

# ***Product Manual***

# ***Model 9112***

## ***Communication Bridge Data Transfer Projects***

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PM9112T Revision 2

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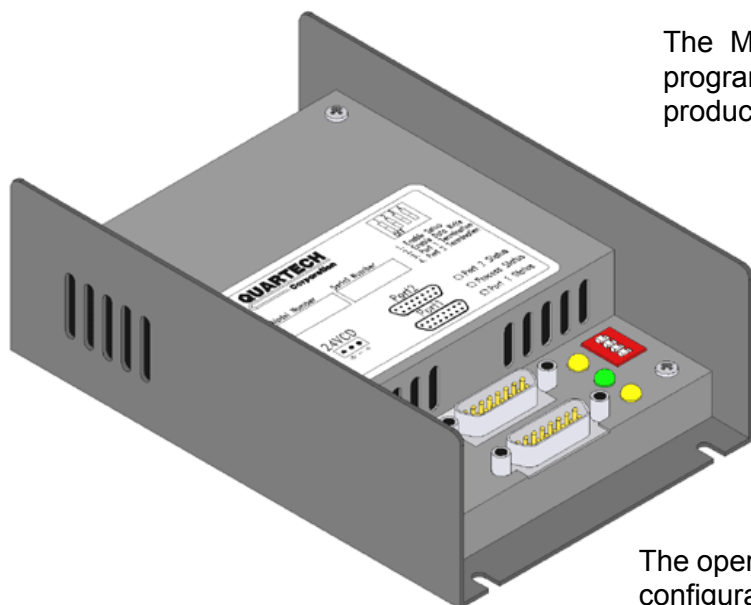
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**ProjectMaker 9112 software is available free of charge at the  
Quartech Corporation web site.  
[www.quartechcorp.com](http://www.quartechcorp.com)**

**Also available is the latest version of this product manual  
plus other related manuals and documents.**



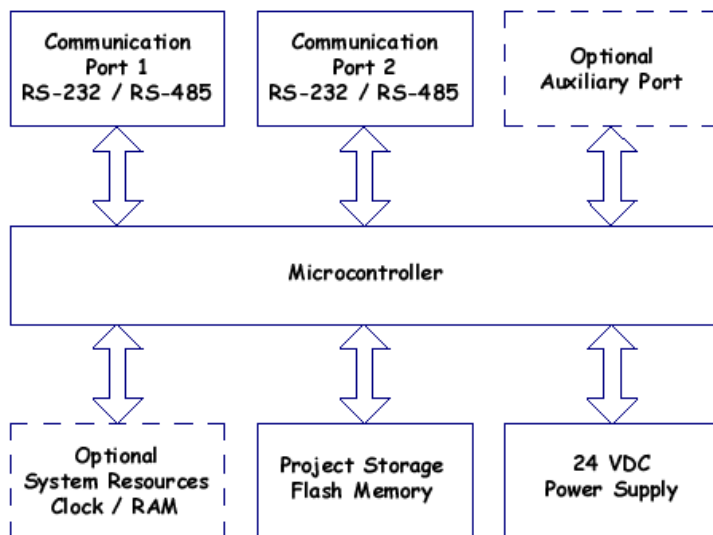
The Model 9112 Communication Bridge is a user programmable device that allows different types of products to exchange data.

Two serial communication ports provide both RS-232 and RS-485 hardware interfaces. Each port can be configured for compatibility with various devices including servo drives, instrumentation, and programmable logic controllers.

Optional interface modules allow the 9112 to connect with devices that have specialized hardware interfaces.

The operation of the 9112 is determined by the software configuration or project that has been downloaded to it. This Product Manual describes the Data Transfer Project.

### Block Diagram of internal architecture



The 9112 is configured and programmed using ProjectMaker 9112 Windows™ based off-line software. The project designer can customize the 9112 to fit the current application. Project files are downloaded to the 9112 using the computers serial communication port and are internally stored in secure Flash memory.

### Operational overview:

Project files are composed of individual transfer files. A transfer file is a list of data transfers, each having a source and a destination. Each transfer file also has a trigger element which determines if and when the list of transfers will be executed.

The 9112 processes transfer files on a rotational basis starting with the lowest file number. To determine if a transfer is to be executed the 9112 analyzes the trigger element of the file. In most cases the trigger element is a variable from an external device, therefore, a read operation must be completed to obtain the current value. If the value returned is one, then the transfer file is executed. If a destination was specified for the trigger element it will be executed regardless of the source value.

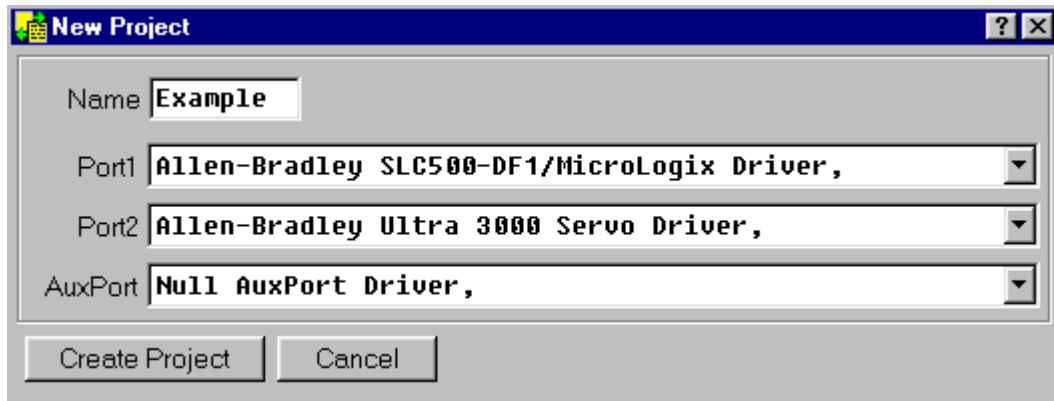
It is legal for the trigger source to be a constant value. If the constant value is one then the transfer file will execute every time it is tested. If the constant value is any value other than one then the execution will never occur.

