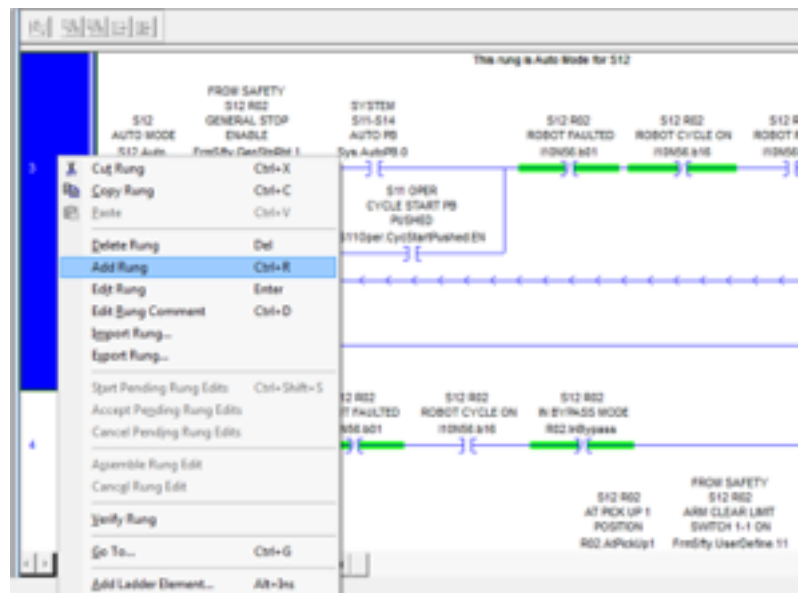
## Lesson Description

A tag is a text-based name for an area of memory. By using a text-based system you can use the name of the tag to document your ladder code and organize your data to mirror your machinery. For example, you could create a tag named Coat\_Tank\_Pressure. This helps to speed code generation and debugging. All tag names are stored in the controller. This lesson demonstrates how to create tags and how they are used within RSLogix5000.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe the different kinds of tags and data types.
2. Identify the relationship between tags and arrays.
3. Store and organize data through the use of tags and arrays.
4. Navigate through the Monitor Tags and Edit Tags windows.



## Lesson Description

There are numerous methods for entering ladder logic instructions into routines of the project. This lesson shows how to add various contacts and coils and create relationships to controller tags in RSLogix5000.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Enter and edit bit level instructions and tags.
2. Copy, cut and paste instructions and rungs.
3. Enter and edit branch instructions.
4. Explain how to add branches to rungs.



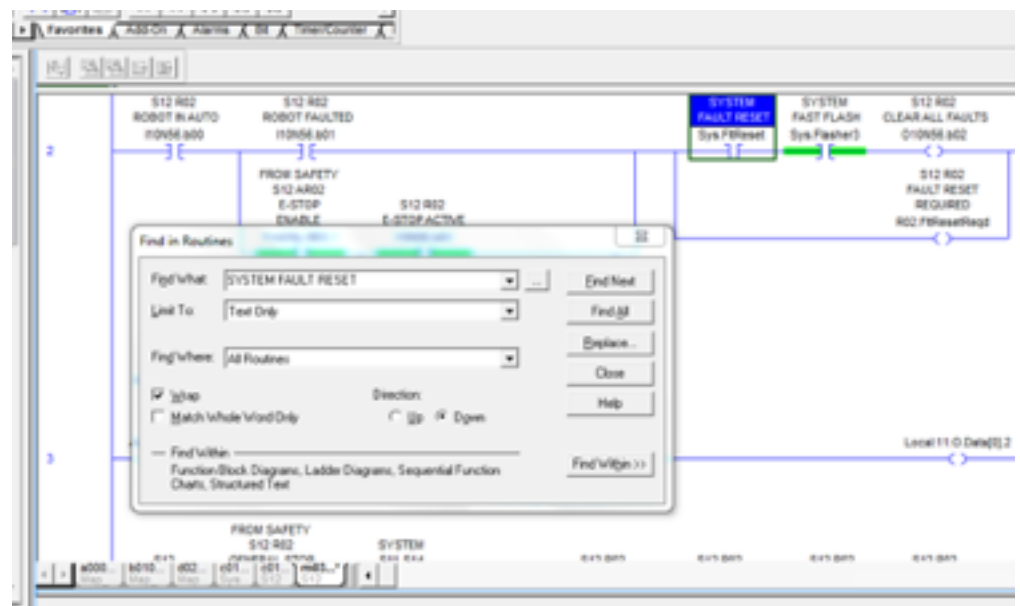
## Lesson Description

This lesson shows the learner how to enter and edit both rung comments and tag descriptions within RSLogix5000.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Add and modify rung comments.
2. Add and modify tag descriptions.
3. Describe the difference between rung comments and tag descriptions.
4. Explain the different workstation options for the Ladder Editor.



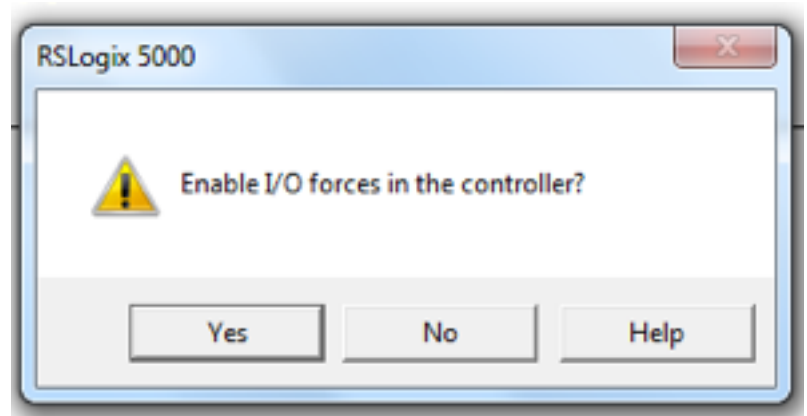
## Lesson Description

This lesson shows the learner how to find specific items in an RSLogix5000 project using various search parameters. The “Find” function will search all routines for the selected search item.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Find, cross reference, go to and browse the logic.
2. Add and browse bookmarks.



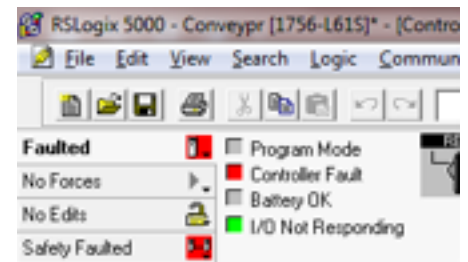
## Lesson Description

RSLogix5000 software can force or override and change the state of actual input and output field devices. This lesson shows the learner how to use forcing and toggling to change the state of specific bits in the logic.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Identify the force light states on a controller.
2. Discuss the risk involved when forcing I/O on a controller.
3. Explain what the different symbols in the Forces box indicate in RSLogix5000
4. Force bits on or off.
5. Toggle bits on or off.



