

Manual Revisions

If you contact us in reference to this manual, be sure to include the revision number.

Title: Getting Started with the RUNtimePC

Bulletin Number: RT-505-M

Issue	Date	Effective Pages	Description of Changes
Original	11/99	All	Original Issue

Getting Started with the RUNtimePC

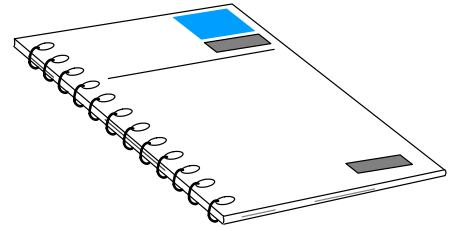
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Manual Overview

Overview of this Manual

This Getting Started Manual describes the basic operation of the **RUNtimePC**. This manual assumes that a licensed copy of Think & Do is installed on a Microsoft® Windows® NT PC.



This PC must have an available Ethernet connection. Think & Do Software is required to develop, modify and download control programs that run on the RUNtimePC. If the software is not currently available or you do not have an existing Think & Do project to run on the RUNtimePC, you can obtain a copy from Automationdirect.com. The Think & Do online help system contains valuable information about product operation. If you have questions, enter the keyword **RUNtimePC** in the online help system index for a list of help topics.

Packing List

Your RUNtimePC comes complete and ready to run. Both the Windows® CE operating system and the Think & Do Runtime version are pre-installed.

- Power Cord
- This Manual
- Production Report
- Motherboard Manual

What you need to Get Started

You must have, as mentioned above, a PC running Windows NT and the most recent version of Think & Do Software. Release 5, Version 5.1 CE2 or later includes development system support for the RUNtimePC. You will also need a RUNtimePC Configuration Kit (RT-CNFGKIT) which includes a 5 port Hub, four straight-through cables and one crossover cable. The kit allows you to scan I/O for configuration.

Other Reference Materials

You may find other technical publications useful for your application. For technical information related to Think & Do Software or Windows® CE, please refer to the appropriate publication for those products. For more information about the **DirectLOGIC™** products, you may want to read the following:

- Think & Do Learning Guide (PC-TND-M)
- Ethernet Based Controller Manual (H24-EBC-M)
- DL205 Installation and I/O Manual (D2-INST-M)

Technical Support

We strive to make our manuals the best in the industry. We rely on your feedback to let us know if we are reaching our goal. If you cannot find the solution to your particular application, or, if for any reason you need additional technical assistance, please call us at

770-844-4200.

Our technical support group is glad to work with you in answering your questions. They are available **weekdays from 9:00 a.m. to 6:00 p.m. Eastern Time**. We also encourage you to visit our website where you can find technical and nontechnical information about our products and our company.

<http://www.automationdirect.com>.

RUNtimePC Overview

Certificate of Integrity

The RUNtimePC (part number RT-505-12TS) is a diskless Industrial PC running the Windows® CE operating system, with **Think & Do** Runtime version pre-installed.

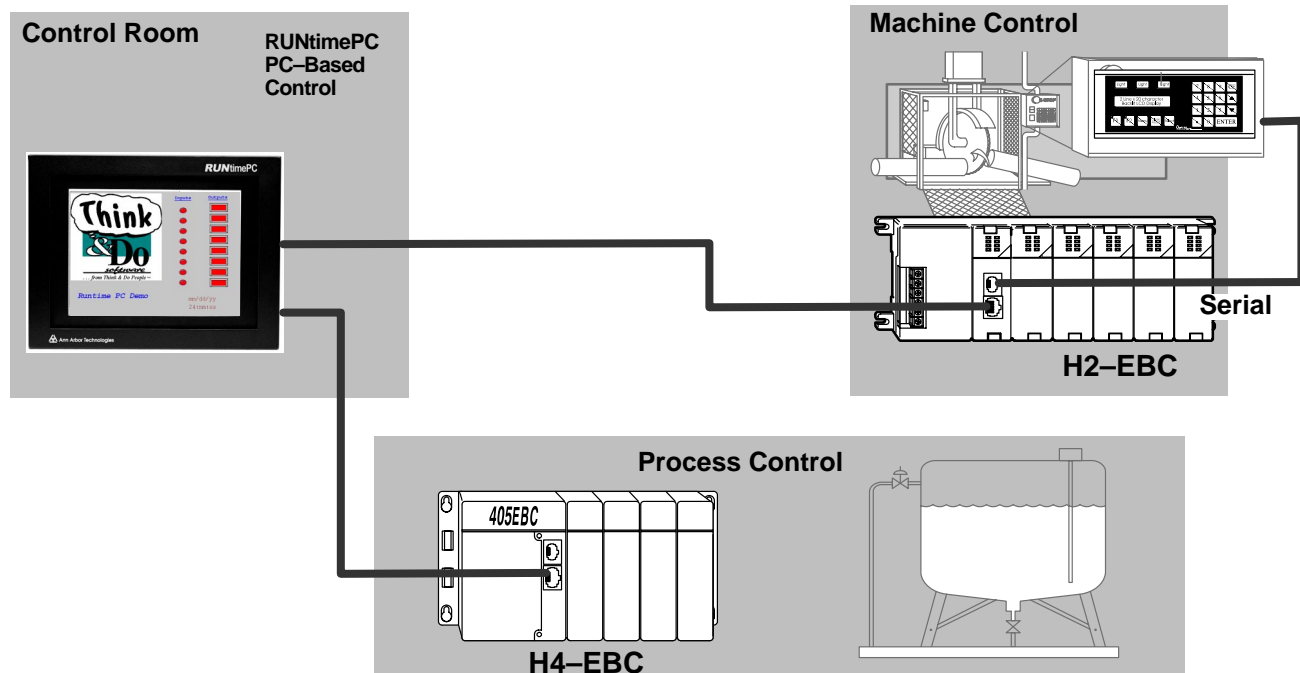
Enclosed with your RUNtimePC is a Think & Do Certificate of Integrity (COI). This is your assurance that the Think & Do Software on the RUNtimePC is properly licensed. The printed COI number identifies the software and will be needed when you register. Please keep the COI in a safe place for future reference.

To register your Think & Do software, log on to **www.thinkndo.com**, click *Register*, and enter the required information.



Connecting to DL205 or DL405 I/O

The RUNtimePC can connect to up to three DL205/DL405 bases *directly* (one of each is shown below) through H2-EBC or H4-EBC modules, respectively. You can connect to more than three bases by using external hubs, like the one included in the RUNtimePC Configuration Kit (RT-CNFGKIT).



Using the Think & Do RUNtimePC Configuration Utility

Refer to the Programming/Development Configuration (on page 7) and connect all hardware as shown. Once this configuration is complete, you are ready to configure the RUNtimePC. The RUNtimePC Configuration Utility, which runs on the screen of the RUNtimePC is used to accomplish this. You will need a keyboard to run the Configuration Utility. If you haven't already done so, you should install the RUNtimePC update to the development system. You must have a properly-licensed copy of Think & Do Release 5 or later installed on the Windows NT workstation where you plan to install the update.

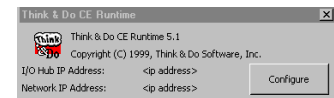
When power is turned on to the RUNtimePC, it boots Microsoft® Windows® CE and then starts Think & Do. The default Think & Do runtime screen will appear when the boot process is complete.

Bootup

1. Touch the Think & Do CE Runtime button at the upper left corner of the default logo screen to open the About ScreenView dialog.



2. When the About ScreenView dialog opens, touch the Configure button to launch the RUNtimePC Configuration utility. The Configuration utility is a dialog with four tabs.



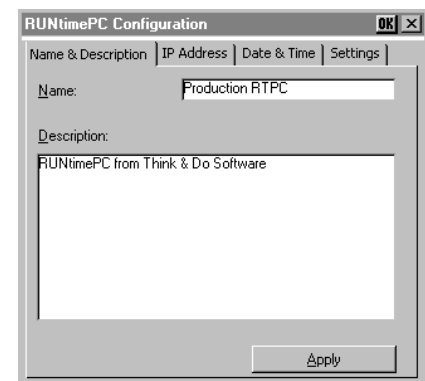
Name and Description Tab

The Name and Description tab is used to assign a descriptive name and description to the RUNtimePC station.

1. Select the Name and Description tab by touching the tab. Then, touch the Name field to position the cursor and use the keyboard to type a name of up to 15 characters. The default name for all RUNtimePCs is RUNtimePC.

2. Move the cursor to the Description field by touching it. Use the keyboard to type a description of the RUNtimePC station. The description is optional but can be useful when you're trying to locate a particular station on a large network.

3. You must press the Apply button to save the changes you just made. If you move to another tab before pressing Apply, the changes will not be saved.



IP Address Tab

The IP Address tab is used to set the IP address, Subnet Mask and Default Gateway of the Network Programming Port on the RUNtimePC. You will see the factory defaults when this dialog opens for the first time.

1. Specify how the IP Address will be assigned. Touch the appropriate radio button to make this choice.
 - a. If you choose Obtain an IP Address From DHCP Server, the IP address will be assigned automatically by the DHCP server. Your network administrator can tell you if your company has this type of server.
 - b. If you choose Specify an IP Address, you can type an IP address for the RUNtimePC. The Subnet Mask should be the same for all RUNtimePCs on the network. If a gateway is used, enter the IP address of the gateway in the Default Gateway field.
2. When you have entered the correct information, remember to press the Apply button to save the changes. If you move to another tab without pressing Apply, the changes will not be saved.

RUNtimePC Configuration [OK] [X]

Name & Description | **IP Address** | Date & Time | Settings

Note:
Any changes to the IP address settings will be effective when you cycle power on the RUNtimePC.

☐ Obtain an IP address from a DHCP server

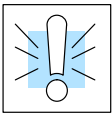
☒ Specify an IP address

IP Address: 172.16.1.100

Subnet Mask: 255.255.0.0

Default Gateway: 0.0.0.0

Apply



WARNING: You should always observe the addressing conventions followed on your corporate network. It is strongly recommended you discuss your plans with your network administrator before assigning an IP address to the RUNtimePC.

Time/Date Tab

The Time/Date tab is used to set the date and time in the RUNtimePC.