As previously stated, transfer files are tested in sequence. After the last transfer file is tested, testing will begin again at the transfer file with the lowest number.

## Section 2: New Project Creation

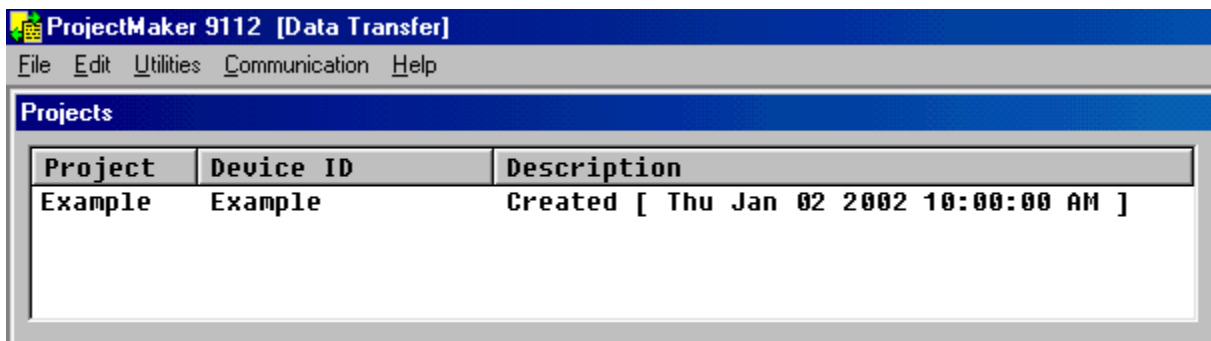
The 9112 is shipped from the factory with manufacturing test code installed. The first step in preparing the 9112 for active duty is to create a project. To create a new project it is necessary to select the communication drivers that will be installed to the various ports within the 9112. A communication driver makes the 9112 compatible with a particular device, i.e. Allen-Bradley Ultra 100 Servo Drive, Modbus controller, etc. The communication drivers must be downloaded to the 9112 before a Project File can be downloaded.

To create a new project choose **File** ° **New Project** from the menu bar. The dialog window below will open.

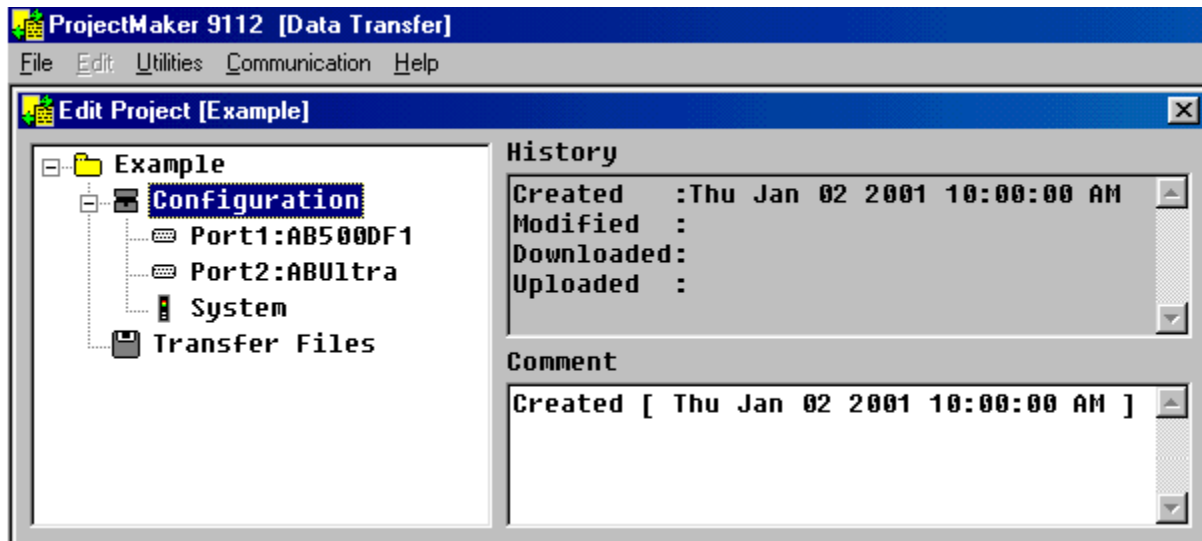


Enter a project name, up to eight characters, then assign device drivers to the ports by selecting the desired device from the drop-down lists.

When the selection is confirmed a project template will be created and the project name will be added to the Projects screen. The screen below is the first screen to open when the ProjectMaker 9112 Data Transfer program is launched. All available projects will be listed. The Project name is the name that will be referenced by the ProjectMaker 9112 software. The Device ID is a name that is actually downloaded to the 9112 hardware and may be different from the software project name.



To begin editing the project, double click the project name. The Edit Project screen shown below will open,



### Edit Project - Comment:

The Comment field is a text editor that allows the project developer to enter a description or notes about the project. The first line of the comment has special significance. It will be displayed under the Description heading on the main Projects screen. To edit the comment field, left click within the field and make the necessary additions or changes.

### Edit Project - History:

The History field is automatically maintained and provides revision control.