## Lesson Description

A Major Fault means the controller experienced a fault within the hardware and will shutdown and you must repair or replace the controller. A Minor Fault is a condition that is not severe enough for the controller to shut down. This lesson shows the user how to handle major and minor faults and how to set the minor fault bit and continue the scan.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Identify and clear major faults.
2. Identify and clear minor faults.
3. Differentiate between minor and major faults.



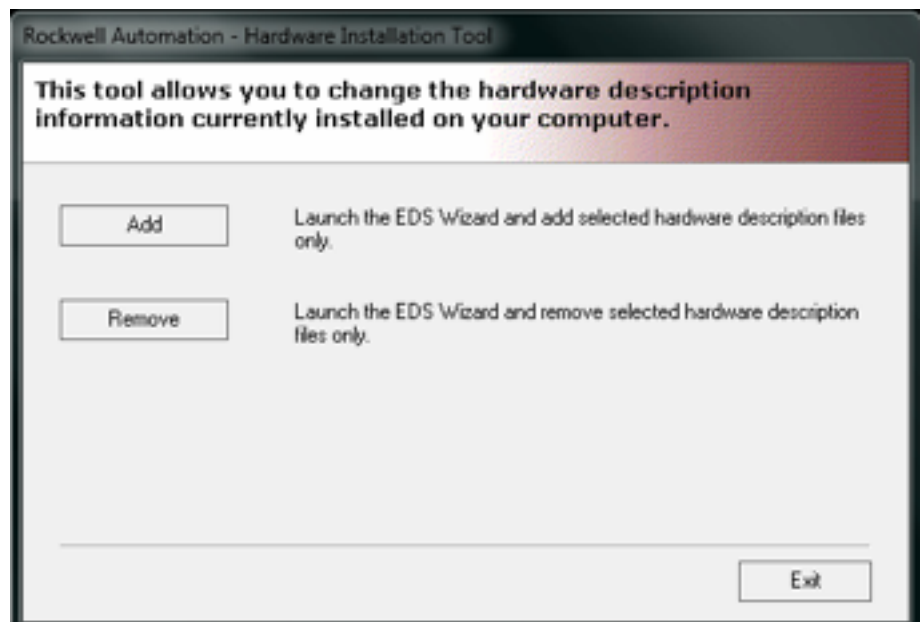
## Lesson Description

Control Flash is a software program provided by Rockwell Automation for the purpose of maintaining the firmware revisions of many different types of controllers and communication modules. Control Flash software uses RSLinx software also from Rockwell Automation to communicate on a network such as DeviceNet. This lesson describes the process of “Flashing” a device like the 1756-DNB, and details the caution that must be taken when performing this action.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Explain how to launch ControlFLASH.
2. Navigate through ControlFLASH.
3. Flash modules..



## Lesson Description

Electronic Data Sheets are simple text files used by network configuration tools to help you identify products and easily commission them on a network. This lesson shows the learner how to use Rockwell Software RSLinx to install EDS files.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Define EDS and describe what EDS files are.
2. Download EDS files.
3. Install EDS files using the RSLinx EDS Hardware Installation Tool.



# Ethernet





## Lesson Description

Ethernet was first described in 1973 as a system for interconnecting advanced computer workstations. This emerging technology found its way into the auto industry as a way for device networks to communicate on the factory floor. Ethernet evolved over time to become the standards that we are familiar with today.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Explain the history and origin of Ethernet and Ethernet Standards.
2. Identify different types of Ethernet including Ethernet over fiber.
3. Describe the function of an RJ45 Connector.
4. Discuss the features and function of HDMI and DOCSIS.

```
Microsoft(R) Windows DOS
(C)Copyright Microsoft Corp 1998-2001.

C:\DOCUMENT~1\CHAD\DESKTOP>ping www.youtube.com

Pinging youtube-ui.l.google.com [74.125.127.113] with 32 bytes of data:

Reply from 74.125.127.113: bytes=32 time=53ms TTL=247
Reply from 74.125.127.113: bytes=32 time=55ms TTL=247
Reply from 74.125.127.113: bytes=32 time=54ms TTL=247
Reply from 74.125.127.113: bytes=32 time=53ms TTL=247

Ping statistics for 74.125.127.113:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 53ms, Maximum = 55ms, Average = 53ms

C:\DOCUMENT~1\CHAD\DESKTOP>
```

## Lesson Description

Networked computers exchange data with each other using a data link. The ping command helps verify connectivity and is used whenever you need to verify that a host computer can connect to the TCP/IP network and network resources.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Explain the function of networks.
2. Describe the function of IP CONFIG in the command prompt window.
3. Assess PING response time and options.
4. Run PING and interpret results.

```
Network          Next Hop          Metric LocPrf Weight Path
r 10.6.6.6/32     10.6.6.6         0      0 65006 1
*> 10.7.7.7/32    10.6.6.6         391    0 65006 1
*> 10.8.8.8/32    10.6.6.6         391    0 65006 1
*> 10.9.9.9/32    10.6.6.6         392    0 65006 1
* 10.99.99.0/28   10.6.6.6         0      0 65006 1
* 10.200.200.0/24 10.6.6.6         0      0 65006 65000 1
*> 172.17.78.0/28 10.6.6.6         0      0 65006 1
* 172.30.0.0      10.6.6.6         0      0 65006 65000 1
* 172.31.1.0/24   10.6.6.6         0      0 65006 65000 1
* 172.31.2.0/27   10.6.6.6         0      0 65006 65000 1
* 172.31.3.0/25   10.6.6.6         0      0 65006 65000 1
* 172.31.4.0/26   10.6.6.6         0      0 65006 65000 1
* 172.31.5.0/28   10.6.6.6         0      0 65006 65000 1
* 172.31.6.0/24   10.6.6.6         0      0 65006 65000 1
* 172.31.7.0/24   10.6.6.6         0      0 65006 65000 1
* 172.31.8.0/24   10.6.6.6         0      0 65006 65000 1
* 172.31.9.0/24   10.6.6.6         0      0 65006 65000 1
--More--
```

## Lesson Description

Routing tables are data tables that are stored in routers or a networked computer. It is a database that allows the gateway to provide information to the node requesting information. The “Route” command is used to view and manipulate the IP routing table in Microsoft Windows operating systems.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Explain routing tables and the information contained in them.
2. Describe the route command and route command options.
3. Identify the route print command and route print options.
4. Differentiate options, or flags associated with the route command.



