EASYTALK™
AND
EASYTALK SHELL™

USER'S GUIDE

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If you inadvertently destroy your original version of the software and all working copies, you may obtain a new copy of the software by sending a written request to CNC Innovations, LLC. Together with a fee of $50.00, to cover the cost of replacement software, postage and handling.

SECURITY INTEGRATION MODULE (SIM) REPLACEMENT
For Legacy versions only

If your security module fails during normal use you may obtain a new one, free of charge, for one year from date of purchase.   If the module fails as the result of misuse or unusual damage, you may obtain a replacement for a fee of $100.00 to cover the cost of a new module along with postage and handling. In either event, the original module **must** be sent to CNC Innovations, LLC. Before a replacement will be issued. Please contact CNC Innovations for a return authorization number before returning your SIM.

EASYTALK SHELL VERSION
 EasyTalk Shell is a variation of the original EasyTalk that eliminates the use of the Security Integration Module (SIM). This version was released because of problems associated with SIMs when used on PCs beginning with Windows 2000 and XP. EasyTalk Shell remains a DOS program and is not sold as an equivalent to CNC's Windows DNC software. The program is sold As-Is and it the responsibility of the user to verify correct operation of all program features when used on any Windows operating system. CNC Innovations, LLC. makes no claims that Easytalk Shell will work for all users on all platforms. For this reason, Easytalk Shell comes with a free 20-day trial as a means to test its functionality before making a final purchase. Furthermore, CNC Innovations, LLC. does provide support—except for that which is listed on our web site--regarding difficulties within a Windows operating system. For all such problems we suggest using our Windows DNC software.

INTRODUCTION

Congratulations on the purchase of EasyTalk. It is the industry's standard for DOS based Machine Tool communications, NC file management, and NC program editing.

The EasyTalk Product line represents years of combined efforts among System Developers, CNC Programmers, Communications Experts, Shop Managers, Machine Operators, and various other professionals interested in making machine shops more productive.

The goal in developing EasyTalk was to create a single, easy-to-use system, which brought together a variety of tools needed to effectively manage NC programs. Since that time we have developed several Editing / Communications Systems to best meet a company's individual needs.

As EasyTalk grew, the initial users provided a wealth of ideas on how to improve the product. These ideas were the driving force in the design of the current version of EasyTalk.

EasyTalk is powerful and multifaceted, yet it has easy to use menus and function keys to navigate through the system. On line help screens are available at the touch of a key for immediate assistance.

Most users will feel comfortable using EasyTalk without ever referring to the procedure portions of this manual. However, before "jumping in" we strongly encourage reading the sections titled "BEFORE YOU BEGIN" and "SAFETY NOTES".

TECHNICAL SUPPORT

ELIGIBILITY
When you purchase EasyTalk software from CNC Innovations, LLC. you are eligible for free, product-specific, telephone technical support for a period of 30 days from the date of purchase. Supplemental technical support is available on a pre-paid hourly basis.

SCOPE
The EasyTalk software product runs under the standard MS-DOS operating system. It is therefore assumed that you have a basic understanding of using DOS based software. It is also assumed that you know how to configure and use the communications options on your machine controls.

We will be happy to answer any relevant questions you may have about using our products, but we reserve the right to limit technical support to our applications and functionality only. For example, we will work with you to help you configure EasyTalk's communications parameters to match those of your machine control, but you must know the current settings on the control and/or how to change those settings.

If your problems go beyond the application and functionality of our product, you may contract with us for Supplemental Technical Support.

Before contacting us for technical support please refer to Appendix A: TECHNICAL TROUBLESHOOTING GUIDELINES.

SUPPLEMENTAL TECHNICAL SUPPORT
CNC Innovations, LLC. provides supplemental technical support for most machine communications applications on a hourly basis. This is available by telephone or on-site. To obtain technical support contact CNC Innovations, LLC. at 508-523-1763.

BEFORE YOU BEGIN

Before using EasyTalk for the first time, a few simple tasks should be completed. These tasks may seem trivial, but they will prove to be of great benefit over the long run.

CHECK PACKING LIST
Check each item on the invoice to confirm that all of the items ordered are included in the package. If any items are missing or were damaged in transit, please contact CNC Innovations, LLC. immediately so that we may remedy the situation.

MAKE COPIES OF ORIGINAL DISK(S)
It is very important that a backup copy of the EasyTalk software disk(s) is made before the system is used. If a backup is not made and the original version is accidentally destroyed new disk(s) will have to be ordered from CNC Innovations, LLC. This will not only be inconvenient, it will also be an unnecessary expense.

SAFETY NOTES

Safety is a prime concern for us at CNC Innovations, LLC. The following are several items which should be considered while using EasyTalk.

CABLING
Installation of data cables through a machine shop involves the risk of contact with high voltage circuits and various mechanical risks. All cabling should be done by **QUALIFIED PERSONNEL ONLY**. Improperly installed cables can cause machine control failure, data transmission errors, and tool crashes.

CONFIRM YOUR NC PROGRAM AND COMMUNICATIONS
EasyTalk cannot check to see if the data being sent to the machine control is the proper code. This is the responsibility of the machine programmer and operator. Always dry-run unproven programs carefully on the machine using sound shop safety practices.

Although EasyTalk communications have been proven in a wide variety of environments, there are variables which impact communications reliability, which the EasyTalk system cannot control. (Cable length, static, disk or electronic component failure, etc.) When initially establishing communications with your machine, make sure that data being sent and data being received are identical. Afterwards, use standard precautions to insure safety should data transmission errors cause unplanned tool movements.

EASYTALK SYSTEM REQUIREMENTS

EasyTalk is designed to run on 100% IBM compatible computers. No BIOS re-directs of resources or hardware address alterations for I/O ports are permissible.

REQUIRED HARDWARE/SOFTWARE:

- 80286 – 80486 (For DTE applications the computer should not exceed 486 class)
- 1 MB RAM
- 3.5" 1.44 MB Floppy
- 40 MB Hard Drive
- 2 Serial Ports and 1 SPP Parallel Port (2 for GE 550 DTE replacements)
- EGA or VGA Monitor
- DOS 5.0 or higher

NOTE: A Windows 95 DOS shell is unacceptable. Windows 95 computers must be booted directly to the Command prompt by pressing F8 during startup and selecting the Command Prompt Only option.

REQUIRED I/O MAP:

PORT	ADDRESS	IRQ
COM1	3F8	4
COM2	2F8	3
LPT1	3BC, 378	7
LPT2	278	5

We cannot guarantee compatibility with any TSR programs. Initial installation of EasyTalk must be performed with a "clean" system running DOS only. TSR programs may be loaded and tested after installation of EasyTalk.

NETWORK CAPABILITIES:

EASYTALK systems can access and store data across standard network file servers. EasyTalk's data management sub-system uses standard DOS function calls for all its file activity. As such, any network operating system, which recognizes DOS functions calls should allow EasyTalk to operate smoothly. As a benchmark platform, EasyTalk is tested extensively on a Novell network before each software release.

EASYTALK SECURIY MODULE (SIM) PROBLEMS

Easytalk™ was originally developed in the 1980s for use on computers running a MS-DOS™ operating system. The program relies on hard-coded algorithms for a security module (dongle) that pre-dates current operating systems and high-speed printer ports.

If your SIM has suddenly failed and you suspect that it is defective, CNC Innovations offers a replacement module for the Activator SIM only (color green) for the sum of one hundred dollars. In order to receive a replacement you must request a Return Authorization number and return the SIM with its PS00xxxx tracking number intact.

CNC Innovations, LLC. does not support legacy Easytalk SIMs for operation on any Windows operating system. However, for the hundreds of customers that have been forced--due to changing technologies or software requirements--to migrate their Easytalk software to a Windows operating system, *we offer the following suggestions*.

- Try running the program from the DOS or Command prompt or, if possible, boot the computer in "Command Line Only" mode by pressing F8 when the computer displays the message Starting Windows. Another solution is to boot the computer using a Windows startup disk.

- Check the current BIOS setting for the computer's parallel port. Very often you will get positive results when the port is configured as a Standard Parallel Port (SPP) or similar designation. Some operating systems such as Windows XP allow you to specify the use of interrupts for the parallel port. Refer to the Device Manager, which is accessed by clicking the System icon located in the Control Panel to make these changes.

- Run the program SSIACT.EXE, located on the original Install or Diagnostics disk, and use the recommended settings for adding a SET environment variable in the Autoexec.bat file. If you do not have the Diagnostics disk or the SSIACT program, try typing the following line in your Autoexec.bat file.   SET SSI_ACT=50, 50, 50

When testing it is also possible to try larger numbers such as 100, 100, 100. If you have entered the Command mode from a Windows shell, the SET environment variable can be entered at the command prompt. However, the variable will only apply for the duration of the Command session. To apply the variable permanently it must be entered in an Autoexec.bat file or within the Windows Environment Variable setup screen—see Windows Help program for details.

- If the above suggestions fail to resolve the problem, CNC Innovations offers a program called Easytalk Shell, which has been designed to operate without the need for a security module. This program is offered for use with RS232 serial data only. It is not recommended for use with CNC's DTE tape emulation devices. For parallel tape emulation we offer stand-alone BTRs the will interface directly with Easytalk or Focal*Point DNC, our Windows software.

DTE INTERFACE TROUBLESHOOTING
(Not For Use With Windows Operating Systems)

- If the message "Security Device Not Found" is displayed when connected to a machine control, it may be necessary to attach the DTE interface to separate parallel port (LPT2). The GE550 (Type 3) must be attached on a separate port.

- If the program continually waits for a program start, try changing the read level parameter if it is available.

- If a program load runs correctly in EasyTalk but does not register in the control's memory, verify that the correct End-of-Block character is used. In the case of UNIX generated files, convert the Files to DOS format, which contains both carriage return and line feed. Also, check the Data Mode setting in both the Normal and Invert setting.

Should you discover a technique that is not listed above, please let us know so that we may share the information with others. You can reach our technical support department at 508-523-1763.

SERIAL RS-232 COMM PORT CONFIGURATION
FOR BUFFER OVERFLOW PROBLEMS

Disable COMM Port FIFO Buffers on Windows PCs

When using the resident serial ports on a Windows PC it is important to disable the communication port FIFO buffers before attempting file transfers to a machine control. If they are not disabled you may experience a buffer overflow problem, especially on older controls.

Note that these buffer controls are only available on newer computers and may not be available for all serial cards and devices.

To disable the buffers, follow the instructions below. Note that each version of Windows has slight variations but in general the procedure remains the same.

Select the Control Panel from the Start menu or My Computer.
Click on the System icon.
Select the Hardware Tab and then click the Device Manager.
Scroll through the listed devices and click on the Ports entry.

In turn, double-click each Com Port to view and configure its properties

Select the Port Settings tab
Click the Advanced button
Move the arrow on **both** the Receive and Transmit Buffer to LOW and click the option to disable the FIFO buffers.
Select OK then exit to the main screen and reboot the PC .

Remember to reboot the computer after making system level changes.

INSTALLING LEGACY EASYTALK SIMS

Plug-in the green Security Integration Module (SIM) into LPT1 or LPT2.

This device is a dual ended connector measuring approximately 2.5" square and 1/4" thick. It has a white label attached which shows the SIM number assigned to your company. This number is in the form "PS00XXXX".

Note the direction of the screws attached to the SIM. These will show the orientation of the SIM when installed. Refer to your PC manual if you are uncertain which is the LPT (printer) port.

EasyTalk is protected against unauthorized distribution by the use of this Security Integration Module (SIM). Without this device the software will not execute.