### Project Folder:

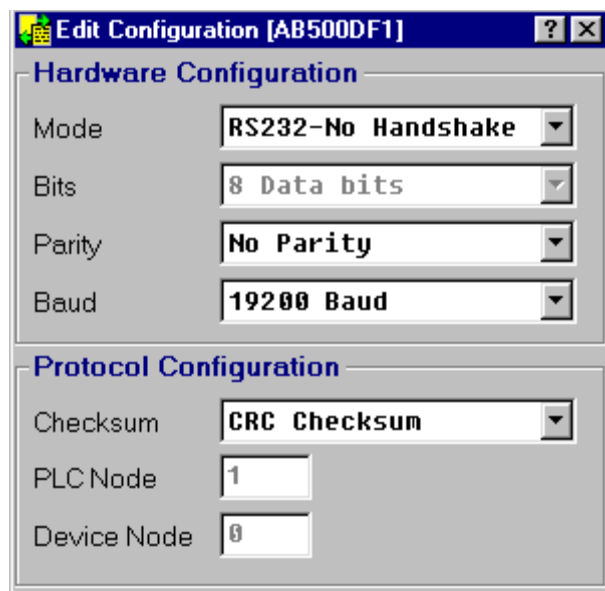
A project is a collection of files within a file folder or directory. The file folder or directory name is the project name. The project files are automatically created and maintained by ProjectMaker 9112.

### Edit Project - Configuration: (Port1 & Port2):

These files represent the physical communication ports on the Model 9112. Port configuration allows hardware and communication protocol parameters to be selected.

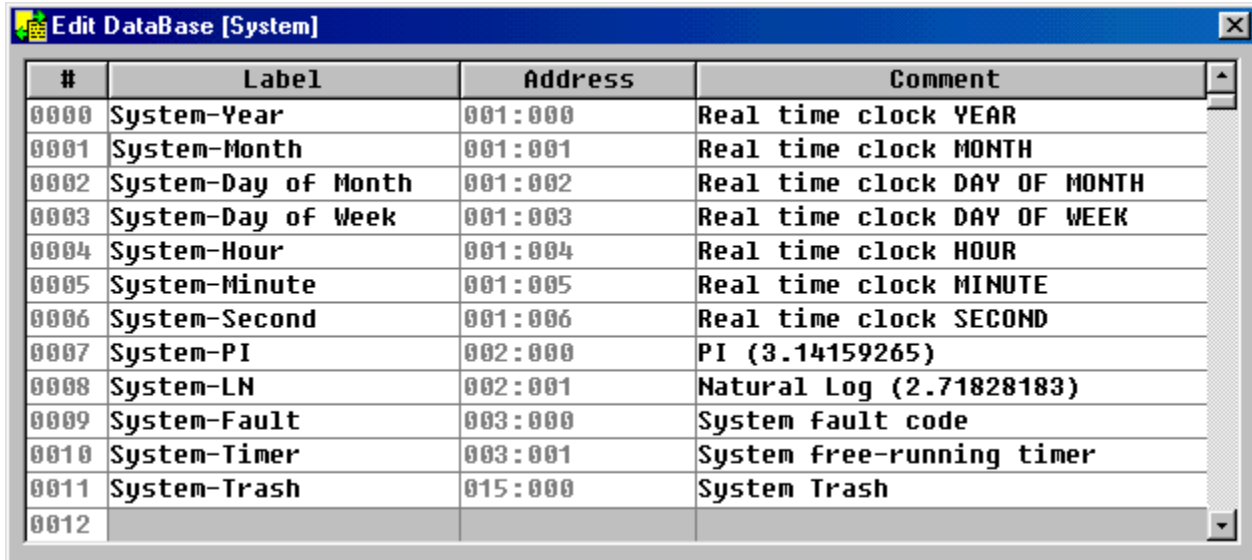
To open the Port Configuration dialog box double click on Port1 or Port2 as desired. A typical Port Configuration pop-up dialog box is shown here. The options available will vary depending on the device the 9112 is connected to.

To guarantee compatibility the configuration setting must be exactly matched to the device that the 9112 will be connected to.



### Edit Project - Configuration: (System):

Double clicking the Configuration System label will open the System Data Base file. This screen is for reference only since modification is not allowed. Within a Data Transfer application only the calendar and time functions have any significance and can be freely used within a Transfer File.



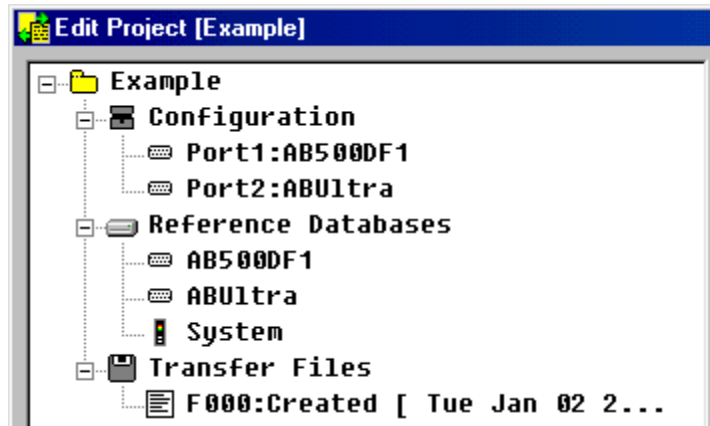
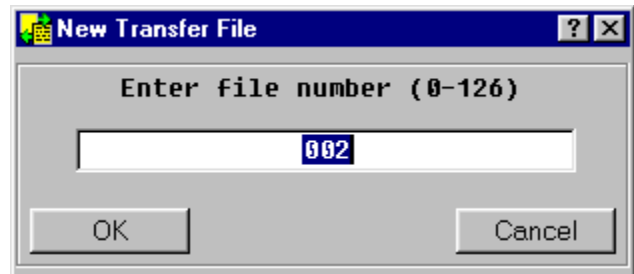
#	Label	Address	Comment
0000	System-Year	001:000	Real time clock YEAR
0001	System-Month	001:001	Real time clock MONTH
0002	System-Day of Month	001:002	Real time clock DAY OF MONTH
0003	System-Day of Week	001:003	Real time clock DAY OF WEEK
0004	System-Hour	001:004	Real time clock HOUR
0005	System-Minute	001:005	Real time clock MINUTE
0006	System-Second	001:006	Real time clock SECOND
0007	System-PI	002:000	PI (3.14159265)
0008	System-LN	002:001	Natural Log (2.71828183)
0009	System-Fault	003:000	System fault code
0010	System-Timer	003:001	System free-running timer
0011	System-Trash	015:000	System Trash
0012			

