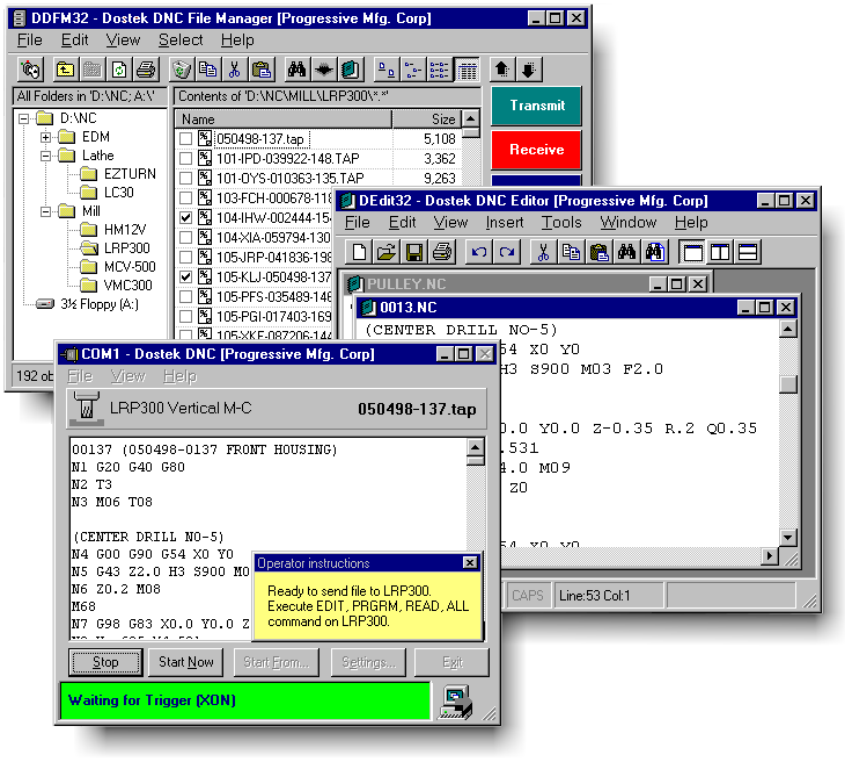
Dostek DNC

Configuration Guide



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1 Technical Support 2

2 Configuration Overview 3

2.1 Using Option Setting Forms 4
2.2 Saving and Restoring Configuration Files 4
2.3 Security 4
2.3.1 Reset Password 5
2.3.2 Security Precautions 5

3 Configure Application Options 7

3.1 Global General Options 8
3.1.1 Root Folders 8
3.1.2 File Archive 9
Archive Sub-Folders 9
3.2 Security Options 10
3.3 File Types 11
3.4 Communication Options 11
3.4.1 Match Device Configuration to Folder 11
3.4.2 Automatic Naming of Received Files 13
3.4.3 Default File Prefix and Extension 13
3.4.4 Transmit Options 13
3.5 Shortcut Manager 14
3.6 Configuration Manager 15
License/Settings Disk 15

4 Configure Device Parameters 17

4.1 Device General Options 18
4.2 Port Settings 18
4.3 Formatting and Filtering Options 21
4.3.1 Transmitting Multiple Files 21
4.4 Transmit Options 22
4.4.1 Transmit Trigger 22
4.4.2 Transmit Repeat 23
4.4.3 Operator Instructions 23
4.5 Receive Options 23
4.5.1 Receive Trigger 23
4.5.2 Receive Terminate 25
4.5.3 Operator Instructions 25
4.6 Receive File Naming 25
4.6.1 File Naming Examples 26
4.7 Managing Device Configuration Files 28
4.7.1 Import 28

5 Device Wiring and Testing 29

5.1 Connect Devices 29
5.2 Testing Communication 31
Using DConfig 31
5.2.1 Test Communication Ports 32
5.2.2 Test Cable 33
5.2.3 Test Receive 34
Test Handshaking 34
Check Data Format 35
Configure Receive File Naming 35
5.2.4 Test Transmit 35
Transmit Trigger 37
Test Flow Control 37
5.2.5 High-Speed Communication 38
5.2.6 FIFO Buffers 38
5.3 Terminal Program - DTerm32 39
5.3.1 Configuration 39
Display Options 40
5.3.2 Capturing Data 40
5.3.3 Transmitting a File 40

6 MultiPort DNC **41**

6.1 Protocol Configuration 42
6.1.1 Receive File Naming 42
6.1.2 Receive Terminate 42
6.1.3 Transmit Trigger 42
6.2 Remote Request 43
6.2.1 Commands 43
6.2.2 Message/Feedback File 43
6.2.3 Command Format 44
6.2.4 Command Files 44
6.2.5 Options 45
6.3 Configure MultiPort DNC Server 46
6.3.1 Server Options 46
6.3.2 Managing Devices 46
6.3.3 Device Properties 47

Appendixes

Appendix A - Special Characters
Appendix B - Using Command-Line Options

Tables

Table 1 - Application Configuration Checklist 6
Table 2 - Application (Global) Configuration Tabs 7
Table 3 - Global General Options Tab 8
Table 4 - Security Options Tab 10
Table 5 - Communication Options Tab 12
Table 6 - Receive File Naming Modes 12
Table 7 - Device Configuration Checklist 16
Table 8 - Device General Options Tab 18
Table 9 - Port Settings Tab 19
Table 10 - Formatting Options Tab 20
Table 11 - Filtering Tab 20
Table 12 - Automatic File Naming 24
Table 13 - RS-232 Communication Port 29

Figures

Figure 1 - Application Settings Form 7
Figure 2 - Configuration Manager 15
Figure 3 - Device Configuration Form 17
Figure 4 - Common Cable Types for CNC Applications 30
Figure 5 - DTerm32 - Dostek DNC Terminal 39

Welcome to Dostek DNC, a versatile and easy to use CNC program management and DNC communication program designed to work with the 32-bit Windows operating systems.

This manual explains how to install and configure the Dostek DNC software, and how to connect machine tools and other devices to the computer.

Refer to the *Dostek DNC Getting Started Guide* for an overview of Dostek DNC and detailed installation instructions.

Refer to the *Dostek DNC User Guide* for detailed information about using Dostek DNC.

To prepare the Dostek DNC software for use, follow these steps:

❑ install software and software license	*Getting Started Guide*
❑ review software features, organization and security issues . .	Section 2
❑ review configuration basics	Section 2.2
❑ configure application settings	Section 3
❑ create menu and desktop shortcuts	Section 3.5
❑ connect devices (CNCs, etc.) to the computer	Section 5.1
❑ configure device communication parameters	Section 4
❑ test communication	Section 5.2
❑ make backup copies of configuration files	Section 3.6

1 Technical Support

Telephone technical support is free for a period of 90 days from date of purchase. Free technical support is always available by email (see below).

An annual Priority Technical Support subscription, which includes telephone support and downloading of software updates and technical documents, is available by annual subscription (contact Dostek for details).

Before contacting Dostek, please review the appropriate items on the following checklists:

If you experience difficulty installing Dostek DNC:

- ❑ if you are using Windows NT or are installing the software on a network file server, be sure to use an account with administrator privileges
- ❑ ensure that all other Windows applications are closed before installing Dostek DNC
- ❑ carefully follow the installation instructions provided in this manual and on the computer screen
- ❑ try to uninstall (if possible) and then reinstall Dostek DNC

If you experience difficulty transferring data between the computer and CNC machines, refer to *Configuration Guide*, Section 5.2, "Testing Communication".

If you experience an unrecoverable error:

- ❑ before doing anything else, ensure you have a current backup copy of your data and your Dostek DNC configuration files
- ❑ close all applications and restart Dostek DNC
- ❑ restart the computer

Contact Dostek

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2 Configuration Overview

Dostek DNC is configured by setting two types of configuration parameters:

- v software options such as file locations and security options
- v device configuration parameters such as baud rate and parity

Configuration settings are stored in files located in the “Settings” sub-folder of the Dostek DNC application folder. Application configuration settings are stored in file `DDNCW32.INI`, and device settings such as baud rate and parity are stored in Device Configuration Parameter files (“`.DCP`” file extension). A separate device configuration file is usually created for each CNC or other device connected to the computer.

Most configuration data is stored in files rather than the system registry to simplify backup or copying of settings to another computer (such as when a computer is replaced or upgraded). Many user preference settings, however, are stored in the system registry to permit each user to store a different profile (Windows user profiles are enabled by selecting Control Panel, Passwords, User Profiles).

The Dostek DNC Configuration application (DConfig) is used to configure device configuration files and many system application options. Other application options are configured by choosing “Preferences” or "Options" from the application’s menu. Some preferences, such as form size and location, are automatically stored in the system registry.

DConfig features two configuration modes. Global configuration mode is used to edit Dostek DNC application configuration settings, and Device configuration mode is used to configure device configuration parameter files. The configuration mode is changed by clicking the “Global” button on the toolbar or by choosing “Global Settings” from the File menu. When Global configuration mode is in effect, the Global toolbar button appears depressed and the Global Settings menu item is checked.

DConfig is started in any of the following ways:

- v choose “Dostek DNC Configuration” on the Windows Start menu
- v choose “Configure Dostek DNC” or “Configure Devices” on the Dostek DNC File Manager “Supervisor” menu
- v choose a Dostek DNC File Manager QuickButton you create
- v choose a Windows desktop shortcut you create

Special Character Symbols

Many Dostek DNC settings accept special character symbols for specifying non-printable characters. For example, you can configure Dostek DNC to send an ASCII `DC4` control code (sometimes used as a "Reader Off" command) to the CNC after a file is sent by specifying "`^T`" in the Transmit Suffix setting. A complete list of special character symbols is provided in Appendix A at the back of this division of the manual.

2.1 Using Option Setting Forms

Option setting forms such as the Global General form illustrated in Figure 3 use the following "controls" for specifying configuration options:

Text Box	Type a value. The number and type of characters (letter, number, symbol) you can enter depends on the option. ASCII control characters can be included in some text boxes by typing a caret symbol (^) followed by the appropriate character (list provided in Appendix A).
List Box	Click the down arrow and click on an item in the list.
Check Box	Change the option by clicking on the check box or it's label.
Option Button	Pick one choice by clicking on the button or it's label.

2.2 Saving and Restoring Configuration Files

Use the Configuration Manager wizard (Section 3.6) to save and load backup copies of configuration files to and from a diskette, network drive or local hard drive. When multiple computers are used, the set of Dostek DNC configuration files used by each computer can be stored as a separate configuration "collection".

The Configuration Manager wizard simplifies system maintenance by quickly loading a saved configuration collection whenever a computer is moved or replaced.

2.3 Security

Dostek DNC provides security features to:

- restrict access to only files stored in specific drives or folders
- restrict access to only files of a specific type (file extension)
- restrict use of Dostek DNC commands that modify files or folders
- restrict modification of Dostek DNC configuration settings and preferences

When Dostek DNC is initially installed, security is disabled and users have full access to all Dostek DNC commands as well as all available resources, including drives, files and printers on the local computer and any connected network computers.

To enable Dostek DNC security, check the “Enable Security” check box on the Configuration program’s Security tab (Section 3.2), and enter a password.

The File Manager "Supervisor Mode" permits full access to all Dostek DNC commands and features. To activate Supervisor mode:

- choose Supervisor Mode from the File Manager File menu, or click the security icon on the File Manager toolbar, and enter the Supervisor password
- start the Configuration program and enter the Supervisor password when prompted
- choose a protected command or feature and, when the password form is displayed, check the "Log on to Supervisor mode" check box and enter the Supervisor password

All security features are disabled while Supervisor mode is active. To terminate Supervisor mode ("log off"), choose Supervisor Mode from the File Manager File menu, click the security icon on the File Manager toolbar, or close all open Dostek DNC applications.

2.3.1 Reset Password

If you forget the password or the security settings become corrupted (for example, by attempting to change the settings with a text editor), you may not be able to operate the Dostek DNC software. To clear the password and security settings:

- insert the Dostek DNC CD-ROM in the computer's CD-ROM drive
- click Start, select Run, and type the command: "`D:\Tools\DUnlock`" (substitute your CD-ROM's drive letter for `D:`)

For security reasons, do not copy the DUnlock utility program to your computer's hard drive, and ensure the CD-ROM is stored in a secure location.

2.3.2 Security Precautions

To prevent unauthorized access or modification of data, consider the following general security measures:

- Control physical access to the computer.
- Use the Windows security features to restrict access to the computer and network resources.
- Use a security utility such as Cetus Storm Windows to restrict use of Windows 95 commands and features.
- Consider setting file attributes of original files to "Read Only".
- Use non-obvious passwords. Passwords that are six or more characters in length using a combination of letters and numbers are most secure.
- Do not disclose passwords to unauthorized users.
- Change passwords frequently.
- Use the Dostek DNC security options.
- Configure Dostek DNC "Root Folders" (Section 3.1.1) to restrict user access to specific drives or folders.
- The Dostek DNC Editor restricts access to specific folders according to the "Root Folders" setting, but allows access to all files in the folders. Store sensitive files elsewhere.
- Some security-related configuration settings, such as file locations, are stored in the `DDNCW32.INI` configuration file. A knowledgeable user with access to the configuration file may be able to modify settings using a file editor.
- Store the Dostek DNC software CD in a secure location to prevent use of the security "unlock" utility (Section 2.1.1).