The SIM will not interfere with printer operations and can usually be stacked with other security modules. In some cases, if a printer is plugged into the SIM module and the printer is turned off the SIM may not operate correctly. If you get a "COPY PROTECTION DEVICE NOT INSTALLED" message when you try to use the system please check to see if the SIM is properly installed and that the printer, if installed, is turned on. If problems persist, please contact CNC Innovations, LLC. for assistance. Be sure to connect the SIM before running the installation procedure.

SOFTWARE INSTALLATION FOR 1.44 MB FLOPPY DISKS

1.   Place the distribution disk in your A or B drive and type A:INSTALL (or B:INSTALL).
2.   Choose the Monitor Type and press ENTER
         EasyTalk will search the PC's directory/file structure—up to 3 directories deep, 1000 files per directory--and then the installation Main Menu will be displayed.
3.   Select 1. INSTALL EasyTalk and press ENTER.
4.   Follow the instructions displayed on the screen to select the installation directory. We recommend installing to the default directories shown.
5.   When the installation is complete and a key is pressed, the EasyTalk Main Menu will be displayed.

SOFTWARE INSTALLATION FOR EASYTALK SHELL (Web Download and CD)

1.   After downloading the installation program, simply double-click the program to start the automated Setup program. The installation process will copy all EasyTalk files to an EasyTalk directory including a few ETShell supplemental windows files. The initial installation has a 20-day free trial providing ample time for configuration and testing with target machine controls. After the trial period it will be necessary to purchase a license code for continued use of the product. To purchase a license key simply contact CNC Innovations at 508-523-1763. At which time you will be asked to provide a credit card number (or other method of payment) and the Password Seed code displayed when EasyTalk runs.

2.   CD installation should begin immediately after inserting the disk. If your CD-ROM drive does not support the Autorun feature, simply navigate to the CD-ROM drive with Windows Explorer and double-click the Setup.exe application file.

CREATE A DIRECTORY FOR THE PART PROGRAM FILES

1.   From the EasyTalk Main Menu, choose 1. NC/TEXT EDITOR/INTERACTIVE DNC.
2.   Press F10 key to change the directory.
3.   Press F3 to create a directory.
      A. Type in a description. (EasyTalk allows 32 character names for directories as well as files. Example: NC FILES FOR MACHINE CONTROLS)
      B. Press TAB and assign a DOS directory name. (Example: C:\NCFILES)
      C. Press ENTER to create the directory.
4.   Press the ESC key twice to return to the Main Menu.
5.   Set the newly created directory as the default.
      A. From the EasyTalk Main Menu, choose 5. SYSTEM DEFAULTS.
      B. Press TAB to position the cursor in the "Directory for file handler" field.
      C. The new directory should already be highlighted as first on the list, so press ENTER to accept it as the default.
      D. Press F2 to save the default values and return to the EasyTalk Main Menu.
6.   Since the defaults only take effect when the software is entered - Press the ESC key and answer Y to exit.

To re-enter the software, type ET and press ENTER.

CONNECTING TO SERIAL (RS232) MACHINE CONTROLS

Connect serial cable from the machine control into either COM1 (usually DE-9 MALE) or COM2 (usually DB25 MALE) on the computer. Refer to APPENDIX C for recommended wiring specifications. Determine the control's BAUD RATE, DATA TYPE, and STOP BITS.

In order to communicate successfully between the computer and the machine control a few parameters will have to be matched. See the machine control operator's manual for the specific parameters, which govern communications.

A.   Baud Rate will range from 110 to 38.4K in industry dictated increments. This value may be found by looking in the machine control parameters.
B.   Data Type can be found by checking either the machine's setting page or it's parameters. ISO or EIA are the typical data formats. These formats have pre-set data bits, parity, etc. If your control uses another format, please note the associated structure also.
C.   One or two stop bits may be selected. If the machine control does not specify a value the best choice for this parameter is two.

After the above settings have been determined and written down set EasyTalk Communications Parameters to match those of the machine control.

1.   From the EasyTalk Main Menu, choose 6. COMMUNICATIONS PARAMETERS.
       The communications parameters screen allows for 15 different machine configurations to be saved.
2.   Type in a specific machine name (Example: HORIZ. MILL #1) and press the TAB key.
       A list of machine control manufacturers will appear on the left of the screen.
3.   If your specific machine control is not on the list, then highlight GENERAL and press the TAB key.
4.   Use the up/down arrow keys to select the proper baud rate and then press TAB.
5.   Next, choose the proper data type (ISO or EIA is most common - the parity and data bits will be preset). If parity and data bits are not pre-set, as in ASCII communications, match these to your machine control settings (data structure) as well.
6.   Choose 1 or 2 Stop Bits.
7.   Select the proper PC communication port (COM1 or COM2).
8.   Carriage Return / Line Feed (CR/LF) is the standard end of block for many machine controls. FANUC controls typically use LF/CR/CR.

The remainder of the communications screen allows for additional specific OPTIONAL parameters. In most cases, these values are left blank. Therefore, at this point, press ENTER and then F2 to save the parameters and exit to EasyTalk's Main Menu.

RECEIVING A FILE FROM THE CONTROL INTO EASYTALK

Now that the cable is connected and the parameters are matched between the computer and the control, it is time to test communications.

Always send from the control to the computer first when testing communications for the first time. When it comes to mis-matched parameters, EasyTalk is much more forgiving than a machine control.

1. From the EasyTalk Main Menu, select 3. RECEIVE FILE.
2. Press the F4 key to open an existing file or create a new file to receive the data.
3. Type in a descriptive part name (Example: AIRFOIL G2284-653 OP 1) and press TAB.
4. To accept the next sequential number as the DOS name for this part, just press ENTER.   Otherwise, type in a new DOS name and press ENTER.

It is suggested file management practice to assign the part program's "O" number as the DOS name. The "O", in this case, refers to a character used to identify a file name within the machine control. (Example: program **O3946** would have the DOS NAME ET3946.NC)

1. The computer is now ready to receive the file and should display: EasyTalk RECEIVE FILE MODE and display the file name.
2. At this point, initiate a normal serial transmission on the machine control. This is usually done with a command like (PUNCH) or (OUTPUT). See the machine control manual for specific details.
   The file should be displayed on the computer screen as it is being received.
3. By pressing any key, the file will be saved and the software will return to the EasyTalk Main Menu.

If the file is not displayed, is garbled, or does not appear to be correct - SEE TROUBLESHOOTING SERIAL MACHINES.

EDITING THE FILE RECEIVED FROM THE CONTROL

In order to ensure that the interface is correct, the file that was just received must be sent to the control. It will then be sent back into the computer and file compare will have to be performed.

Before the file is sent back to the control, the program O number (or similar field) must be changed so that the machine does not alarm or overwrite the existing program. To do this, follow the steps below.
1. From the EasyTalk Main Menu, press 1. NC/TEXT EDITOR/INTERACTIVE DNC. This will display the EasyTalk File Handler. Using the keyboard arrow keys, move to the file just received, so that it is highlighted.
2. With the file which was just received highlighted, press ENTER.
3. Ensure that the beginning of the program is in the right format for the machine control. Delete   any header characters (such as &HE: - with FANUC 0 controls). The first line should be either a blank line or a % sign.

A typical program may take the structure similar to:

```
%
O1234
(B-HANDLE 43682-22B-10 REV C)
N10G00T1200
N20G50X17.435Z6
.
.
N2390G50X22.398Z7.
N2400M30
%
```

4. Press Ctrl-End. The end of the file is now displayed. Delete any "garbage" characters from the end of the file.

5. Press Ctrl-Home to return to the top of the file.
6. Change the program O number, (or equivalent field) to one that is not presently in the machine (Example: O3946 ⇒ O1234).
7. Press F10 File Utilities.
8. Press F10 SAVE & EXIT.

SENDING A FILE TO THE CONTROL

1. From the EasyTalk Main Menu, select 2. SEND FILE.
2. With the correct file highlighted, (See A. on the previous page) press ENTER. The file is now queued in a send standby mode, waiting for (READ) or (INPUT) to be pressed on the control. Do not override by pressing any key. A handshake from the control should initiate file transfer.
3. When READ is initiated on the control, the file will scroll through on the computer screen.
4. After the file is sent, press N (do not re-transmit) and return to the Main Menu.

If the control does not receive the file, alarms out, or receives only part of the file - SEE TROUBLESHOOTING SERIAL MACHINES.

COMPARE THE ORIGINAL FILE WITH THE RECEIVED FILE

1. From the EasyTalk MAIN MENU, choose 9. COMPARE FILES.
2. Using the Up/Down arrow keys to highlight the original file, press ENTER. EasyTalk will enter the file handler screen.
3. Using the Up/Down arrow keys to highlight the original file sent as the FIRST FILE and press ENTER. Highlight the received file as the SECOND FILE and press ENTER. The compare routine will display the progress of the comparison by indicating the line number, number of matches, modifications, inserts, and deletes.
4. Press any key to see a side by side listing of the two files.
5. If the files are not IDENTICAL, use the F2 and F3 keys to search forward / backward through the files for the next or previous mismatch. There should be NO major differences in the two files.

On some FANUC controls, the program (O) number will be changed to a (:). Other controls may show a DC2/DC4 code at the beginning and end of the file; This does not affect file transfer - it's a punch turn on/off code.

If there are sections of the program missing, or dropped characters in the program - see the section on TROUBLESHOOTING SERIAL MACHINES.

Congratulations on reaching this point in the manual. It means the software has been successfully installed, communications have been established, and a majority of EasyTalk's features have at least been seen. The remainder of this manual will cover each property in detail and outline OPTIONAL features and different modes of operation.

EASYTALK NC/TEXT EDITOR

From the EasyTalk Main Menu, choose 1. NC/TEXT EDITOR / INTERACTIVE DNC.

The screen will display the EasyTalk File Handler. Using the arrow keys, highlight the file to be edited and press ENTER.

The NC/TEXT EDITOR serves as an editing function as well as a base for DNC ("drip-feed") operations. Throughout the editor the following general keys apply:

F1:	Displays indexed help screens.
ENTER:	Enters data or executes a command.
ESC:	Exits or terminates a command and returns to previous menu.
ALT:	Press and hold this key for additional menu selections.
ARROWS:	Moves the cursor one space in the direction specified.
HOME:	Moves the cursor to the start of the current line.
END:	Moves the cursor to the end of the current line.
PAGE UP:	Scrolls the screen up one screen-page.
PAGE DOWN:	Scrolls the screen down one page.
CTRL-HOME:	Moves the cursor to the top of the file.
CTRL-END:	Moves the cursor to the end of the file.

The editing features include:

CHARACTER INSERT
Any key typed during the edit mode is automatically inserted at the current cursor location. To perform a text typeover press the INSERT key. Once in the typeover mode any text entered will be placed over the existing text at that cursor location. The typeover mode is indicated by TYPEOVER being displayed on the bottom of the screen. To exit the typeover mode press the INSERT key again.

CHARACTER DELETE
The Delete key erases one character at a time at the current cursor position and shifts the remaining text to the original position.   The backspace may also be used to delete a character. It moves the cursor back one position and deletes the character at that position.

Control-Enter deletes all characters from the current cursor position to the end of the line. Once these characters have been deleted they can not be recovered so be careful not to delete lines that should be retained.

BLOCK ACTIONS
A block is a group of lines marked for a particular action. Typical block actions are block copy, block move, block save, block delete and block print. Block markers are also used to provide limits to automated procedures such as search and replace, or any of the NC utilities.

F5 - BLOCK DEFINE
When the F5 key is pressed a "BLOCK ANCHOR" is established at the current cursor line. The block is then extended to either the up or down direction as the cursor is moved. Block definitions cause the entire line, not individual characters to be set.