### Edit Project - Transfer Files:

The purpose of a Data Transfer application is to transfer specific data from one device to another. To accomplish this a data transfer file must be created. A transfer file is simply a list that indicates to the 9112 where to get a data value from and where to put it. Up to 127 files may be created, each having up to 127 transfers.

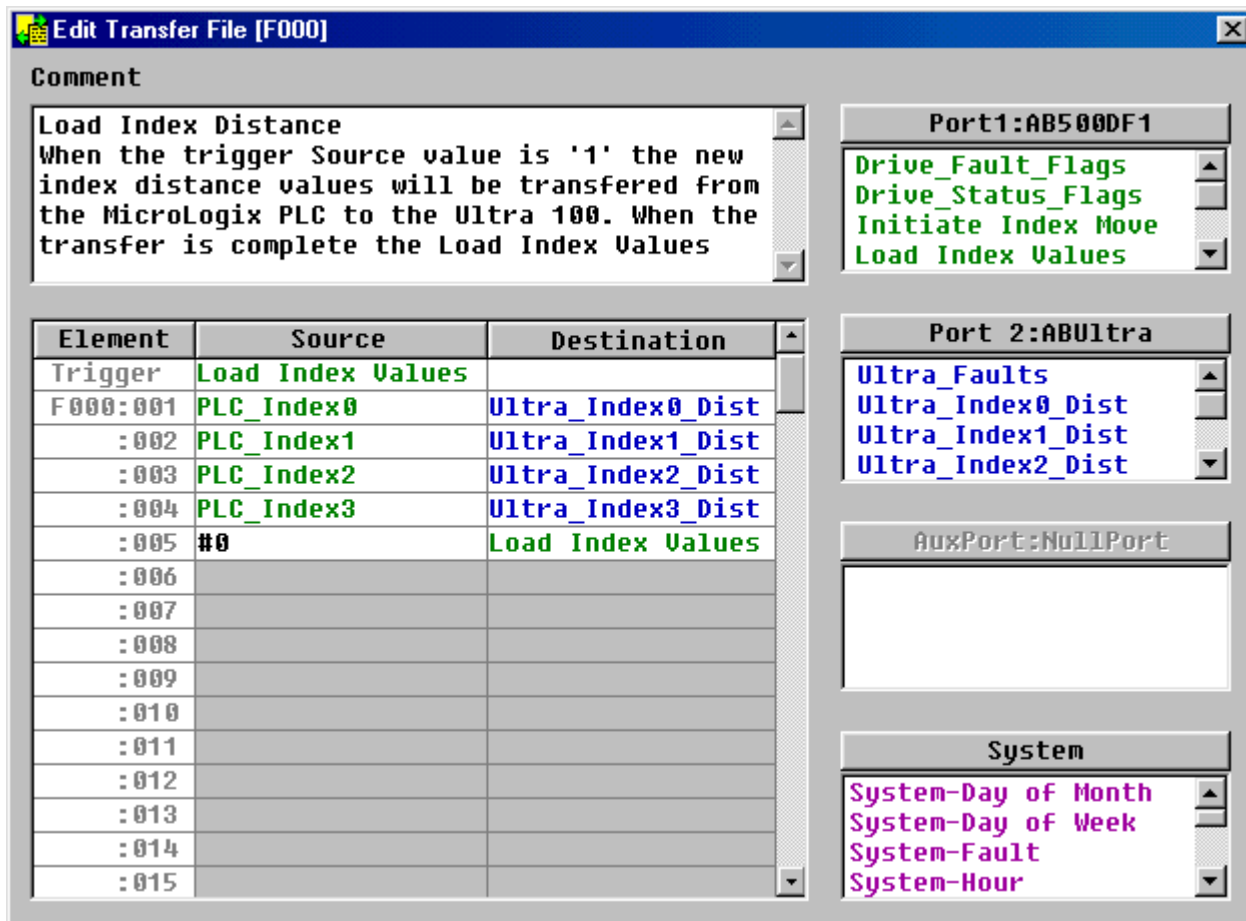
To create a new Transfer File, right click on the **Transfer Files** label then left click **New Transfer File**. The pop-up dialog box shown here will open.

Left click the OK button to accept the default file number or enter a different number.



A transfer file will be created and added to the Transfer File directory as shown here.

To open the transfer file editor, double click on the new file number. The Edit Transfer File screen will open. Shown on the next page is a Transfer File from the Example project that is included with ProjectMaker 9112



### Edit Transfer File - Comment:

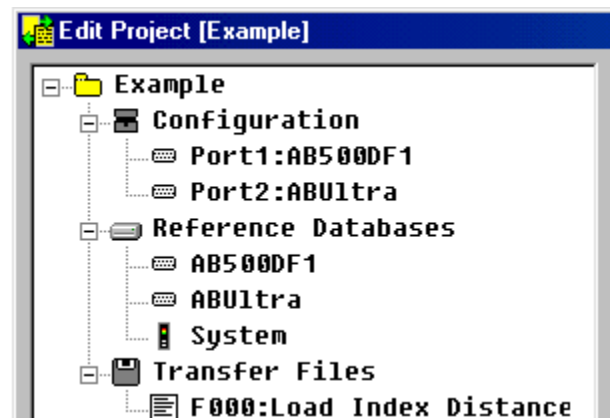
The Comment field is a text editor that allows the project developer to enter a description or notes about this transfer file. The first line of the comment has special significance. It will be displayed as the label that follows the file number on the Edit Project screen. To edit the comment field, left click within the field and make the necessary additions or changes.