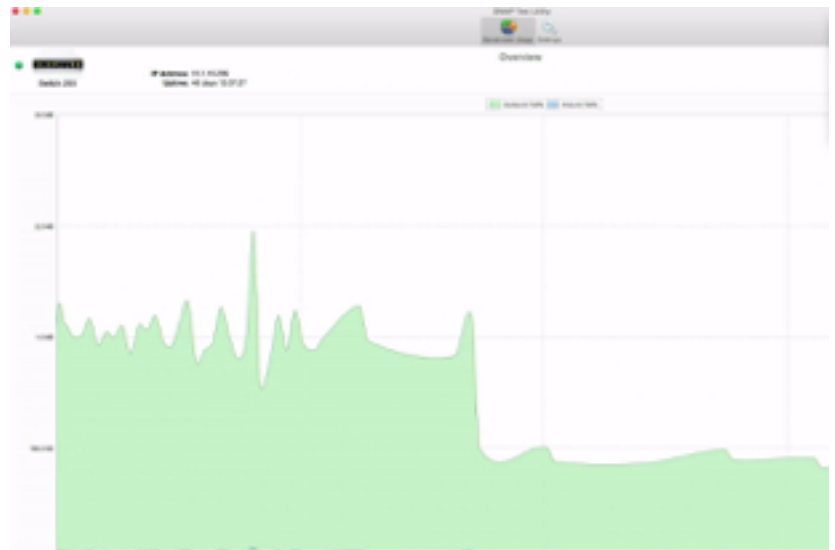
## Lesson Description

Ethernet crossover cables, often called “null cables” are a type of Ethernet cable used to connect two devices of the same type. Ethernet crossover cables can be made and tested easily by closely following this guide.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe uses and standards for crossover cables.
2. Examine the function of a terminal device.
3. Understand connections over fiber.
4. Describe the materials involved in the making of a crossover cable.
5. Examine step-by-step the process of making and testing a crossover cable.



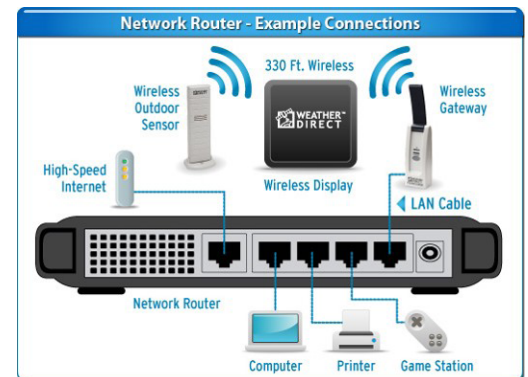
## Lesson Description

This lesson identifies various network monitoring tools which can be utilized to monitor traffic and maintain the health of the network.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe an Ethernet sniffer.
2. Explain the basics of Wireshark.
3. Utilize various network performance monitoring tools such as a port scanner, interface monitoring, packet flow monitoring, and the SNMP protocol.



## Lesson Description

In this lesson, we are going to cover the features - uses, advantages and disadvantages of unmanaged switches, managed switches, routers and hubs. We will also compare and contrast their interchangeability.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Differentiate between switches, routers, and hubs.
2. Explain when and where switches, routers, and hubs should be used on a network.
3. Determine when switches, routers, and hubs can be interchangeable.

128	64	32	16	8	4	2	1
0	0	0	0	0	0	0	0
$2^8$	$2^7$	$2^5$	$2^4$	$2^3$	$2^2$	$2^1$	$2^0$

## Lesson Description

Subnetting allows your network to run faster. Subnetting reorganizes your network to make it more secure. Charts help you to convert binary numbers to decimal and vice versa. This helps when subnetting your network. Each device must have its own IP address for it to communicate on the network.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Convert binary to decimal and vice versa.
2. Determine available IP addresses given a used address.





## Lesson Description

All switches have LED indicators to communicate with the controller. This lesson takes a closer look at the LEDs on the switch and its ports.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe the features of a network switch.
2. Assess what the switch LEDs are communicating.
3. Explain what the port LEDs are communicating.



### Lesson Description

The 1756-ENBT module has three indicator lights that identify operation and problems. In this lesson, we identify and describe the meaning of these indicator lights. Understanding them can help you properly troubleshoot a malfunctioning network.

### Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe the characteristics of the 1756-ENBT module
2. Discuss the meaning of the three LED indicator lights on the 1756-ENBT module



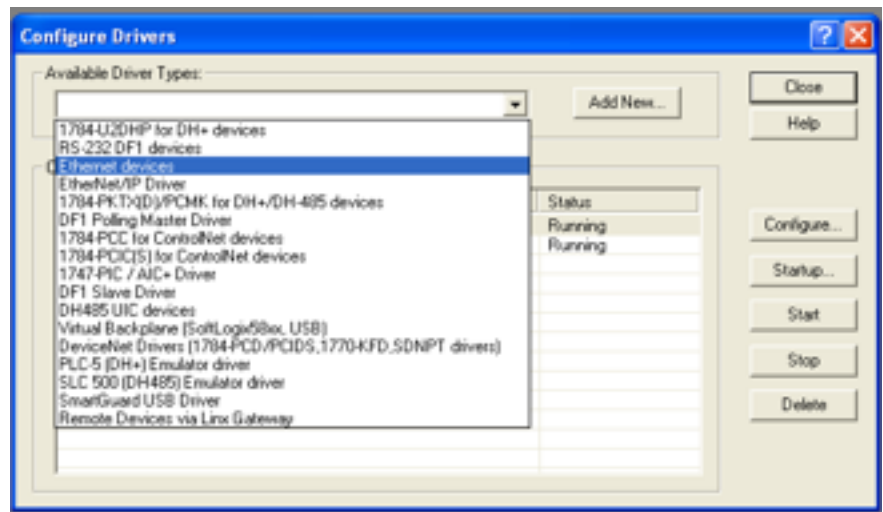
## Lesson Description

Devices send and receive information in several different ways; sometimes through cabling and sometimes wirelessly. This lesson will focus on wired connections as well as two different systems of wireless data exchanging: full-duplex systems and half-duplex systems.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Examine the difference between “Duplex” and “Simplex” systems.
2. Describe types of wiring and cabling, including twisted pair, shielded wiring, Ethernet crossover cables, and patch cables.
3. Examine the differences between half-duplex and full-duplex Wsystems.
4. Examine LAN (Local Area Network) technology.



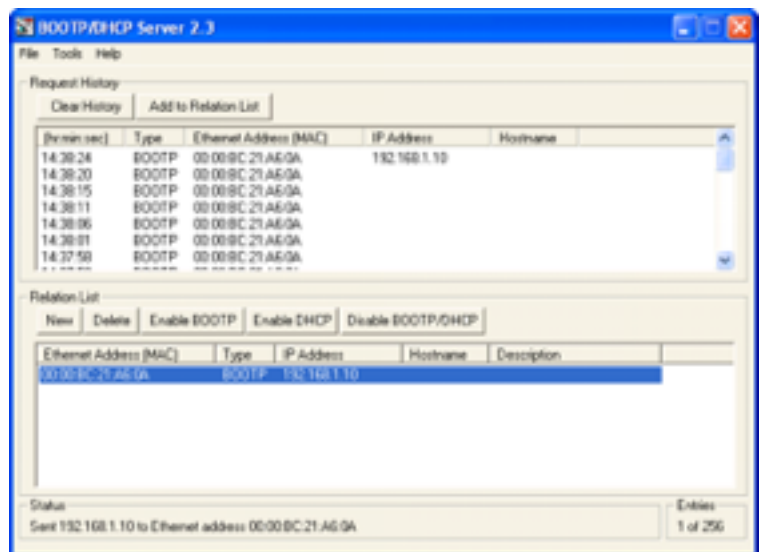
## Lesson Description

In this lesson you will learn how to discover available Ethernet drivers and how to configure the Ethernet drivers both manually and automatically.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Determine the available Ethernet drivers.
2. Configure the Ethernet drivers.
3. Compare manual configured and automatic configured Ethernet