A block may also be extended by using the F3 SEARCH function to extend the block to a given text string. Once a block has been defined you may accept it for further action by pressing the F5 key again. A block define may be aborted by pressing the ESC key. Once a block mark has been accepted it may be cleared by pressing the F6 key.

F6 - BLOCK CLEAR
Block clear - clears the block markers. It does not erase or delete any text that was in the block. To delete text within a block use ALT F6, BLOCK DELETE.

Blocks are cleared automatically after all function executions except for copy block. Once a block is defined using F5 it may then be saved, copied, moved, deleted or printed.

ALT F4 - COPY BLOCK
Block copy allows for a defined block to be copied to another location in the program. The defined block will be copied to the location immediately before the current cursor line.
NOTE: The cursor must be moved to the location in which you want the defined block before pressing ALT F4. The original defined block is preserved so that it may be copied in multiple locations.

ALT F5 - BLOCK MOVE
This function is the equivalent of a combined cut and paste operation. Move block - moves the contents of a defined block from its original position to the position immediately before the current cursor location.
NOTE: Like block copy, the cursor must be moved to the location in which you want the defined block before pressing ALT F5.

ALT F6 - BLOCK DELETE
This function will delete the contents of a defined block. Once the block has been deleted it is not possible to recover the deleted data. If the mistake has catastrophic consequences you may perform an EXIT WITHOUT SAVING to restore the file back to it's pre-edited form.

ALT F10 - BLOCK PRINT
Block Print prints the contents of a defined block.

SEARCH ACTIONS

F3 - SEARCH
The search mode prompts for a 'string' definition, then searches the file for that string. Searching starts at the current cursor location and continues to the end of the file. If a block is defined the search begins at the start of the block and continues to the end of the block. The search function may be terminated at any time by pressing the ESC key. The search function is not case specific. In other words, an upper case "A" is equivalent to a lower case "a".

ALT F3 - SEARCH AGAIN
This function repeats the previous search without the need to redefine the search string. Search again is very similar to a continuous search and can be quite effective once the search function has been used.

F4 - SEARCH AND REPLACE
Search and replace prompts for a search string definition and a replace string definition. The search and replace function may be terminated once started by pressing the ESC key.

During the search and replace operation you may choose to replace a specific occurrence, skip a specific occurrence, or replace all occurrences to the end of the search. The search portion of the function is not case specific while the replace portion is case specific.

NC / TEXT MODE

The NC text mode displays text as it would on a typical machine control but with additional spaces. These spaces are logical only and do not change the size or content of the file. While in the NC text mode a beep tone will be produced if a "O" is typed. This is to prevent the user from accidentally using the letter "O" for the number "0".

The additional spaces and the beep tone are not activated within the comment fields (text within parenthesis). Any text inside of the parenthesis will appear unchanged when switching between the two modes.

MACROS

A macro is a "recorded" series of keystrokes which may be "played back" to automate a desired task. For example, to strip sequence numbers from an NC program, do the following: (This example assumes that the sequence numbers consist of an "N" followed by 3 digits.)

1.   Position the cursor at the beginning of a block on an "N".
2.   Press F8 and select RECORD (you will be prompted to enter a macro name for recall purposes).
3.   Press the Delete key four times.
4.   Press the down arrow key to go to the next line.
5.   Press F8 and select either END RECORD for later "play back" or select END RECORD/PLAY to immediately "play back" the macro.

Macro "play back" may be terminated at any time by pressing any key.

After a macro is recorded and saved, it may be recalled and played at any time. Press F8 and select PLAY. All previously recorded macros will be displayed (alphabetically sorted).

Up to 50 macros can be stored for recall. To delete a macro, press F8 and select DELETE from the menu.

NC UTILITIES

IMPORTANT NOTE ON NC UTILITIES !!!   The math functions of SCALE, SHIFT, ABSOLUTE TO INCREMENTAL and INCREMENTAL TO ABSOLUTE perform mathematical calculations only. There is no checking for G-codes or other NC commands which may modify the desired results. It is the responsibility of the person editing the file to understand where the application of these functions is appropriate.

F2 / F3 - SCALE AND SHIFT
These functions search the text for the user specified dimension or command prefix letter(s) (A B C D E I J K U V W X Y Z S or F). With SCALE, the number immediately following the specified letter is multiplied by the factor. With SHIFT, the number is added to the factor. The number is then replaced with the result.

The SCALE function is helpful in converting from diameter to radius NC programming mode or vice versa. (Select X and a factor of .5 or 2) It may be used to increase or decrease speeds and feeds (Select S or F). The SHIFT function is useful in shifting the tool path off the part by a specified amount. It may be used to repeat the same tool path in a different location. To do this, first copy a block, then select and shift in the appropriate dimensions (eg.X,Y,I,J). The output of these functions is formatted as follows:
- All leading and trailing zeros are deleted.
- Speeds are displayed to 2 decimal places.
- Feeds are displayed as whole numbers without decimals.
- All dimensions (X Y Z I J K A B C D E) are displayed from 0 to 6 decimal places. (The default is 4, the user may specify any number from 0 to 6).
- Results, which exceed the decimal places specified, are rounded.
- This function can be exited at any time by pressing the ESC key.

F4 / F5 - ABSOLUTE TO INCREMENTAL / INCREMENTAL TO ABSOLUTE

These functions search the text for the user specified dimension prefix letter(s) (A B C D E U V W X Y Z S or F). The numbers are then converted to the dimension type specified.

When shifting from absolute to incremental, the result is calculated as the difference between the previous and current position. The previous position is assumed to be zero.

When shifting from incremental to absolute, the result is calculated as the sum total of all incremental moves from the beginning of the search. The starting position is assumed to be zero.

If a starting position other than zero is desired for either function, insert a "dummy" line in to adjust the starting position, execute the function, then delete the "dummy" line.

The output of this function is formatted as follows:
- All leading and trailing zeros are deleted.
- All dimensions (X Y Z U V W A B C) are displayed from 0 to 6 decimal places. (The default is 4, the user may specify any number from 0 to 6).
- Results that exceed the decimal places specified are rounded.

F6 - RENUMBERING

Renumbering searches text for the letter "N" plus any digits immediately following the "N". A new sequence number is then generated using a "starting number" and "increment". Line numbers may be inserted on any lines not numbered if desired.

You may choose to start renumbering at the current cursor location and proceed to the end of the file or start from the top of the file and renumber the entire file. If a block is defined, only the block is renumbered. In addition to "starting number" and "increment", you will be told to enter the following information:

NUMBER of DIGITS - This number specifies the minimum number of digits to be displayed. All line numbers with less digits than "NO. of DIGITS" will be padded with zeros.

LINE NUMBER LIMIT - When this limit is reached, line numbers are restarted from the "starting number".

F7 - AUTOMATIC NUMBERING

Automatic numbering generates a line sequence number each time the ENTER key is pressed. The sequence number consists of the letter "N" followed by the "starting" number plus the "increment". Automatic numbering may be temporarily suspended, or re-activated by pressing ALT F7.

F8 - STRIP LINE NUMBERS

Erases line numbers from the entire file.

F9 - DECIMAL MASK

Decimal masking allows your dimension values to change from a decimal value to a value without a decimal point with leading and/or trailing zeros or vice versa.

This function will search the text for the user specified dimension or command prefix letter(s) (A B C D E U W V X Y Z S R or F). The numbers immediately following the specified letter(s) are converted. The conversion is determined by the field format selected, the leading and/or trailing zeros, and which value is selected decimal or no decimal. This function can be exited at any time by pressing the ESC key.

FILE UTILITIES

F2 - MERGE FILE
Merge file allows the user to merge one or more existing files into the file currently being edited. The second file is merged at the line immediately before the current cursor position. **NOTE**: Before entering the File Utility make sure the cursor is at the location where you want the second file to begin.

F3 - SAVE AND CONTINUE
This function saves the current file being edited, then allows you to continue with the editing process.

F4 - SAVE WITH NEW NAME
Save with a new name allows you to save the current file with a new name.

F5 - COMPRESS FILE
This function saves the current file in compressed mode. The file will be compressed based on selections made on the System Default screen for tabs, spaces, line numbers, and comments.
WARNING: Compressed files CAN NOT be decompressed.

F9 - EXIT NO SAVE
Using this function will allow exiting the editing process without saving changes.

F10 - SAVE AND EXIT
This function saves the current file with all changes, exits the editing process, and returns to the File Handler.

SYSTEM DEFAULTS

Default values provide the system with initial configuration information. For example, the monitor type or the default directory for the File Handler. To edit the default values, select 5. System Defaults from the EasyTalk Main Menu. Use TAB (forward) or Shift-TAB (backward) to move between fields.

MONITOR TYPE
The choices are color, black and white, or LCD. Highlight the appropriate choice by using the up/down arrow keys, then press TAB to move to the next field.   If a black and white monitor is being used and some of the screens do not have enough contrast with (B & W selected as the monitor type), try setting to LCD.

PARALLEL PORT
When EasyTalk is being used for Direct Tape Emulation, choose the Parallel Port to be used for the tape emulation cable (LPT1 or LPT2).

PRINTER PAGE LENGTH
This value is the number of lines on a sheet of printout paper for the printer. The default setting is 66.

PRINTER TYPE
A parallel, serial, or network printer can be selected. If a parallel printer is selected the text will be output to the same port as the security integration module. If a serial printer is selected the output will be directed to a serial interface port. This will either be COM1 or COM2 depending on which device is selected in the communications parameters for machine #17, Serial Print Device.   If the network option is selected, then the printed text will be output to whichever port has been designated as LPT1 by DOS or by the Network.

FILE PREFIX AND FILE EXTENSION
For convenience, when creating a file in the File Handler, a DOS name will be automatically generated. The file can be either created in the editor (new or duplicated) or received from a machine control. In the following example, the Prefix has been specified as JAX and the Extension as NC.

Note the DOS names assigned by EasyTalk to the two files created:

```
===================================================================
   PART NAME/NUMBER                 | DOS NAME   | SIZE    | DATE
===================================================================
   AIRFOIL G2281-3298 OP80          | JAX0001.NC |         |
   GEAR CASING G6634-42332          | JAX0002.NC |         |
```

The new file will consist of the default **PREFIX** and **EXTENSION,** along with the next available sequential number in the directory. This default value will provide a prefix/extension for ALL directories. The defaults may also be set on a per directory basis within the File Handler.

SETTING THE DEFAULT DIRECTORY FOR THE FILE HANDLER
When EasyTalk is first loaded and the File Handler screen is first displayed, the system will display files from the directory entered in this field. Press F3 to select an alternate default.

SORT BY
Allows selection of whether a directory should sorted by PART name or by DOS name when displayed by the File Handler.

COMPARE DEFAULT SETTINGS:

IGNORING TABS AND SPACES
Some controls automatically add a space to the end of a line, if the number of characters in that line is odd. In other cases, files may look identical but one has tabs and the other has spaces. In both these examples the files may not be identical but they are functionally equivalent. To ignore tabs and spaces when comparing two files, select Y for the Ignore Tabs and Ignore Spaces questions.

LOOK AHEAD VALUE
The compare look ahead value sets how many lines to look ahead when a file is mismatched, before deciding whether the lines are modifications, inserts or deletes. The default look ahead value is 25 lines. Use the TAB key to move to the "Lines To Look Ahead " field and enter the desired value.

If the files being compared are very dissimilar, a smaller look ahead value will cause the compare to run faster and a larger value will cause the compare to run slower. If the files are nearly identical the look ahead value will have little impact on the speed of the compare.

A small look ahead value will not result in dissimilar files being reported as equal. But, if the number of contiguous inserted or deleted lines exceeds the look ahead value, those lines will be reported as modifications -- not inserts or deletes.