### Edit Transfer File - Source:

The source reference is either a constant value or a database label that specifies where data will be obtained. Any valid database reference that permits a read data operation is valid. A database reference is assigned by using the standard Windows drag and drop operation. To assign a constant value or string simply left click within the source field then type a '#' character followed by the value or string. For example: #50, #3.75, or #'abcd'.

### Edit Transfer File - Destination:

The destination reference may be any valid database reference that permits a write data operation. A database reference is assigned by using the standard Windows drag and drop operation.



### Edit Transfer File - Element:

An Element represents a single data transfer within a transfer file. A single transfer file may have up to 128 transfers. The first transfer, labeled Trigger, has special significance. The Trigger element determines when the transfer of data will occur. A transfer will occur when the trigger source value is one (1). The trigger source may be any database element or a constant value. It is not necessary to have a trigger destination.

### Edit Transfer File - Port1, Port2, AuxPort, System:

These list boxes, located on the right side of the Edit Transfer File screen, are associated with databases and contain the data references that may be used as a source or destination address. As discussed on page 4, the system database is predefined and cannot be modified by the project designer. The AuxPort is an optional hardware port with a special purpose. The database parameters will be detailed within the ProjectMaker 9112 help system. Before a transfer file list can be assembled the port databases must be created. To open a database left click on the port button located above the port list box. Below is one of the databases found in the Example project that is included with ProjectMaker 9112.

#	Label	Address	Node	Data Type	Size	Commer
0000	Load Index Values	B003:000/00		Bit		Initiate transf
0001	Initiate Index Move	B003:000/01		Bit		Initiate an inc
0002	PLC_Index0	N007:000		Signed Long		
0003	PLC_Index1	N007:002		Signed Long		
0004	PLC_Index2	N007:004		Signed Word		
0005	PLC_Index3	N007:006		Signed Word		
0006	Drive_Status_Flags	B003:001		Unsigned Word		Copy of Ultra 1
0007	Drive_Fault_Flags	B003:002		Unsigned Long		Copy of Ultra F
0008						
0009						

### Edit Database - Label:

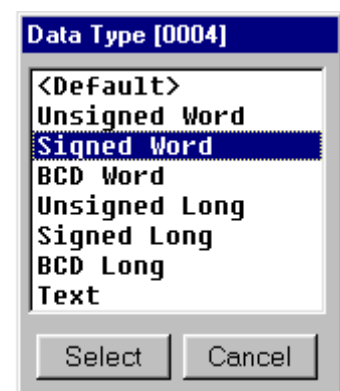
The label field is part of every database and is entered by the project designer. Each label within a particular database must be unique. Labels are case sensitive with a maximum length of twenty four characters. All source and destination references that are not constant values are database labels.

### Edit Database - Address:

The address field is part of every database and in most cases is entered by the project designer. The address must conform to a specific syntax which is generally identical to the addressing syntax of the device that will be connected to the physical communication port. Information on the addressing syntax for a specific port driver is available through the ProjectMaker 9112 Help system.

### Edit Database - Data Type:

The Data Type field is directly associated with the Address field and in some cases is automatically set based on the address entered. In cases where the data type may vary, double clicking the field will open the list box shown here allowing the desired format to be selected. Information on the legal Data Types for a specific port driver can be found in the ProjectMaker 9112 Help system.



### **Edit Database - Size:**

The Size field is associated with the Text Data Type and allows the project designer to allocate reference memory to accommodate multiple ASCII character transfers.

### **Edit Database - Node:**

The Node is a device address that is used with devices that may be connected within a network topology. Both master/slave and peer-to-peer networks require device addresses. Specific information is available through the ProjectMaker 9112 Help system.

### **Edit Database - Comment:**

The Comment field allows a descriptive text string of up to 80 characters to be included with each label.