1. Press the down arrow in the Date field to locate the proper date. Touch to select the date.
2. Touch the Time field to position the cursor, then use the keyboard to enter the correct information. You can use the tab key to move between segments of the time field.
3. When you have entered the correct information, remember to press the Apply button to save the changes. If you move to another tab without pressing Apply, the changes will not be saved.

RUNtimePC Configuration [OK] [X]

Name & Description | IP Address | **Date & Time** | Settings

Date: October 19, 1999

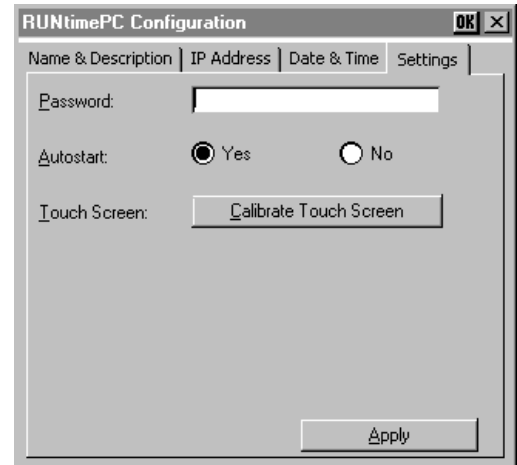
Time: 09 : 32 : 21

Apply

Settings Tab

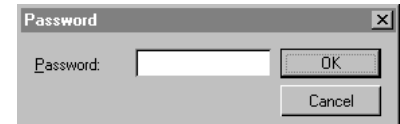
The Settings Tab is used to set a password that protects the configuration, choose the AutoStart option, and calibrate the touchscreen.

1. To set a password, touch the Password field to position the cursor, then use the keyboard to type the password.
2. To enable Autostart, touch the Yes radio button. Autostart automatically launches the current project when power is applied to the RUNtimePC.
3. Touch the Calibrate button to initiate the calibration routine. This routine defines the active area of the screen. A cross-hair will appear at the upper left corner of the screen. Touch the center of the cross-hair when asked to do so. Repeat the steps with cross-hairs that appear at the lower, then upper right of the screen.
4. Remember to press the Apply button to save the changes you have made.



Password Dialog

If you have set a password to protect the RUNtimePC configuration, you will be required to enter it before you can open the Configuration Utility.



When you press the Think & Do CE Runtime button, the Password dialog will open, allowing you to enter a password.

Restart the RUNtimePC

Once you have finished configuring the RUNtimePC, you will need to restart the RUNtimePC to use the new settings.



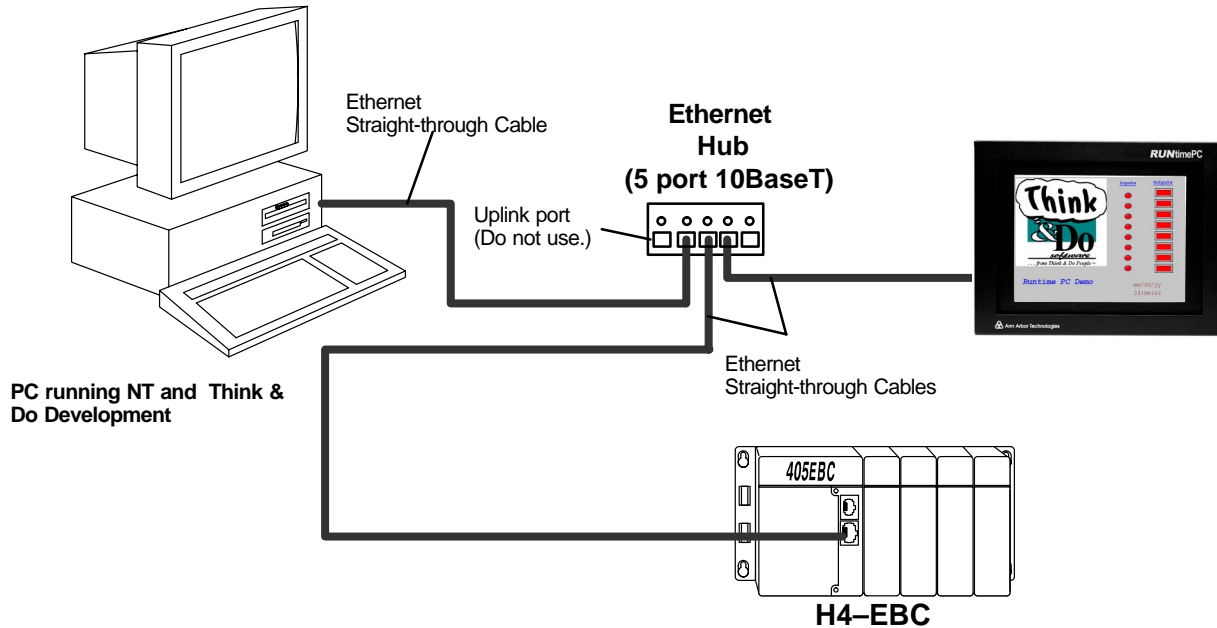
Online Help

NOTE: When cycling power on the RUNtimePC, you must wait at least 15 seconds before turning it back on. This time is required to reset the I/O ports.

Details on developing and editing projects for the RUNtimePC are included in the online help system which is part of the current Think & Do update. The help file is installed as part of the Think & Do Software development system. The Think & Do Software CD-ROM that shipped with the RUNtimePC contains the current update to Release 5 and includes support for the RUNtimePC. For a list of topics that relate to the RUNtimePC, select the Help Topics command from the Help menu, select the Index tab and enter the keyword **RUNtimePC**.

Programming/Development Configuration

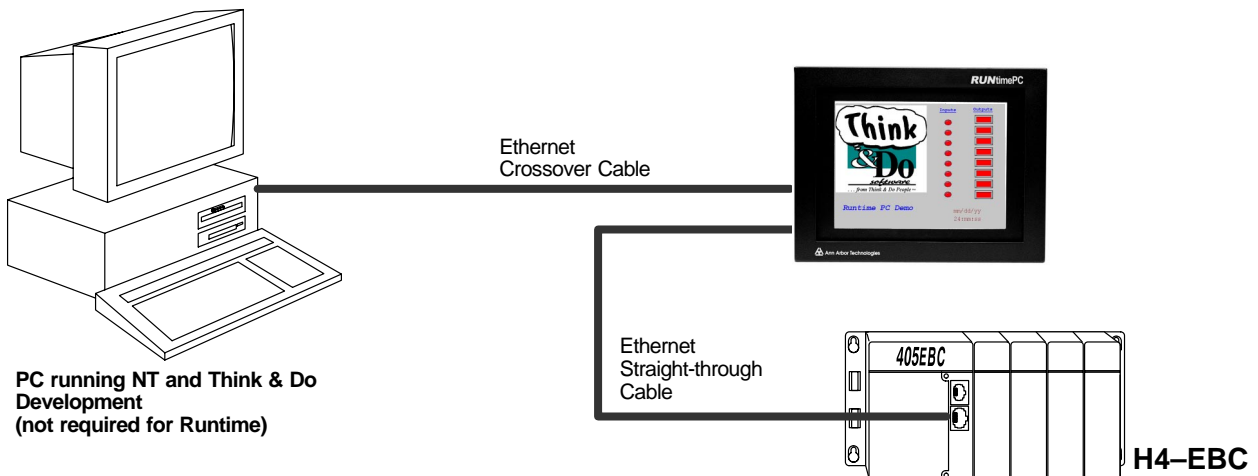
Below is a typical configuration for Programming or Development with the RUNtimePC. **If the PC is being connected through a hub, as shown below, use a standard straight-through cable. Do not use the Uplink port.**



NOTE: The RUNtimePC Configuration Kit (RT-CNFGKIT) has a 5 port Hub, four straight-through cables and one crossover cable for quick configuration.

Runtime Configuration

Below is a typical configuration for Runtime use of the RUNtimePC. The desktop PC, used for programming/development is not necessary for runtime use. **If the PC is being connected directly to the RUNtimePC, as shown below, use a crossover cable.**

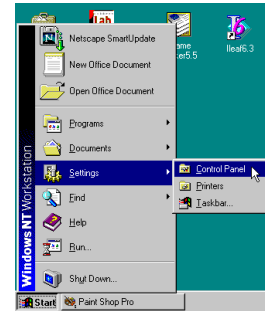


Creating a Network with a Peer-to-Peer Connection

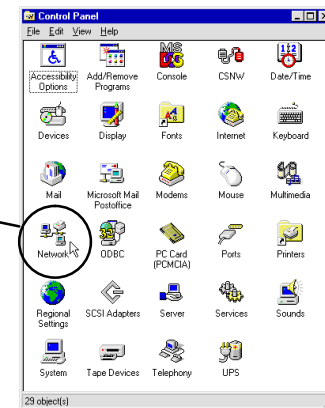
Setting Up Your Windows NT System

This section will show you how to configure a new peer-to-peer network. The RUNtimePC uses an IP (Internet Protocol) address for identification on the Ethernet network. This step is necessary whether you have one or several RUNtimePCs connected.

- 1) On the Windows NT system click the Windows *Start* menu button, then *Settings*, then *Control Panel* to open the Control Panel window.

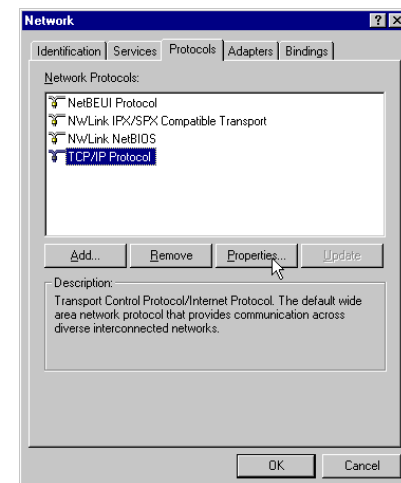


- 2) In the Control Panel, double-click the *Network* icon.

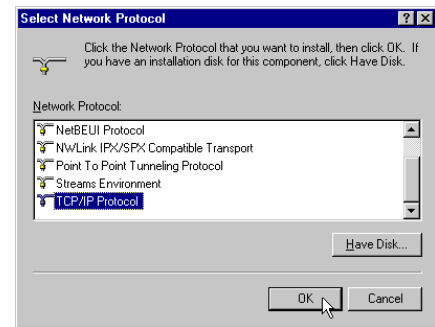


- 3) On the *Network* window, select the *Protocols* tab. You should see the TCP/IP protocol in the list.