COMPRESS DEFAULT SETTINGS
These settings are used when sending files or compressing a file with File Utilities (within the editor). If the value is set to Y, then EasyTalk will "strip-out":
* Comments enclosed in parentheses
* Line numbers (N numbers)
* Tabs
* Spaces
* A specific ASCII character

PRINT MODE

Print a file in NC Mode (spaced text) or regular Text Mode (as displayed).

BRIDGEPORT REAL-TIME SUBPROGRAM

When using Bridgeport Real-time DNC on Bridgeport BOSS controls, this default value sets the number of characters in the "data block" to be sent. Refer to separate documentation for detailed instructions for this special protocol.

COMMUNICATIONS PARAMETERS

The EasyTalk communications function may be accessed through the Main Menu or within various communication functions. The communications screen allows for 15 different combinations of parameters to be specified. Two "slots" are reserved. One for CAD/CAM communications and one for a serial printer. A machine name (or any identifier of your choice) up to twenty characters in length may be assigned for ease of identification. To enter a specific machine name use the up/down arrow keys to position the highlight bar to the desired space number then simply type or edit the name in that field.

Next, press the TAB key. This action will display a list of machine control types. If the control type for the machine you wish to communicate with is on this list, use the arrow keys to highlight it. This will set the communication parameters at a suggested starting point. If your particular control type is not shown, select GENERAL and adjust from there. The following paragraphs will discuss how to "tweak" these settings, if required.
NOTE: As the highlight bar is moved through the different pre-sets, the displayed parameters on the right hand side of the screen change to reflect the suggested starting values for the control type selected.

Once a control type has been selected and set you may move to the special protocol parameters by pressing the TAB key. Each machine control requires a combination of several parameters in order to establish proper communications. Many of these parameters may be set on the machine control as well as in EasyTalk. A discussion of each parameter follows:

BAUD RATE
Baud rates will range from 110 to 38.4K. The industry standard increments are used. These are: 110, 150, 300, 600, 1200, 2400, 4800, 19200, 38400 baud. The selected baud rate must match the rate selected by the machine control parameters. Since the baud rate is the speed with which the control and computer communicate, it is advantageous to set as high a baud rate as is possible without lose of data integrity. Cable length has an important impact on determining the maximum practical baud rate. For longer cable runs (those exceeding 100 - 200 feet) you will need to select a slower baud rate, perhaps 1200 to 2400. For shorter cable runs (those of around 7 - 10 feet) 19.2K baud should work very well. Experimentation will show the optimum for your particular application.

DATA TYPE
Four data format types are available: ISO, EIA, ASCII, and BINARY. ISO and EIA are the typical data formats used for NC programs. ASCII can be used on those controls that don't require parity bits, or that need a custom word length, but still need the normal DOS end of block sequence. The BINARY format is usually used for "executive tapes" or for storage of information other than NC program files. All of the data received in this mode will be saved verbatim without any attempt to correct EOB's or the like.

Some controls may refer to ASCII code for part programs and/or for "executive tapes". ASCII simply refers to the standard used as the data encoding format, not the communications format. In fact, ISO is a subset of ASCII, with seven data bits and even parity. If the machine control is configured for ASCII, even parity, seven data bits, you may also use ISO. For any other configuration, use the EIA or ASCII and match the parity and data bits.

PARITY
Three parity options are available: even, odd, and none. For ISO and EIA codes these values are preset and can not be changed. For ASCII and BINARY any of the three may be chosen. For "executive tapes" or other data files, "none" is the usual choice.

DATA BITS
Seven or eight data bits may be chosen. As with PARITY, the number of data bits is preset for ISO and EIA. For BINARY and ASCII the values must match the values set on the machine control. For "executive tapes" or other data files, the usual selection is eight data bits.

STOP BITS
One or two stop bits may be selected. If the machine control does not specify a value the best choice for this parameter is "two".   In many cases, this selection is not critical to proper communications.

COMMUNICATION PORT
Many computers have two (or more) serial communications ports. EasyTalk can only address COM1 or COM2, due to interrupt conflicts. These ports are usually located on the back of the computer.

END OF BLOCK
Carriage Return / Line Feed is the standard or default end of block code for most PCs and many machine controls. Some controls require a special end of block. For example, most Fanuc series controls use Line Feed / Carriage Return / Carriage Return (LF/CR/CR).

If EIA code is being used for program transfer the default setting will be LF, as EIA code does not recognize a Carriage Return.   Many tape readers also use only LF, and in tape emulation mode, several of the reader types have a preset end of block as LF.

If a protocol is selected other than NO CONVERSION (this setting is forced if the data type is set to BINARY) an automatic end of block checking utility is enabled. If the end of block sequence does not match what is being sent from the control, an alarm window is displayed showing a warning that the protocol has to be reset with proper parameters. Suggested parameters are shown inside the alarm window. If NO CONVERSION is set then the file is saved exactly as transmitted from the machine control.

Some machine controls require additional communication settings. In most cases, these values are left blank. A description of these parameters follows:

DELAY AFTER END OF BLOCK - (Foreground Communications Only)

Some older controls require a small amount of time to "digest" each incoming line or block of data. If characters are dropped at the beginning of each line, try an end of block delay. Usually 50 - 100 milliseconds is sufficient, but some experimentation may be needed.

DELAY AFTER CHARACTER - (Foreground Communications Only)

This is similar to the delay after the end of block above except the delay is after each character.

PAUSE CHARACTER
This parameter will cause program transmission to pause after a specific character is transmitted.   Transmission will resume once a "read" is initiated at the machine control.

START STRING, OCCURRENCES
This is the equivalent of tape leader. Usually this is set to an ASCII value of 0 (NUL) and an occurrence of 10 for each inch of leader required by the control.

STRING
This option allows the definition of up to eight different ASCII characters. Some controls may require a series of dissimilar characters which "tell" the control to prepare to receive a program. Refer to your control's user manual for specifics.

END STRING, OCCURRENCES
This is similar to the Start String above and is usually used to simulate tape trailer. For controls requiring a special end of file character, you may assign the End String Character as the ASCII value of the end of file indicator (EOF) and use an occurrence of 1.

STRING

Similar to the STRING option above, this allows the user to define a series of dissimilar ASCII characters that may be required by the control to terminate reception of a file. Again, your control manual will supply specific requirements.

TAPE EMULATION PARAMETERS

Tape Emulation is not supported within Windows operating systems

Once tape emulation has been selected from the specific protocol section a second "pop-up" window appears offering several additional selections. The right side of the screen changes from the standard serial parameters setting menu to a menu designed for tape (or parallel) emulation. If you are not comfortable with this type of installation and troubleshooting, please call CNC Innovations Technical Support for assistance. A description of these setting follows:

DRIVE DIRECTION

This setting is not applicable to all tape readers, and is only accessible when a tape reader that requires this parameter is selected.

Most controls use a "drive left" and a "drive right" signal to tell the tape reader which direction to move for forward and rewind. A good clue to this setting is to note in which direction the reader accepts a tape. If this is unknown, set the parameter for drive right and initiate read from the control. If the file starts to transfer, the setting is correct. If there is no activity at all, try the other setting. EasyTalk does not use the rewind function in the tape emulation interface, so only one of the two choices will be valid.

DATA MODE

Many controls require that the data received from the tape reader be inverted. If tape reader emulation has been selected with this function as a variable, you will be able to TAB into this field. Again, if no specific information is available, experimentation is required.

TAPE SPEED

This parameter should be set to the number of characters per second that the tape reader currently reads tape. The tape reader manual will specify this setting. The setting may be determined (if not available) by putting a tape of known length into the tape reader and observing how long it takes to read the tape. Punched tape contains 10 characters per inch., so a tape containing 2 feet of data contains 240 characters. Divide the number of characters read by the number of seconds of elapsed "read time" and then select the value given in the software that is the closest.

We have found that most controls will read a program from EasyTalk at substantially faster speeds than the original tape reader will permit. However, if you decide to use a setting that is faster than that which was specified by the reader manufacturer, you will be doing so at your own risk.

STROBE

The strobe setting is only used on a few tape reader types. To determine the setting of this parameter, look in the operator's manual of the tape reader. The choices will be either inverted or normal. If no manual is available, experimentation is required.

READY

This setting is also used on only a few tape reader types.

READ LEVEL

Some machine controls may have a relatively unknown type of tape reader interface. On most controls, the control logic will request data from a tape reader by sending 5 volts out on a line to the reader control card. This parameter is only available on a few tape reader types and should not be set unless absolutely necessary.

REWIND SPEED

This setting is only used on a few tape reader types. Normally this value will be set the same as the tape speed. On some tape readers a higher rate may be desired.

LEADER CHARACTER

This parameter has the same effect as the Start String Occurrence parameter in serial mode. If the control requires two feet of nulls then enter a "0" for this setting. For a list of available characters, refer to the ASCII Character Code Chart or press F4 when in the Leader Character setting window.

LEADER AMOUNT

This parameter determines the number of Leader Characters that will be sent before the actual program text is transferred. If the control requires two feet of leader then this parameter should contain 240. (10 characters per inch times 12 inches per foot times 2.)

COMMUNICATING WITH OLDER TELETYPE STYLE MACHINES

This mode is used primarily for older machine controls, like early Bridgeport controls, which need bi-directional communications from an external keyboard. The control manual may mention an ASR 33 Teletype terminal for this purpose. The general steps to follow for these controls are outlined below:

1. Select TERMINAL MODE on the Main Menu.
2. While you are in terminal mode, everything that is typed on the keyboard is automatically transmitted to the machine control. Use this to perform commands like 'K' for KILL or 'L' for LIST. If the machine looks for upper case (CAPS) letters be sure to use the CAPS LOCK function.
3. After preparing the control to receive, remain in Terminal Mode and select F3 (Send File). Proceed as in SENDING A NC PROGRAM in the foreground outlined previously.
4. To receive a file from the control while in Terminal Mode, select F4 (Capture). Proceed as in RECEIVING A NC PROGRAM in foreground outlined previously. All data sent by the control will be saved to the selected file.
5. If you see double characters on the screen every time you type, it is the result of the machine control "echoing" each character. To correct this, use the F5 key to select the Full Duplex mode.

INTERACTIVE DNC

The DNC function allows the machine control to be run directly from the computer. Interactive DNC runs directly from within the Editor, giving the flexibility to edit files, monitor file position, and stop/restart from any position within the file.

USING THE DNC FUNCTION / STARTING DNC

To enter the DNC function, press F9 from within the EasyTalk editor. When you enter the DNC mode, a highlight bar will appear on the first line of text. The highlight bar indicates where DNC operations are to begin. To start a DNC operation at that location, press F3. This will put you in the "WAITING FOR REMOTE START" mode. DNC transfer will start when the machine control's Cycle Start button is pressed. On most controls, the mode select switch will be set either to "TAPE" or "REMOTE", not "MEMORY". As the machine control requests more data, the highlight bar moves down through the text to indicate the line being currently transmitted. Depending on the buffering characteristics of the machine control, the highlight bar will be one or more lines ahead of the actual line being executed.

STOPPING OR PAUSING DNC

While DNC data is being transmitted, data transmission may be suspended from EasyTalk at any time by pressing either the F5 key (to go into single block mode) or the F3 key to pause DNC.

Pressing the ESC key will stop data transmission entirely. After the ESC key is pressed, the machine control should be reset before continuing with further DNC operations from EasyTalk. This will reduce the possibility of data inconsistencies between EasyTalk and the machine control.