## Lesson Description

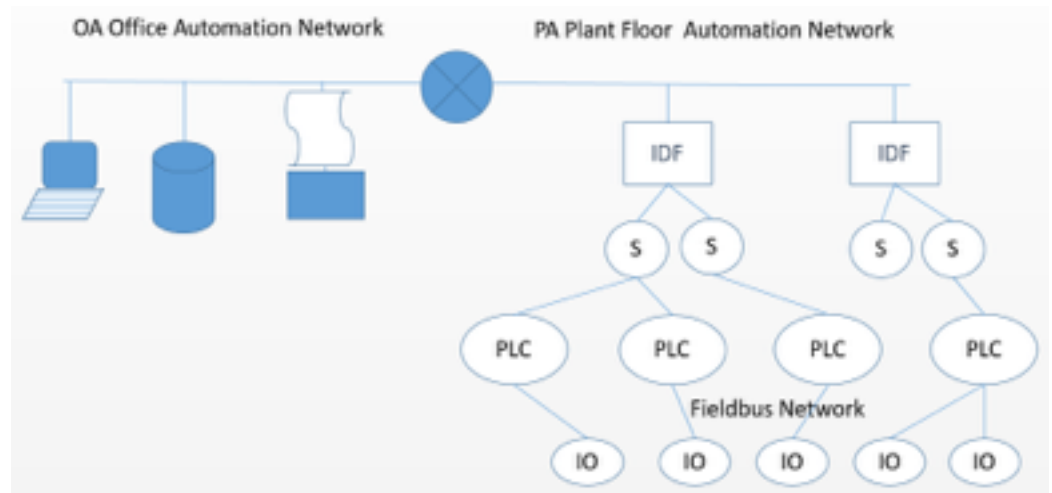
We are going to cover how to launch the BootP server on the computer and how to create a relationship between the MAC ID of an Ethernet device and an IP address.

You should understand how to launch BootP and use it to create relationships between MAC ID's and IP addresses, and know how to disable BootP for the relationship that was created so that the device does not lose its IP address.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Launch the BootP Server.
2. Create a relationship between the MAC ID and IP address of an Ethernet device to send to the server.
3. Disable BootP so that the MAC ID—IP address relationship is maintained.



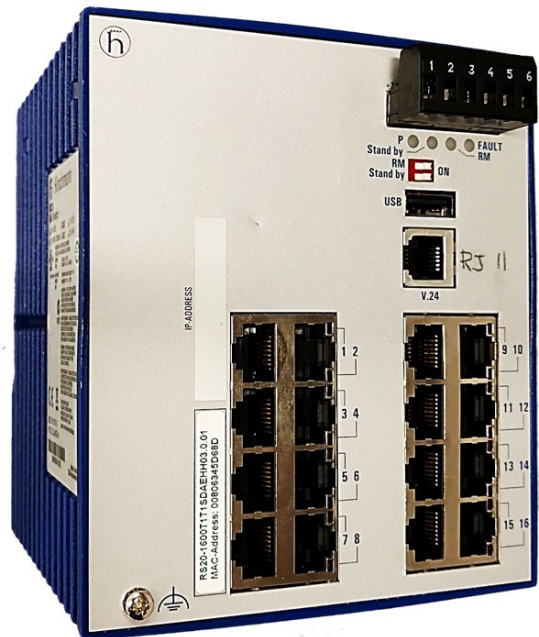
## Lesson Description

In this lesson, we are going to have an overview of Chrysler's typical Ethernet media types, lengths, node number limits, and data rates. This includes the types of cabling, terminations, connectors like the RJ45, M12, etc.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Identify the different Ethernet media types typically used by Chrysler.
2. Assess the data rates for each of the Ethernet media types typically used by Chrysler.
3. Explain the node number limits used for Chrysler networks.



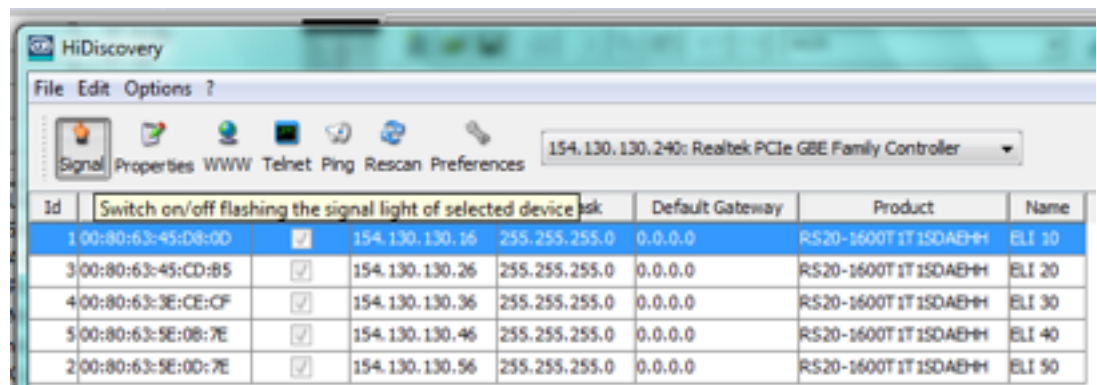
## Lesson Description

In this lesson you will learn how to discover available Ethernet drivers and how to configure the Ethernet drivers both manually and automatically.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Remove and replace the Ethernet switch.
2. Set the correct IP address, subnet mask, and default gateway.
3. Load the correct configuration file.



The screenshot shows the HiDiscovery application window. At the top, there is a menu bar with 'File', 'Edit', and 'Options'. Below the menu bar is a toolbar with icons for 'Signal', 'Properties', 'WWW', 'Telnet', 'Ping', 'Rescan', and 'Preferences'. A dropdown menu is open, showing the selected device: '154.130.130.240: Realtek PCIe GBE Family Controller'. Below the toolbar is a table with the following columns: 'Id', 'Switch on/off flashing the signal light of selected device', 'Ip', 'Default Gateway', 'Product', and 'Name'. The table contains five rows of data, all with checked boxes in the second column.

Id	Switch on/off flashing the signal light of selected device	Ip	Default Gateway	Product	Name	
1	<input checked="" type="checkbox"/>	154.130.130.16	255.255.255.0	0.0.0.0	RS20-1600T1T1SDAETH	ELI 10
3	<input checked="" type="checkbox"/>	154.130.130.26	255.255.255.0	0.0.0.0	RS20-1600T1T1SDAETH	ELI 20
4	<input checked="" type="checkbox"/>	154.130.130.36	255.255.255.0	0.0.0.0	RS20-1600T1T1SDAETH	ELI 30
5	<input checked="" type="checkbox"/>	154.130.130.46	255.255.255.0	0.0.0.0	RS20-1600T1T1SDAETH	ELI 40
2	<input checked="" type="checkbox"/>	154.130.130.56	255.255.255.0	0.0.0.0	RS20-1600T1T1SDAETH	ELI 50

## Lesson Description

This lesson shows the learner how to use the program HiDiscovery to monitor switch operation and back up configurations settings of a switch. Configuration settings can be stored within HiDiscovery and also on an external USB device known as an AutoConfiguration Adapter.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Use the program HiDiscovery to monitor an Ethernet switch.
2. Use the program HiDiscovery to backup an Ethernet switch.
3. Discuss use of the Hirschmann Memory Stick as an alternate method to reconfigure an Ethernet switch.