Table 1 - Application Configuration Checklist	
Files	❑ organize files (Section 2.3)
Network	❑ to use network resources, set up user accounts and file and printer resources on the file server(s) ❑ to print on a network printer, set up the printer on the local computer
Security	❑ specify security options (Section 3.2) ❑ to restrict access to specific file folder(s), specify Root Folders (Section 3.1.1) ❑ to restrict access to specific file type(s), specify File Filters (Section 3.3) and choose "File Filter" from the File Manager "View" menu
File Archive	❑ to implement a File Archive, refer to Section 3.1.2
Communication Ports	❑ to share a communication port using a Dostek 208/216 CommSwitch, check "CommSwitch" on the Communication Options tab (Section 3.4) ❑ to use a multi-port communication card, install the card and the vendor's software drivers
Communication Options	❑ to enable automatic selection of device communication parameters according to the file folder (Section 3.4.1), check "Match device to folder" on the Communication Options tab ❑ specify a receive file naming option (Section 3.4.2) ❑ to distinguish all automatically named received files with a file name prefix, refer to Section 3.4.3 ❑ specify a default file extension for received files (Section 3.4.3) ❑ to omit extraneous text from being transmitted (such as file headers inserted by a post processor), refer to Section 3.4.4

3 Configure Application Options

To modify Dostek DNC application options such as file locations and security options, start the Dostek DNC Configuration program (DConfig) and choose the “Global” configuration mode (if necessary) by clicking on the Global icon in the toolbar or by choosing "Global Settings" from the File menu.

Application configuration option are displayed on a tabbed form as indicated by Figure 1 and described in the following paragraphs.

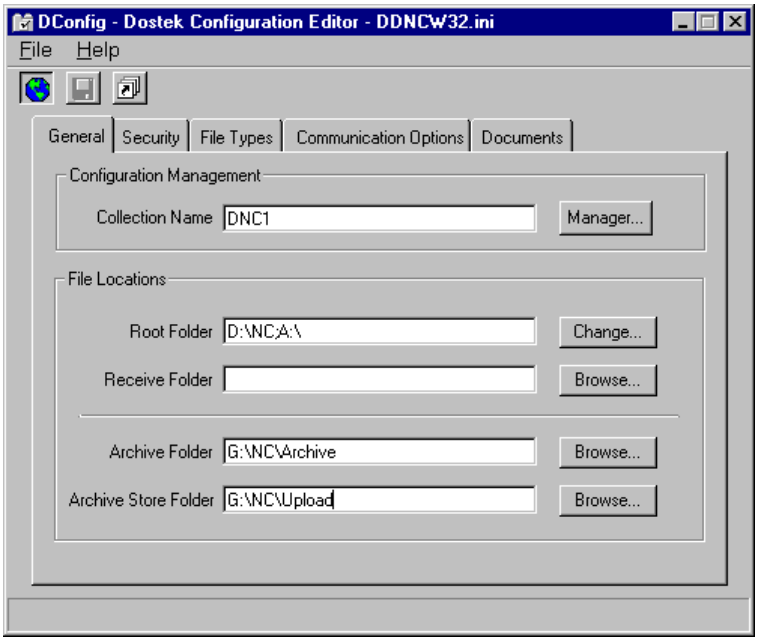


Figure 1 - Application Settings Form

Table 2 - Application (Global) Configuration Tabs

Tab	Configuration Options
General	File locations, computer identification and Configuration Manager button.
Security	Security options.
File Filters	File filter specifications.
Communication	Communication options.
Documents	Related document specifications (for use with the "View Related Document" command).
Event Log	Options and file locations for event logging.

3.1 Global General Options

Text fields and Browse buttons on the General tab are used to specify file locations as described in Table 3. To configure a file location, type a drive and folder specification into the text field (for example, “`C:\NC Programs`”), or click the appropriate Browse or Change button to select a file location by browsing through a list of drives and folders.

You can specify network resources by specifying a mapped drive or UNC name ("`\\Server\Path\File`"), or by browsing the Network Neighborhood.

Table 3 - Global General Options

Item	Description
Configuration Management	You can assign a name to the collection of configuration files used by each computer. Click the Manager button to start the Configuration Manager wizard to save, load, copy or delete a configuration "collection" to or from a diskette, file server or local hard drive. (Section 3.6)
Root Folders	To restrict access to specific drives or folders, enter the path for each root folder separated by a semicolon character, or click the Change button to manage root folders using the Root Folder Manager. To permit access to all local drives and mapped network drives (subject to network security restrictions), leave the Root Folders field blank or choose "My Computer".
Receive Folder	If specified, files received from CNC machine tools are stored in this folder or one of it’s sub-folders. If blank, the Receive Folder is set initially to the first folder specified in “Root Folders”. To ensure received files can be accessed for viewing, editing or transmitting, the Receive Folder must be a sub-folder of a Root Folder.
Archive Folder	If specified, this folder is the root folder from which the Dostek DNC File Manager “Archive Retrieve” command retrieves files. If this field is blank, the File Archive commands are disabled. (Section 3.1.2)
Archive Store Folder	If specified, this folder is the root folder to which the Dostek DNC File Manager “Archive Store” command writes selected files. If this field is blank, files are stored to the specified Archive Folder. (Section 3.1.2)

3.1.1 Root Folders

User access is restricted to the specific drives and folders specified in the “Root Folders” field, as indicated in Table 3.

For security reasons, Dostek DNC permits copying of files to or from a diskette only if the diskette drive is specified as a root folder. If files must frequently be copied to or from diskette, include the diskette drive in the root folder list.

3.1.2 File Archive

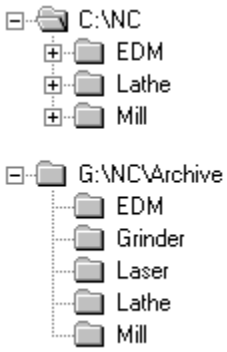
Dostek DNC is often used in a network environment where CNC program files are stored on a file server. To prevent machine down time, however, you may prefer to store files on the computer's local hard drive where they can be loaded even if the network is down. The File Archive feature lets you implement a system where the master copy of CNC program files are stored on a file server (the "file archive") and a working copy of some or all of the files is stored on the shop-floor computer (the "working folder").

Some Dostek DNC users store all files on both the server and the shop-floor computers and use the File Manager's Archive command to retrieve new or updated files from the server. Other users prefer to keep current files (work in process) on the shop-floor computer, and restrict access to other files (by requiring the Supervisor password to use the Archive Retrieve command).

Direct Server Access	File Archive
v only one copy of files to manage v direct access to current copy of all files at all times	v no down time due to network problems v restricted access to master files v shop-floor users work with a copy of the original file, and can be prevented from modifying the working copy v shop-floor files are not updated when master files are added or changed, but are easily updated by the Archive Retrieve command

To implement a file archive, specify the name of the Archive Folder on the Global General tab. To store files uploaded by the Archive Store command to a different folder, specify an Archive Store Folder (if blank, uploaded files are stored in the Archive folder). The Archive Retrieve command searches both the archive folder and the archive store folder. If a file is present in both locations, you can choose which file to retrieve.

Archive Sub-Folders



The file archive and working folder can be subdivided into sub-folders to categorize files. Consider the folder arrangement illustrated at right. The archive folder is "`G:\NC\Archive`", the working folder is "`C:\NC`", and separate sub-folders are used to categorize files by machine type. If the current folder is "Mill" (or any of it's sub-folders) when the Archive Retrieve command is used, Dostek DNC searches only the matching "Mill" folder in the archive file area. This feature simplifies file searching and prevents files from being copied (retrieved or stored) to a different file category (folder).

When the Archive Search/Retrieve form is displayed, the name of the matching folder is displayed in the form caption. If files are not categorized in folders, or a matching folder is not found, Dostek DNC sets the search/retrieve folder to the archive root folder. If the "Search sub-folders" check box is checked, one additional level of folders is searched.

3.2 Security Options

Check boxes on the Security tab specify which commands or operations are restricted as described in Table 4. When Dostek DNC is initially installed, security is disabled. To enable security, check the “Enable Security” check box and enter a new password. Security options may be set only if security is enabled.

When a restricted command is chosen in any Dostek DNC application while security is enabled, a form is displayed for the user to enter the Supervisor password. A check box on the password form allows the user to optionally “log on” to Supervisor mode, removing all security restrictions until the user “logs off”. Otherwise, the password must be entered each time a restricted command is chosen.

A Security icon appears on the toolbar of the File Manager application. This toolbar icon displays the current security state, and may be clicked to “log on” to or “log off” from Supervisor mode. The icon appears to be "depressed" while the user is logged on to Supervisor mode, and appears as a “ghosted” image if security is disabled.

Table 4 - Security Options Tab

Item	Description
Enable Security	When checked, security is enabled and access to certain Dostek DNC features and commands can be restricted by checking the appropriate check box (described below).
Change Passwords	Click this button to enter a new Supervisor password.
Modify files	When checked, the Supervisor password is required to modify files (delete, rename, edit, etc.).
Modify folders	When checked, the Supervisor password is required to modify folders (create, delete, rename, move, etc.)
Receive	When checked, the Supervisor password is required to receive files from machine tools or other devices.
Change system configuration	When checked, the Supervisor password is required to use the Dostek DNC Configuration program (DConfig), or use File Manager Options or Root Folders commands.
Change preferences	When checked, the Supervisor password is required to change user preferences and display options.
Archive Retrieve	When checked, the Supervisor password is required to retrieve files from the Archive folder.
Archive Store	When checked, the Supervisor password is required to store files to the Archive folder.

3.3 File Types

The File Types tab specifies files types for four categories of files, each represented by a different icon. One or more file specifications can be entered if separated by the semicolon character (“;”). File specifications may not include a drive or path. The asterisk character (“*”) is permitted as a “wild card” character. For example, the NC Files file filter could be set to “O*.TAP;*.TXT” to include any file with the extension “.TAP” starting with the letter “O” or any file with the extension “.TXT”.

The File Manager displays (and thereby permits access to) the specified file types according to it's File Filter option setting. File filters can be used to restrict access to only files of specific types (such as NC program files) for ease of use or to enhance security.

The Dostek DNC Communication application permits access to NC Files, Job Files and Binary Files.

3.4 Communication Options

The Communication Options tab specifies the communication options listed in Table 5.

3.4.1 Match Device Configuration to Folder

When the “Match device configuration to folder" check box is checked, DDNC32 automatically selects a device configuration file that matches the current file folder. This feature, referred to as "automatic device protocol selection", can save time as well as prevent errors by ensuring that files in a particular folder are used only with specific machine tools.

When a file is transmitted or received, DDNC32 searches the Settings folder for a device configuration file whose name begins with any of the folder names in the file's path specification. For example, if file “C:\NC\Mill\Base\O1234.TAP” is transmitted, DDNC32 searches for a device configuration file whose name begins with “NC”, then “Mill” and finally “Base”. If only one matching name is found ("Mill", for example), it is automatically selected. If more than one matching name is found ("Mill 1" and "Mill 2", for example), DDNC32 lets the user choose any of the matching files. If no matching device configuration files are found, DDNC32 lets the user choose any configuration file.

If the device configuration file includes text within square brackets, the text is ignored when matching the device name. For example, "[A] Mill" and "[B] Mill" will both match a folder named "Mill".

Table 5 - Communication Options Tab

Item	Description
Match device configuration to folder	When checked, automatic selection of a device configuration parameter file based on the current file folder is enabled (Section 3.4.1).
Use Dostek 208/216 CommSwitch	When checked, support for the Dostek 208/216 CommSwitch is enabled, and a CommSwitch port selection field is added to the device configuration “Port Settings” tab. When the 208/216 CommSwitch is used, RTS/CTS flow control may not be used.
Default Receive File Naming Mode	Specify the default mode for automatic naming of received files (Table 6). Check the “Permit operator...” check box to allow the operator to change the mode. (Section 3.4.2 and Section 4.6)
Master Name Prefix	When automatic naming of received files is enabled, the Master Name Prefix is inserted at the start of each file name. This feature can be used to designate uploaded files or prevent replacement of existing files (Section 3.4.2, Section 4.6).
Default File Extension	The Default File Extension is applied to all received files whose name does not already contain a file extension. The Extension setting on the device Receive Options tab (Table 12) overrides this setting.
Omit lines...	When checked, lines that start with any of the specified characters are not transmitted. Use this feature to omit comments such as file headers inserted by CAM software.

Table 6 - Receive File Naming Modes

Item	Description
Manual	The operator must specify a file name. If a name is not specified, “Untitled” is used.
AutoName: Individual	File names are determined by the content of the received data, and a new file is opened each time a file name is detected.
AutoName: Single	File name is determined by the content of the received data, and all programs are combined into a single file using the first name detected. Use this option to keep subprograms in the same file as main programs.

3.4.2 Automatic Naming of Received Files

The “Automatic Naming of Received Files” feature automatically names received CNC part program files according to the program number or other identification (such as a part number stored in a comment) output by the CNC.