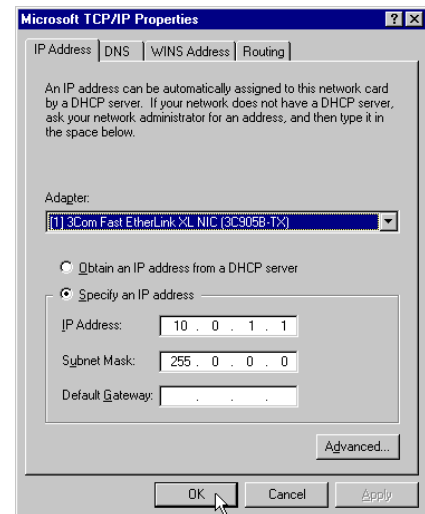
- * If so, skip to step 5.
- * If not, click the *Add...* button.



4) Clicking the *Add...* button opens the *Select Network Protocol* dialog. Then select TCP/IP from the list. After you click OK, Windows Networking will add TCP/IP to the list in the *Protocols* tab.



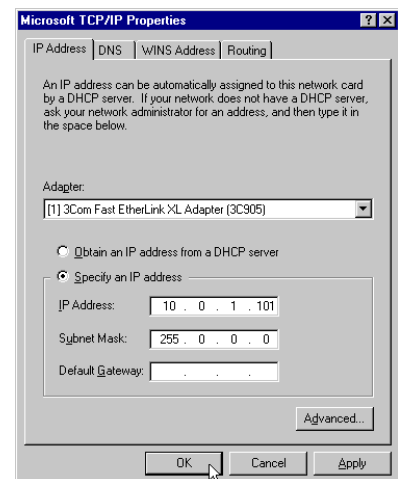
5) Once the TCP/IP protocol is on the Protocols list, click the *Properties...* button to open the *Microsoft TCP/IP Properties* dialog.



If TCP/IP is already installed, do not change the settings without consulting your network administrator. Serious connectivity problems can result.

6) Set the IP Address to 10.0.1.101 and the Subnet Mask to 255.0.0.0 and click OK.

7) Restart your computer to apply the changes.



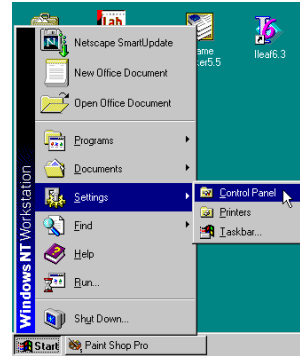
NOTE: The default address for the RUNtimePC is IP address 10.0.1.100, Subnet Mask 255.0.0.0. All RUNtimePCs and your Windows NT system have the same subnet mask value.

Connecting through an Existing Network

Step 1: Check the desktop PC's IP Address

Follow the steps below if you want to configure the RUNtimePC on an existing Ethernet network. This option allows other users on the network to 'see' the RUNtimePC.

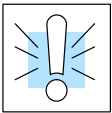
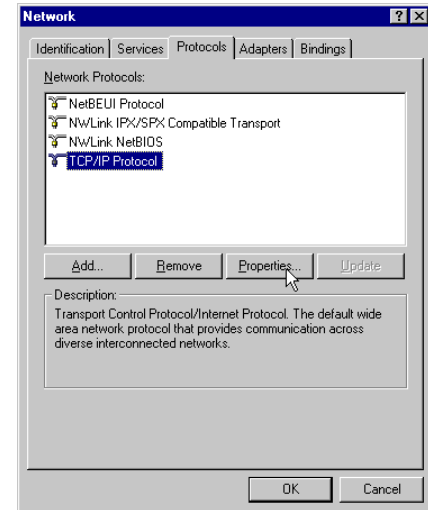
1) On the Windows NT system click the Windows *Start* menu button, then *Settings*, then *Control Panel* to open the Control Panel window.



2) In the Control Panel window, double-click the *Network* icon.

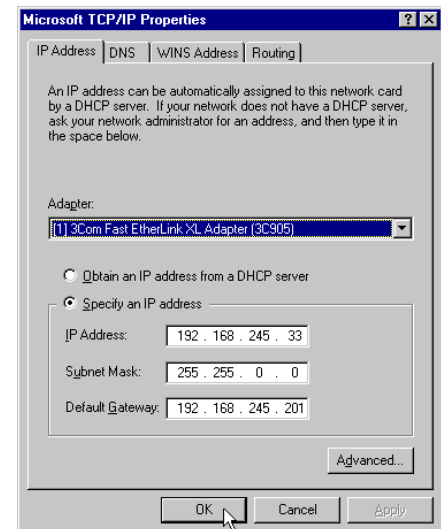


3) Select the Protocols tab (If the TCP/IP Protocol is not there, click *Add...* to add it.). Then select *TCP/IP Protocol* and click *Properties...*



WARNING: If TCP/IP is already installed, do not change the settings without consulting your network administrator. Serious connectivity problems can result.

4) Finally, select the IP Address tab to view the IP Address of the desktop PC. *Write this address down so you can conform the RUNtimePC settings to your network addressing conventions.*



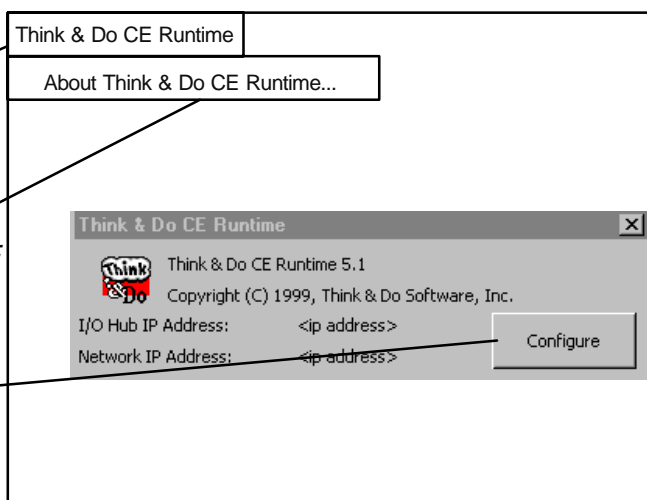
Step 2: Set the RUNtimPC's IP Address

Follow the steps below to set the RUNtimePC's IP Address for an existing network.

1) Press *Think & Do CE Runtime*

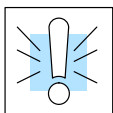
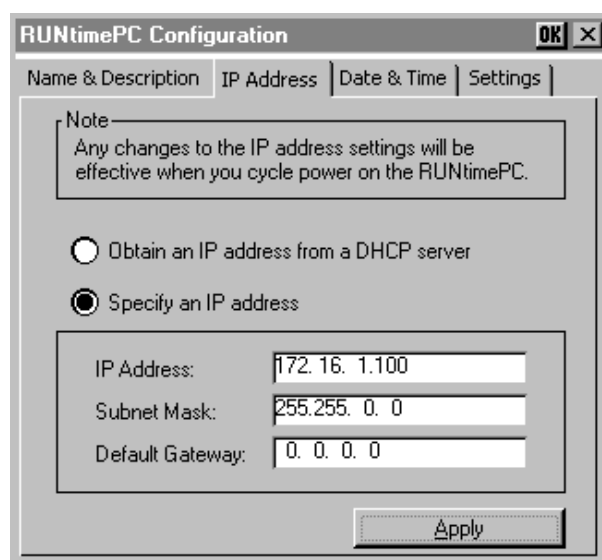
2) Press *About Think & Do CE Runtime...*

3) Press the *Configure* button



4) Select the *IP Address* tab to view the *Network IP Address*.

5) Set the IP address to one not being used on your network. See your network administrator for IP address information.



WARNING: You should always observe the addressing conventions followed on your corporate network. It is strongly recommended you discuss your plans with your network administrator before assigning an IP address to the RUNtimePC.

Establishing Communications

Establishing Communications when Creating a New Project

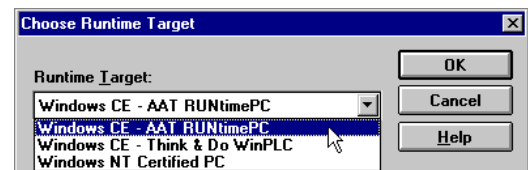
Once the correct network option has been chosen and completed, you are ready to establish communications with the RUNtimePC.

- 1) Confirm the Ethernet cable connection between the RUNtimePC and your Windows NT workstation. The RUNtimePC's Link LED should be ON. If the LED is NOT ON, return to "Creating a Network With a Peer-to-Peer Connection" (or "Connecting through an Existing Network") in order to verify the IP Address.

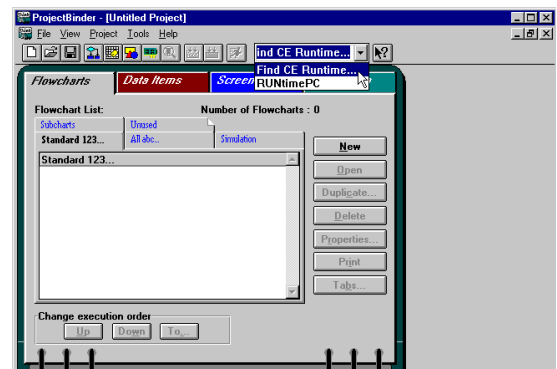
- 2) Click the ProjectBinder icon on the Windows desktop on your NT system to launch ProjectBinder.



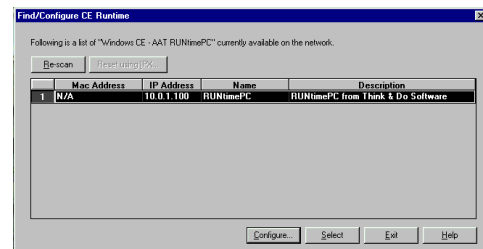
- 3) Use the File menu, and click New (or use the New toolbar button) to open the Choose Runtime Target dialog. Choose the Windows CE AAT RUNtimePC from the list of available target types.



- 4) Once the project opens, click *Find CE Runtime...* In the RUNTIME STATION LIST to open the *Find/Configure CE Runtime* dialog.