### **New Project Creation Summary:**

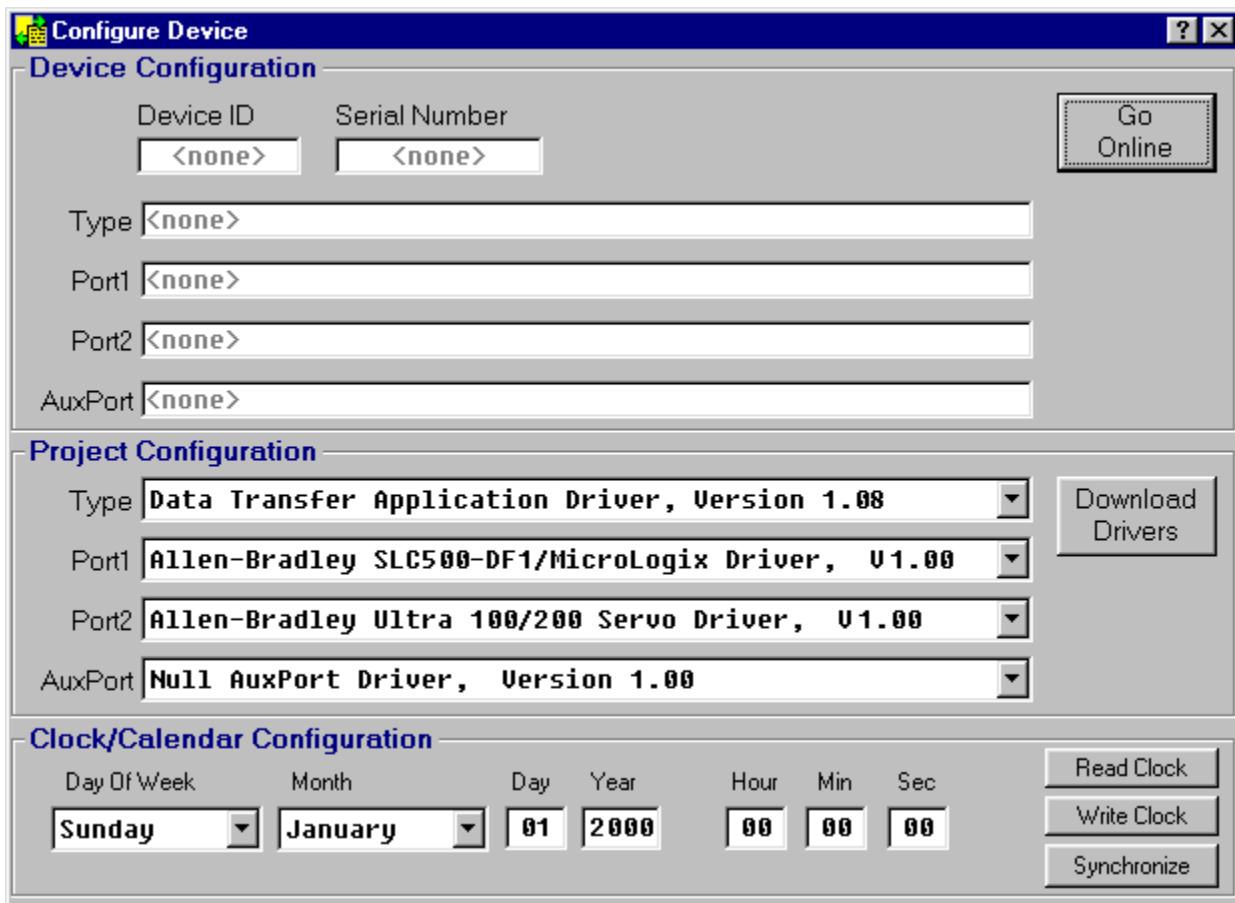
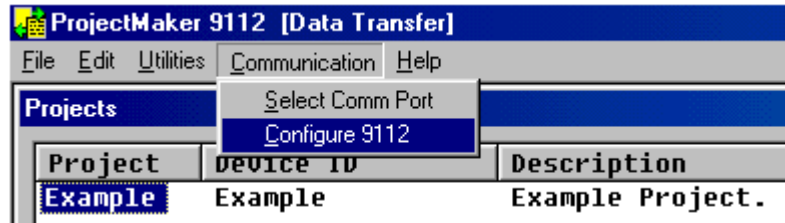
The creation of a project has been shown to be a simple process of creating databases then filling in tables using the Windows drag and drop function. As with any project, complete success requires careful planning and a full understanding of the systems intended operation. It is also important to fully understand how the 9112 processes transfer files. This was described on page 1. To create the best application we recommend making database labels descriptive and using comments throughout the project.

## Section 3: Download 9112 Configuration

The 9112 must be configured to accept a Project File by first installing communication port drivers. A driver makes the 9112 compatible with a particular device, i.e. Allen-Bradley Ultra 100 Servo Drive, Modbus controller, etc. To download the communication drivers to the 9112 follow these simple steps:

- 1: Connect a 2136-10 communication cable between the computer and either Port 1 or 2 on the 9112 and set DIP switch one to the ON position to enable configuration mode.
- 2: Apply power to the 9112.

To open the 9112 configuration screen, left click the desired project name to highlight it, then from the menu bar select **Communication** ° **Configure 9112**



- 3: Go Online to establish a connection with the 9112 and read its current configuration. If a successful connection is established, the Download Drivers button will become active.
- 4: Download the drivers to the 9112. If the Clock/Calendar option is installed in the 9112, then it may also be read or written.

When the driver download is complete, remove power from the 9112 and set DIP switch one to the off position. A project file may then be downloaded.

## Section 4: Download Project File

To download a project file the project must first be open. This is done by double clicking the file name on the main Projects screen. To download the Project File to the 9112 follow these simple steps:

1. Set DIP switch one to the ON position to enable configuration mode.
2. Connect a 2136-10 communication cable between the computer and either Port 1 or 2 on the 9112.
3. Apply power to the 9112.