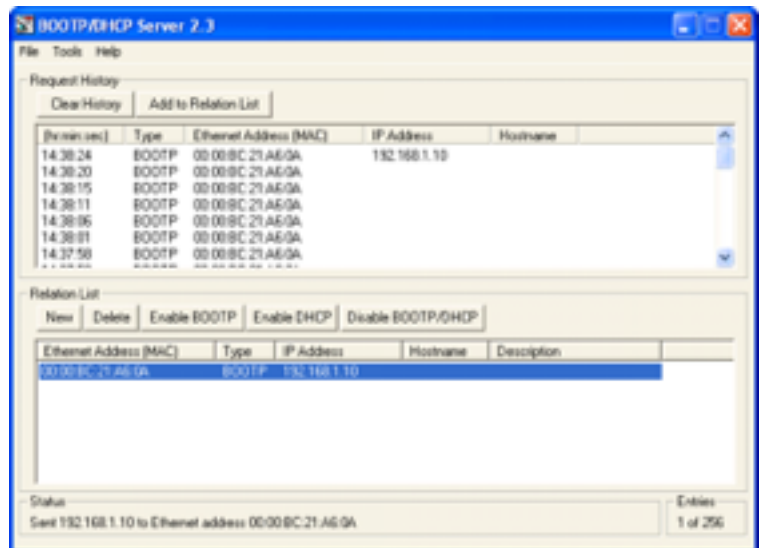
## Lesson Description

There are several methods to add a PowerFlex 755 drive to the network. The rotary switches found in the Ethernet card of the drive can be used to manually set the IP address. An IP address can be automatically assigned to the drive using a BootP server. In this lesson, we will demonstrate how to add the drive to the network using the HIM or Human Interface Module.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Set the rotary switches on the Ethernet adapter correctly.
2. Navigate to the PowerFlex 755 in the HIM.
3. Disable BootP using the HIM.
4. Enter the IP address for the drive using the HIM.
5. Confirm IP address in the HIM.
6. Enter the subnet mask for the drive using the HIM.



## Lesson Description

In this lesson, we are going to use BOOTP/DHCP to reconfigure a PowerFlex 755, whose IP address is unknown or must be changed.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Set the rotary switches on the Ethernet adapter correctly.
2. Connect the 755 drive to the computer.
3. Launch the BootP Server.
4. Create a relationship between the MAC address and IP address of the PowerFlex 755 to send to the server..



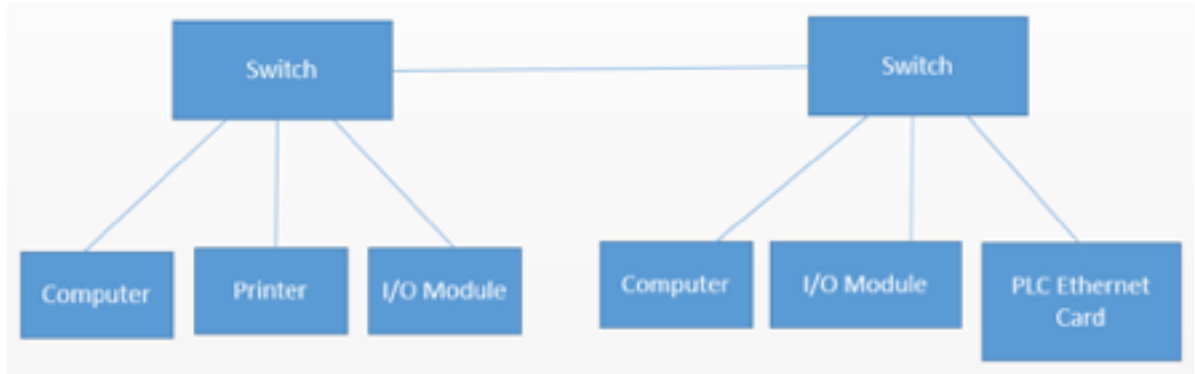
## Lesson Description

In this lesson, we are going to add an Ethernet I/O Module to the existing Network, verify its connection through RSWho and configure the I/O to the controller through RSLogix 5000 software.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Add an I/O Module to the existing Network.
2. Configure the I/O to the PLC.



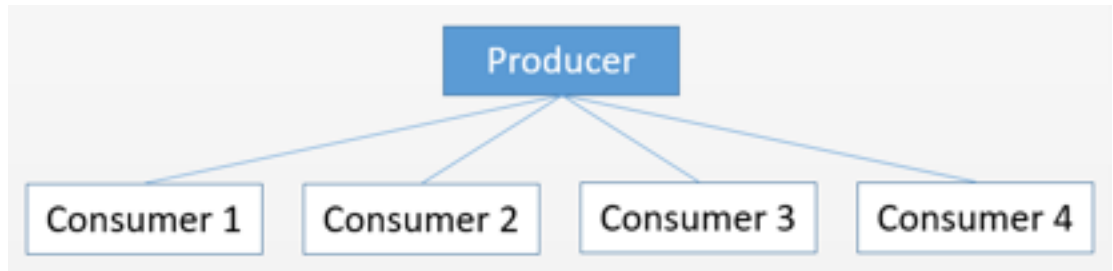
## Lesson Description

In this lesson, we are going to build a network, verify its connections and set all addresses & port settings.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe how to change and set the IP address on 1756-EBNT cards
2. Explain how to set and reset the IP address on I/O modules
3. Discuss how to set the IP address on a computer
4. Set up a network with two switches and six devices.
5. Set up all addresses and ports for the network devices.



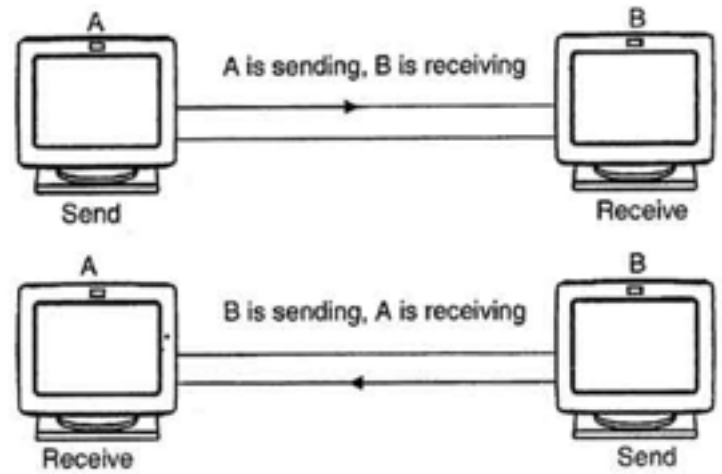
## Lesson Description

Tags are the method used in RSLogix5000 to share data between controllers. A tag intended to be read by other controllers is called a “produced tag.” A tag whose values are read from a remote produced tag is a “consumed tag.” In this series of four lessons you will learn how to set up produce and consume tags.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Add a Local and Remote Ethernet/IP Module to an I/O Configuration.
2. Add a Controller to an I/O Configuration.
3. Configure a Produced and Consumed Tag.
4. Monitor Tags.