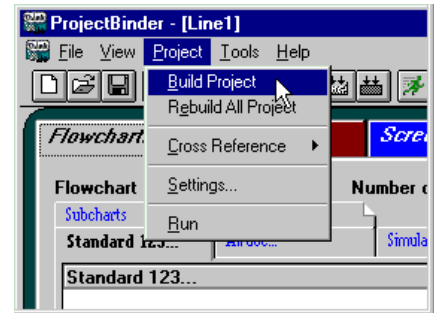
- 5) In the *Find/Configure CE Runtime* dialog, select the specific RUNtimePC to which you will target this project. If your IP address settings are correct, your RUNtimePC will be listed.



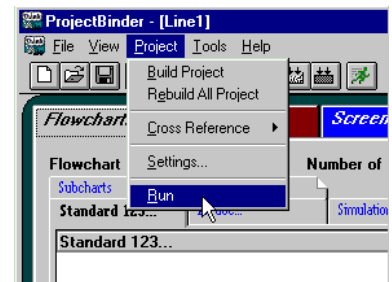
- **If the RUNtimePC is listed**, select (highlight) it and click the *Select* button. All RUNtimePCs on the network will appear in this list if they have been properly configured. If there are several, be sure to choose the correct target for the current project. If the RUNtimePC you're looking for doesn't appear initially, click the Re-scan button.

- **If the RUNtimePC is not listed**, make sure your RUNtimePC Ethernet cable (peer-to-peer type) is connected. If the connection is ok, check and correct the IP address settings on the RUNtimePC. Then click the *Re-scan* button in the *Find/Configure* dialog.

6) When you have completed development of your project, click the Build button on the ProjectBinder toolbar or from the Project menu, and select the Build command to launch the compiler.



7) Once the project is compiled, click the Run button on the ProjectBinder toolbar or, from the Project menu, and choose the Run command to send the project to the specified RUNtimePC.



Retargeting an Existing Project

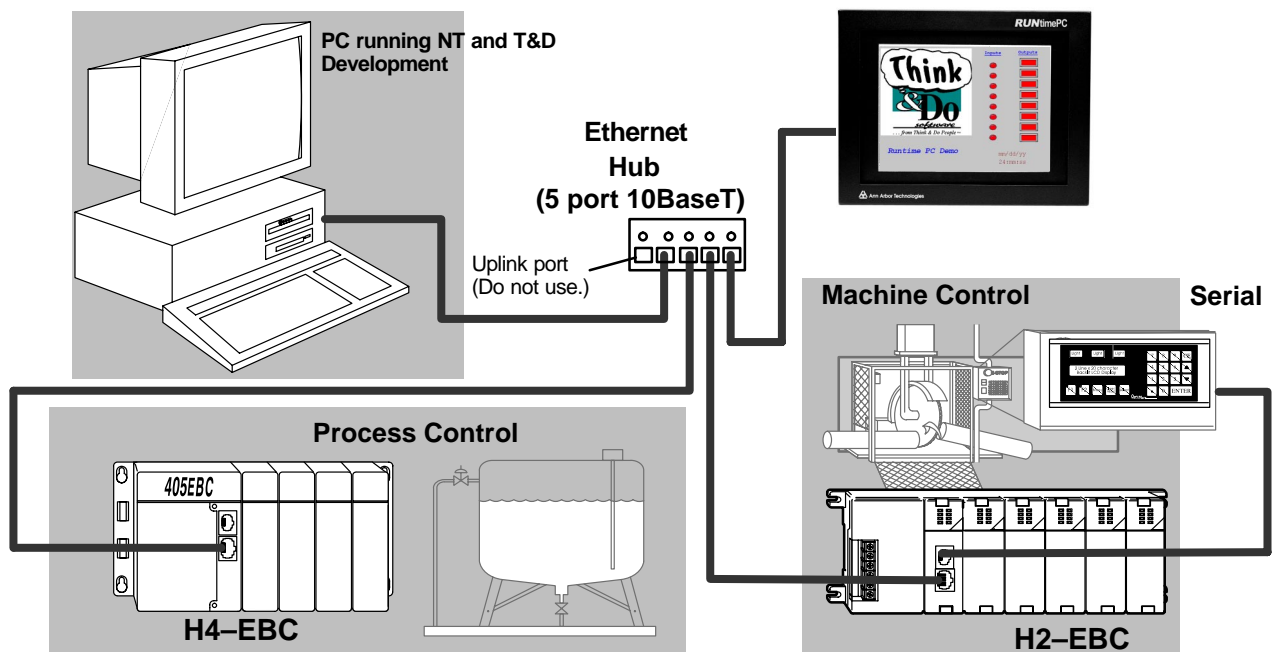
Please see the Think & Do Help File for information on Retargeting Existing Projects.

I/O System Checkout

The following directions show how to use Think & Do Software to perform I/O system checkout. This allows you to test wiring and communications between Think & Do and your I/O system by creating a configuration that runs outside a Think & Do project. To add an I/O configuration to a Think & Do project, open the project in ProjectBinder, then click the IOView button on the ProjectBinder toolbar and proceed. Details on using IOView and creating an I/O configuration are in the Think & Do Software Learning Guide and Online Help.

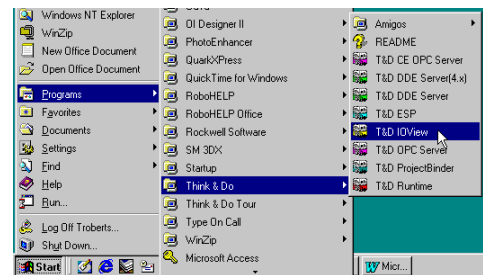
Step 1: Connect the system

Step 1: Connect the RUNtimePC to the I/O and the PC running Think & Do Software through a hub, as shown below.



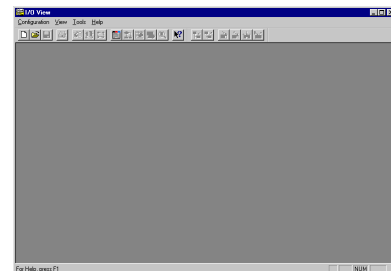
Step 2: Start I/O View

Step 2: I/O View is one of the views in Think & Do software. A view is a tool that lets you create a particular part of your project. I/O View will help you configure your I/O System. It is directly accessible from the Start menu after installation. Select Start, then Programs, then Think & Do, then TND I/O View, as shown to the right.



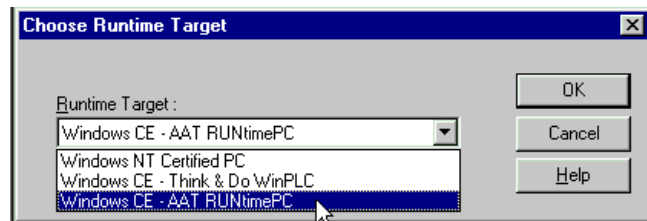
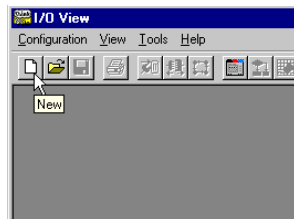
The I/O View window will appear, with a blank I/O configuration screen (the default name is "IOView1").

For now we are going to use a new I/O View window temporarily, to verify that the I/O in our new system is connected and accessible from Think & Do software.



Step 3: Start a New Configuration

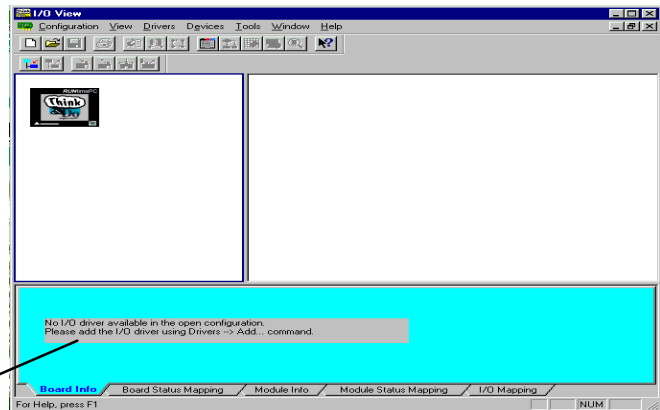
Step 3: To start a new I/O configuration, select the Configuration menu, then New. The Choose Runtime Target dialog will open (normally you will set this in ProjectBinder for new projects). Select "Windows CE - AAT RUNtimePC" and click OK.



Step 4: Add the I/O Driver

Step 4: The next screen which appears is divided into three regions separated by window splitter bars. Just select and drag each bar to re-size a pane.

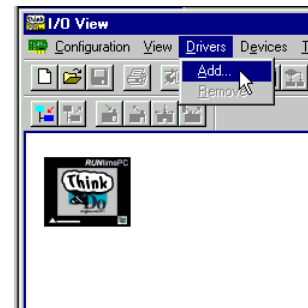
Each project maintains its own I/O configuration. So the first time you open I/O View to create a new project, it will prompt you to choose an I/O driver as shown below.



No I/O driver available in the open configuration.
Please add the I/O driver using Drivers -> Add... command.

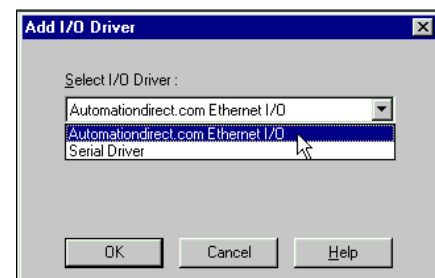
Use the Drivers menu and select Add or use the Add Driver toolbar button as shown to access a list of I/O drivers. Other I/O toolbar buttons include:

- Add Driver
- Remove Driver
- Add Device
- Remove Device
- Insert Device
- Replace Device



From the list of I/O drivers, select the Automationdirect.com Ethernet I/O driver. This driver enables the RUNtimePC to control DL205 I/O and DL405 I/O.

Later, you can add the serial port driver to the RUNtimePC to access the RS-232 port from your project.

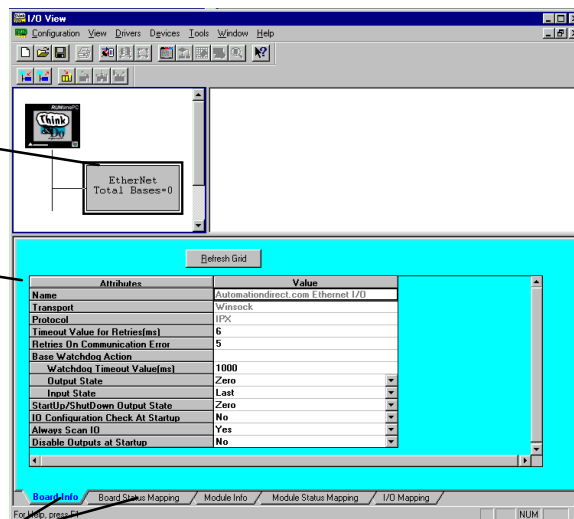


NOTE: New I/O drivers are constantly being developed. Check the Think & Do Web site at www.thinkndo.com for product updates.