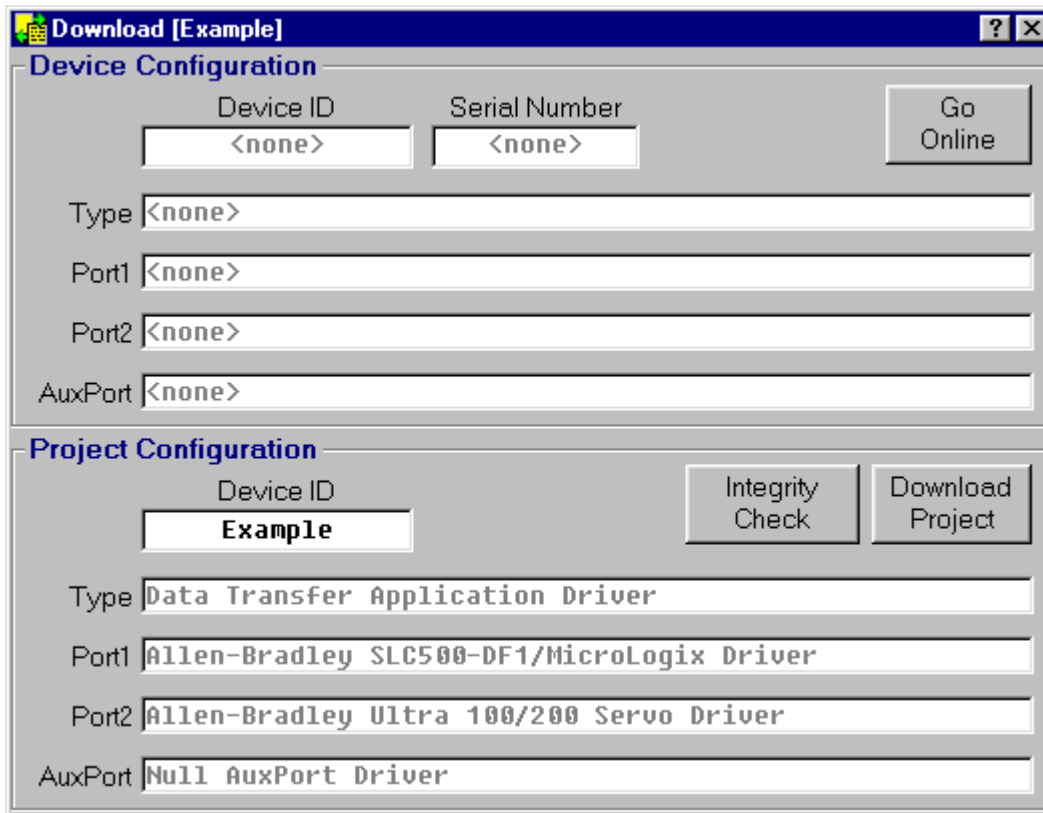
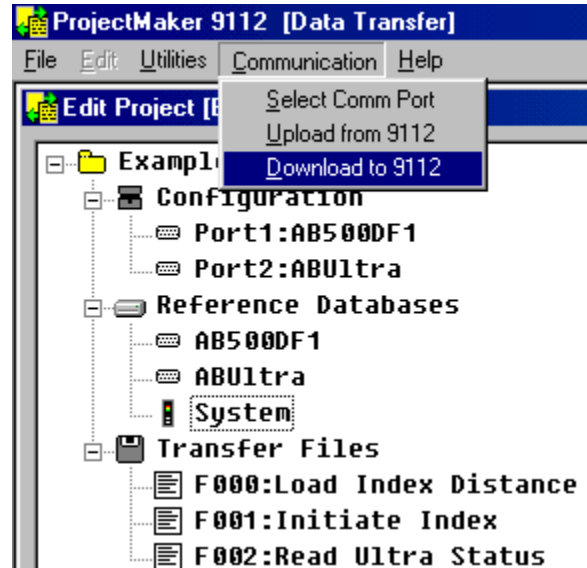
To open the 9112 project download screen, select **Communication** ° **Download to 9112**

4. Go Online to establish a connection with the 9112 and read its current configuration. This will establish a connection between the computer and 9112 and verify a compatible driver group is installed. If a successful connection is established then the send project file button will become active.

The Device ID may be changed if required. Remember, this label is stored in the 9112.

5. Left click the Download Project button to initiate the download.

When the download is complete, remove power from the 9112 and set DIP switch one to the off position.



Three Light Emitting Diodes (LED) are visible through the front cover of the 9112 and provide operational status. The status displays can be categorized into four groups.

**Power-up Cycle**      The following displays could occur during initial powering of the device.

Process Status	Port 1 Status	Port 2 Status	Description
Red	Red	Red	System reset
Amber	Amber	Amber	Validating checksum
Green	Amber	Amber	Validating internal RAM memory
Green	Amber	Green	Validating external RAM memory
Green	Green	Green	System initialization

**Normal Operation**      The following displays represent fault free operation

Process Status	Port 1 Status	Port 2 Status	Description
Flash Green	Amber	XXX	Port 1 - Transmitting data
Flash Green	Green	XXX	Port 1 - Receiving data
Flash Green	XXX	Amber	Port 2 - Transmitting data
Flash Green	XXX	Green	Port 2 - Receiving data
Flash Green	Off	Off	No serial communication

**Minor Faults**      A minor fault is certainly cause for concern and action must be taken to eliminate the source of the fault, however, these faults do not halt the operation of the unit. Valid resources will continue to process normally.

Process Status	Port 1 Status	Port 2 Status	Description
Flash Red/Green	XXX	XXX	Data access failure to port or memory
XXX	Flash Red	XXX	Port 1 - Invalid configuration
XXX	XXX	Flash Red	Port 2 - Invalid configuration

**Major Faults**      A major fault will halt operation of the 9112. These faults may be the result of a corrupt configuration or project file, or may indicate hardware failure within the 9112.

Process Status	Port 1 Status	Port 2 Status	Description
Flash Red	Red	Red	System Fault
Flash Red	Green	Green	External RAM Fault
Flash Red	Green	Amber	Internal RAM Fault
Flash Red	Amber	Amber	Project Checksum Fault
Flash Red	Red	Green	Port 1 Checksum Fault
Flash Red	Off	Red	Port 2 Checksum Fault
Red	Off	Off	Corrupt data file or Project type mismatch

## Input Power:

A removable three position terminal block is provided for wiring 24 VDC source power.

## Serial Communication Port

Two 15 pin male D-Type connector provide both RS-485 and RS-232 communication interfaces to Programmable Controllers, Personal Computers or other host devices.

## 4 Position DIP Switch

### Switch 1 - Run / Program

This switch is set to the on position only when a new configuration file or project file is to be downloaded or uploaded using ProjectMaker 9112.

### Switch 2 - Memory Protect

This switch prevents the Flash memory from being modified during normal operation. It is only used by specific applications and should remain off unless the application documentation instructs otherwise.

### Switch 3 - Port 1 Termination

This switch is set to the on position when Port 1 is configured for RS-485 communication and line termination is required.

### Switch 4 - Port 2 Termination

This switch is set to the on position when Port 2 is configured for RS-485 communication and line termination is required.

## LED Indicators:

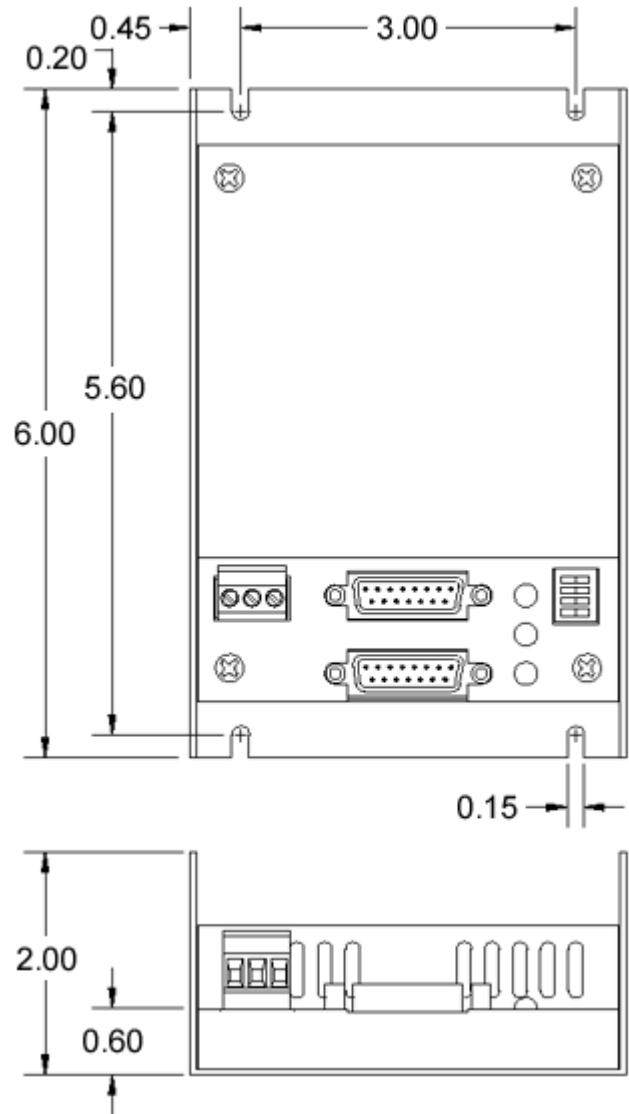
Three tri-color Light Emitting Diodes (LED) are present and provide operational status. Refer to section 5 for information on specific status conditions.

## Auxiliary Port:

Some models of the 9112 provide additional connections, switches, and indicators. An addendum sheet is available that describes the specific function and operation of these devices.

## Specifications:

Electrical:	24 VDC, $\pm 5\%$ , @ 200 ma
Temperature:	0°C to +60°C Operational, -20°C to +70°C Storage
Humidity:	10% to 95%, Non-condensing, Operational or storage
Vibration/Shock:	0.5mm displacement (X,Y,Z axis), 10-55Hz, 30G shock
Weight:	3 pounds



All dimensions in inches

## Mounting:

The 9112 is designed to be mounted to a panel within an enclosure. Care must be taken to prevent metal chips or other conductive particles such as wire clippings from entering the unit during installation. Failure to protect the unit may cause damage when power is applied and may void the warranty.

A minimum clearance of six inches should be kept between the 9112 and any other device that generates heat. In the event that the internal enclosure temperature periodically exceeds 60°C (122°F), fans or a purge air system must be used.

## Communication Port Connectors

Both communication Port 1 and Port 2 are electrically and mechanically identical. The following electrical schematic defines the connector pin assignments.

2 >)))	TXD, RS-232 Transmit Data	(Output)
3 >)))	RXD, RS-232 Receive Data	(Input)
4 >)))	RTS, RS-232 Request To Send	(Output)
5 >)))	CTS, RS-232 Clear To Send	(Input)
6 >)))	TXDA, RS-485 Transmit Data "A"	(Output)
7 >)))	SC, RS-232/485 Signal Common	
12 >)))	RXTXDB, RS-485 Receive/Transmit Data "B"	(Input/Output)
13 >)))	RXTXDA, RS-485 Receive/Transmit Data "A"	(Input/Output)
14 >)))	TXDB, RS-485 Transmit Data "B"	(Output)

**Notice: Undefined pins must remain disconnected.**

## File Download Cable

The schematic below shows the cable required to transfer Configuration Files and Project Files between the 9112 and a personal computer. The cable is available from Quartech in a standard ten foot length. Cables up to fifty feet in length are available.

**File Download Cable**  
Quartech Part Number: 2136-10

Personal Computer		9112		
9 Pin Female D-Type		15 Pin Female D-Type		
RXD	2 >))))))))))))))))))))<	2	TXD	
TXD	3 >))))))))))))))))))))<	3	RXD	
SC	5 >))))))))))))))))<	7	SC	
RTS	7 >)),	+))))<	4	RTS
CTS	8 >))-	.))))<	5	CTS
DCD	1 >)),			
DTR	4 >))1			
DSR	6 >))-			

**ProjectMaker 9112 software is available free of charge at the  
Quartech Corporation web site.**

**Also available is the latest version of this product manual  
plus other related manuals and documents.**

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