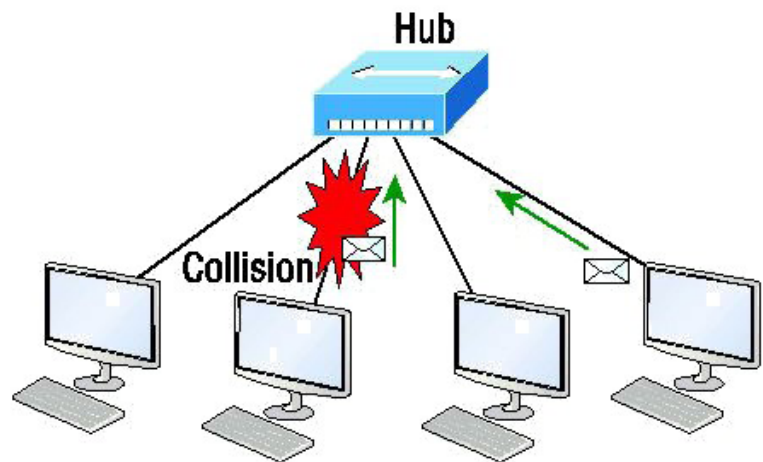
## Lesson Description

CSMA/CD, or Carrier Sense Multiple Access With Collision Detection, is a method of media access control that was used in early Ethernet technology. CSMA/CD uses a carrier sensing scheme in which a transmitting station detects collisions by sensing transmissions from other stations while transmitting a frame.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Discuss the meaning of the CSMA/CD and how it affects Ethernet.
2. Compare how full-duplex and half-duplex affects CSMA/CD and how a new system with switches and full-duplex does not require CSMA/CD today.
3. Explain how the Ethernet LED's on a computer relate to CSMA/CD and bus traffic.



## Lesson Description

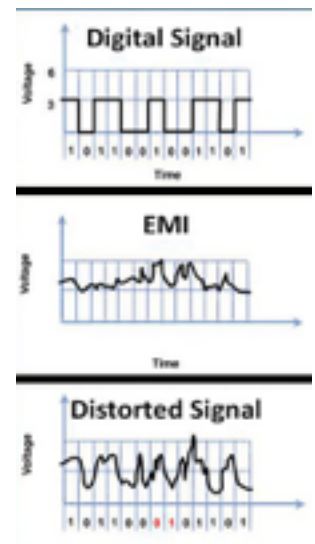
Network collisions occur on networks running in half duplex mode. On a half-duplex network, only one device can be sending information at any given time. A network collision occurs when two devices attempt to communicate simultaneously. When this happens neither message is transmitted on that frame. Thankfully, half duplex mode is largely a thing of the past, when networks were made up of hubs and coaxial cabling.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe network conditions that lead to packet collisions.
2. Compare and contrast half duplex and full duplex modes.
3. Describe segmentation and load sharing as ways to minimize collisions on a half duplex network.
4. Utilize the Hirschmann switch software interface “Railswitch” to determine if collisions or late collisions are occurring and on which ports of the switch.
5. Utilize Hirschmann Railswitch to determine if devices are operating in half duplex or full duplex mode.

## Lesson Description



In this lesson we cover the symptoms and causes of electromagnetic interference (EMI) and how to eliminate them, how to recognize damaged and poorly constructed modular connectors, how to test a NIC card to verify it is operational, how to locate duplicate IP addresses on the network, and identify the cause of any collisions or late collisions. Upon completion of this lesson you should be able to troubleshoot common network failures and be capable of transforming a poorly performing network into an efficient network.

## Lesson Scope

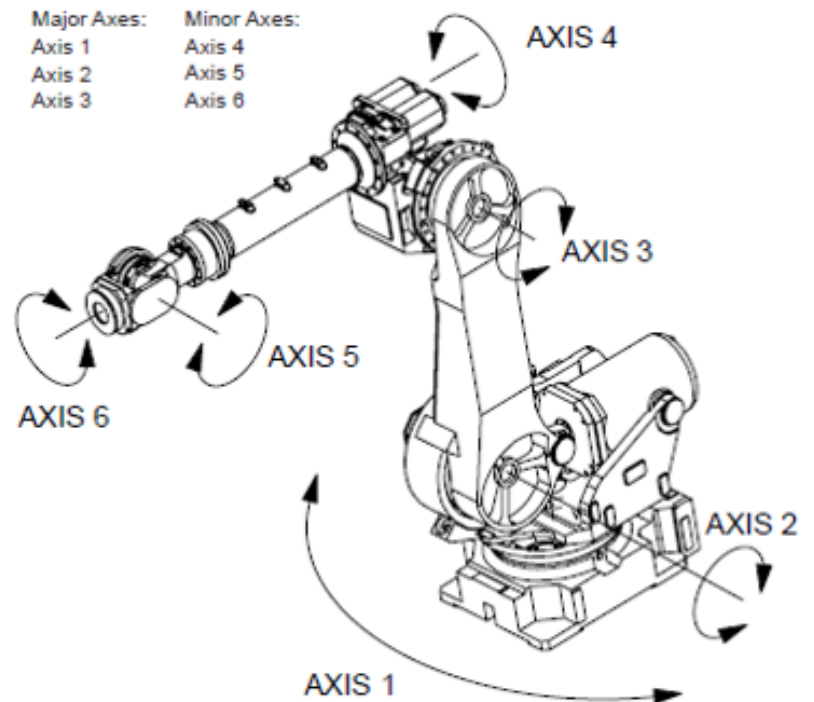
Learners who successfully complete this lesson should be able to:

1. Electromagnetic interference
2. Damaged cables/connectors
3. Bad NIC card
4. Duplicate IP addresses on the same subnetwork
5. Packet collisions and late collisions



# Robots





## Lesson Description

In this course, the student will start off learning the different methods available for jogging FANUC robots. The students will learn about World, Tool, User, and Joint mode movement, as well as the cartesian coordinate system. This lesson also covers recovery from common faults associated with FANUC robots, as well as identifying common components used with the robotic systems.

## Lesson Scope

This lesson examines the learner's ability to identify the different methods used to jog a FANUC Robot.