BUFFER CONSIDERATIONS

Some controls have large DNC buffers that may cause EasyTalk to move hundreds of blocks ahead of the actual instruction being executed. If this is the case, you will have to rely on the machine control's display to see which block is actually being executed. If a problem occurs on the machine tool, you CAN NOT rely on EasyTalk to stop the machine, you must stop the machine from the control.

SINGLE BLOCK DNC

In single block mode, one line of data is sent each time that the F5 key is pressed. This function emulates single block reader action on a machine control. Continuous DNC operations may resume at any point by pressing the F3 key. If a feed hold has been initiated on the machine control, Cycle Start on the machine control will also have to be pressed.

STARTING DNC ANYWHERE IN A PROGRAM

To start DNC operations anywhere in a file, use the keyboard arrow keys or search function to reposition the highlight bar to the desired starting point. (Refer to the NC/Text Editor section for movement keys). Once the highlight bar has been repositioned to the desired location, press F3 to either initiate or restart the DNC operations. DNC operations may also be restarted at the beginning of the file by pressing F4 and then pressing F3.

SUBPROGRAMS IN DNC MODE

EasyTalk's "subprogram call" uses a Fanuc type format. When the main program encounters an M98, it looks at the next instruction (Pxxxx) to determine the program number and the following instruction (Lxxxx) to determine the number of repetitions needed. The required syntax of a subprogram call is "M98 Pxxxx" where xxxx is any number with four or less digits. If a repeat factor is employed then the "L" MUST be placed after the "P" in the calling program block (M98 Pxxxx Lxxxx).

EasyTalk uses the "P" value to determine the subprogram name to call. The subprogram MUST have a DOS name in the form Etxxxx . SUB, where xxxx is equal to a four digit number corresponding to the number following the "P" address. The subprogram MUST also be in the SAME sub-directory as the calling program. The subprogram may have any 32 character name. Although you will still be in the editor display while in a subprogram, you will not be able to exit from a subprogram to the editor. Subprograms must be edited separately.

EasyTalk supports only one level of subroutines. On a subprogram call, EasyTalk does not send the M98, or the "P" or "L" data, instead it will jump immediately to the FIRST line of the subprogram. Data will then be transmitted immediately from the beginning of the subprogram. The data at the beginning of the file must be in a format acceptable to the control.

LINE NUMBER BRANCHING

You may jump to specific lines within a main program by using M99. An M99 followed by Pxxxx, where xxxx is a valid program line number (Nxxxx), will immediately jump to the given line number. When EasyTalk encounters an M99 NOT followed by Pxxxx, a jump is made to the FIRST line of the program. As with M98, M99 and associated data (Pxxxx) are NOT transmitted. An M99 encountered within a sub-program will always return control back to the main program to the line immediately following the M98 sub-program call.

DISABLING SUB-PROGRAMS AND LINE NUMBER BRANCHING

While in DNC mode, the [F6] key toggles SEND/PERFORM on M98 and M99 codes. In the "SEND" mode, M98 and M99 characters are transmitted as normal data, and no special processing occurs. In the "PERFORM" mode, processing works for M98 and M99 as previously described.

REAL TIME CONTROL

The Bridgeport Real Time Control cutting mode is available through the TAPE READER PORT on Bridgeport Boss 4, 5, 6, and 7 series controls. For specific details on this feature, please refer to the appropriate section in your Bridgeport Manual. Consult your machine control manual for compatibility with this option.

This feature facilitates the execution of long programs that exceed the 80 feet of tape storage memory on the control. The procedure requires sectioning programs into segments that are no longer than 80 feet of tape (approx. 9600 characters). Each segment must be preceded with #0 and terminated with $. The EasyTalk Tape Emulation Protocol (in INTERACTIVE DNC only) for the Bridgeport series of controls provides an automated feature for this.

IT IS IMPORTANT THAT YOU FULLY UNDERSTAND HOW THIS WORKS AND THE POSSIBLE EFFECT ON BOTH PART QUALITY AND MACHINE SAFTEY BEFORE YOU PROCEED!

The sequence of data that the machine expects takes the form:

#0(cr)...<NC CODE SEGMENT>...$(cr)#0(cr)...

Where the NC CODE segment is the usual NC program data and is less than 80 feet in length. EasyTalk accomplishes this by taking your original file and automatically inserting a user defined "break block" file into the data stream at the end of each line following 7500 characters of original data. This data must be stored in the file entered in from the Default Screen.

This data block must take the format:

    Optional NC Command
    $
    #0
    Optional NC Command

The optional commands allow you to specify any tool movements desired prior to and immediately after data loading. This is necessary because when the next block of data is being loaded the machine will continue with the last cutting command it received possibly creating unacceptable dwell marks on the part. For example, if you are using a ball end mill to mill a 3D surface, with absolute dimensions, you may wish to retract the tool off the part prior to the loading of the next block, then return the tool to the part surface to continue cutting.

To do this you would use the following subprogram:

    G91 Z+.01
    $
    #0
    Z-.01
    G90

This would do the following:

1. The first 7500 characters of the program plus the G91 Z+.01 and $ will be automatically loaded into the machine control memory.
2. Once the machine sees the $, it will stop loading and begin execution of the first program segment.
3. Just prior to finishing the first segment, the machine will go into incremental (G91) and move up off the part.
4. The machine control will then start loading the next block of data while the tool is off the part.
5. Once the next block is loaded, execution will start with the Z-.01 move back to part, followed by a return to absolute mode (G90) and then the execution of the next 7500 character block.
6. This process will continue until the end of the file.
7. NOTE THE IMPLICATIONS OF THE "BREAK BLOCK" FILE. YOU MUST FULLY UNDERSTAND YOUR PROGRAM AND THE IMPLICATIONS OF THE "BREAK BLOCK" YOU DEFINE. FAILURE TO UNDERSTAND THESE IMPLICATIONS MAY RESULT IN A RUINED PART, BROKEN TOOL, AND/OR PERSONAL INJURY.

EXITING FROM DNC MODE
After DNC operations have been completed, exit by pressing the ESC key. ESC will exit back to the edit mode. From the edit mode, save any edited changes or quit without saving changes.

PRINT A FILE
The print file selection prints an existing file to a printer. The file is printed with a heading showing all directory and extended name information as well as the date and time printed. EasyTalk sends characters in text (draft) mode. Please refer to your printer manual for any details on connection and configuration. **NOTE**: The print device is always LPT1 even though LPT2 may have been selected as the parallel tape output device.

DISK MANAGER

The disk manager provides a convenient platform for complete file and directory management including renaming, creating, duplicating, and deleting files along with changing and printing directories. An extended 32 character name may be assigned to both files and sub-directories. The disk manager consists primarily of the File Handler.

FILE HANDLER
The File Handler displays a list of files within a particular directory or sub-directory. It provides a cross-reference between the part name/number and the DOS name. There are several components to the File Handler. A description of each follows:

CUST/MACH
Related files are typically stored in groups called directories or sub-directories. This field allows you to assign 32 character names to directories or sub-directories.

DIRECTORY
This field shows the DOS name for the directory or sub-directory currently being used.

PART NAME/NUMBER
The part name/number field shows the name for a particular file. The name/number may be up to 32 characters in length. This field is an optional field and may be left blank.

DOS NAME
This is the name used by DOS to store and retrieve a file. When a file is created, a DOS name is automatically generated by EasyTalk, using the prefix and extension indicated in the Default Settings. The generated DOS name may be used or modified as needed. Be sure to follow the rules of DOS when changing the DOS name of a file.

SIZE
The size field displays the size of the file (in bytes) as reported by DOS.

DATE
This is the date, generated by DOS, that the file was created or last changed.

FILE HANDLER FUNCTIONS
The File Handler will be entered with the highlight bar on the last file selected during this session. Otherwise, the first file in the alphabetical list of 32 character names will be highlighted. Once in the File Handler, a different directory may be selected by pressing F10, CHANGE DIRECTORY. The File Handler consists of the following functions:

FILE SORTING
File names are displayed on the screen in alphabetical order by 32 character name or by DOS name. The sorting technique used is controlled by "Sort By" parameter in System Defaults. If sorting by Part Name, files with a cross-reference part name/number are sorted first, then any remaining DOS names without cross references are sorted.

SEARCHING FOR A FILE
Pressing any number or letter key will cause the list of files to be dynamically searched based on the character entered. The files are searched by PART NAME. The highlight bar will automatically move to the first match found based on the key entered. If the TAB key is pressed first, the list will be searched by DOS name.

F2 - RENAME FILE
Press F2 to change either the part name or the DOS name. Move between the part name/number and DOS name fields by pressing the TAB key.

F3 - DELETE FILE
Highlight the file you wish to delete by using the arrow keys, or the procedures for search previously discussed Press F3. The system will ask for a Yes/No confirmation before deleting the file.

F4 - CREATE FILE
Press F4 to create a new file. When this action is taken, a new line will be inserted in the File Handler screen and the cursor will appear in the part name/number column. A new DOS name is automatically assigned by the EasyTalk software. Type a part name/number desired.

F5 - ET COPY
This function transfers or copies a specified file and its associated Part Name to another drive or directory.
NOTE: The normal DOS copy command will NOT retain the association between the 32 character Part Name and the DOS name.

ET Copy has two primary uses. First, for copying a file and its part name/number from a hard disk to a floppy drive for backup purposes. Second, for transferring files and associated part name/numbers between different EasyTalk systems.

F6 - DUPLICATE FILE
This function creates a duplicate of the selected file and prompts for a new name. Naming conventions are the same as used for create file. Using this function before an extensive editing session, creates a backup of the original file to protect the file from editing mistakes or equipment failure.

F7 - REFRESH LISTING
EasyTalk assumes that all file management is conducted through its own facilities. This function enables EasyTalk to go to the DOS level and reconcile any DOS level changes with its own table of files. When this function is invoked, new files will be added and deleted files will be removed from the File Handler screens. File statistics on size and date will also be updated. As an added feature, 32 character file names can be created using the first comment field in the file. If you wish to use this feature, answer "YES" when prompted by "Create Part Names From File Contents?".

F8 - PRINT DIRECTORY LISTS
This function allows a "hard copy" listing for a specific directory to be printed. The contents of a specific file may also be printed.

F9 - CHANGE PREFIX
This function is used to change the file prefix and file extension for the directory being used. This does not affect the settings in System Defaults.

F10 - CHANGE DIRECTORY
This function is used to switch the File Handler' "attention" to another directory and/or drive.

ALT F6 - MAZAK UTILITY
This function works only if you have purchased the Mazatrol option for EasyTalk. The Mazak utility allows EIA programs to be converted into Mazak Packets and Mazatrol Packets to be converted into EIA programs. To learn more about the Mazatrol option refer to the section titled "EasyTalk OPTIONS".

REMOTE FILE REQUESTS

Remote File Request allows a file to be requested from the machine control.

PROGRAM QUALIFIER
The program qualifier is the character that the control uses to designate a file name. The qualifier may be any character. The most common are: 0, N, or :

PROGRAM NUMBER
The program number, in most cases, is a four digit number which represents the "name" of the file.

OPTIONAL COMMENTS
Additional information may be placed in the program by using the optional comments feature. Optional comments are usually qualified by start and stop codes. These codes are usually parentheses ( ).

PROGRAM DATA
Program data refers to the NC program file.

COMMAND CODE
The command code is part of the program data. There are several command "registers", some are: M, G, X, T.

COMMAND VALUE
The command value follows the command code and is usually numeric.

FILE STRUCTURE
Most files have the following general structure:

```
01111
(AIRFOIL ABC)
G00 G90 X1.4 Y2.7
M17 ..... etc.
```

REMOTE REQUEST PRINCIPLES OF OPERATION

EasyTalk has been designed to monitor incoming files and respond according to a set of rules to facilitate communications between machine controls and EasyTalk. This allows a file to be requested from the machine control.