I/O View now adds the driver to the RUNtimePC configuration. I/O View will display an image of the driver as a device in a tree-like structure that supports multiple drivers (you can also add a serial port driver later).

I/O driver loaded on
RUNtimePC

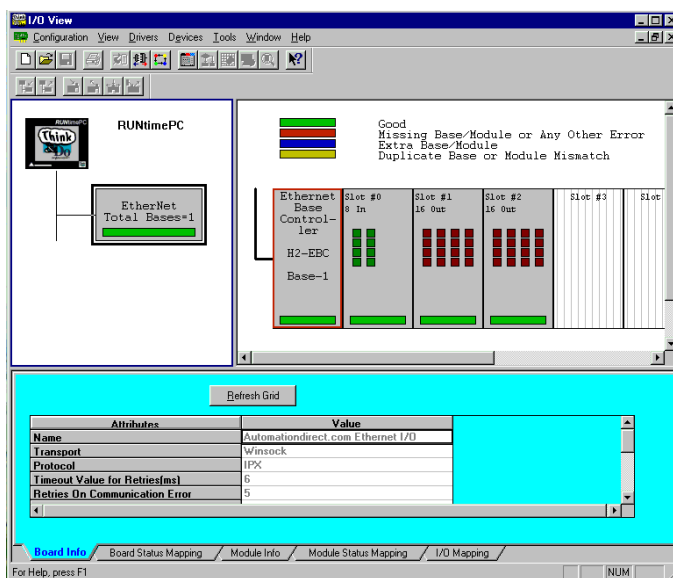
Board info on the I/O driver
displayed



Additional information on the Ethernet base is available in the tabbed dialog at the bottom of the screen. If the network adapter configuration is OK, we're ready to connect to the I/O System.

Step 5: Connect to the I/O System

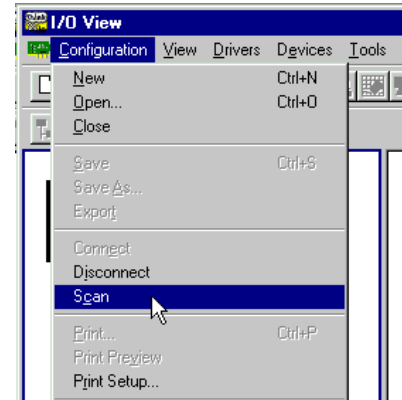
When the I/O connection is made, I/O View acquires status information from the network, creating an on-screen image of the I/O System. The legend at the top of the I/O View window describes the colored status bars on each device. Verify that your I/O System is correctly installed (green status bar = good) and that it is connected to the PC and RUNtimePC.



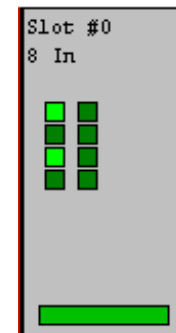
NOTE: I/O View always shows eight slot positions for **Automationdirect.com** DL205 bases, although your base may have fewer slots.

Step 6: Scan the I/O

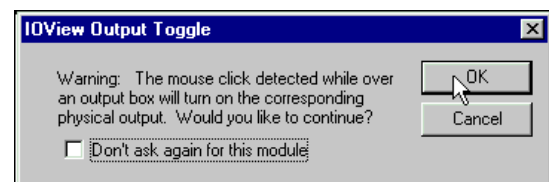
Step 6: From the Configuration menu, select Scan, or use the toolbar Scan button as shown to the right. After doing so, I/O View will continuously scan the base(s) in the system. When using the DL205 or DL405 Ethernet base controllers, the Activity LED will be ON at this time.



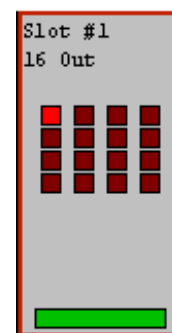
Monitor Inputs – While I/O View is scanning you can monitor the status of discrete inputs. For example, turn on some of the switches on the input simulator, and the corresponding on-screen LED will brighten to indicate the ON status. I/O View is a great tool for I/O checkout, as well as creating I/O configurations for projects.



Turn On Outputs – While I/O View is scanning, you can toggle output points ON or OFF. Just click the LED on the module graphic. The first time for each module, you'll see the warning dialog as shown. You can disable the message if desired.

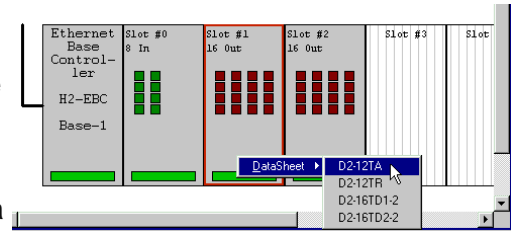


Just click an LED to turn ON the corresponding point, and click it again to turn it OFF. This new feature makes I/O checkout easy, since you avoid having to write programs or configure forced I/O.

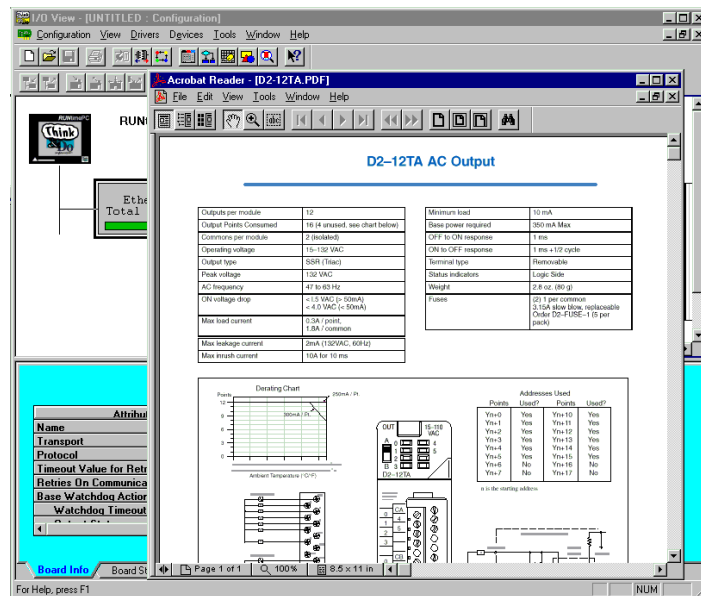


Step 7: Other I/O View Features

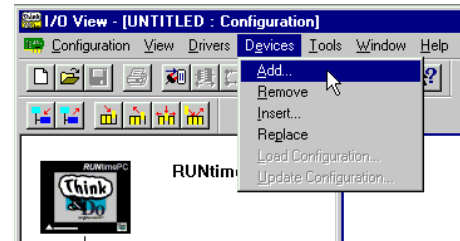
Step 7: Think & Do has online I/O module information for Automationdirect.com I/O modules, which you can access in I/O View. Following the example shown, place the cursor over a module graphic and right-click for a data sheet menu. The menu will list applicable modules in the current I/O family. Select a module to get the data sheet for that module, as shown on the right. This feature provides convenience during system wiring and installation.



The viewer for module data sheets is the Acrobat Reader, by Adobe Systems. When the file reader loads, the module's data sheet will appear as shown below. Note that some modules (such as analog type) have multiple pages. For those modules, use the page control toolbar buttons in Acrobat Reader. You can print the data sheet using the File | Print command in the reader. Close the reader when you are finished.

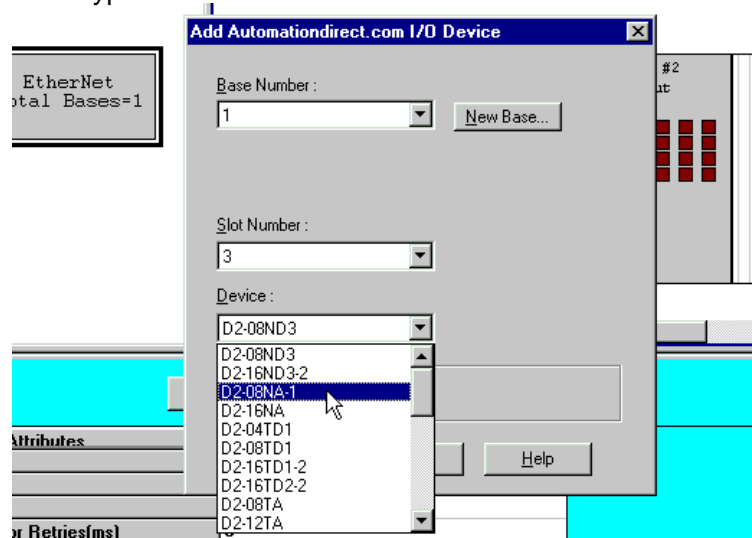


When I/O View is not connected to the I/O System, you can access the Devices toolbar buttons (shown at right). It will let you Add, Insert, Remove, or Replace I/O modules or bases in the configuration. This allows you to create and save I/O configurations before you have the actual I/O attached!



The example below shows an *Add Device* operation when the configuration was empty. I/O View first has you add a RUNtimePC. A description field is included.

After the base is configured, select *Add Device* again to begin adding I/O modules in the selected slot positions. I/O View lists the available modules for the current base type.



Step 8: End I/O Checkout

Step 8: To end this I/O checkout session:

- From the *Configuration* menu, select *Disconnect* (or click the *Disconnect* button).
- From the *Configuration* menu, select *Close*. I/O View will ask if you want to save the changes to "I/O View1." Select **Yes**.
- From the *Configuration* menu, select *Exit*, which returns to the Windows NT desktop.

You are now ready to create your first project. Chapter 3 of the Think & Do Learning Guide shows how to create flowcharts and HMI screens. Chapter 7 discusses establishing communications.

The following sections show how to use the RUNtimePC serial port, and how to manage projects on your Windows CE target devices.