1. FANUC Equipment Overview
2. Jogging
3. Joint Jogging
4. Coordinates
5. World Jogging
6. Tool Jogging
7. User Jogging
8. Troubleshooting



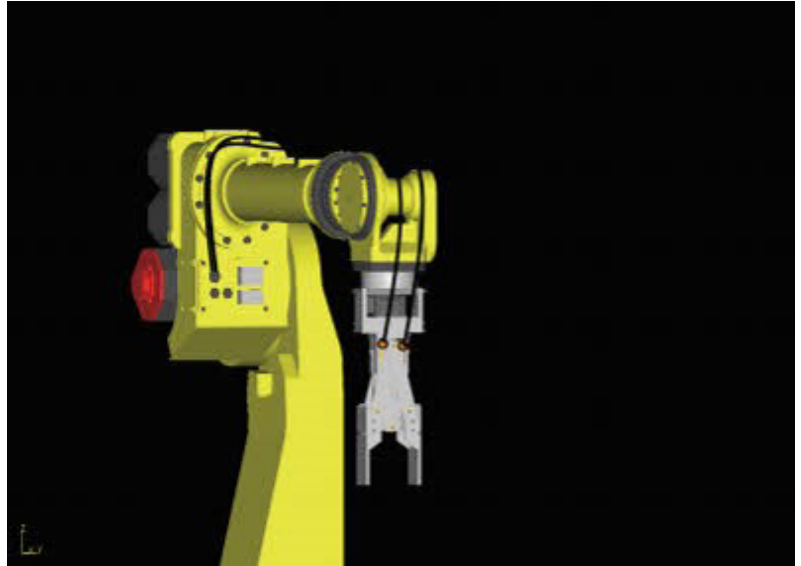
## Lesson Description

The student will be taught the importance of the home position in this course, as well as the different methods for sending the robot to the home position. These include stepping the robot forward/backward through the program, running a macro, or running the home position routine. This course will also outline the position register, and the advantage of using it to retain commonly used points.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe why home position is important
2. Determine if the robot is at “home” position
3. Understand a position register and its advantage over a point
4. Return the robot to home position to start a new cycle
5. Determine best way to move the robot home by:
  - a. Stepping the robot forward or backward to home position
  - b. Running a move home macro or routine



## Lesson Description

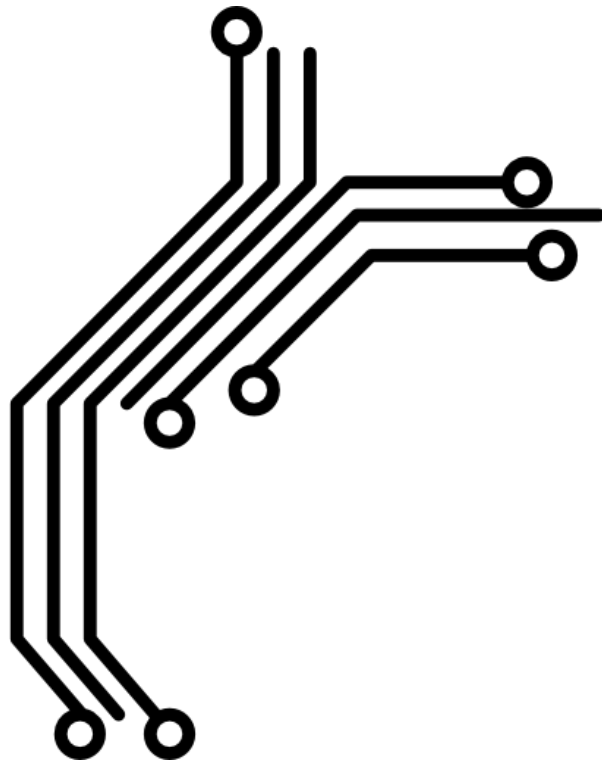
This course is designed to teach the student basic manipulation of the End-of-arm-tooling on FANUC robots by manually controlling the valves. The course also covers how to work with the analog, digital, group, and robot I/O, covering topics such as simulating I/O for troubleshooting purposes and robot end of arm manipulation.jpg monitoring the different signals for accuracy.

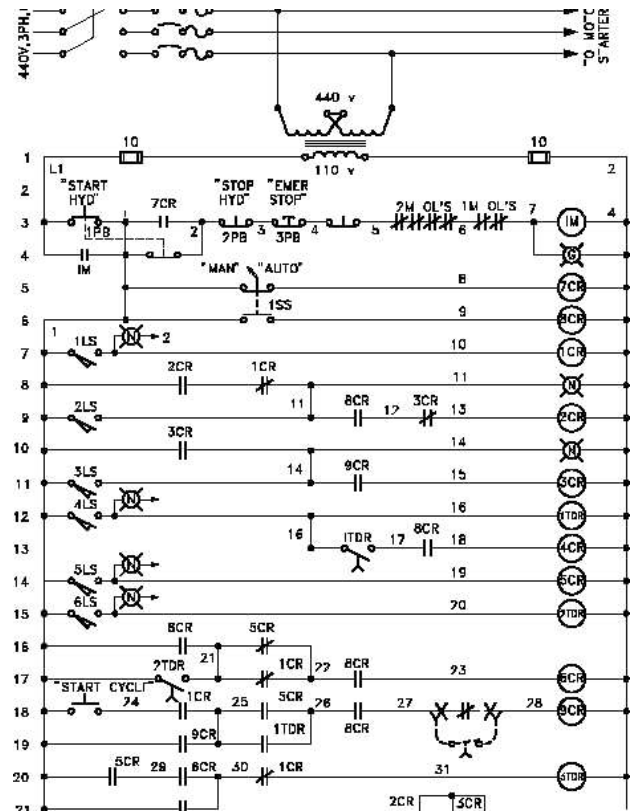
## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe how to manually actuate End of Arm Tooling (EOAT)
2. Explain the analog, digital, robot and group inputs and outputs.

# Prints





## Lesson Description

In Basic Print Reading, we will teach to the student the different symbols used in prints, and explain the electric, pneumatic, and hydraulic components they may encounter within a set of prints. Also covered are the different sections of a set of prints (such as the index, machine layout, and BOM, for example), and how to use a set of prints to troubleshoot faults or discover other various discrepancies with a machine.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe the different types of prints
2. Explain the basic layout of a print
3. Describe the information included in a print
4. Identify common symbols used on prints
5. Interpret drawings



# Machine Operation





## Lesson Description

The focus of this course is on fault recovery, and the modes of operation and standard sequences for starting the machine. Identification of the most common faults (15+) a student will encounter, as well as the recovery procedures for each, are outlined in this course. The students will then be given the opportunity to complete hands-on, HMI-based exercises. These exercises are developed (and instructor-led) to solidify understanding through practical use of the equipment, as they would encounter in day-to-day activity.

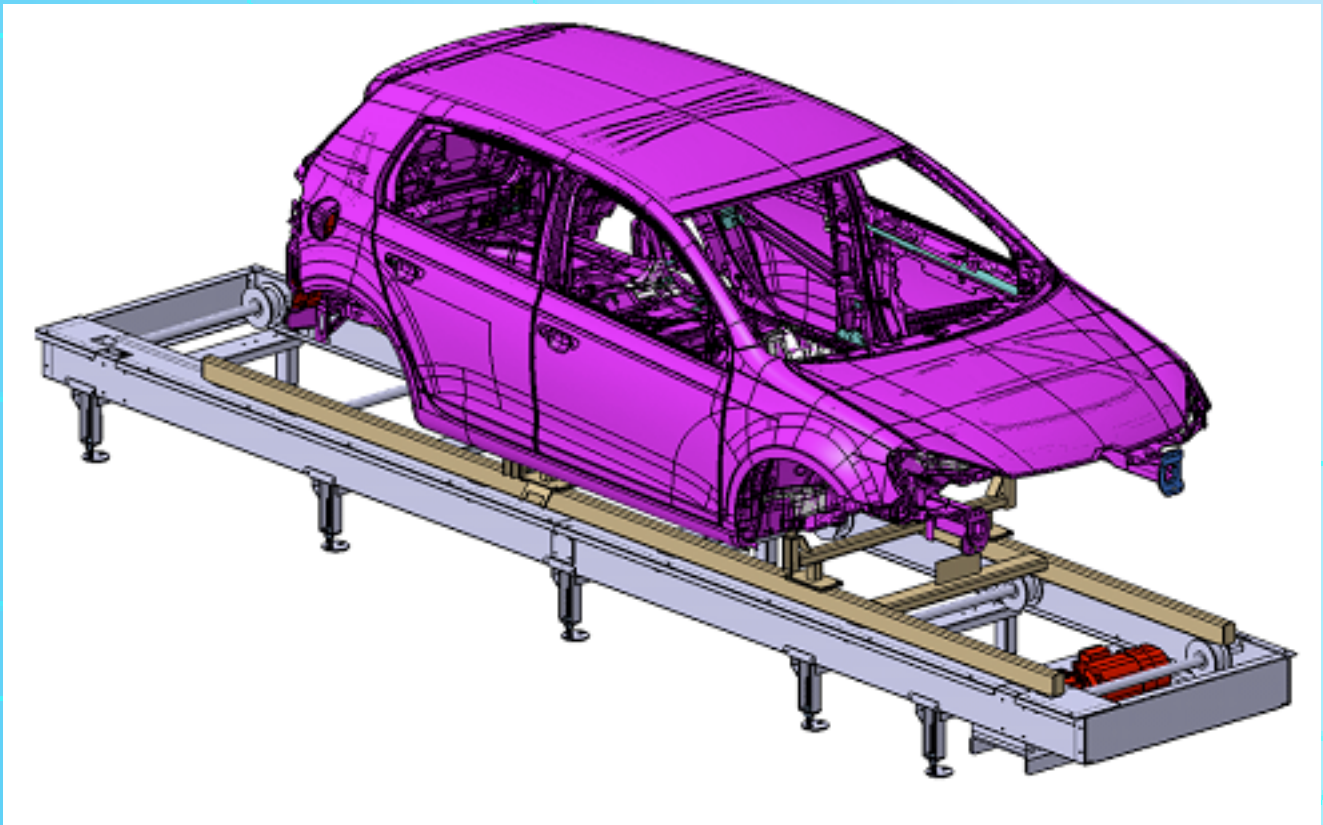
## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Identify common faults
2. Troubleshoot common faults
3. Recover from common faults



# Conveyors





## Lesson Description

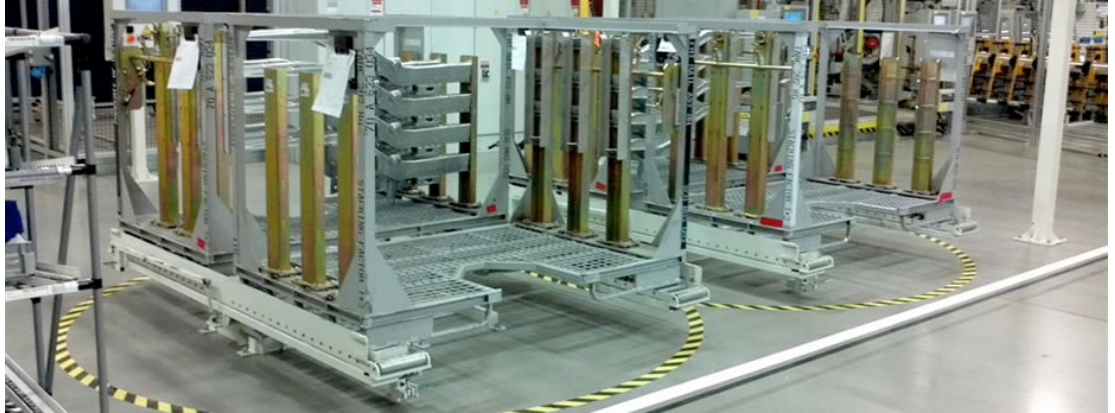
In this lesson the student will learn about the various components of a conveyor system and how to identify those components which are worn and failing.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe and explain the function of the components of a power and free conveyor.
2. Assess equipment failures through troubleshooting, and apply appropriate procedures to return equipment to an operational status.
3. Explain the system maintenance requirements for, and demonstrate competency in completing these requirements for all the major components of the conveyor.

# Hovair Marketplace Roller Conveyor



## Lesson Description

This lesson examines the learner's ability to identify the different components of the Hovair Systems, the sequence of machine operation, the autonomous (operator) maintenance cleaning, inspection and adjustment procedures required to maintain the equipment, and general system troubleshooting procedures.

## Lesson Scope

Learners who successfully complete this lesson should be able to:

1. Describe various Hovair equipment components
2. Explain the sequence of operation of Hovair equipment
3. Implement autonomous maintenance procedures
4. Implement troubleshooting Procedures
5. Perform routine maintenance

# Professional Maintenance



## EZ Trak and EZ Path CNC/Mill/Lathe Training



### Lesson Description

This 40 hour program is intended for personnel who are working in WCM Professional Maintenance and need to use EZ Trak and EZ Path software for a CNC Machine, Mill, or Lathe.

The class uses a 40 year veteran in machining to deliver instructor led hands on training using the learners actual shop, machine, and tools. The learners are asked to present a recent problem or a problem that they are working on and will be shown the correct application of the software and tools for that job. Practice will be given with demonstrations on how to properly program using the EZ Trak and EZ Path software. Repetitions will be used until all the learners have successfully completed each task. Backups of the programming will be left with the learners for future use. All training will be performed as to real world conditions with approximately 80% of this course being hands on.

A maximum class size of 4 students is recommended to ensure optimum hands on experience and trainee/instructor interaction.

The student performance objectives will be met through a combination of 20% Classroom and 80% hands on with actual projects.





### Lesson Scope

Upon successful completion of these objectives the student will have the knowledge and skills required to:

1. Apply safety standards to CNC, milling and lathe operations.
2. Read a Parts Program.
3. Program, and operate EZ Track Software.
4. Program and operate EZ Path Software.
5. Machine parts using the EZ Track Software to produce to print dimensional parts on a CNC/Mill/Lathe.
6. Machine parts using the EZ Path Software to produce to print dimensional parts on a CNC/Mill/Lathe.
7. Modify Coding to change dimensions on parts.
8. Perform offsets as necessary when changing a tool or when the tool has wear.
9. Download the program into the control.
10. Define X, Y, and Z Axis.
11. Adjust Tooling Feeds and Speeds.
12. Explain the difference of tooling inserts and the various uses of these cutting tools.