REMOTE REQUEST PROGRAMS vs. NC PROGRAMS
Since all incoming communications will be in the form of program, it is necessary to distinguish between a remote request program and an NC program. To distinguish between the two, EasyTalk applies the following rules:

1.   Any program longer than 256 characters is assumed to be an NC program.
2.   All incoming programs shorter than 256 characters are POSSIBLE remote request programs. Programs shorter than 256 characters are immediately evaluated for content. EasyTalk first extracts the program qualifier and program number from the incoming program and then compares these values with those which have been set for that control in the Communications Parameter Section. If the program qualifier and program number match the user-defined criteria for a Remote Request, the request is acted upon. Otherwise, the program is saved in the Receive File Administration area.

SELECTING THE DESIRED PROGRAM
Once an incoming program is identified as a Remote Request, the next step is for EasyTalk to determine the specific program being requested. This program identification is based on several pieces of information which are pre-set by the user.

The request may be based on either the part name/number (32 character name) or the DOS name.   After the system detects the file name, it will search for the requested file in one of two ways:

1.   A search by part name/number extracts the first comment field from the incoming request file and uses this as the search criteria. EasyTalk will look for an EXACT match for this file name. An example would be:

                sample program requested: 09999 (AIRFOIL 916)
                part name that would be searched for: AIRFOIL 916

2.   A search by DOS name operates as follows:
                Request file:
                        O9999
                        T3241
                        M30

EasyTalk would extract the numbers following the T code as part of the DOS name. Next, System Defaults is searched for the defined File Prefix and Suffix. Let's assume these are ET and NC respectively. Then, using the numbers extracted from the request program's "T" code, the complete file name to be found is: ET3241.NC

EasyTalk will then search for this DOS name and "queue it up", ready to be sent. EasyTalk will display "Waiting for Remote Start".

FILE COMPARE UTILITY

This function allows two files to be compared side by side on the screen. To compare two files complete the following steps:
1.   Select COMPARE FILES on the Main Menu.
2.   EasyTalk will automatically enter the File Handler screen. Select the first file for comparison by moving the highlight bar using the up/down arrow keys and pressing ENTER.
3.   EasyTalk will stay in the File Handler screen to allow the second file for comparison to be selected.
4.   After highlighting the second file, press the ENTER key.
          NOTE: All references to inserts and deletions refer to the SECOND file in relation to the FIRST.
5.   The compare routine will display the progress of the comparison by indicating the line number, number of matches, modifications, inserts, and deletes. If the files are very different the routine will proceed slowly and display few "matches". The compare function may be terminated and the partial results shown at any time by pressing ESC.
6.   At the completion of the comparison, EasyTalk will display the total matches, modifications, inserts, and deletes. At that point, press any key to see a side by side listing of the two files. Use the F2 and F3 keys to search forwards/backwards for the next or previous mismatch.

PRINTING COMPARE RESULTS

The compare results may be printed by following these simple steps.
1.   Run the compare as stated above.
2.   Press F4, Print Compare Results.
3.   You are then given the option to print the entire report or print the differences only. Select the option that best fits your needs. The files, or partial files, will be printed side by side with the appropriate annotation.

RECEIVE FILE ADMINISTRATION

Receive File Administration can be viewed as a temporary holding area for files sent to the computer from a machine control. The following functions may be employed in Receive File Administration:

F2 - EDIT PART NAME / NUMBER
To edit a part name/number press F2 after highlighting the appropriate file. A part name/number will automatically be created for files received with comments embedded in them. The first comment in the file will be used for this purpose.   NOTE: Files MUST have a part name/number before being moved into an assigned port directory.

F3 - DELETE PROGRAM
To delete a highlighted file press F3. EasyTalk will ask for confirmation before taking this action.

F4 - VIEW / EDIT PROGRAM
Pressing F4 on a highlighted file will toggle into the EasyTalk Editor. A file may be edited prior to moving it into a working directory.

F5 - VIEW PORT (TARGET) DIRECTORY
The Port or Target directory is the directory where received files will be moved. To view the target directory press F5. The File Handler will appear on the screen. The directory being used will be displayed in the right hand corner of the screen. The default directory is the directory assigned in the default settings.

F6 - CHANGE PORT (TARGET) DIRECTORY
Pressing F6 allows the target directory to be changed.

F7 - MOVE PROGRAM TO PORT (TARGET) DIRECTORY
To move a highlighted file into the target directory press F7. If a file does not have a part name/number, one must be supplied before continuing. If a part name/number is created and already exists in the target directory, the existing file may be overwritten or the file being moved may be renamed before moving the file.

F8 - EDIT DOS NAME
A file will be given a unique DOS name once it has been received from the machine control. The prefix and extension defined in the default settings will be used to create the DOS name. The file number, if there is assigned by the control, will appear between the prefix and extension. If there is no control assigned file number, a unique sequence number will be created.

F9 - COMPARE WITH ANOTHER FILE
This selection will compare the currently highlighted file with a second file selected from the File Handler.

EASYTALK OPTIONS

TAPE EMULATION
A Direct Tape Emulator (DTE) allows for replacement of tape readers on older machine controls. This option allows EasyTalk to communicate to the Direct Tape Emulator.

BACKGROUND SEND
This option allows EasyTalk to send files in the background while all other EasyTalk functions like editing and file compare are performed in the foreground. This option also allows the user to exit EasyTalk to perform other applications like spreadsheet analysis concurrently with the background communications. The use of Background Send concurrently with another product is contingent on the other product's ability to work with the background send TSR in low RAM. EasyTalk with Background Send requires 530K of RAM.

Background Send is limited to serial communications and does not support specialized protocols like Bridgeport DNC Link or Boston Digital CRC. Direct Tape Emulation (DTE) or serial communications to another COM port are available in the foreground concurrently with Background Send, provided there are two serial ports on the host computer. A background send queue allows the user to specify up to ten files to be automatically sent in the background. Additionally, each file may be flagged to be sent multiple times. Each time a file transmission is completed, the next program is queued and waits for a "remote start "signal from the machine control. The next file

is transmitted when the operator presses read or cycle start at the control. This feature eliminates the need to interrupt foreground communications while using the Background Send option.

PASSWORD PROTECTION

There are eight security options that may be enabled by the password protection option. In order to enable the password option and set the password, the setup option on the EasyTalk installation disk MUST be used. The installation disk must then be retained in order to make any changes to the password or password options.

PASSWORD SECURITY OPTIONS

The software may be protected for the following applications:
- deletion of files or directories
- renaming files or directories
- editing the default options including the prefix/extension for each directory
- editing the communication parameters
- editing a file within the Editor
- receiving a file and overwriting an existing file while in terminal mode
- moving a file from Receive File Administration to another directory

USING PASSWORD PROTECTION

During the execution of protected EasyTalk functions, a password prompt will appear. If the correct password is entered, all normal functions will be accessible. There are three chances to enter the correct password. If an incorrect password is entered or ESC is pressed, the functions of the particular module can be viewed, but not modified.

MAZATROL PROTOCOL

The Mazatrol Protocol Emulation option allows a PC running EasyTalk to communicate with a Mazatrol control using the control's CMT port. Using EasyTalk in this manner will replace the micro floppy device or cassette tape drives (provide by Mazak) for saving and loading programs and other data.

When in the Mazatrol Protocol Emulation mode the data being transferred will be called Mazatrol packets. These Mazatrol packets may contain one or multiple work numbers, and may also contain other control information depending on the machine control capabilities.

The Mazatrol packet files can not be edited, compared, or viewed. EasyTalk can display a directory of the contents of each packet. To display any packets' contents, enter the Editor and select a file with the .MZP extension. (All files with the .MZP extension are Mazatrol packets.) Instead of displaying the file to edit, a box will pop up with the packet's contents. The box will display all the work numbers along with indicators for any other control information that is in the packet, similar to the way the Mazak control displays a directory listing. Packets for the T1 control are an exception; packet's contents are undefined. As the T1 control cannot retrieve a directory listing, neither can EasyTalk.

To communicate between the Mazak control and EasyTalk select the Mazatrol CMT Specific Protocol from the Communications Parameters screen. The Mazatrol CMT Protocol automatically recognizes all machine types (i.e., T1, M2, T32).

When sending data from the control to EasyTalk, select Receive File and create a file to receive the data. When EasyTalk is set for the Mazatrol Emulation, the DOS file names are automatically generated with the extension MZP (Mazatrol Packet). This MZP extension is required for all Mazatrol packets and can not be changed. Although EasyTalk generates sequence based DOS names we suggest that you edit the DOS name to reflect the first work number in the data packet.

To load a Mazatrol packet from EasyTalk into the control select Send File. Then select a Mazatrol packet file to send. Remember you can only transfer Mazatrol packet files, files with the MZP extension. It is not necessary to load the whole packet into the control. EasyTalk uses the same concept as the micro floppy and tape boxes when storing and loading programs by letting you select any or all of the information in the Mazak packet.

For more information on any of the options available for EasyTalk please contact CNC Innovations, LLC.

APPENDIX A

TECHNICAL TROUBLESHOOTING GUIDELINES

Perform all applicable diagnostics and answer the following related questions before calling CNC Innovations, LLC. for technical help. Make sure there is a valid NC program in a format that is compatible with the machine control when running all tests.

Performing these tests will save time and money. Experience shows that performing these tests immediately solves about 95% of all communication problems. In the event that these tests do not lead to a solution the results will help the technical staff to be able to further assist you.

PORT AND CONFIGURATION TEST (PTEST.EXE) INSTRUCTIONS
The following is a list of several different purposes for performing the port and configuration test.

1.   To perform a software diagnostic on your computer and report the system configuration.
2.   To perform tests on the installed communications ports to verify proper hardware response to software commands.
3.   To provide a real time display of an individual port status during this physical testing.

NOTE: If the PTEST diagnostic program reports a port as "bad" it is the result of an improper response from the hardware. A bad result is definitive and our software will not work with that hardware. A bad report may be the result of hardware failure, conflicts with nonstandard devices such as internal modems, or a configuration that is not a 100% IBM compatible. You will need to refer the problem to your computer vendor.

If the PTEST program reports a port as "okay", there may still be a problem that PTEST can not detect. An example may be a blown driver chip. An okay response may not be definitive and further testing may be required.

USING THE PTEST
1.   Make a photocopy of the PTEST status report form and the general diagnostics report form to record your results. These forms are supplied with this manual.
2.   PTEST.EXE is installed in the selected directory during the installation process. From the DOS prompt, change to that directory (usually C:\EasyTalk) and at the DOS prompt type PTEST.
3.   Press the ENTER key.
4.   The software will ask for the type of monitor being used, select the correct response, then press the ENTER key.
       The diagnostic program will now execute. Write down the relevant results on the response page that was photocopied in step one.
5.   If the port is reported as bad, **STOP!!**   You either have a computer that is not 100% IBM compatible, or there is a problem with the output device. Contact your computer vendor for assistance.
6.   Press the ENTER key to continue. The real time reporting page will appear.
7.   Write down the status of each line of the communications port attempting to be used.
8.   Unplug the cable for that port and note any change in the status.

LOOP-BACK TEST INSTRUCTIONS
The Loop-Back Tester is not supplied with your EasyTalk package. However, it is easily constructed using the following diagrams, or it may be purchased directly from CNC Innovations.