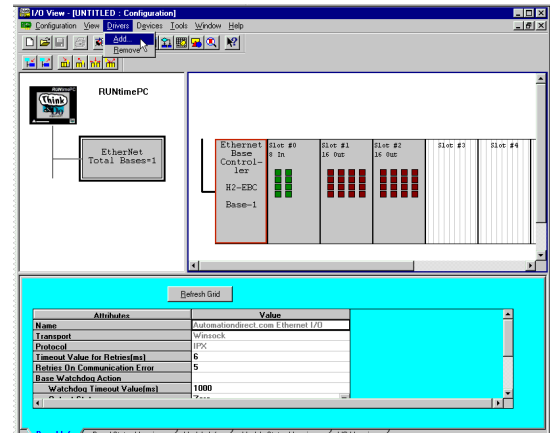
Using the RUNtimePC Serial Port

After you have added the Think & Do I/O driver in I/O View, you may want to add the serial port driver as well. This supports access to the RUNtimePC's RS-232 port from your project. The serial port on the RUNtimePC can be used to connect barcode readers, operator interface panels, weigh scales, and other serial devices. Just follow these steps:

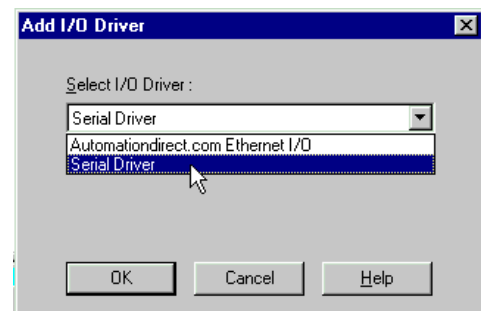
Step 1: Add the Serial Driver to the I/O Configuration

Step 1: In this step, you will use I/O View to add the serial driver for the RUNtimePC.

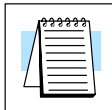
- a. Launch I/O View if it is not already open, by clicking the I/O View button on the ProjectBinder toolbar. The RUNtimePC configuration you just completed will appear in the Board and Module panes (upper left and right, respectively). Make sure I/O View is not connected or scanning the I/O at this time.



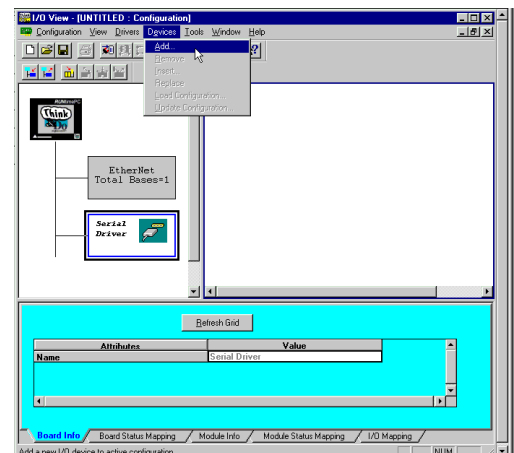
- b. Click the Add Driver button to open the Add I/O driver dialog. Choose the Serial Driver from the list of available drivers.



- c. When you click OK, the Serial Driver will be added to the Board View pane of I/O View.



NOTE: The modules shown in the Module View pane (upper right) are those associated with the driver selected in the Board View (upper left) pane. When you select a driver (will be highlighted), the Module View graphic will change to show the devices connected to that board/driver combination.



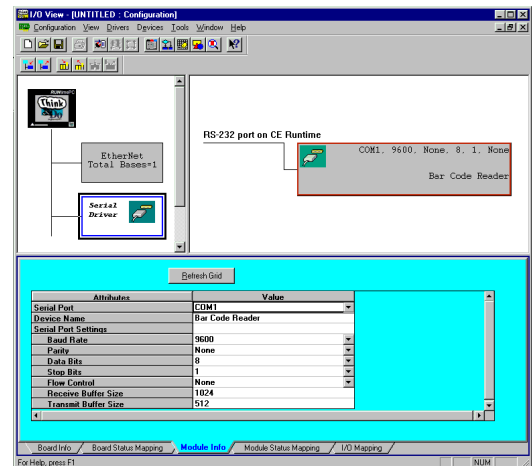
Step 2: Add the RS-232 Serial Port

Step 2: After you have added the Serial Driver, you're ready to add an RS-232 serial port device through which the RUNtimePC can communicate with an external device.

a. While the Serial Driver graphic is selected (highlighted), click the Add Device button to open the Add Serial Device dialog, and choose COM1. You can optionally enter a descriptive name for the device that will connect to the serial port.



b. When you click OK, the Serial Device will appear in the Module View pane (upper right) of I/O View. Then use the Module Info tab to configure parameters associated with the serial device.



Tip: Details on the board and module status items are found in Online Help. Double-click the Help tool and click the Find+tab (enter the driver name for the status items).

Step 3: Connect the Serial Device

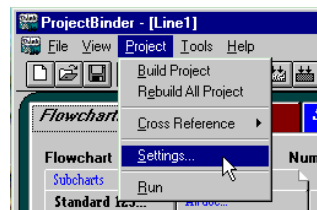
Step 3: Be sure to check the pinout of the serial device to which you are connecting the RUNtimePC and to use the proper cable. The RUNtimePC serial port is a standard 9-pin PC serial port.

Windows CE Target Options

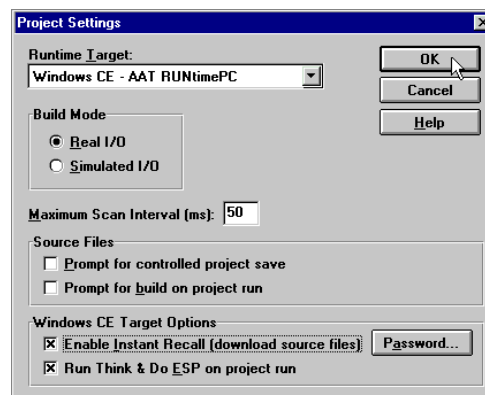
Project Settings for CE Runtimes

After you have finished developing a project, you have some options for sending it to the Think & Do RUNtimePC target runtime system. You can download only the files needed to run the project—or, you can also download compressed source files. You can even password protect the source files so they cannot be uncompressed by unauthorized personnel.

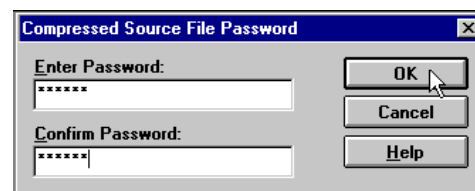
From the ProjectBinder *Project* menu, select the *Settings* command.



When the *Project Settings* dialog opens, you'll see the Runtime Target specified in the first field. At the bottom of the dialog are Windows CE target options. If you check *Enable Instant Recall*, the project source files will be downloaded to the RUNtimePC along with the runtime files. Instant Recall is the name of the feature that stores and retrieves the project's editable source files in compressed format in the Windows CE device's FLASH memory.



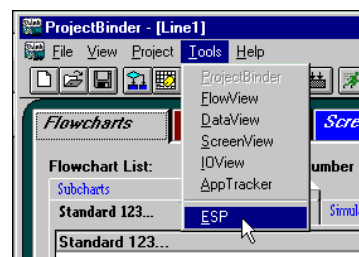
If you choose, you can password protect the downloaded files. Click the *Password...* button to open the *Compressed Source File Password* dialog and enter a password of up to 15 characters. You'll need to confirm the password before it is set.



Using Think & Do ESP

Think & Do ESP provides a handy interface between the RUNtimePC and your Windows NT workstation, and helps you manage your project. It will run whenever the project runs if you choose this option in the *Settings* dialog. In order to use this option, your RUNtimePC must be connected to your Windows NT workstation while the project is running.

It is not required that you run ESP every time the project runs. Rather than checking the target option in the *Project Settings* dialog, you can launch ESP from the ProjectBinder Tools menu at any time. As long as there is a network connection between the RUNtimePC and the Windows NT workstation, ESP will run.



The RUNtimePC is designed to run a project indefinitely. It can be configured to run on startup. You may want to monitor its progress anyway – and the best way to do this is with the Think & Do ESP. The previous section described how to automatically run Think & Do ESP whenever the project runs (but the project can also run without ESP). Some features of Think & Do ESP include:

- Shows you the current runtime statistics
- Set the scan interval (This is a temporary setting. The permanent scan time settings are done in ProjectBinder – the default scan time each time the project starts.)
- Load and start a project, and stop a project
- Clear files (erase project files on the RUNtimePC)
- Lock the project, so a password is required to start or stop it

Before ESP can do project operations such as load, start, etc. You must have a connection between the Think & Do NT workstation and the RUNtimePC.

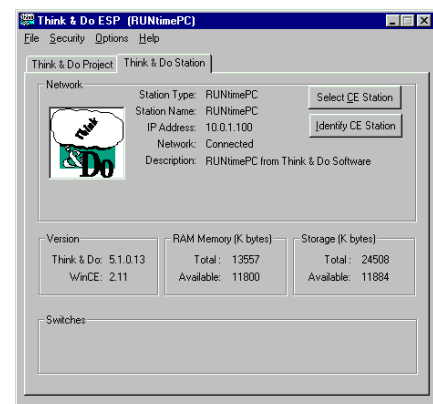
The *Think & Do Project* tab provides runtime statistics and buttons that allow you to interact with the project that is currently running. The buttons at the bottom of the dialog let you stop, restart, load and start a project, and upload project runtime files.

Runtime Files – After uploading project runtime files, you can use *Load and Start* to send the project to other RUNtimePCs. **Source Files** – Project source (editable) files are automatically uploaded to your Windows NT workstation if present.

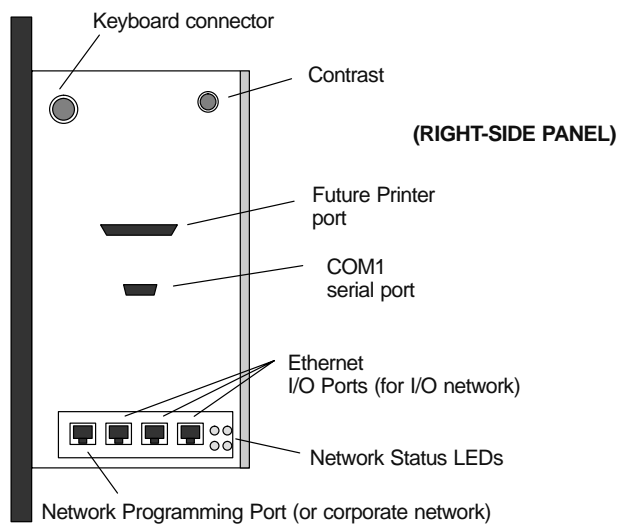


- Source files will only be present on the RUNtimePC if ProjectBinder's project settings enabled the *Instant Recall* feature at the time of the project download.
- The *Load and Start* command can automatically send uploaded source files with runtime files to other RUNtimePCs. Use ESP to select the RUNtimePC station.
- ESP does not uncompress source files for editing when they are uploaded.
- You must uncompress the source files if you want to edit them with Think & Do development tools. Alternatively, use ProjectBinder's *Instant Recall* to open (and uncompress) the source files directly from the RUNtimePC.

The *Think & Do Station* tab provides basic information about the Think & Do RUNtimePC station itself. The station name, IP address, network connection status and description, if any, is displayed. The center portion of the dialog shows the Think & Do version and the available RAM and storage.

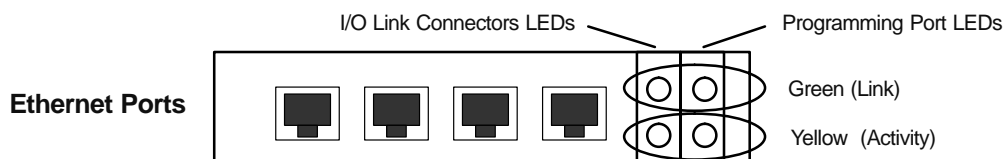


RUNtimePC Ports and Controls



Ethernet LEDs

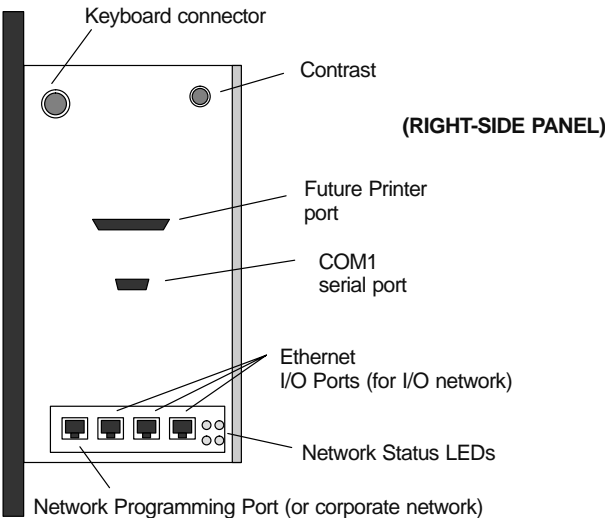
The RUNtimePC has two sets LED indicator lights, one for the programming port and one for the I/O Link Ports. The Green LEDs indicate Link and the Orange LEDs indicate Activity.



NOTE: On early versions of the RUNtimePC, the Green LEDs indicate Activity and the Yellow LEDs indicate Link. *If you are unsure of what your unit has, notice that the Activity LED will be blinking while the Link LED is ON.*

10BaseT Network Cabling

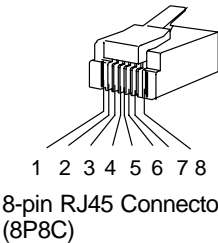
The RT-505-12TS supports the Ethernet 10BaseT standard. The 10BaseT standard uses twisted pairs of copper wire conductors.



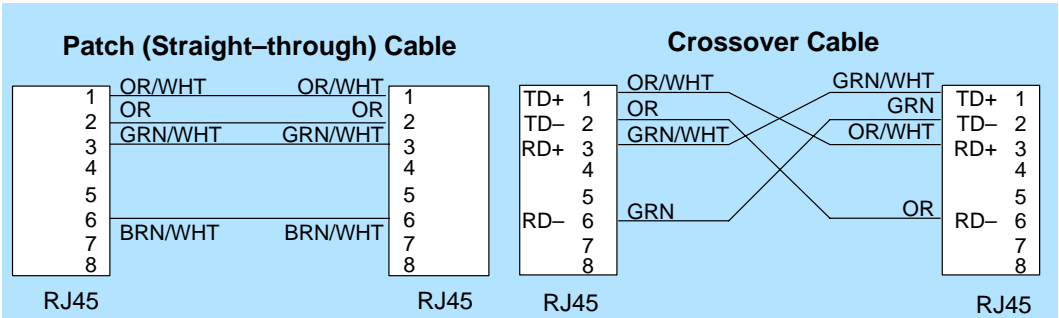
10BaseT Connections

The RT-505-12TS has a 3-port passive ethernet hub, with one port for programming (and/or corporate networking) and three ports for I/O. Each port has an eight-pin modular jack that accepts RJ45 connector plugs. UTP (Unshielded Twisted-Pair) cable is rated according to its data-carrying ability (bandwidth) and is given a “category” number. We strongly recommend using a category 5 cable for all Ethernet 10BaseT connections. For convenient and reliable networking, we recommend that you purchase commercially manufactured cables (cables with connectors already attached).

10BaseT



To connect an RT-505-12TS (or PC) to a hub or repeater, use a **patch cable** (sometimes called a straight-through cable). The cable used to connect a PC *directly* to a RUNtimePC or to connect two hubs is called a **crossover cable**.



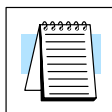
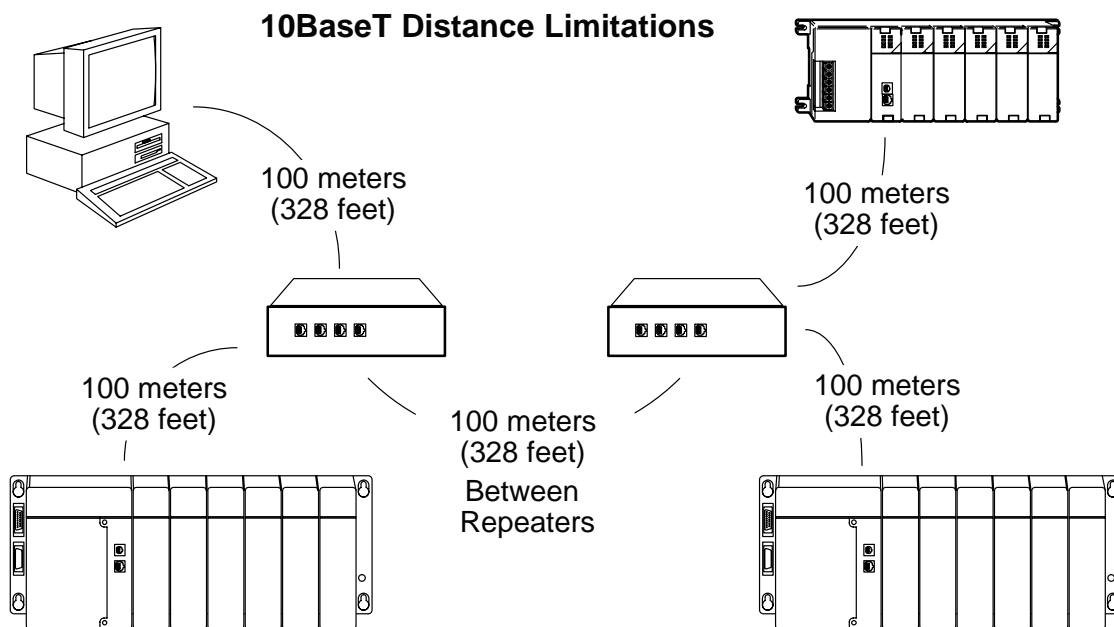
This diagram illustrates the standard wire positions in the RJ45 connector. We recommend all RUNtimePC 10BaseT cables to be **Category 5**, UTP cable.



NOTE: See page 28 for 10BaseT distance limitations.

Maximum Ethernet Cable Length

The **maximum distance** per **10BaseT** cable segment is **100 meters** or **328 feet**. Repeaters extend the distance. Each cable segment attached to a repeater can be 100 meters. Two repeaters connected together extend the total range to 300 meters. There are other important Ethernet limitations— see the note below.



NOTE: Please visit the Think & Do website (www.thinkndo.com) for more information regarding Ethernet guidelines and limitations.

Diagnosing Network Cable Problems

If you are experiencing communication problems, swapping cables is one of the simplest diagnostic procedures you can perform. If the network operates correctly with a different cable, you have isolated and cured the problem. If possible, use a short run of cable to test the network because problems with longer cable runs can be more difficult to diagnose and are more often intermittent.

If you are unable to swap cables, verify the proper operation of all other network components. You probably have a cable problem if you have verified that your:

- RUNtimePC is working correctly (Green Link Light).
- RUNtimePC configuration is correct.
- PC-based Control program is correct.
- hubs are working correctly (Link/Activity Lights on hubs).
- Windows configuration is correct.
- network adapter card is the correct type, and it is working correctly.

It is a good maintenance practice to test network cables periodically and maintain a permanent record of cable characteristics. A number of cable test instruments are available to test 10BaseT networks. These instruments will check the electrical characteristics of your cabling, including:

- Continuity – This is a check to make sure the communication pairs are wired correctly, and that the wires are continuous from end to end.
- Attenuation – This refers to the amount of signal loss over the cable segment at the signal frequency of interest. The 10BaseT specification allows for a maximum signal loss of 11.5 decibels (dB) for the entire link at the signal frequency used by 10Mbps Ethernet.
- Crosstalk – Crosstalk occurs when a signal in one pair of wires is electromagnetically coupled to an adjacent pair.



NOTE: Any significant difference between the cable characteristics of the transmitter and receiver can cause communication errors.

Ethernet devices continually monitor the “receive data” path for activity as a means of verifying their link is working correctly. When the network is idle, each network device (including the RUNtimePC) sends a periodic *link test* signal to verify that the network is working. If the link test signal or other network activity is not received periodically, the Link LED on the RUNtimePC is turned off.

Specifications: Display and Resistive Touchscreen

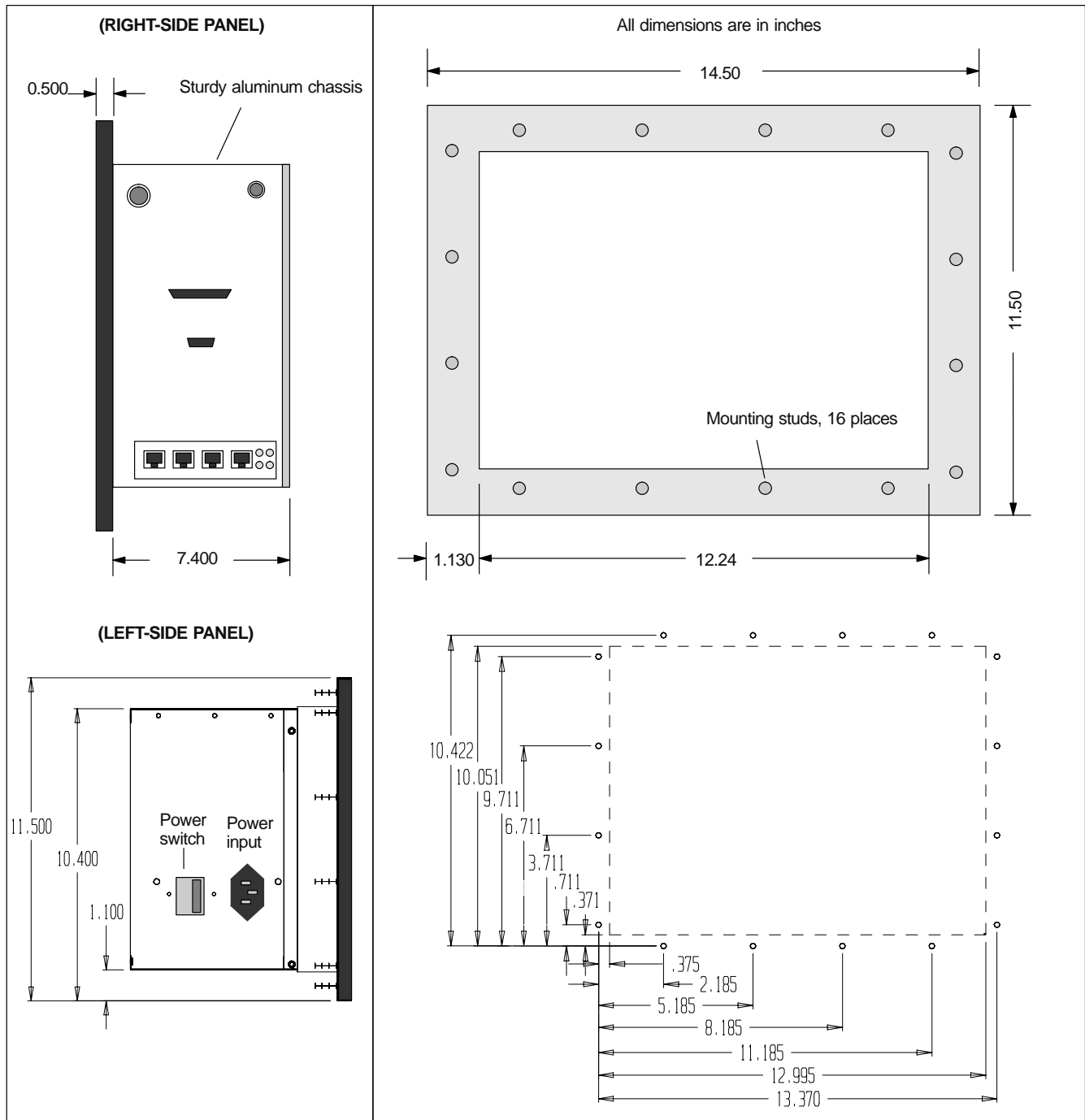
Display	Dual scan color LCD	
Model	Sharp LM12S49	
Backlighting	CCFT backlit	
Resolution (pixels)	800 x 600	
Dot Pitch (mm)	0.0825x0.2875	
Colors	256	
Power Consumption (W)		
	– panel	1.26
	– backlight	3.25
Viewing Area (inches)	– dimensions	9.68 x 7.26
	– diagonal	12.1
Contrast Ratio (typ.)	40	
Brightness (cd/m2)	180	
Viewing Angles (°)	– horizontal	–30 to +30
	– vertical	–15 to +253
Temperature Range (° C)		
	– operating	0 to +45° C
	– storage	–25 to +60° C
Humidity (@40° C)	95% RH NC4	
Vibration	10–57Hz/.075mm	57–500Hz/1.0G
	11 min. sweep	
Mechanical Shock	50G, 11msec	1 cycle/ X, Y, Z
Expected Lifetimes (hours)		
	– backlight (half-life)	40,000
	– display (MTBF)	50,000
RESISTIVE TOUCHSCREEN		
Top	Polyester with outside hard surface coating.	
Inside	Transparent conductive coating.	
Bottom	Glass substrate with uniform conductive coating. Top and bottom layers separated by Elo TouchSystems patented separated dots.	
Positional Accuracy	Standard deviation of error is less than +/-0.080".	
Resolution	More than 40,000 touchpoints per in ² when used with Elo TouchSystems controller.	
Touch Activation Force	Typically 3 to 4 ounces.	
Expected Life Performance	AccuTouch technology has been operationally tested to more than 35 million touches in one location without failure using a stylus similar to a finger.	
Surface Durability	Surface meets Taber Abrasion Test (ASTM–D–1044), CS–10F wheel, 1000 g.	
Operating Temp.	–10°C to 45°C	
Storage Temp.	–40°C to 71°C	
Relative Humidity	(Based on 24–hour cycle)	
Operating	0% RH at 35°C	
Storage	0% RH at 35°C	
Chemical Resistance	The active area of the touchscreen is resistant to the following chemicals when exposed for a period of one hour at a temperature of 70°F:	
	Acetone	
	Methylene chloride	
	Methyl ethyl ketone	
	Isopropyl alcohol	
	Hexane	
Electrostatic Protection		
Per IEC 801–2 (150 pF and 150 ohms) the touchscreen shall withstand 300 discharges of 15 kV, distributed randomly across the active area of the touchscreen with proper transient protection.		
Note: Specifications are for touchscreen only and do not necessarily apply to the entire system.		

Specifications: Processor Motherboard and Flash Disk

MediaGX Processor Motherboard:

Manufacturer	GCT
Processor:	233 MHz Cyrix Media GX
Memory:	24MB FLASH ROM, 32MB RAM
Model	ST-MGXm
Chip Set	Cyrix CX5520
BIOS	Licensed Award BIOS
RAM Capacity	Two 168 pin DIMM sockets support 3.3V SDRAM only Expandable to 128MB SDRAM
Expansion I/O	One Programming/Corp. networking port (Ethernet 10BaseT) A three port passive hub (Ethernet 10BaseT) One 9-pin serial port (NS16C550-compatible UART) One parallel port (EPP and ECP compatible) One standard AT-compatible keyboard interface
Temperature	0 to 50°C
Power Supply:	120 VAC (switch-selectable), power cord for 120VAC included
Power Consumption:	30 Watts maximum
Weight:	20 lbs.
Dimensions	13.25" W x 10.5" H x 6.75" D
Flash Disk:	24MB
Compatibility	Full Disk Emulation
Manufacturer	Ann Arbor Technologies
Performance	
Seek Times (Typical)	Sustained Write Speed 550 KB/sec Sustained Read Speed 1.4 MB/sec Burst Transfer Read Rate 5 MB/sec Burst Transfer Write Rate 5 MB/sec
Environmental	
Operating Temp.	0° to 70°C
Storage Temp.	-20° to 80°C
Operating Humidity	10% to 90% non-condensing

Dimensions and Mechanical Mounting



Mechanical Mounting Instructions

The RUNtimePC is designed to be mounted into a panel. To ensure a good NEMA 4 seal of the mounting gasket to the panel, there are a number of mounting studs around the perimeter for even compression. The mounting studs are standard 10/32 size. Please note that there should be TWO (2) nuts on each stud. **The first nut is used for the front bezel assembly and should never be removed.** The second nut is the mounting nut and is run onto the stud prior to shipping only for convenience. Please remove the outer mounting nuts prior to mounting the RUNtimePC and use these nuts for holding the RUNtimePC in place.

Frequently Asked Questions (FAQs)

Q. What is the configuration kit used for?

A. Think & Do Software provides an easy method of automatically configuring your DL205/DL405 subsystem, by providing a “Scan I/O” function. In order to take advantage of this feature, a separate Ethernet hub is needed to connect your Think & Do Development PC, the RUNtimePC, and the DirectLogic I/O. The configuration kit provides this external hub with all of the necessary cables to make it easy for you to use this feature.

Q. Which version of Think & Do Software comes with the unit?

A. The current version (at the time the unit is shipped to you) of the Think & Do Run-time engine is loaded into the RUNtime PC's internal memory at the factory.

Q. Is the ROM upgradable?

A. Yes, the flash ROM is upgradable.

Q. Can I attach a mouse and keyboard to the RUNtime PC?

A. Keyboard, Yes. Mouse, No.

Q. Which I/O sub-system interfaces are already installed, and can I install others?

A. The RT-505-12TS comes standard with an Ethernet 10BaseT 10Mbit interface and a built-in 3-port hub. The initial drivers in the unit will include one for **Direct**LOGIC I/O, and other driver(s) for use on the serial port. There are no expansion slots for other I/O scanner or network cards.

Q. Can I develop my program on a desktop PC, and download it to multiple RUNtime PCs?

A. Yes. Each RUNtimePC is licensed to run projects created with Think & Do Software. The Think & Do Software must reside on a separate desktop PC, running Windows NT. You will need at least one copy of Think & Do Software (PC-TND-DEV) for the desktop PC.

Q. What sort of mounting brackets, etc. will I need to mount the RUNtime PC?

A. The Runtime PC housing is a sturdy aluminum chassis, with 16 threaded studs for mounting around a rectangular panel cut-out.

Q. Will the RUNtime PC stand up to splashes or high-humidity environments?

A. Yes, just follow the mounting instructions. The unit has a NEMA 4 rating, and the front panel flange features a thick rubber gasket for sealing against a rectangular cut-out in a panel. The touchscreen operator interface helps ensure no contaminants enter the unit from the exposed front panel area.

Q. What are the provisions on the RUNtimePC for memory retention?

A. The Think & Do Software database manager (DataView) provides an optional retentive setting for variables. They are saved in FLASH ROM and restored at runtime after system powerup. If your system will experience sudden power loss, we recommend using an Uninterruptible Power supply (UPS).

Q. In the future, how can I upgrade the software on the RUNtime PC?

A. You can update software in the RUNtimePC via the Ethernet connection. However, the system is designed for run-time use rather than project development, so the need for upgrades will be minimal.