When more than one program is received, Dostek DNC can store each program in a separate file or store all programs in a single file. If you usually store main programs and subprograms in the same file, choose "Single" as the default file naming mode. If you usually store main programs and subprograms in separate files, choose "Individual". If you prefer to enter a file name manually, choose "Manual". Check the "Permit operator to change mode" check box to permit the operator to change the file naming mode.

Automatic file naming can save time, reduce typing errors and (by using the Prefix or Extension option) prevent accidental overwriting of original program files.

Automatic naming of received files is described in Section 4.6.

3.4.3 Default File Prefix and Extension

A prefix, suffix or file extension can be added to automatic file names to (a) distinguish uploaded files from original files so the system administrator can keep track of program changes or (b) prevent accidental overwriting of original program files. The exclamation character (“!”) is often specified as a file prefix character so uploaded files automatically appear first in the sorted list of file names. The File Manager Search command can be used to locate uploaded files when a file name prefix is used.

A file extension can also be specified in each device configuration file. If the name of a received file does not include a file extension, the extension is the device configuration file is used. If the extension in the device configuration file is blank, the Default Extension on the Communication Options tab is used.

3.4.4 Transmit Options

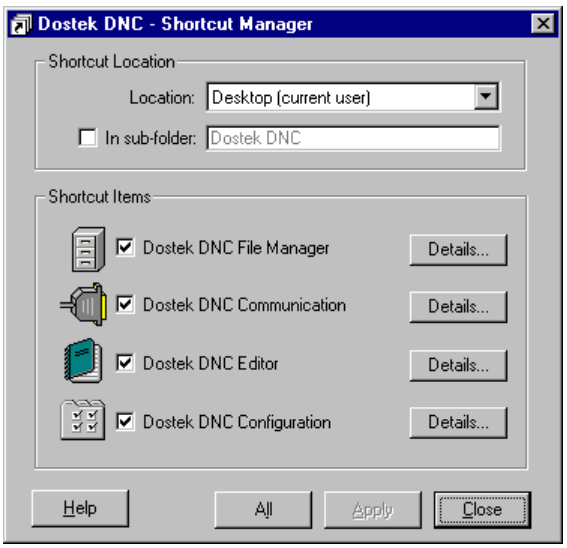
The Dostek DNC Communication application can prevent extraneous text (such as a program header inserted by your CAM post processor) from being transmitted to the CNC. Lines that begin with any of the characters specified in the "Omit lines starting with" option on the Communication Options tab are not transmitted.

More than one character can be specified. For example, specify "#*" to omit lines that start with either "#" or "*".

A similar "Remove lines" option is provided on the device configuration "Filtering" tab (Section 4.3). If both options are specified, both are effective.

3.5 Shortcut Manager

The Shortcut Manager provides a convenient way to create or remove Windows shortcuts for starting the Dostek DNC software. To use the Shortcut Manager, start the Dostek DNC Configuration program and click the Shortcut Manager icon or choose “Shortcut Manager” from the Tools menu.



Shortcuts can be created in or removed from the following locations:

- Windows Desktop
- Windows Start Menu
- Windows Programs Menu
- Favorites folder
- Personal folder

To create or remove shortcuts, follow these steps:

1. Choose a shortcut location.
2. Enter a folder name if you wish to create a folder to contain the shortcuts (for the Windows Start menu or Programs menu, creating a folder produces a sub-menu).
3. Check or clear the appropriate check box to create or remove a shortcut for each of the four Dostek DNC applications. Click the All button to alternately check or clear all check boxes.
4. To change the name or command-line arguments for a particular shortcut, click the corresponding Details button.
5. Click Apply or Close to implement the changes. Windows will take a few seconds to update your system files.
6. Repeat for each shortcut location you wish to modify.

Desktop shortcuts are created in the first available desktop location, and may be rearranged by dragging the icon or by clicking the right mouse button on an empty area of the screen and selecting Arrange from the menu.

The Windows Start menu is accessed by clicking the Start button on the Windows task bar. The Windows Program menu is accessed by choosing “Programs” on the Windows Start menu.

If the Windows “User Profiles” feature is enabled (Passwords item in Control Panel), the desktop and menu items may be specified for either the current user or for all users.

3.6 Configuration Manager

The Configuration Manager wizard backs up and restores configuration files between the Dostek DNC Settings folder and a diskette, network drive or local hard drive. When Dostek DNC is used on multiple computers, the complete set of configuration files for each computer may be stored in a separate configuration "collection" (folder).

To use Configuration Manager, click the "Manager" button on the system configuration General tab (Section 4.1), and choose one of the four actions: Save, Load, Copy or Delete. When saving, the collection of configuration files is stored in a folder named according to the "Collection" field on the global general configuration tab, or "Untitled" if the field is blank. Alternately, you may type a name in the "Folder" field when the wizard's file selection panel is displayed (consider using the computer's network name as the folder name). When loading, copying or deleting a previously saved collection, pick the name of the collection from the "Folder" list on the file selection panel.

One or two configuration collection backup locations may be specified by clicking the Configure button on the wizard's location selection panel. Configuration collections are typically stored on a diskette (see "License/Settings Disk" below) or a network file server. You may Save to both locations simultaneously, or Copy collections between locations.

When replacing a computer, the Configuration Manager wizard lets you quickly configure the Dostek DNC software by loading a previously stored configuration collection.

License/Settings Disk

A "License/Settings" diskette is supplied with Dostek DNC to provide a location to save a backup copy of your configuration files and your customer license file. Use the Configuration Manager wizard to copy configuration files, or choose "License" from the Dostek DNC Configuration menu to load or save the license file. You can use a blank diskette in place of the supplied disk or for an additional backup copy. Update the License/Settings disk any time you receive a new license file or update any configuration files.

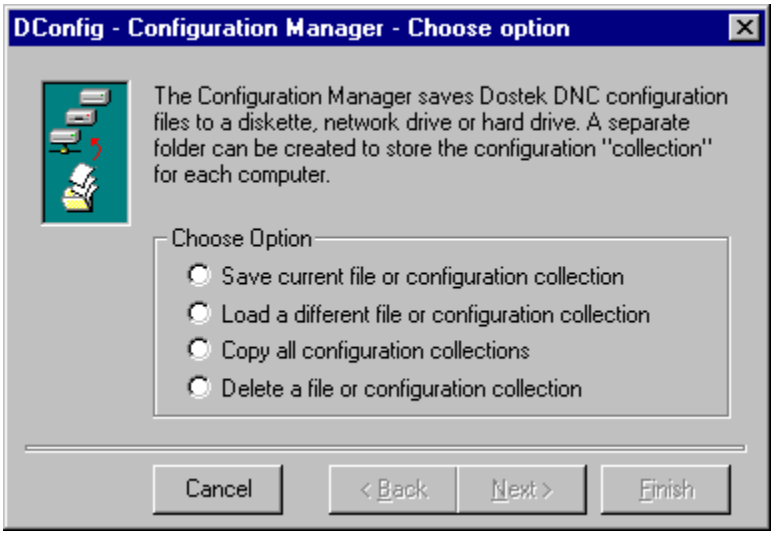


Figure 2 - Configuration Manager

Table 7 - Device Configuration Checklist

Multiple Configuration Files	❑ create a separate device configuration file for each device if: v you are using a Dostek CommSwitch or an external electronic switch box to connect multiple devices to a single port v you are using a multi-port communication card ❑ if you use a sample device configuration file supplied by Dostek, click the Notes button on the General tab to view configuration notes (Section 4.1)
Electronic Switch	❑ if you are using a Dostek 208/216 CommSwitch, select a CommSwitch port on the Port Settings tab ❑ if you are using an electronic switch box, enter the command required to set the switch port in the Transmit and Receive "Initialize" fields (Section 4.3)
Computer COM Port	❑ Configure the FIFO port settings for each computer COM port used with Dostek DNC (Section 5.2.8).
Receive File Naming	❑ to use Automatic Naming of Received Files, configure file name parameters (Section 4.6)
Transmit Trigger	❑ to configure Dostek DNC to wait until you execute a "read" command on the CNC before starting to transmit, set the Transmit Trigger option (Section 4.5.1)
Filter Options	❑ if your files contain text that must not be transmitted, choose transmit filter options (Section 4.3)
Operator Instructions	❑ to display operator instructions on the screen when Dostek DNC is ready to transmit or receive, refer to Sections 4.4.3 and 4.5.3.
Notes	❑ record relevant information (CNC parameter settings, cable wiring, etc.) in each configuration file by clicking the Notes button on the General tab (Section 4.1)
Backup Copy	❑ when you are finished configuring the system, and any time you change the configuration, save all configuration files to the Settings Diskette or a network file server using the Configuration Manager (Section 3.6)

4 Configure Device Parameters

Device parameters such as baud rate and parity are stored in Device Configuration Parameter files located in the Dostek DNC “Settings” sub-folder. A separate configuration file is usually created for each device connected to the computer.

Long file names can be used for device configuration files. However, brief descriptive file names are easier to use.

To modify device configuration files, start the Dostek DNC Configuration program (DConfig). If the DConfig “Global” configuration mode is active (the Global icon in the toolbar appears depressed and a check mark appears beside the Global Settings item on the File menu), switch to the device configuration mode by clicking the global icon or choosing the Global Settings menu item.

Device configuration parameters are displayed on a tabbed form as illustrated by Figure 3 and described in the following paragraphs.

When started, DConfig opens all configuration files located in the Settings folder. To select a specific file, click the file list box or the adjacent left/right (previous/next) arrow buttons.

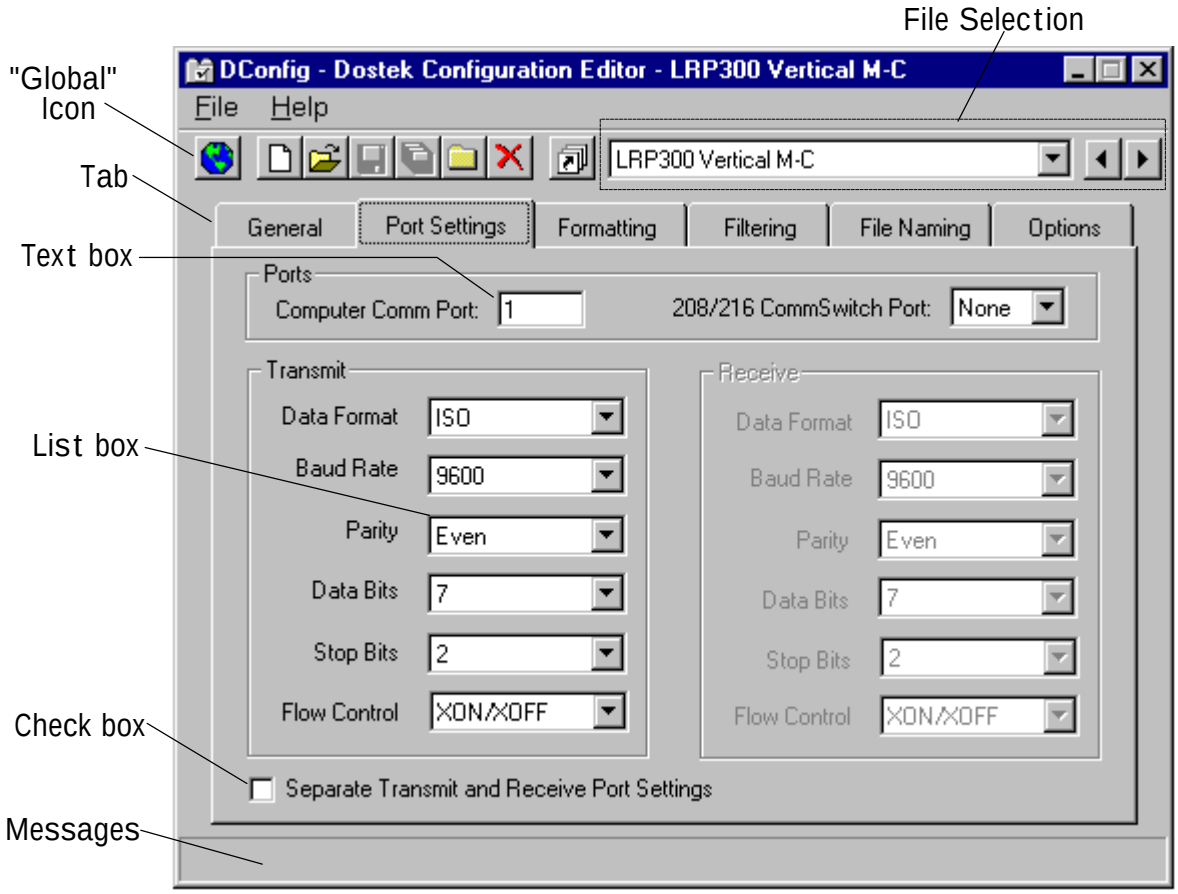


Figure 3 - Device Configuration Form

4.1 Device General Options

The General tab displays the options listed in Table 8.

An icon can be associated with each device. Choose one of the supplied icons, or create your own using your icon editing program. Icons are stored in the "Graphics" folder.

Certain CNCs require a special handling option. For example, some Okuma OSP5000 CNCs require special formatting of the program number. To enable special processing for a specific CNC model, choose from the “Special CNC” list.

Notes can be stored in the device configuration file by clicking the Notes button. Sample device configuration files provided by Dostek use the Notes form to provide information such as a cable diagram, CNC parameter settings and any additional setup instructions.

4.2 Port Settings

Choose the Port Settings tab to specify a computer communication port and configure communication settings such as baud rate, data format and flow control. Port settings are described in Table 9.

"Transmit" refers to sending data *from* the computer *to* the CNC. "Receive" refers to sending data *from* the CNC *to* the computer.

Table 8 - Device General Options Tab

Item	Description
Description	Enter a description of up to 40 characters in length. The device description is displayed in the status bar on the Communication application's Settings form and is visible as a "tool tip" on the main form when the mouse is positioned over the device name
Icon	Select an icon to associate with each device configuration file.
Special CNC	Select “Normal” for most applications, or choose a CNC type from the list to enable special software support.
Notes	Click the “Notes” button to view or edit notes included in the device configuration file (2,500 characters maximum).
Editor	Click the “Editor” button to modify parameters used by the Dostek DNC Editor to reformat NC programs.

Table 9 - Port Settings Tab

Item	Description
Comm Port	Enter the number of the computer communication port to which the device is connected. Computer port availability can be checked by Start, Settings, Control Panel, System, Device Manager, Ports (Windows 95, 98) or Control Panel, Ports (Windows NT 4).
CommSwitch Port	Enter the number of the Dostek 208/216 CommSwitch the device is connected to. (This option is available only if the "Use CommSwitch check box is checked (Table 5)).
Data Format	Select a data format suitable for the device. Most CNC machine tools use ISO format (ASCII code with 7 data bits and even parity). When ISO is selected, 7 data bits and even parity are set automatically. (Note: some CNCs indicate a setting of ISO with 8 data bits and no parity; this CNC setting is consistent with the Dostek DNC ISO setting because ISO data is, by definition, 7 data bits plus even parity (8 bits). Choose Binary data format to disable all data filtering and conversion. Binary format is automatically used to transmit any file of a "Binary" type as designated by File Type options (Section 3.3).
Baud Rate	Select a communication baud rate to match the device baud rate.
Parity	Select a parity setting to match the device parity setting. (Refer to Data Format above)
Data Bits	Select 7 or 8 data bits to match the device setting. (Refer to Data Format above).
Stop Bits	Select 1 or 2 stop bits. Select 2 stop bits for compatibility with all devices. Select 1 stop bit to increase data throughput by up to 10 percent.
Flow Control	Select a flow control option to suit the device. Flow control must be properly configured and tested to ensure reliable data transfer. When the Dostek 208/216 CommSwitch is used, RTS/CTS flow control may not be used.
Separate Settings	When checked, different communication settings may be used for transmit and receive operations. Transmit refers to sending of data from the computer to the device.

Table 10 - Formatting Options Tab

Item	Description
End of Block	Select the end-of-block option to match the device. Most CNCs require a Line Feed only.
Initialize	Specify text to transmit to the device before transmitting or receiving any data. Use the Initialize option to send commands to an electronic switch or conversational CNC, or to solve data "framing" problems (Section 4.3). The Initialize data is transmitted only once, even if multiple files are selected to transmit.
Close	Specify text to transmit to the device after all data is transmitted or received. Use the Close option to send commands to an electronic switch or conversational CNC, or to solve data "framing" problems (Section 4.3). The Close string is transmitted only once, even if multiple files are selected to transmit.
Prefix	Specify text to transmit immediately before transmitting each file.
Suffix	Specify text to transmit immediately after transmitting each file.

Table 11 - Filtering[3] Tab

Item	Description
Remove lines starting with...	Lines that start with any of the specified characters are not transmitted to the CNC. You can use this filter to omit comments in the NC program file, such as those inserted by a CAD/CAM post processor.
Remove comments	Comments beginning with a parenthesis character "`(`" are omitted from transmission. All text from "`(`" to the end of the line is omitted. Lines that start with "`(`" will be transmitted as a blank line unless you also include "`(`" in the "Remove lines..." filter. Do not use this filter option if your programs may contain comments in the middle of a program block, such as "`G28 (ZERO) X0`".
Remove control characters	All non-printable characters are omitted from transmitted data and removed from received data. When receiving, use this option to omit extraneous characters output by a CNC, such as the null characters used to produce a “leader” on a tape punch.
Remove Blank Lines	Blank lines are omitted from transmitted data.
Compress	Space characters are omitted from transmitted data. Space characters within parenthesis `( )` are not affected.
Truncate block numbers	Block numbers that are longer than 4 digits are truncated to four digits. For example, `N12345` is transmitted as `N2345`.

[3] When transmitting, filtering only prevents specific data from being transmitted — original files are not modified.

4.3 Formatting and Filtering Options

Choose the Formatting and Filtering tabs to configure the options described in Tables 10 and 11. (Note: review "Special Character Symbols" on page 3)

Many CNCs require that received data be "framed" in a specific format requiring special characters before or after the NC programs. Use the Initialize, Close, Prefix and Suffix options to "frame" data when transmitting to the device. Following are some examples of program format or framing problems and how they are corrected by setting Dostek DNC formatting and filtering options.

Example Problem	Solution
A CNC rejects received programs if not preceded by, for example, tape leader (null characters), a percent sign, or a DC2 code.	Set Transmit Initialize to "^@@", "%" or "^R".
A CNC rejects received programs if not concluded by, for example, a percent sign, EOT or DC4 code.	Set Transmit Close to "%","^D" or "^R".
To automatically detect EIA or ISO tape code, a CNC discards received data until the first "end of block" code is received. That is, it discards the first line of text received from the computer, which may be the first line of the program.	Add "^J" to Transmit Initialize.
A CNC requires a percent sign to indicate the end of data, but stops reading if a percent sign is present at the start of a program.	Set Transmit Close to "%", and include "%" in Transmit Filter "Remove lines..." option.
A CNC uses a conversational terminal port for program loading and requires the user to type "K" followed by Carriage Return before receiving the program, and Ctrl+Z when finished	Set Transmit Initialize to "K^M" and Transmit Close to "^Z".

4.3.1 Transmitting Multiple Files

Formatting and filtering settings determine how multiple files are transmitted. Dostek DNC can be configured to pause after each file or send all files without pausing. For a typical CNC that requires a line feed before any data is received (to determine ISO or EIA tape format), and a program stop code (%) at the end of data, configure formatting and filtering options as follows:

Pause between files	No pause
Set device configuration to: v Transmit Initialize = "^J" v Transmit Suffix = "%^J" v include "%" in "Remove lines..." v check "Pause between files" check box (Transmit Options tab)	Set device configuration to: v Transmit Initialize = "^J" v Transmit Close = "%^J" v include "%" in "Remove lines..." v clear "Pause between files" check box (Transmit Options tab)
Press READ on CNC to load each file.	Press READ once on CNC to load all files.

4.4 Transmit Options

Choose the Transmit Options tab to configure options related to transmitting of files to the CNC. (Note: review "Special Character Symbols" on page 3)

4.4.1 Transmit Trigger

When the Transmit Trigger option is enabled, Dostek DNC waits until the CNC is ready before starting to transmit. Synchronizing communication in this way eliminates the need to run back and forth between the computer and the CNC, even when transferring multiple programs. You get the computer ready to send, then complete the transfer at the CNC.

Choose one of the following Transmit Trigger options:

None	Transmit starts immediately. The CNC must be ready to receive data when the Dostek DNC Transmit command is executed.
Manual	Transmit starts when the operator clicks the "Start Now" button on the Communication application's main form.
XON	Transmit starts when an XON character (^Q) is received from the CNC.
CTS	Transmit starts when the CNC turns on the signal connected to the CTS input on the computer's RS232 connector (Table 13)
Other	Transmit starts when the specified character is received from the CNC.

Most CNCs output an XON character when ready to receive if configured for "XON/XOFF" or "DC-Code" flow control. If your CNC outputs a different character, select "Other" and specify the character by entering a numeric value or symbol (for example, enter "^R" or "18" if your CNC outputs the 'DC2' code).

Some CNCs do not output a character when ready to receive, but do turn on one or more of it's RS-232 control signals. In this case, connect the appropriate CNC RS-232 output signal to the "CTS" input on the computer’s RS-232 port and select the "CTS" Transmit Trigger option.

If the receiving device is always ready to receive data, choose "None".

If the receiving device does not provide a suitable trigger when ready to receive (character or RS-232 signal), set the transmit trigger to Manual and start the transfer manually by clicking the "Start Now" button on the Communication application's main form.

When the Dostek DNC Communication application is waiting for a trigger, you can start the transfer manually by clicking the "Start Now" button.

4.4.2 Transmit Repeat

If you drip-feed programs to the CNC and wish to run multiple parts, you can configure Dostek DNC to automatically repeat (retransmit) a file by choosing one of the following Transmit Repeat options:

None	Transmit the file once only.
Triggered	Automatically retransmit the file, but wait for the specified Transmit Trigger condition to occur again (4.4.1).
Continuous	Automatically retransmit the file without pausing.

You can manually retransmit a file by clicking "Restart" on the Communication application's main form.

4.4.3 Operator Instructions

Text entered in the Operator Instructions text box is displayed as a pop-up note each time Dostek DNC is ready to start transmitting data. The note disappears when the transfer begins. If you do not enter any text, a note is not displayed. You can disable display of operator instruction notes by unchecking the “Show Instructions” item on the Communication application's View menu.

4.5 Receive Options

Choose the Receive Options tab to configure options related to receiving of files from the CNC.

4.5.1 Receive Trigger

Use the Receive Trigger option to automatically transmit a trigger character to the CNC when Dostek DNC is ready to receive. Choose one of the following options:

None	Do not send a trigger character to the CNC.
XON	Transmit an XON character (^Q) when ready to receive.
Other	Transmit the specified character when ready to receive.

If you normally prepare the computer to receive before using the Punch command on the CNC, set Receive Trigger to "None".

Some CNCs and tape readers do not respond to any trigger character, and can only be triggered by turning on one of it's RS-232 input signals. In this case, connect the device's trigger input signal to the "DTR" output signal on the computer's RS-232 port. Dostek DNC turns the "DTR" signal on when ready to receive and turns it off when receive is terminated (regardless of the Receive Trigger setting).

Table 12 - Automatic File Naming

	Name Location Group
Item	**Description**
Identifier	Specify the character or string that the CNC outputs at the beginning of a line to identify the start of program number data. For example, the Identifier is either “0” or “:” for most Fanuc CNCs.
Line	Specify the line containing the program number with respect to the Identifier. In most cases, this option is set to Same Line. However, some CNCs output the program name on the line following the Identifier.
Start	Specify either (a) a numeric value indicating the column in which the program name starts, or (b) the letter or symbol that appears immediately before the program name. If Start is blank, the program name starts at the beginning of the line.
End	Specify either (a) a numeric value indicating the maximum length of the program name, or (b) the letter or symbol that appears immediately after the program name. If End is blank, the program name ends at the end of the line.
	Name Format Group
Item	**Description**
Prefix, Suffix	Specify a character or string to insert at the start (Prefix) or end (Suffix) of the program name. Use Prefix or Suffix to add an "upload" identifier or "machine" identifier to automatic file names. For example, machine identifier "M3" could be added as “`M3-O1234.TAP`” (prefix) or “`O1234-M3.TAP`” (suffix). If a Master Name Prefix (Table 5) is also specified, the file is named Master Prefix + Device Prefix + name + Extension.
Extension	Specify a file extension to add to automatic file names. If the detected name already contains a file extension, this setting is ignored. If Extension is blank, the default file extension specified on the Global, Communication Options tab will apply.

4.5.2 Receive Terminate

Dostek DNC terminates receive mode according to the which of the following Receive Terminate options is selected:

Manual	Receiving is terminated when you click the "Stop" button.
Character	Receiving is terminated when the specified character is received. (For example, "%" or "^D").
String	Receiving is terminated when the specified string of characters is received. (For example, "M30" or "#END#").
Time	Receiving is terminated when the specified time interval (in seconds) elapses with no data received. Timing of the interval does not begin until the first data is received.

If the computer is turned off (or the power fails) before receive is terminated, some received data may be lost.

4.5.3 Operator Instructions

Text entered in the Operator Instructions text box is displayed as a pop-up note each time Dostek DNC is ready to start receiving data. The note disappears when the transfer begins. If you do not enter any text, a note is not displayed. You can disable display of operator instruction notes by unchecking the “Show Instructions” item on the Communication application's View menu.

4.6 Receive File Naming

The Automatic File Naming option group (Table 12) specifies options for automatically naming files received from the CNC. Received files can be named according to the CNC's program identifier or according to other information (such as part number) stored in a comment on the first line or two of the program. This option group is disabled if the "Default Receive File Naming Mode" on the global "Communication Options" tab is set to Manual (Section 3.4.2).

Automatic naming options specify the location of the file name and can add an optional prefix, suffix or file extension. Consider the following example of the first line of a typical CNC program:

```
O1234 (75X438-22-001 UPPER CONTROL BRACKET)
```

Automatic naming options can be configured to name the file according to any of the following examples:

- the CNC's program number ("O1234")
- the entire first line of the program, plus a file extension
- the entire text enclosed in parenthesis, plus a "#" suffix to indicate an uploaded file (the suffix ensures the received file does not have the same name as the original file, so the original file will not be replaced or recycled)
- the text enclosed in parenthesis up to the first space ("75X438-22-001")

Automatic naming of received files eliminates file name errors caused by typing mistakes and can prevent overwriting of original program files (by using the Prefix, Suffix or Extension option).

For more information about naming, replacing and recycling of received files, refer to Section 5.3 in the Dostek DNC *User Guide*.

4.6.1 File Naming Examples

The following examples illustrate how to apply the receive file naming options described in Table 12.

Example 1 - O1234

The program identification is a four-digit number on a line starting with the character "O". To store the file as "O1234", set the file naming parameters as follows:

Identifier	O (letter O)
Line	Same line
Start	1
End/Length	5

Example 2 - :1234

The program identification is a four-digit number similar to example 1, except the line starts with the colon character (":"). Because the colon character is not permitted in a Windows file name, the Column parameter must be set to 2 and the length to 4. The Prefix option can be set to “O” (letter O) to store the file as "O1234".

Identifier	:	
Line	Same line	
Start	2	(colon character : also works)
End/Length	4	
Prefix	O (letter O)	

Example 3 - Machine ID Prefix

To change Example 1 so that machine identification prefix “M3” is inserted before the program number to create a file named "M3-1234", set the file naming parameters as follows:

Identifier	O (letter O)	
Line	Same line	
Start	2	(O (letter O) also works)
End/Length	4	
Prefix	M3-	

Example 4 - (PGM,="ABC123 ")

The program name is enclosed in quotes on a line starting with "(PGM". To store the file as “ABC123”, set the file naming parameters as follows:

Identifier	(PGM
Line	Same line
Start	8 or "
End/Length	20 or "

Set the name length option to either the double quote character (") or maximum number of characters possible in the file name. Dostek DNC trims leading and trailing spaces from the file name to comply with Windows file name rules.

Example 5 - Program Number as Comment

If the program identification is stored as a comment on the same line as the program number, such as:

```
O1234 (6A1234R XL-7 SHAFT)
```

set the file naming parameters as follows to name the file according to the text enclosed within parenthesis:

Identifier	O (letter O)
Line	Same line
Start	(
End/Length	)

Example 6 - File Extension

If the program identification output by the CNC includes a file extension:

```
$A123456.MIN
```

set the End/Length option as follows to include or exclude the file extension:

End/Length	. (period)	file extension is excluded
End/Length	99	file extension is included

If the detected file name does not include a file extension, Dostek DNC automatically uses the file extension specified by the "Extension" option in the Name Format option group (Table 12) or, if blank, by the "Default file extension" option on the global "Communication Options" tab.

Example 7 - Identifier and Name on Different Lines

If the program name is on the line following the identifier:

```
%PM
1234
```

set the file naming parameters as follows:

Identifier	%PM
Line	Next line
Start	1

4.7 Managing Device Configuration Files

When the Dostek DNC Configuration program is started, all device configuration files in the Settings folder are opened.

A specific file can be selected by picking it from the drop-down list on the toolbar or by clicking the arrow buttons adjacent to the list box.

Modifications are not stored in the configuration file until you choose to save them. If you change your mind, you can exit DConfig without saving changes. Whenever changes are made, the diskette icon on the toolbar is enabled. Save changes by clicking the Save icon or by choosing “Save” from the File menu. Save changes to all open files by clicking the Save All icon on the toolbar or by choosing “Save All” from the File menu.

To create, rename, duplicate or erase a device configuration file:

Create new file	Choose ”New Configuration” from the File menu or click the New icon on the toolbar.
Duplicate	Choose “Save as” from the File menu and specify a name for the new file.
Delete	Choose “Delete” from the File menu or click the Delete icon on the toolbar.
Rename	Choose “Rename” from the File menu and specify a new file name.
Samples	Choose "Samples" from the DConfig "Tools" menu to copy selected sample configuration files to your Settings folder. DConfig searches for sample files in folder "Samples" on your hard drive or the Dostek DNC CD-ROM.
Backups	Save or load backup copies of device configuration files using the Configuration Manager (Section 3.6).
Change Folder	Select “Choose Configuration Folder” from the File menu to view or edit configuration files stored in a different folder. Configuration file collections for multiple computers can be stored in separate folders on a diskette or network file server (Section 3.6).

4.7.1 Import

If you upgraded to Dostek DNC from either Dostek NC File Manager or Dostek DNC for DOS (DDNC), you can import your existing device configuration files by choosing "Import" on the File menu. Choose the type of file to import from the “Files of type” list, then browse and select one or more files to import. A new Dostek DNC device configuration file is created for each imported file. Because of software differences and new features, settings that do not import directly are set to default values. In some cases, it may be necessary to manually adjust imported configuration files.

5 Device Wiring and Testing

This section explains how to connect devices to the computer's RS-232 ports, and how to test communication between the computer and devices.

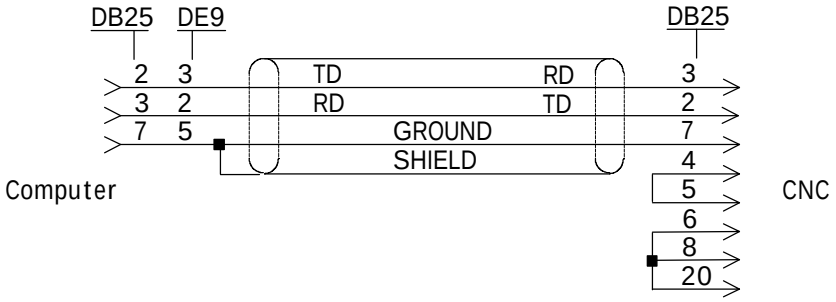
5.1 Connect Devices

A functional description of the RS-232 signals used by a standard PC-compatible communication port is provided in Table 14. Cable wiring diagrams for common CNC communication applications are illustrated in Figure 4.

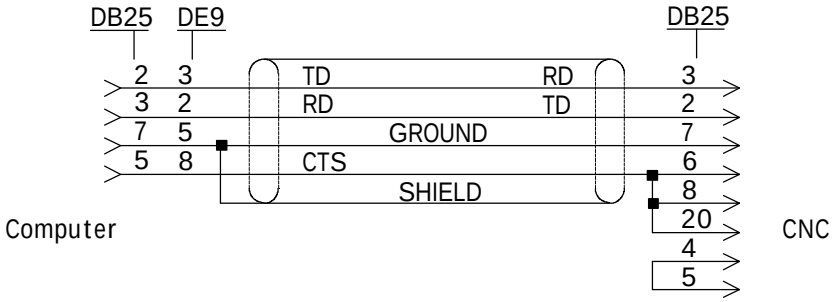
Connect devices using a good quality multiple-conductor shielded cable. Use low-capacitance cable for longer distances or high baud rates. Avoid running communication cables in proximity to electrical power circuits. Check with local authorities to determine if your wiring is subject to electrical or building code regulations.

Table 13 - RS-232 Communication Port

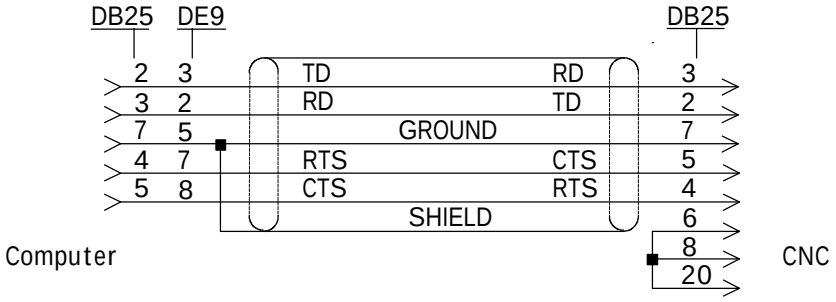
DB25	DE9	Symbol	Function
2	3	TD	Transmit Data output from computer to device.
3	2	RD	Receive Data input to computer from device.
4	7	RTS	Request To Send output. When CTS/RTS flow control is selected, Dostek DNC turns RTS on when ready to receive data, and off when not ready. When CTS/RTS flow control is not selected, Dostek DNC turns RTS on while the communication port is open. When the Dostek 208/216 CommSwitch is used, RTS is used to control the CommSwitch.
5	8	CTS	Clear To Send input. When CTS/RTS flow control is selected, Dostek DNC transmits data while CTS is on, and suspends data transmission while CTS is off.
6	6	DSR	Data Set Ready input. When DSR/DTR flow control is selected, Dostek DNC transmits data while DSR is on, and suspends data transmission while DSR is off.
7	5	Ground	
8	1	CD	Carrier Detect input. Not normally used. When the Dostek 208/216 CommSwitch is used, CD is used to monitor the CommSwitch.
20	4	DTR	Data Terminal Ready output. When DSR/DTR flow control is selected, Dostek DNC turns DTR on when ready to receive data, and off when not ready. When DSR/DTR flow control is not selected, Dostek DNC turns DTR on while the communication port is open.



(a) Xon/Xoff (DC-Codes) Flow Control



(b) Xon/Xoff Flow Control with CTS Trigger



(c) CTS/RTS Flow Control

Figure 4 - Common Cable Types for CNC Applications

Cable Installation Guidelines

- maximum cable length allowed by RS-232 specification is 50 feet; however, cables up to 250 feet are commonly used
- use good quality multiple-conductor cable with 24 gauge (or 22 gauge) stranded conductors and an overall foil shield; choose cable with a 'low capacitance' rating for longer distances or high baud rates
- avoid placing communication cables in proximity to electrical power circuits
- avoid stretching or sharply bending the cable

5.2 Testing Communication

Testing communication between the computer and CNC involves four steps:

- ❑ test computer's communication port . . . . . Section 5.2.1
- ❑ test cable . . . . . Section 5.2.2
- ❑ test receive (from CNC to computer) . . . . . Section 5.2.3
- ❑ test transmit (from computer to CNC) . . . . . Section 5.2.4

To save time, test the communication port and cable only if you are unable to transmit or receive.

Considerable startup time can be saved by following the simple test procedure provided in Section 5.2. Always test communication by first punching a program from the CNC to the computer because, if the communication settings are incorrect, Dostek DNC usually displays received data while the CNC usually does not, and Dostek DNC usually displays more informative error information than the those displayed by the CNC.

Note: Select 2 stop bits until communication with the device is working properly, and then try selecting 1 stop bit if faster data transfer is important.

Using DConfig

When using the Dostek DNC Configuration program to create and modify device configuration settings (Section 4), remember:

- v changes you make are not saved in the device configuration file until you exit DConfig or use the Save command
- v the Communication application (DDNC32) reads the device configuration file when you start the program or when you use the "Reload" command

If DDNC32 is running when you change a communication setting using DConfig, update DDNC32 with the new settings by using the DConfig "Save" command then the DDNC32 "Reload" command.

Tools Required

An "RS-232 Breakout Box" or an "RS-232 Mini Tester" is recommended if detailed testing is required. This device plugs into an RS-232 connector and provides LED indicators to display the state of the RS-232 signals. RS-232 testers can be purchased from computer and electronic stores, or from Dostek. This manual assumes the tester indicator is red when the RS-232 signal is on, green when the signal is off, and off when the signal is disconnected.

If the RS-232 port on either the CNC or computer uses a 9-pin connector, a 9-25 adapter and a 25-9 adapter may also be required.

A "loop-back" adapter is required for some tests. You can build a loop-back adapter by wiring together pins 2 and 3 of a DB25S or a DB25P connector.

The Dostek DNC Terminal program (DTerm32) is required for some tests. To start DTerm32, choose "Terminal" from the DConfig "Tools" menu or from the File Manager "Supervisor" menu.

5.2.1 Test Communication Ports

To test the computer's communication port:

1. Plug the RS-232 tester into the computer's RS-232 connector (leave the CNC cable unplugged). The "TD" indicator (pin 2) should be green, and the "RD" indicator (pin 3) should be off. If either indicator is red, the computer communication port may be defective.
2. Start DTerm32, and configure as follows:
   - clear the "Display typed characters" check box ("Display" options)
   - set the baud rate to 300
   - set the COM port to select the RS-232 port the tester is plugged into
3. Plug a loop-back adapter into the tester and type some characters on the computer keyboard. Both the "TD" and "RD" indicators on the tester should flash red each time a key is pressed, and each typed character should appear on the DTerm32 screen. If the typed characters are not displayed and the tester indicators do not flash, the wrong COM port may be selected or the communication port may be defective. If the tester indicators both flash but typed characters are not displayed, the communication port input may be defective. Try using a different COM port.

To test the CNC's RS-232 output port:

1. Test the cable according to the procedure in section 5.2.2.
2. Connect the cable between the computer and CNC.
3. Start DTerm32, and configure as follows:
   - set the baud rate to match the CNC
   - set the COM port to select the RS-232 port to which the CNC is connected
   - send a program from the CNC to the computer
4. If data is displayed on the computer screen, the CNC's RS-232 output port is likely working properly. If the displayed data is incorrect, the CNC and computer parameters may not match (baud rate, parity, ISO/EIA, etc.). If no data is displayed and the CNC appears to indicate that output is complete, the CNC's RS-232 output port may be defective. If the CNC displays an alarm, the cable may not be wired properly, the cable may be connected to the wrong port on the CNC, or the CNC parameters may be set incorrectly.

To test the CNC's RS-232 input port:

1. Test the cable according to the procedure in section 5.2.2.
2. Connect the cable between the computer and CNC.
3. Start DTerm32, and configure as follows:
   - set the baud rate to a setting that is different than the CNC (for example, if the CNC is set to 4800 baud, set DTerm32 to 2400 baud)
   - set the COM port to select the RS-232 port to which the CNC is connected
   - prepare the CNC to receive data (press READ, LOAD, etc.)
   - type several different characters on the computer keyboard
4. If the CNC displays an alarm indicating a communication data error (parity or framing error, for example), the CNC's RS-232 input port is likely working properly. If no alarm is displayed, and the CNC appears to continue waiting for data, the CNC's RS-232 input port may be defective.

5.2.2 Test Cable

To test the cable connecting the computer to the CNC:

1. Plug one end of the cable into the CNC communication port and plug the RS-232 tester into the computer end of the CNC cable (do not plug the computer end of the cable into the computer yet). The "RD" indicator (pin 3) on the tester should be green, and the "TD" indicator (pin 2) should be off. If either indicator is red, the CNC communication port may be defective. If the "RD" indicator is off and the "TD" indicator is green, connections to pins 2 and 3 in the cable may be reversed.
2. Plug the tester into the computer's RS-232 port, plug the computer end of the CNC cable into the tester, and plug the CNC end of the cable into the CNC communication port. Both the "TD" and "RD" indicators should be green. If either indicator is off, connections to pins 2 and 3 in the cable may be reversed.
3. Repeat the communication port test (Section 5.2.1) except plug the CNC cable into the computer and plug the loop-back adapter into the CNC end of the cable. If the typed characters are not displayed and the tester TD and RD indicators do not flash, the wrong COM port may be selected or the communication port may be defective. If the tester's TD and RD indicators both flash but typed characters are not displayed, the cable may be defective.

5.2.3 Test Receive

To test receiving of data from the CNC to the computer:

1. Plug the RS-232 tester into the computer's RS-232 port and connect the cable between the CNC and the computer.
2. Start DTerm32, and configure as follows:
   - v select the COM port the RS-232 tester is plugged into
   - v set the "Port Settings" parameters to match the CNC communication settings (for most CNCs, even parity, 7 data bits, 2 stop bits, XON/XOFF flow control and ISO data format are suitable)
   - v "check" the "Display typed characters" check box ("Display" options)
   - v "uncheck" the "Display control characters..." check box ("Display" options)
   - v "check" "COM Port Open" on the "Options" menu
3. Transmit (Punch) a program from the CNC to the computer.
4. If the program is displayed properly on the computer screen, proceed to "Test Handshaking" below.
5. If the program is displayed, but some or all of the data is garbled, distorted or otherwise incorrect, proceed to "Data Format" below.
6. If the CNC displays an alarm indicating the RS-232 "timed out" or is "not ready", or the CNC appears to be waiting indefinitely, proceed to "Test Handshaking" below.
7. If the CNC transmits data (either TD or RD indicator on tester is flashing red), but no data is received at the computer, check the computer's communication port (Section 5.2.1) and the cable (Section 5.2.2). If the cable is wired properly, the tester's RD indicator should flash red when data is being received at the computer.

Test Handshaking

Most CNCs will not transmit data until specific RS-232 signals are turned on (as indicated by red on most RS-232 testers). Some CNCs also require the computer to send a specific "trigger character" when ready to receive data.

If the computer and CNC are both set for "XON/XOFF" or "DC Codes" flow control, the cable shown in Figure 4 (a) will normally work. In most cases, all tester indicators will be green when the CNC is not ready to communicate, and the RTS, CTS, DSR, CD and DTR indicators will all be red when the CNC is attempting to communicate. If the RTS or DSR indicators remain green, or the CNC issues an alarm or waits indefinitely, consider the following:

- ❑ The cable may be connected to the wrong connector on the CNC.
- ❑ The CNC may be configured to punch to the wrong port or device.
- ❑ The CNC may require a cable wired for "hardware handshaking" (Figure 4 (c)).
- ❑ The CNC may require the computer to send a "trigger" character to start the transfer — try setting the Receive Trigger to Xon or "^R".
- ❑ The CNC communication port may be defective.
- ❑ Refer to the CNC manufacturer's documentation for more information about RS-232 communication protocols.

Check Data Format

If the received data is not correct, consider the following:

- ❑ If received data is garbled (distorted), check that the CNC's communication parameters match the computer's settings, or determine the correct settings experimentally by changing the DTerm32 communication settings (baud rate, data bits, parity, etc.). Most CNCs use ISO data format, which is 7 data bits and even parity, although some require the CNC be set to 8 data bits with no parity and the computer set to 7 data bits with even parity.
- ❑ Try switching DTerm32 between ISO, ASCII and EIA data format.
- ❑ If only about half the characters are displayed properly in ISO or ASCII mode, the baud rate is correct but the parity or data bit setting may be incorrect.
- ❑ Try setting DTerm32 to use 8 data bits and even parity, and check the "Display as 7-bit character" check box ("Display" options).
- ❑ Try using 2 stop bits until receive works properly, then switch back to 1 stop bit if faster throughput is important.

Configure Receive File Naming

Once a program can be received from the CNC and display properly on the DTerm32 screen, configure and test the Automatic Naming of Received Files feature as follows:

1. Transmit a program from the CNC to the computer and capture the data in a log file using DTerm32 (Section 5.3.2).
2. Transmit a program from the CNC to the computer. Close the log file when the transfer is complete.
3. View the log file (using File Manager) to analyze the format of the received data and set the receive naming options as explained in Section 4.6.
4. Test receive file naming by transmitting several programs from the CNC to the computer (*User Guide*, Section 5.3). Each received file should be stored in a separate file named according to the option settings you chose.

5.2.4 Test Transmit

Transmit a file from the computer to the CNC (*User Guide*, Section 5.2). If the program is received correctly at the CNC, proceed to "Transmit AutoStart" below. If the program is not received correctly at the CNC, consider the following:

- ❑ If the CNC displays an alarm indicating a communication "overrun" or "overflow" error (a common problem with Fanuc 10 and Fanuc 11), set the communication port transmit FIFO to use a smaller size (refer to Section 5.2.6 "FIFO Buffers").
- ❑ If the first line of the program is missing or the CNC displays an alarm indicating the program number is not valid, set Transmit Initialize to "^J".
- ❑ Some CNCs require the program number to start with a colon character ":" instead of an "0" when using ISO or ASCII data format.
- ❑ If the CNC displays an alarm indicating a framing, overrun or similar error, double-check the baud rate setting, set Stop Bits to 2 (Section 4.2) or experiment with different parity or data bit settings.

- If the CNC appears to read the program but waits indefinitely or displays an alarm when the end of the program is reached, the CNC may be expecting a particular character sequence to indicate the end of the program. Try setting Transmit Close to "^J%". If this does not correct the problem, capture CNC output into a log file (Section 5.3.2) and analyze the format of the received program to determine if any special characters are required after the program. For example, if the CNC outputs "^T" or "^D" after the end of the program, set Transmit Close to match.
- If the CNC always displays an alarm when receiving data, check communication settings on both the CNC and computer, and review the CNC manufacturer's documentation. Experiment with different data bit and parity settings. Some controls, especially older models, are incapable of receiving data at higher baud rates and may display a misleading alarm message. To eliminate problems caused by higher baud rates, test communication at the slowest possible baud rate (for example, 300 baud). If communication is successful at a low baud rate, test with successively higher baud rates to determine the highest reliable rate.
- If the CNC always displays an alarm when receiving data, it may be necessary to slow the data rate in order to determine exactly which character or section of data is causing the alarm. For a controllable data rate, use DTerm32 and type characters on the computer keyboard. To test a Fanuc CNC, for example, type Ctrl+J, O (letter O), 1, Ctrl+J. The CNC should update the screen to indicate that it is receiving program O0001. Continue by typing M, 3, 0, Ctrl+J, %. The CNC should terminate receive mode and program O0001 should contain the single line "M30".
- If the CNC does not display any alarm and does not appear to receive any data, try to force an alarm condition by changing the computer's baud rate setting. If using a different baud rate does not cause the CNC to report an alarm, the CNC's RS-232 port may not be configured properly, may not be connected properly (internally), or may be defective.
- If one or two characters are missing from the beginning of each line, try a lower baud rate or an inter-block delay (Section 4.3).
- If sections of the program are missing (several characters or lines are missing), the data flow control may not be working properly. Refer to "Test Flow Control" below.
- If the computer does not automatically start sending data when the CNC is ready to receive, refer to "Transmit Trigger" below.
- If extra blank lines appear in the received data, change the Transmit "End of Block" setting. (Section 4.3)
- If blank lines that should appear are missing, clear the "Remove blank lines" check box (Section 4.3).
- The CNC may display an ambiguous alarm message if the received program contains a syntax or format error. To eliminate the possibility of a syntax or format error, try sending a program from the CNC to the computer first, and then send it back to the CNC. Edit the received file to change the program number so it can be loaded in the CNC without conflicting with the original program number.

Transmit Trigger

If the computer does not automatically start sending data when the CNC is ready to receive (that is, when the READ command is executed on the CNC), test the Transmit Trigger feature as follows:

1. Start DTerm32, and configure as follows:
   - v select the COM port the CNC is plugged into
   - v set the "Port Settings" parameters to match the CNC communication settings
   - v set Flow Control to "None"
   - v "check" the "Display control characters..." check box ("Display" options)
   - v "check" "COM Port Open" on the "Options" menu
2. Execute a READ command on the CNC, and observe the DTerm32 display. Any trigger characters output by the CNC will be displayed on the screen. The trigger character is usually the XON character, which appears as "^Q"). Set Transmit Trigger (Section 4.4.1) to match the CNC trigger character.
3. If the CNC does not appear to output a trigger character, use the RS-232 tester to determine if the CNC turns one of the RS-232 signals from off to on when it executes a READ command. If so, set Transmit Trigger to "CTS" and connect the CNC output signal the CTS input on the computer (Table 13).

If the CNC does not output a suitable trigger character or RS-232 handshake signal, set Transmit Trigger to Manual.

Test Flow Control

After testing transmit and receive modes, verify proper flow control (handshaking) operation for transfers in both directions as follows:

1. Send the largest available program from the CNC to the computer, and use Manual naming mode to store it in a file named `TEST1`.
2. Edit `TEST1` to change the program number to an unused number.
3. Send `TEST1` to the CNC (it will be stored under the new number).
4. Send the new program from the CNC to the computer and store it as file `TEST2`.
5. Compare files `TEST1` and `TEST2` using the Editor's Compare command. If the files are identical, communication and flow control are working properly in both directions.

The first two steps of this test may appear unnecessary. The reason for starting by sending a program from the CNC to the computer is that many CNCs automatically reformat programs by removing spaces or blank lines, or even by renumbering blocks. The file comparison in step 5 is accurate only if both files are formatted exactly the same.

Flow control operation should be re-tested any time a communication problem is suspected or any time a significant change is made (faster baud rate, new cable, different computer, etc.).

5.2.5 High-Speed Communication

Dostek DNC supports high-speed communication with baud rates of up to 38,400 baud. For reliable operation and maximum throughput, follow these recommendations:

- ❑ use a Pentium 120 or faster computer
- ❑ use a high-quality low-capacitance shielded computer communication cable, and locate the computer as close to the machine tool as possible to reduce the cable length (the cable should not exceed 50 feet in length)
- ❑ set the communication port FIFO buffers to maximum size (refer to "FIFO Buffers", below).
- ❑ ensure parity is enabled; ISO/ASCII data format with even parity is recommended
- ❑ work from a local hard drive — accessing a diskette or network drive to send or store data may limit the data throughput
- ❑ close all other applications
- ❑ if a screen saver is required, choose "Blank screen"; some screen savers use considerable computer resources and may interfere with high-speed communication

5.2.6 FIFO Buffers

The computer's communication port is equipped with First-In-First-Out (FIFO) buffers to enhance performance of data communication. For most applications, set the Transmit Buffer to the highest value (16) and set the Receive Buffer to 8.

Some CNC machines may report a communication "overrun" or "overflow" error when receiving information from the computer. This error can result if the CNC uses an input buffer that is unable to accept up to 16 characters (the maximum size of the Transmit buffer) after data flow is suspended. For example, some Fanuc CNCs (Models 10 and 11 in particular) can accept only 10 characters after suspending data flow. To correct the problem, set the Transmit FIFO buffer setting to the Low (1) setting. Leave the Receive FIFO setting at 8.

If Dostek DNC reports an "overrun" error when receiving from the CNC (to the computer), set the Receive FIFO setting to a lower value.

To set the communication port FIFO buffer in Windows 95 and Windows 98, use the following command sequence: Start, Settings, Control Panel, System, Device Manager, Ports, select a COM port, Properties, Port Settings, Advanced. After making this change, restart (reboot) the computer.

To set the communication port FIFO buffer in Windows NT 4, use the command sequence: Start, Settings, Control Panel, Ports, select a COM port, Settings, Advanced. After making this change, restart (reboot) the computer.

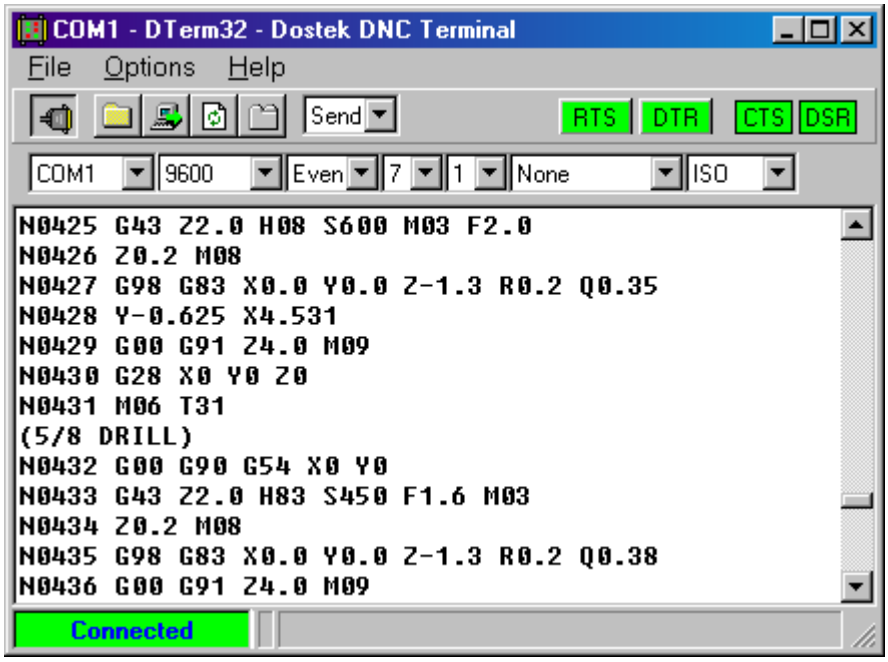


Figure 5 - DTerm32 - Dostek DNC Terminal

5.3 Terminal Program - DTerm32

The Dostek DNC Terminal Program is used for interactive testing and troubleshooting of RS-232 communication. DTerm32 transmits characters you type on the computer keyboard and displays received data on the screen. You can also capture received data to a log file or transmit a text file. ASCII, ISO and EIA-244 data formats are supported.

Start DTerm32 by choosing "Terminal" from the File Manager "Supervisor" menu or the DConfig "Tools" menu, or by choosing "Dostek DNC Terminal" from the Start menu.

Received data and typed characters are displayed in a scrollable text window. Data that has scrolled off the screen can be viewed using the scroll bar or by pressing Page Up, Page Down, Ctrl+Home or Ctrl+End. The last 8000 characters (approximately) are stored in the scroll-back buffer.

RS-232 control signal states are displayed on the right side of the toolbar. Red indicates the signal is on, and green indicates the signal if off. The computer's RTS and DTR output signals can be turned on or off by clicking the indicator on the tool bar. Communication settings and status is displayed on the status bar at the bottom of the form.

5.3.1 Configuration

After starting DTerm32, select a communication port and configure port settings (baud rate, etc.) by choosing "Settings" from the Options menu, or by clicking the "Change settings" icon on the toolbar. To set DTerm32 according to a Device Configuration File, choose a file from the list box on the Options "General" tab.

Initial settings are loaded from the Dostek DNC system configuration file. Click the "Save" button to replace the initial settings with the current settings, or click the "Reset" button to reload the initial settings.

Display Options

Choose the Options "Display" tab to set the following display options:

Typed characters	When checked, typed characters are displayed on the screen.
Controls characters as symbols	When checked, control characters are displayed as two-character symbols (eg: ^J for line feed). A list of control character symbols is provided in Appendix A. Note: DTerm32 does not display received XON and XOFF characters (^Q and ^S, respectively) on the screen while flow control is set to XON/XOFF. To view these control characters, set flow control to NONE.
7-bit characters	When checked, all characters are displayed as 7-bit characters. Use this option, for example, when DTerm32 is set for 8 data bits and received data may contain parity information in the eighth bit.
Hexadecimal	When checked, a split window is used to display data as both text and as hexadecimal values.

5.3.2 Capturing Data

Received data can be captured into a disk file. When used with the "Display control characters as symbols" display option, this feature lets you analyze a CNC's program format to determine correct communication option settings.

To capture received data:

1. If necessary, "check" the DTerm32 "Display control char. as symbol" check box ("Display" options).
2. "Check" "Capture to log file" in the DTerm32 "File" menu and type in a suitable file name (for example, "TEST.LOG").
3. When finished capturing data, clear the check mark from "Capture to log file" in the File menu.

5.3.3 Transmitting a File

To transmit a text file, choose "Transmit text file" from the File menu or click the "Transmit" icon in the tool bar.

6 MultiPort DNC

To prepare the Dostek DNC MulitPort Edition software add-on for use, follow these steps:

- ❑ install, configure and test Dostek DNC Professional Edition software according to checklist provided on page 1 . . . . . Checklist Page 1
- ❑ configure file transfer protocol . . . . . Section 6.1
- ❑ configure remote request parameters . . . . . Section 4.8
- ❑ configure MultiPort DNC server . . . . . Section 6.3.1
- ❑ add machines to MultiPort DNC server . . . . . Section 6.3.2
- ❑ make backup copies of configuration files . . . . . Section 3.6

The Dostek MultiPort DNC Server application receives allows the CNC user to upload, download and drip-feed files directly from their CNC console. To send a command from the CNC to Dostek MultiPort DNC, the CNC operator creates and outputs (punches) a small CNC program that is formatted in a specific way. The CNC operator can save a CNC program to the computer or request a CNC program be sent from the computer to the CNC. In addition, the operator can request a file directory or activity log report be sent from the computer to the CNC.

When data is received from the CNC, Dostek MultiPort DNC aborts any transfers that may already be in progress and stores received data in a file according to the receive file naming parameters (Section 6.1.1). If the received file is recognized as a command file (Section 4.8.4), the command is interpreted and acted upon. Otherwise, the file is simply stored to disk.

To save a program to a disk file, the operator simply sends it to the computer. To store multiple programs into a single disk file or to store a program as a specific file name, the operator must send a Receive Open command file, output the program(s), and send a Receive Close command file.

When the CNC operator requests the computer send information to the CNC (a program file or a report), the computer prepares the file sends it to the CNC when the CNC operator executes a "read" or "input" command, or a time out occurs.

Recommendations

When preparing device configuration files for use with Dostek DNC MultiPort Server, consider the following recommendations:

- ❑ create and configure devices according to the checklist provided in Table 7 (page 20)
- ❑ connect devices to the computer according to Section 5.1
- ❑ test communication between the computer and CNCs using the Dostek DNC Professional Edition components according to the checklist provided at the start of Section 5.2; in particular, test receive file naming, receive terminate and transmit trigger features

6.1 Protocol Configuration

The Dostek DNC command format and file transfer protocol may be easily configured for each individual machine to accommodate virtually any type of CNC. Protocol settings control how the Dostek DNC software determines when a file has been received, when a received file is a command file (rather than a CNC program file) and when the CNC is ready to receive a requested file.

6.1.1 Receive File Naming

The Receive File Naming parameters (Section 4.6) must be suitably configured for Dostek MultiPort DNC to work properly.

Most CNCs output a program number in the first line when sending a program to the computer. For example, most Fanuc CNCs output the letter "O" followed by a 4-digit program number. When using a CNC that does not output a program number, you must always format the first line of each program in a specific way before sending the program to the computer. For example:

```
N0001X0.1234
```

In this case, set the receive file naming parameters (Section 4.6) as follows:

Identifier	`N0001`	
Start	`.`	(period)

When configured this way, Dostek DNC will save each received program in a file named according to the numbers following the decimal point.

6.1.2 Receive Terminate

The Receive Terminate parameter (Section 4.5.2) must be suitably configured for Dostek MultiPort DNC to properly detect the end of data received from the CNC.

Most newer CNCs send a "%" character or a "Control-T" character after sending a file to the computer. When the Receive Terminate parameter is set to match the CNC, Dostek DNC can process received files and commands immediately.

To determine how the CNC terminates output, read the CNC manual or capture data using the Dostek DNC Terminal application (DTerm32, Section 5.3.2).

If the CNC does not terminate output in a detectable way, set the Receive Terminate mode to "Time" and set the time out value to 2 seconds. This way, Dostek DNC will process each received file 2 seconds after the last data is received.

If the CNC outputs null characters (displayed as ^@ by DTerm32) after the end of the program, set the CNC parameters to disable output null characters. If the CNC can not be configured to omit null characters, then select the time out mode as explained in the previous paragraph.

6.1.3 Transmit Trigger

The Transmit Trigger parameter (Section 4.4.1) must be suitably configured for Dostek MultiPort DNC to properly wait until the CNC is ready to receive requested data from the computer.

Most newer CNCs send a "Control-Q" character (XON) to the computer as soon as the operator executes the "read" or "input" command. Others turn on one of the RS-232 control signals.

If the CNC provides no detectable indication of when it is ready to receive, set the "Transmit Trigger Timeout" value (Section 4.8.5) to a value of, say, 5 seconds. This way, Dostek MultiPort DNC server will automatically send the requested data about 5 seconds after the command is received. Set the time out value to provide adequate time for the CNC operator to press the necessary buttons to execute a "read" or "input" command.

If Receive Terminate mode is also set to "time out", the total time between when the CNC finishes data output and the computer starts to send data will be the sum of both time out settings.

6.2 Remote Request

Choose the Remote Request tab (Dostek DNC Configuration application) to configure options related to uploading and downloading of files using the Dostek DNC communication server module, DMDNC32 (MultiPort Edition).

In order to use remote request commands, the "Receive Terminate" (Section 4.5.2) and "Automatic File Naming" (Section 4.6) options located on the Receive Options tab must be enabled and configured properly.

6.2.1 Commands

Remote request commands may be customized for each CNC. The default settings are:

- `+T` Transmit file from computer to CNC
- `+R` Receive file from CNC to computer
- `+D` Transmit file directory from computer to CNC
- `+M` Transmit recent messages from computer to CNC

Any character or string of characters can be specified for each command in the "Commands" frame on the Remote Request tab in DConfig. For example, the command identifier for the Transmit command could be changed to "`#SEND`".

The "+" symbol is used at the beginning of each default command identifier to ensure that comments are not incorrectly interpreted as commands. In the following command file, for example, the comment starting with "`(TYPE`" is not incorrectly interpreted as a Transmit command.

```
(+T,A123-456)
(TYPE PROGRAM NAME ABOVE AND PUNCH TO COMPUTER)
```

6.2.2 Message/Feedback File

The Message/Feedback option specifies the first line of the message or feedback file that is transmitted from the computer to the CNC if an error occurs while processing a remote request command or if the CNC operator uses the Message command to request a list of recent MultiPort DNC messages.

Use this option to specify the program number and an optional comment. By default, the Message/Feedback option is set to "`O7999 (DNC MESSAGES)`". This way, the message file will always load as program number O7999, and the comment "`DNC MESSAGES`" will usually appear in the CNC program directory.

If the Message/Feedback option is blank, the message file sent to the CNC will not contain a program number and the CNC will usually either store the file according to the first available program number or ask the operator to enter a program number.

6.2.3 Command Format

Command format options specify how commands are to be formatted when sent from the CNC to the computer.

Start, End	Specify the character or characters that each command line must begin with and end with. The default settings are to start with a left parenthesis "(" and end with a right parenthesis ")". For example: `(+T A123-456)`
Option	Specify the character that command options must begin with. The default is minus "-". For example: `(+T A123-456 -C)`
Character Substitution	Some common punctuation or symbol characters are not permitted on certain CNCs. Up to 5 character substitutions may be specified. Enter characters in pairs starting with the character to be substituted and followed by the character to substitute. Separate character pairs with a space. For example, to substitute the forward slash for the backward slash and the equal sign for the colon, enter: `\/ :=`

6.2.4 Command Files

Dostek MultiPort DNC provides two options for recognizing remote request commands received from the CNC:

- recognize a defined range of "Master Program Numbers" as remote request commands
- search all small files for remote request commands

Either option or both options may be enabled. By default, only the "Scan all small files" option is enabled because the program range specification varies according to the type of CNC.

Where possible, Dostek recommends selecting only the "Master Program Numbers" option and specifying "`0799*`", "`:799*`" or "`$799*`" (depending on CNC) so the command samples provided in the manual will work correctly.

Master Command Programs	When checked, program numbers matching the specified number are permanently designated as remote request command files. For example, if "`0799`" is specified and the CNC uses a 4-digit program number, program numbers O7990 through O7999 will always be treated as remote request command files. The Master Command Programs option must be checked in order to use the remote request Receive command (*User Guide*, Section 6.2).
Scan all small files	When checked, all received files less than 500 characters in size are searched for remote request commands.
(Note)	Both options may be checked. If both options are unchecked, remote request operation is disabled.

6.2.5 Options

One of two options is displayed, depending on whether the BTR440 protocol is selected (when using a Dostek Model 440 Behind-the-Tape Reader).

Transmit Trigger Timeout	Transmit will start automatically when the specified time interval elapses, even if a trigger is not received from the CNC. This feature allows remote request commands to work even if the CNC does not issue any trigger when it is ready to receive, and allows a transmit command to complete even if the CNC issues the trigger before the computer is ready to respond. Recommended setting is between 10 and 20 seconds.
BTR Transmit Reset	A transmit command using the Dostek Model 440 BTR will automatically reset (terminate) when the specified time interval elapses. This feature prevents a failed transfer from blocking received data from the CNC. Recommended setting is 30 seconds.

6.3 Configure MultiPort DNC Server

This section explains how to add, remove and rearrange devices, configure device settings and configure server options for the Dostek MultiPort DNC Communication Server application (DMDNC32.EXE).

6.3.1 Server Options

Choose "Options" from the MultiPort DNC Communication Server's "Configure" menu to configure server options.

Start Options

When the "Start as a Windows service" option is checked, Dostek MultiPort DNC communication server starts working as soon as Windows starts, and continues to work even without a user logged on. When running as a Windows service, the server icon appears in the Windows system tray. To view or manage the server while it is running as a service, log on to Windows and right-click or double-click the server icon in the system tray.

After changing this option, you must restart Windows for the new setting to take effect.

Receive Options

Received files (uploaded from the CNC to the computer) will always replace existing files of the same name. When the "Keep (rename) existing files" option is selected, existing files of the same name will be erased (if located on a network drive) or sent to the recycle bin (if located on a local fixed drive).

When the "Keep (rename) existing files" option is selected, existing files of the same name will be renamed. The renamed files will include an 8-digit numeric suffix denoting the date and time the replacement occurred. The suffix is formatted as "`+DDDDDTTT`" with the first 5 numeric digits representing the date as the number of days since 1/1/1900, and the time representing the number as a fraction of a day (500 representing 12 noon).

The "Keep..." option will prevent the accidental loss of files, but can result in a large number of backup files being created. To purge the old backup files, use the file search capability of the Dostek DNC File Manager to find all files matching "`*+*`" and matching a date range. When the search result is displayed, confirm that the files are all old versions that can be safely deleted, then choose the "Delete" button.

6.3.2 Adding and Managing Devices

Each active channel is represented by a separate row in the channel table on the Multi-Port DNC server main form. When Dostek MultiPort DNC is started for the first time, the channel table is empty.

To add a device to the table, choose "Add Device" from the Configure menu, or click the Add Device button in the toolbar. When a device is added, it will remain inactive until all device properties (Section 6.3) are properly configured. The maximum number of rows in the table is determined by the software license. Choose "About" from the Help menu to view the maximum number of ports for your system. If more ports are needed, contact Dostek for a license upgrade.

To remove a device from the table or move a channel up or down in the table, choose the appropriate item from the Configure menu or click the appropriate button in the toolbar. Devices may not be deleted or moved while they are connected.

Reset Device

To reset a device, choose "Reset" from the Configure menu. To reset all devices, choose "Reset All" from the Configure menu. Resetting a device disconnects the communication port, reloads the device configuration settings and reconnects the communication port.

Device Modes

Three channel modes are possible. The channel mode may be set by choosing from the Device menu or by clicking one of three toolbar mode buttons.

Manual	The channel is ready to accept manual Transmit or Receive commands issued at the computer.
Remote Request	The channel is waiting for or processing a remote request command from the CNC.
Disconnected	The channel is disconnected (not connected to a communication port).

6.3.3 Device Properties

To configure properties for the currently-selected device, choose "Device Properties" from the Configure menu or click the Device Properties button in the toolbar. The Device Properties form provides two tabs.

Choose the Device tab to view, change, remove or edit the device configuration file associated with the channel.

Choose the Options tab to configure channel options including file locations.

Transmit Options

Transmit options specify the root folder for the channel as well as the default transmit repeat mode for manually-transmitted files.

CNC operators will be allowed to obtain directory listings and to download files stored in or below the transmit root folder, but will be denied access to files outside the transmit root folder.

Receive Options

Receive options specify the location to store received files as well as the default receive file naming mode for manually-received files.

Uploaded files always replace existing files of the same name. To prevent overwriting of original files, specify a separate "Receive to" folder. For example, create an "Uploads" folder in the Transmit Root folder. This way, the CNC operator will be able to download either the original version in the transmit root folder or the modified version in the Uploads folder.

Replaced files may be converted to backup files by specifying the "Keep" option (Section 6.1.2). If the "Keep" option is not enabled, replaced files will be moved to the Windows recycle bin if they are located on a local fixed disk.

Remote Request Options

Check the "Search subfolders..." option to enable the MultiPort DNC communication server to search one level of subfolders to locate a requested file. If this option is not checked, only the Transmit Root folder will be searched (Section 6.3.1).

Check the "Start in Remote Request Mode" option to start the channel in Remote Request mode. This option should normally be checked for all devices. If this option is not checked, the channel will start in manual mode (Section 6.2, "Device Modes").

Appendix A

Special Characters

The ASCII character set used by personal computers includes 32 special "control" characters in addition to 96 printable letters, numbers and symbols. Dostek DNC/32 permits use of special characters in configuration fields by expressing them as a two-character string comprised of the caret symbol (^) followed by a letter, as listed in the following table. The decimal and hexadecimal values of each special character are listed.

The first item in the table (^@@) is a special symbol for use in transmit prefix and transmit suffix fields to output a 5-inch leader (50 null characters). The leader symbol can be used when transmitting to a tape punch or when transmitting to a CNC that issues an alarm if the program is not "framed" by tape leader.

Char	Description	Dec	Hex	Char	Description	Dec	Hex
^@@	50 Nulls			^P	DC1	16	10
^@	Null	0	0	^Q	DC2 (XON)	17	11
^A	SOH	1	1	^R	DC2	18	12
^B	STX	2	2	^S	DC3 (XOFF)	19	13
^C	ETX	3	3	^T	DC4	20	14
^D	EOT	4	4	^U	NAK	21	15
^E	ENQ	5	5	^V	SYN	22	16
^F	ACK	6	6	^W	ETB	23	17
^G	Bell	7	7	^X	CAN	24	18
^H	Backspace	8	8	^Y	EM	25	19
^I	Horizontal Tab	9	9	^Z	SUB	26	1A
^J	Line Feed	10	0A	^[	Escape	27	1B
^K	Vertical Tab	11	0B	^\	FS	28	1C
^L	Form Feed	12	0C	^]	GS	29	1D
^M	Carriage Return	13	0D	^^	RS	30	1E
^N	SO	14	0E	^_	US	31	1F
^O	SI	15	0F				

Appendix B

Using Command Line Options

Optional command-line parameters such as file names or operating modes may be specified when you start a Dostek DNC/32 application from any Windows shortcut (Start Menu, Desktop, Send To Menu, etc.) or from an application program you write. For example, you can use a command line "argument" when starting the Communication application (DDNC32.EXE) to specify a file name and communication mode (transmit or receive).

This Appendix describes the Dostek DNC/32 command-line options and explains how to use the Dostek DNC/32 command line in Windows shortcuts and in your application programs.

Command Line Options . . . . . Section 1

Windows Shortcuts . . . . . Section 2

Programming Guide . . . . . Section 3

1 Command-Line Options

This section describes the command-line arguments that can be used with each Dostek DNC/32 application.

Command-line arguments may specify file names or command options. Command options must be preceded by a forward slash character (for example: "`/TRANSMIT`") to distinguish them from file names.

Arguments must usually be separated by spaces. For this reason, file names that contain spaces must be enclosed in double quote characters (for example: "`C:\NC Tapes\O1234.TAP`").

1.1 File Manager

One or more "Root Folder" names may be specified on the Dostek DNC/32 File Manager application (DDFM32) command line. If multiple folder names are specified, they must be separated by semicolon characters. For example:

```
DDFM32 C:\My CNC Programs;A:\
```

Because folder names are separated by semicolons, names that contain spaces need not be enclosed in double quotes.

Root folders specified on the command line override root folder settings stored in the configuration file (Section 4.1). However, if a root folder specified on the command line is not a sub-folder of the root folders specified in the configuration file, and the "Manage root folders" security option is checked, the user will be prompted to enter the supervisor password.

1.2 Communication

One or more file names and/or the following command line options are permitted on the Dostek DNC/32 Communication (DDNC32) application command line:

`/APS` Enable "Automatic Protocol Selection" to automatically match the device configuration file with the name of the current folder (Section 4.4.1)

`/AutoName=x` Specify a mode for automatic naming of received files (Section 4.4.2). Choices are:
- `I` - Individual
- `S` - Single
- `M` - Manual

If automatic file naming is disabled in the selected device configuration file, this option is ignored.

`/C=`*`filename`* Specify a device configuration file. Wildcard (*) is permitted. Refer to example below.

`/J=`*`filename`* Specify the name of a "job" file. A job file contains a list of one or more files to be transmitted.

`/NoBrowse` When specified, the file "browser" may not be used to select a file (a file name must be typed in).

`/NoSetting` When specified, the "Settings" item is removed from the File menu, and the operator may not launch the Dostek DNC/32 Configuration application from within the Communication application.

`/Receive` Receive mode.

`/Transmit` Transmit mode. Transmit mode is the default mode, and will be activated unless /Receive or /? is specified.

`/?` Prompt user to select Transmit or Receive mode. Transmit mode is the default mode, and will be activated unless /Receive or /? is specified.

When Receive mode is used, one file name may be specified on the command line. If no file names are specified, the user is prompted to select a file. If more than one file name is specified, only the first name is used. Enclose a file name in double quotes if the name includes spaces. For example:

```
DDNC32 "3XR Pump housing.tap" /Receive
```

When Transmit mode is used, one or more file names may be specified on the command line. If no file names are specified, the user is prompted to select one or more files. If more than one file name is specified, each file is transmitted in sequence. To specify multiple file names, separate the names with spaces. For example:

```
DDNC32 O1234.TAP "3XR Pump housing.tap"
```

Multiple files may also be transmitted by specifying the name of a "job file". The job file is a text file that contains the name of each file on a separate line. All files must be located in the same folder as each other. To specify a job file, use the "/J=" command-line option. For example:

```
DDNC32 /J=A1234.Job
```

The /C command-line option specifies the name of a Dostek DNC Device Configuration Parameter file (.DCP file extension) that you have created using the Dostek DNC Configuration application (DConfig). If /C is not specified, a list of existing device configuration files will be displayed to permit the operator to choose. An asterisk character may be used as a wild card. For example, to allow the operator to pick which one of four identical QT100 lathes to send to, specify `"/C=QT100*"`. DDNC32 will display a list of all matching device names.

1.3 Editor

The Dostek DNC Editor application (DEdit32) may be launched for either of two purposes. If the "/Print" option is specified, DEdit32 will print the specified documents to the default printer in the background and then exit. Otherwise, DEdit32 will open the specified files for editing. If no arguments are specified on the command line, DEdit32 will open a new empty document named "Untitled". To specify multiple file names, separate the names with spaces. For example:

```
DEdit32 O1234.TAP "3XR Pump housing.tap"
```

The following command line options are available for background printing:

`/Print`	Print the specified files.
`/Format=x`	Specify a page format mode. Choices are: `P` - Portrait mode. `L` - Landscape mode. `C` - Landscape mode, 2 columns.
`/Wrap`	Wrap long lines onto the next line.
`/Nowrap`	Do not wrap long lines onto the next line. Instead, truncate lines at the right margin.
`/Page`	Display the page setup dialog to allow the user to set page format and margins.
`/Setup`	Display the printer setup dialog to allow the user to select a printer and printer options.

1.4 Configuration

A single file name or the "/Global" command option is permitted on the Dostek DNC/32 Configuration application (DConfig) command line. If the name of a Dostek DNC/32 device configuration file is specified on the command line, it is loaded for editing. If a file name is not specified, all configuration files in the \Settings folder are loaded for editing. If the /Global option switch is specified, the "Global settings" form is displayed.

2 Windows Shortcuts

To modify a Windows shortcut, display the shortcut properties. To display shortcut properties for a Windows Start Menu item, click the Windows Start button, then click in the following order: Settings, Taskbar, Start Menu Programs, Advanced. An Explorer view of the menu structure is displayed. Select a menu item and choose "Properties" from the File menu. To display shortcut properties for a Windows Desktop item, click on the item with the right mouse button and choose "Properties" from the context menu. To display shortcut properties for other Windows shortcuts, including "Send To" menu items, start Explorer, locate the item, and choose "Properties" from the File menu.

When the Properties form is displayed, choose the "Shortcut" tab and enter command-line arguments at the end of the Target field (following the application path specification).

3 Programming Guide

Dostek DNC/32 applications may be launched from an application program or "macro" you write in a language that provides a means of executing a Windows "shell" command. For example, you may use the Microsoft Access "RunApp" action or the Visual Basic for Applications "Shell" function.

Your program can determine the location of the Dostek DNC/32 application files by retrieving the "Path" value from the following "key" in the Windows system registry:

```
My Computer\HKEY_LOCAL_MACHINE\SOFTWARE\Dostek\Dostek DNC32
```

Sample programs are provided in folder Tools\Launch on the Dostek DNC/32 CD-ROM to illustrate how to launch a Dostek DNC application from a Visual Basic or Visual C program.