25 Pin DSub	9 Pin DSub
Jumper Pins 2 - 3 4 - 5 6 - 8 - 20	Jumper Pins 2 - 3 7 - 8 1 - 6 - 4
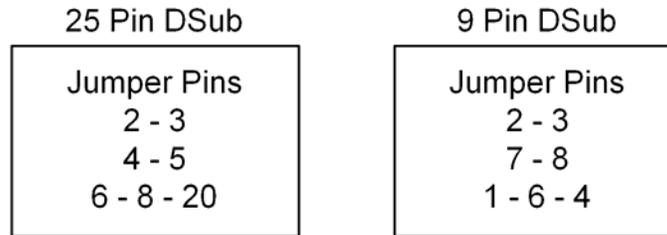
Use with serial communications (COM1 OR COM2) ONLY!!!   DO NOT use with parallel interfaces.

On a standard DB25 serial communications line, data is sent out on line 2 and is received on line 3 (Data Terminal Equipment Format). After connecting the loop-back tester to your computers serial port or serial cable, it simply takes the output on line 2 and "loops" it back to line 3.

The following is a list of several different purposes for performing the loop-back test.
1.   To check for improperly configured or broken serial cables.
2.   To check for non-functioning serial ports (COM1 or COM2).

USING THE TESTER

1.   If "garbage" appears on the PC or alarms at the machine control occur, the loop-back test may not be necessary. See the general diagnostic report form before continuing.
2.   Unplug the serial line from the machine control and plug the loop-back tester into the line at the machine end. (In the cases where a machine requires a female input, our tester will be incompatible with your cable. To accommodate our tester, use a standard Male/Male gender charger available from any electronics stores.)
3.   Start the communications software on the computer. Select Terminal mode and any set of serial communications parameters. Make sure the COM port associated with the attached cable has been selected. When in terminal mode, select half duplex.
4.   After setting as described above, type any standard characters on the keyboard of the computer. Double characters should appear on the screen as you type. The first character is the one you type, the second is the "echo" back through the loop-back tester.
        If you do not see these double characters, either the cable is faulty or the COM port itself is not functioning properly.
5.   To eliminate the cable as the source of the problem, unplug the tester at the machine end and re-attach the tester directly to the COM port. If a 9 pin connector is used at the computer, use any standard 9 pin to 25 pin serial adapter.
        If the "character echoing" is still not occurring, the problem is most likely a bad serial port on the computer. Try the test with the other serial port (if available) on the computer or on a different computer.

REPORT FORMS

<u>PTEST STATUS</u>

DISK DRIVE INSTALLED _____

CURRENT DRIVE IN USE _____

NUMBER OF LOGICAL DRIVES _____

AMT OF DISK SPACE FREE _____

BASE MEMORY AVAILABLE _____

MATH CO-PROCESSOR _____

GAME ADAPTER INSTALLED _____

NUMBER OF COM PORTS _____

INTERNAL MODEM INSTALLED _____

NUMBER OF PRINTER PORTS _____

ANY PRINTERS ACTIVE _____

COMPATIBLE COMPUTER _____

ADDRESS D0000000 _____

TOTAL EXTENDED RAM AVAILABLE _____

CNC SPEED INDEX_____

COM PORT 1 TEST RESULT_____

COM PORT 2 TEST RESULT_____

PORTS ADDRESSED AT_____   _____

PORTS ADDRESSED AT_____   _____

MEG TOTAL DOS RAM AVAIL._____

ADDRESS E0000000_____

Status with cable attached

Status of Parallel Port LPT1
7   6   5   4   3   2
___ ___ ___ ___ ___ ___

Status of Parallel Port LPT2
7   6   5   4   3   2
___ ___ ___ ___ ___ ___

Status of Serial Port COM1
DCD RI DSR CTS RD
___ ___ ___ ___ ___

Status of Serial Port COM2
DCD RI DSR CTS RD
___ ___ ___ ___ ___

Status with cable disconnected

Status of Parallel Port LPT1
7   6   5   4   3   2
___ ___ ___ ___ ___ ___

Status of Parallel Port LPT2
7   6   5   4   3   2
___ ___ ___ ___ ___ ___

Status of Serial Port COM1
DCD RI DSR CTS RD
___ ___ ___ ___ ___

Status of Serial Port COM2
DCD RI DSR CTS RD
___ ___ ___ ___ ___

GENERAL DIAGNOSTICS

Answer the following questions according to the results of the tests.

NOTE: Always start testing by sending a program from the machine control to the PC. The software is more "forgiving" than a machine control and the nature of the results may indicate the cause of the problem.

1.   When you ran PTEST, did it report a status of "okay" for the COM port being tested?   Yes   N o
        If no, **STOP**, you have a problem in your computer. Contact your computer vendor.
        If yes, continue.
2.   When you try to receive from the control to the PC do you get "garbage"?
        Yes   No
        If yes, check the data type, baud rate, etc. The cables and port are probably okay.
3.   If an alarm occurs at the machine control when sending, chances are it is a "not ready" or "DSR or
        DTR error". Check the cable configuration, especially pins 4, 5, 6, 8, and 20.
        For machines with more than one input/output port, check your machine parameters to make sure
        you are trying to communicate with the correct port.
4.   If there is no response on the PC when trying to receive, go to the loop-back test.
5.   If there is a valid response continue.
6.   When you try to send a program from the PC to the control do you get an alarm?
        Yes   No
        If yes, check the program content, program format, and communications parameters. If the alarm
        indicates "not ready" or "DSR or DTR error" check the cable configuration, especially pins 4, 5, 6, 8,
        and 20.

NOTE: If the machine control is reporting an alarm when testing, make sure you have the error code description listing from the machine control manual when you call.

LOOP-BACK TEST

Perform this test ONLY if the PC or the machine control is not responding when you attempt to send or receive data through the serial port.

1. With the loop-back tester attached to the machine control end of the line did you get double characters while typing in Terminal mode?   Yes   No

    If yes, but the machine does not respond to the input, the likely problem is the machine control parameters need to be changed to select the correct input device. For example, a machine that has always received input from a built-in tape reader needs to be told that input is to be accepted from the serial port.   Another possibility is that there is an invalid program format. Try entering a blank line at the beginning of the program; some controls need to see an end of block before the first line or they do not recognize the program. Also, some controls require a % sign at the beginning and/or end of the file.

2. With the loop-back tester attached directly to the COM port at the computer did you get double characters while typing in Terminal mode?   Yes   No

    If yes, check the cable with an ohm meter for continuity.
    If no, check to make sure the COM port being tested is the one selected in the software. If the problem persists, a bad serial port or incompatible PC architecture (Not 100% IBM compatible) may be the problem.

If the above diagnostics have not helped you to solve your problem(s) call CNC Innovations LLC.

APPENDIX B

COMMUNICATIONS TROUBLESHOOTING GUIDELINES

NOTE: We will be happy to answer questions about configuring and using EasyTalk, but we can not offer free assistance in configuring the machine control or in using communications on the control. Extended technical support may be purchased for these issues on a pre-paid hourly basis.

Always start troubleshooting by sending from the machine control to EasyTalk. The EasyTalk software is much more flexible in how it receives data and will not issue an "alarm" like a machine control. The nature of the data received may help you identify the source of the problem.

Follow these steps if you are having a problem communicating with the machine control.

1. With EasyTalk in Terminal mode send a program from the machine control to the PC.

    If the machine "alarms":

    The cable may not be connected to the correct port at the machine control. Check the cable configuration at the machine end, particularly pins 6, 8, and 20.

    If the machine acts like it is prepared to send but "sits" continuously in send mode:

    A file will not be sent if the CTS line (line 4 or 5 depending on the machine configuration) is not asserted. The cable should have a jumper between pins 4 & 5, or lines 4 and 5 should pass through to their compliment lines on the computer end.

    If the machine looks like it is trying to send but you receive nothing:

    Check the cable. Pins 2 and 3 may need to be swapped to match the send/receive lines on the machine control with the receive/send lines on the computer. If hardware handshaking is being used and pins 2 and 3 need to be swapped pins 4 and 5 will also need to be swapped.
    Check to see that the correct port has been selected. A quick test is to unplug the cable while trying to send. If an alarm is shown, then the correct port is being addressed.
    Check the EasyTalk communications parameters to be sure the correct COM port has been selected.
    Try sending to EasyTalk from another machine control or another computer to verify the COM port is not defective.

    If "garbage" prints out on the computer screen while receiving:

    The communications parameters are probably mismatched. Check to see that the data types (ISO, EIA, or ASCII) match. Many machines have a parameter or setting to select between EIA and ISO. Then check the baud rate.

    Other possible sources of "garbage" are long cables, cables with weak connections, cables running near EMF sources, or ground faults.

2. Once data has been successfully received most cable, machine parameters, and COM port configuration problems have been eliminated.

    Now send from EasyTalk to the machine control.

    If EasyTalk appears to send the file but the machine acts like it is not receiving:

    Check the file contents. Perform the initial tests with a file that has been received from the control, not one generated on your CAD/CAM system. Some controls require an end of block at the

beginning of the file or require a program qualifier (like O2213) at the beginning of the file. Others require a M30, M02, %, or END at the end of the file.

If a partial program is received, blocks of data appear to be dropped, or the machine issues a data overflow alarm:

Check to make sure handshaking has been properly enabled. If the cable uses only lines 2, 3 and 7 select X-ON/X-OFF protocol. (Also referred to as Software Handshaking or DC1/DC3 control codes.) If the machine does not support software handshaking use a cable with pins 4 and 5 connected. This will enable CTS/RTS handshaking.

APPENDIX C

CABLING

We highly recommend the use of surge suppressers to reduce the potential for lightening and other surge damage to the machine controls. These may be obtained from CNC Innovations, LLC.

It is your responsibility to verify serial cable requirements for the control. If in doubt, refer to a machine control dealer or a qualified service representative.

As cabling and machine configuration requirements go beyond the specific range of our product, we can not offer free technical support for any cabling or machine configuration problems. Extended technical support may be purchased for these issues on a pre-paid hourly basis.

On the following pages are 4 suggested cable configurations. Two configurations are for COM ports with 25 pin connectors, the other two are for COM ports with 9 pin connectors. Each configuration is further grouped by hardware/software handshaking.

If one of these configurations does not work refer to your machine control manual for more details.

SUGGESTED CABLE CONFIGURATION SOFTWARE HANDSHAKING
(Software may be referred to as XON/XOFF or DC1-DC4 control codes)

```
  Computer                        Machine
  (9-pin)                         Control
................................................................

                              ___/_____ 1  Shield

  RXD  2  _____ 2  TXD

  TXD  3  _____ 3  RXD

  RTS  7  ┐                              ┌ 4  RTS
          │                              │
  CTS  8  ┘                              └ 5  CTS

  GND  5  _____ 7  GND

                                         ┌ 6  DSR
                                         │
                                         ├ 8  DCD
                                         │
                                         └ 20 DTR
```

```
  Computer                        Machine
  (25-pin)                        Control
................................................................

  Shield     1  _____/

  TXD  2  _____      _____ 2  TXD
                  \    /
  RXD  3  _____  \/  _____ 3  RXD

  RTS  4  ┐                              ┌ 4  RTS
          │                              │
  CTS  5  ┘                              └ 5  CTS

  GND  7  _____ 7  GND

                                         ┌ 6  DSR
                                         │
                                         ├ 8  DCD
                                         │
                                         └ 20 DTR
```
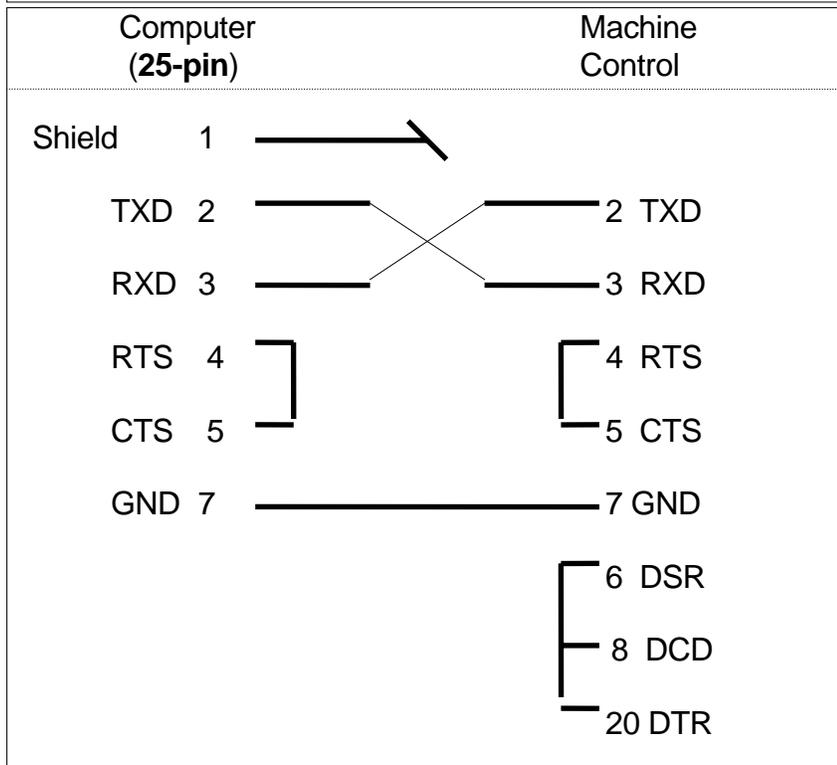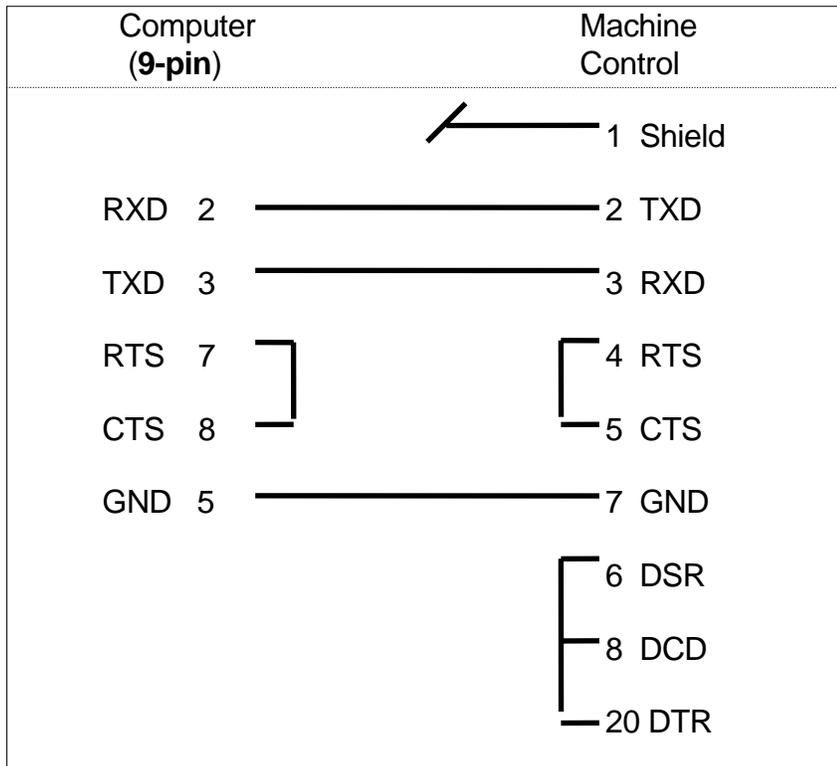
SUGGESTED CABLE CONFIGURATION HARDWARE HANDSHAKING

Computer (**9-pin**)		Machine Control
		1 Shield
RXD 2	————	2 TXD
TXD 3	————	3 RXD
RTS 7	⤬	4 **RTS**
CTS 8		5 **CTS**
GND 5	————	7 GND
		6 DSR
		8 DCD
		20 DTR

Computer (**25-pin**)		Machine Control
Shield 1	————	
TXD 2	⤬	2 TXD
RXD 3		3 RXD
RTS 4	⤬	4 **RTS**
CTS 5		5 **CTS**
GND 7	————	7 GND
		6 DSR
		8 DCD
		20 DTR
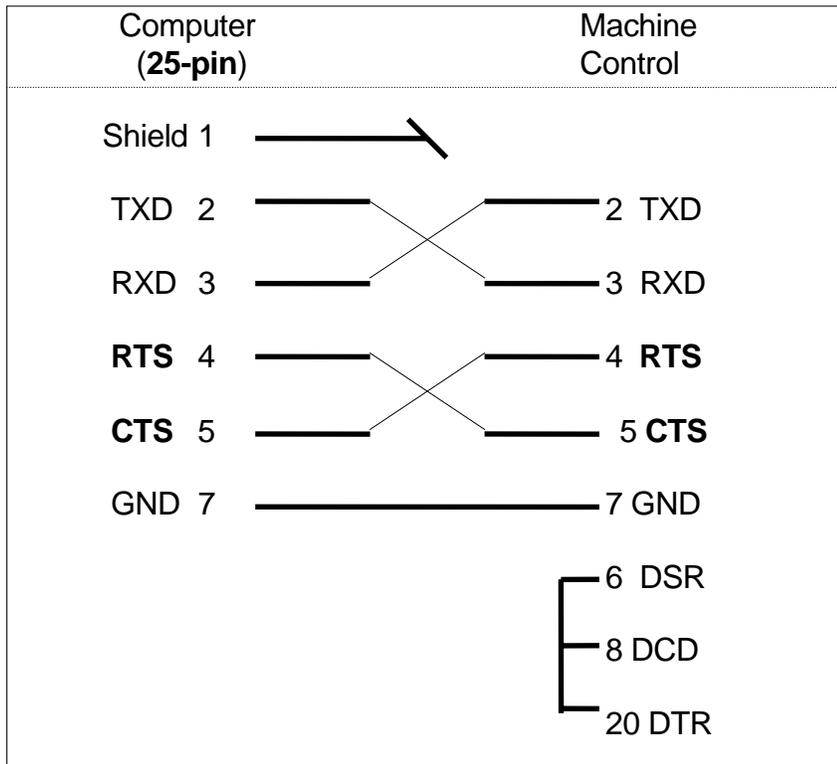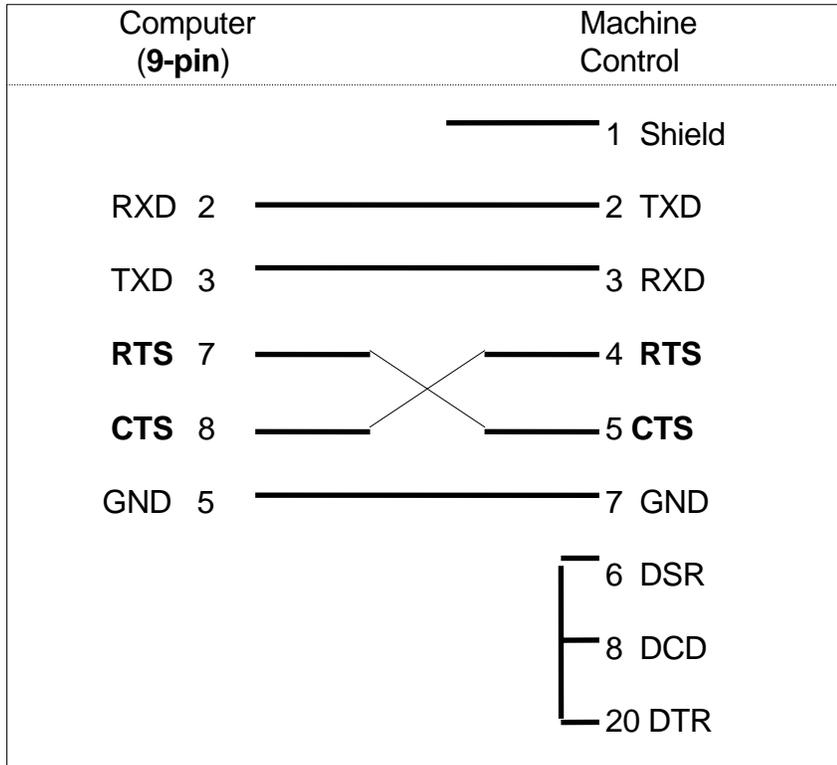
APPENDIX D

BACKGROUND DNC CONSIDERATIONS

DOS based PC's are designed to perform only one task at a time. EasyTalk's background communications is a TSR (Terminate and Stay Resident) program that "sits" in the background and executes every time the serial port sends or receives a character.

EasyTalk's TSR uses advanced processing techniques designed to keep it out of the way of another program running in the foreground. Both the foreground and background processing share a common computer and single task operating system. As such, a bug or crash in another foreground application can have an impact on the background communications.

In the event the foreground program "locks" creating a need to re-boot the computer be aware that background communications will also stop. If this occurs while operating a control in DNC mode, contact the machine operator so he may stop the control and wait for you to re-start the communications at a designated point.

APPENDIX E

END OF BLOCK CONVERSION NOTES

DOS stores the End Of Block (EOB) as the combination Carriage Return/Line Feed (CR/LF). Many machine controls use a different format. To accommodate different formats for various machine controls EasyTalk uses an EOB conversion table.

Any time EasyTalk sends a file to the machine control it converts the EOB from the DOS default of CR/LF to the user-defined value. On the way in from the control EasyTalk will convert from the defined value back to the DOS CR/LF format.

When setting Communications Parameters select the EOB conversion to match the needs of the machine control. If the machine control uses the DOS standard select No Conversion or the CR/LF default.

END OF BLOCK CONVERSION TESTING

If in doubt about which EOB to use place EasyTalk in Terminal mode (NOT Receive Mode) and select the most likely combination and send a file to EasyTalk from the machine control. (Do **NOT** use the No Conversion option.) If the EOB output from the machine doesn't match the one selected EasyTalk will display a message indicating the mismatch and informs what was actually received. If a mismatched message was received select the EOB conversion to match the values actually received and try again.

Failure to properly match the EOB may lead to double spaces between lines, one continuous line with no breaks, or the ASCII LF symbol (a small rectangle with a circle in the middle) being displayed in the file when in the editor.

DIAGNOSTIC TEST INSTRUCTIONS FOR THE
SECURITY INTERGRATION MODULE (SIM)

If you are having problems with your SIM please insert the Diagnostic Test Software Disk into your A or B drive and perform the following tests.

BE SURE TO RUN ALL 3 TESTS
1.   At the DOS prompt type DIAGS and press Enter.
        Record error messages (if any).
2.   At the DOS prompt type ACTDIAG1 and press Enter.
        Record error messages (if any).
3.   At the DOS prompt type ACTDIAG2 and press Enter.
        Record error messages (if any).

If any kind of printer or other parallel port peripheral is involved, you should run the three diagnostic tests in the following scenarios:
1.   Printer/peripheral attached behind the security integration module (SIM), and powered ON.
2.   Printer/peripheral attached behind the security integration module (SIM), and powered OFF.
3.   Printer/peripheral disconnected from the security integration module.

If your PC has a secondary parallel port (LPT2), try the tests on it as well. If an error is detected on any of the tests performed contact CNC Innovations, LLC. at 508-523-1763.

SOFTWARE SUGGESTIONS

COMPANY NAME:

SOFTWARE TYPE:

SIM NUMBER:

Suggestions for improvements to the software:

SIGNATURE: DATE: