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SuiteFactory Technote

Document and Records Mangement   Job Packets
DNC   Wired and Wireless Ethernet Networks
Wired and Wireless RS-232   Consulting Services

CNC Communications Setup
RS-232 or Networked Ethernet
Mazatrol PC Based CNC's

Please note! The following information comes from our many years of experience in setting up RS-232 and Ethernet communications with CNC's. However, our experience also has taught us that many times same model CNC's differ from each other. So, please double-check this information in the Operator or Maintenance or Parameter manual that came with your machine.
This document assumes that for RS-232 communications, your Mazatrol CNC controller has an RS-232 port or that a USB to RS-232 converter has been added for communications for CMT (Mazatrol programs) and/or TAPE (G code/ISO programs) data. If not, see Appendix A.

NOTE! The Matrix controller supports only loading CMT (Mazatrol) programs from a CMT device. It does not support saving Mazatrol programs to a CMT device. It does, however, allow you to save your Mazatrol programs via TAPE I/O to the SuiteFactory database. These Mazatrol programs are saved as ASCII files. Work numbers are converted to "O" numbers. When you send these programs back to the Matrix CNC from the SuiteFactory database they get converted back to Mazatrol programs.

1   RS-232 Settings

Press softkey DATA I/O at the bottom of the screen. If it is not shown, then use the left and/or right end buttons until you see it.
Press softkey I/O SETTINGS.
Select CMT/TAPE. You will see the RS-232 settings for both CMT and Tape Data I/O
For CMT: Baudrate 19200, SAME WNo. ALARM, Port COM3 or whatever the port was configured to be when a USB to RS-232 converter was installed. It usually defaults to COM3.
For Tape: Baudrate 19200, Data Bits 8, Parity NONE, Stop Bits 2, Handshake DC CNTR, Format ISO, Same WNo. ALARM, Port COM3 or whatever the port was configured to be when a USB to RS-232 converter was installed.

For more information call, email or visit our web site:
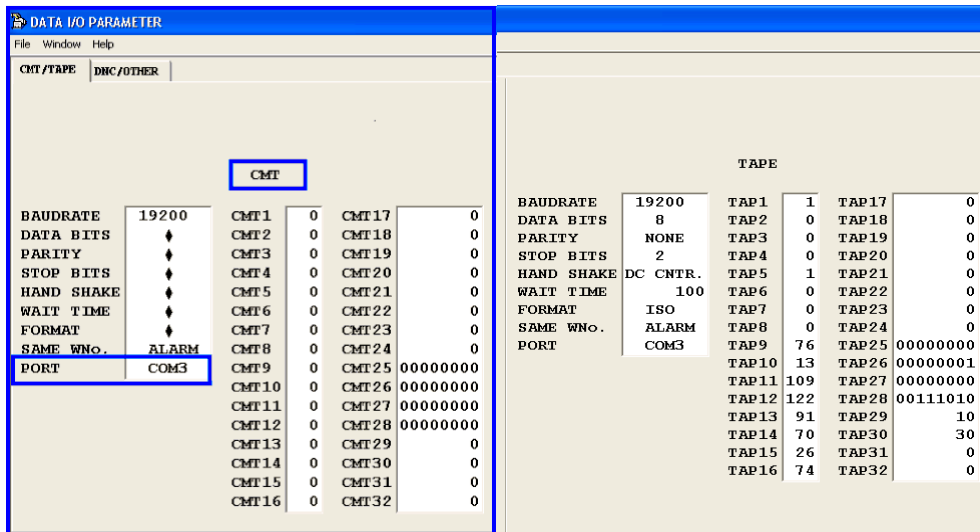**CAD/CAM Integration, Inc.**
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DATA I/O PARAMETER

File   Window   Help

CMT/TAPE   DNC/OTHER

CMT

BAUDRATE	19200	CMT1	0	CMT17		0
DATA BITS	♦	CMT2	0	CMT18		0
PARITY	♦	CMT3	0	CMT19		0
STOP BITS	♦	CMT4	0	CMT20		0
HAND SHAKE	♦	CMT5	0	CMT21		0
WAIT TIME	♦	CMT6	0	CMT22		0
FORMAT	♦	CMT7	0	CMT23		0
SAME WNo.	ALARM	CMT8	0	CMT24		0
PORT	COM3	CMT9	0	CMT25	00000000
		CMT10	0	CMT26	00000000
		CMT11	0	CMT27	00000000
		CMT12	0	CMT28	00000000
		CMT13	0	CMT29		0
		CMT14	0	CMT30		0
		CMT15	0	CMT31		0
		CMT16	0	CMT32		0

TAPE

BAUDRATE	19200	TAP1	1	TAP17	0
DATA BITS	8	TAP2	0	TAP18	0
PARITY	NONE	TAP3	0	TAP19	0
STOP BITS	2	TAP4	0	TAP20	0
HAND SHAKE	DC CNTR.	TAP5	1	TAP21	0
WAIT TIME	100	TAP6	0	TAP22	0
FORMAT	ISO	TAP7	0	TAP23	0
SAME WNo.	ALARM	TAP8	0	TAP24	0
PORT	COM3	TAP9	76	TAP25	00000000
		TAP10	13	TAP26	00000001
		TAP11	109	TAP27	00000000
		TAP12	122	TAP28	00111010
		TAP13	91	TAP29	10
		TAP14	70	TAP30	30
		TAP15	26	TAP31	0
		TAP16	74	TAP32	0

1.1   DNC Parameters

1.1.1 Tape I/O

Set the SuiteFactory machine properties as follows:

The protocol is Generic RS-232, the Data Type is ASCII. Communication settings are as follows:

Sending: 19200, 7 bits, Even, 2 stop bits, XON/XOFF Wait.
Receiving   19200, 7 bits, even, 1 stop bit, XON/XOFF Wait. **NOTE! 1 stop bit for receiving.**

If you use the Remote Request feature for requesting files from your CNC control panel see Remote Request Technotes.

1.1.2 CMT I/O

Set the SuiteFactory machine properties as follows:

The protocol is Mazak CMT; the Data Type automatically defaults to Binary.

Communication settings are as follows:

Sending: 19200, 7 bits, Even, 2 stop bits, None
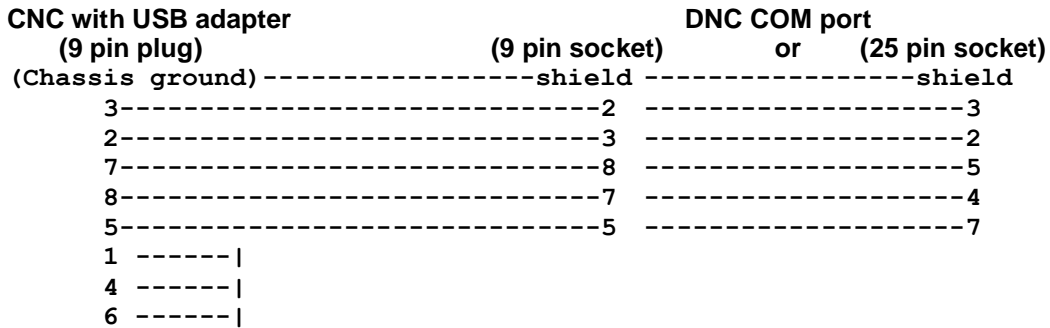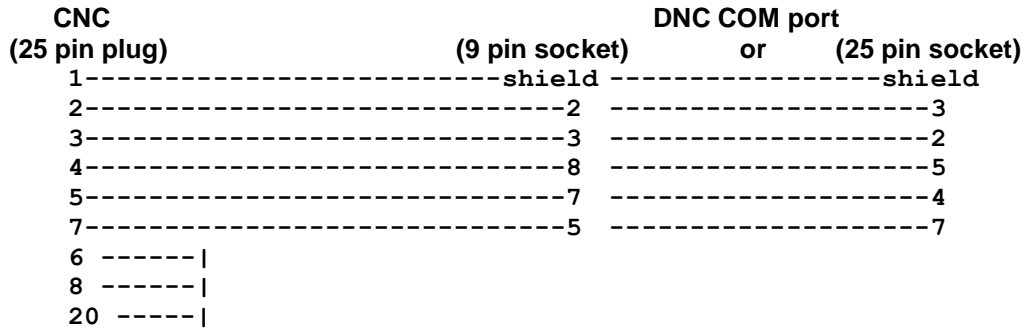Receiving   19200, 7 bits, Even, 1 stop bit, None **NOTE! 1 stop bit for receiving.**

If you use the Remote Request feature for requesting files from your CNC control panel see Remote Request Technotes.

1.2   Wiring – there are 4 possibilities

Use CCI's Modular SuiteCable or 24 AWG stranded, low capacitance computer cable with an overall shield (foil is fine and easier to work with.)

```
        CNC                                   DNC COM port
    (25 pin plug)               (9 pin socket)    or    (25 pin socket)
        1------------------------shield ----------------shield
        2----------------------------2  ------------------3
        3----------------------------3  ------------------2
        4----------------------------8  ------------------5
        5----------------------------7  ------------------4
        7----------------------------5  ------------------7
        6 ------|
        8 ------|
        20 -----|


CNC with USB adapter                          DNC COM port
    (9 pin plug)                (9 pin socket)    or    (25 pin socket)
(Chassis ground)----------------shield ----------------shield
        3----------------------------2  ------------------3
        2----------------------------3  ------------------2
        7----------------------------8  ------------------5
        8----------------------------7  ------------------4
        5----------------------------5  ------------------7
        1 ------|
        4 ------|
        6 ------|
```

1.3   Sending and Receiving DNC Files

1.3.1 Tape I/O
SuiteFactory parameters must be set for Generic RS232 protocol as described above.

1.3.1.1 To Get a File from the SuiteDNC database and send it to the Mazatrol
Login to SuiteFactory Runtime and queue up the file to be sent.

At the Matrix, press [DATA I/O] [TAPE] [ALL LOAD NC < TAPE] [START]

1.3.1.2 To Receive a File from the Mazatrol
Login to SuiteFactory Runtime and queue up the file to be received by entering a unique file name and clicking RECEIVE.

At the Matrix, press [DATA I/O] [TAPE] [PUNCH NC > TAPE] [START]

1.3.2 CMT I/O
If you have legacy CMT files in the SuiteFactory database that need to be sent to the Matrix, follow the instructions below:

SuiteFactory parameters must be set for Mazak CMT protocol as described above.

Login to SuiteFactory Runtime and queue up the file to be sent.

At the Matrix, press [DATA I/0] [CMT] [CMT > NC] [CMT CONTENTS]
The work number(s) of the program you requested should appear on your CNC screen.
Press [LOAD CMT > NC] [START]

2 Networked (Ethernet) Setup

PC based models of Mazatrol CNC's run Windows XP Embedded. The PC has an Ethernet connection that is setup the same way as any PC would be, via the Windows Control Panel "Network Connections" icon. Communications between the CNC and SuiteFactory is done via a shared folder on the CNC's hard drive.

2.1 Accessing Windows on the Mazatrol CNC

Using the built-in mouse pad on the control panel, move the cursor to the bottom left of the screen. Either a Windows menu bar will pop up or if not press the left mouse button.

2.1.1 Setting up the TCP/IP address

Go to Settings/Control Panel/Network Connections. Open Network Connections. Right click on Local Area Connections and select Properties. Now you should see the regular Windows Local Area Connections screen.
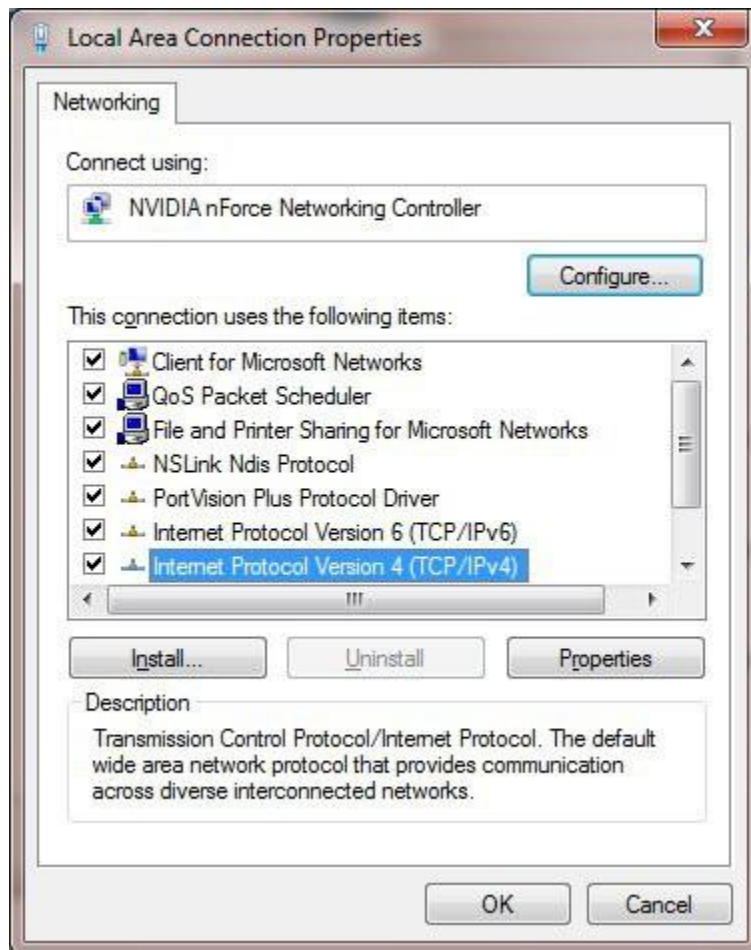
Scroll down to TCP/IP (Version 4 if there is a choice) and click properties.
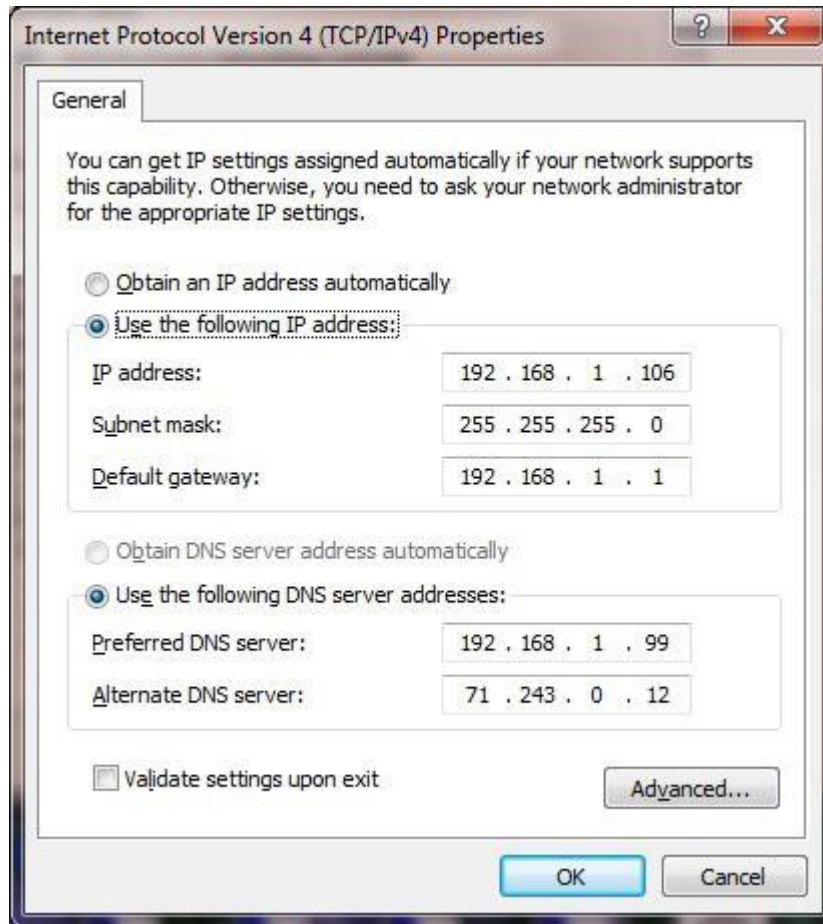
The above is an example. You must set this up as per the requirements of your own network. It could be setup to obtain an IP address automatically or to use a specifically assigned unique address. We recommend an assigned address. Then you can use that IP address to access the CNC rather than trying to find it by a name.

2.1.2 Changing Computer Name

If you wish you can change the default name of the CNC's PC to something meaningful to you. Highlight "My Computer". With the mouse pad right click. Select the Computer Name tab and then touch the "Change" button.
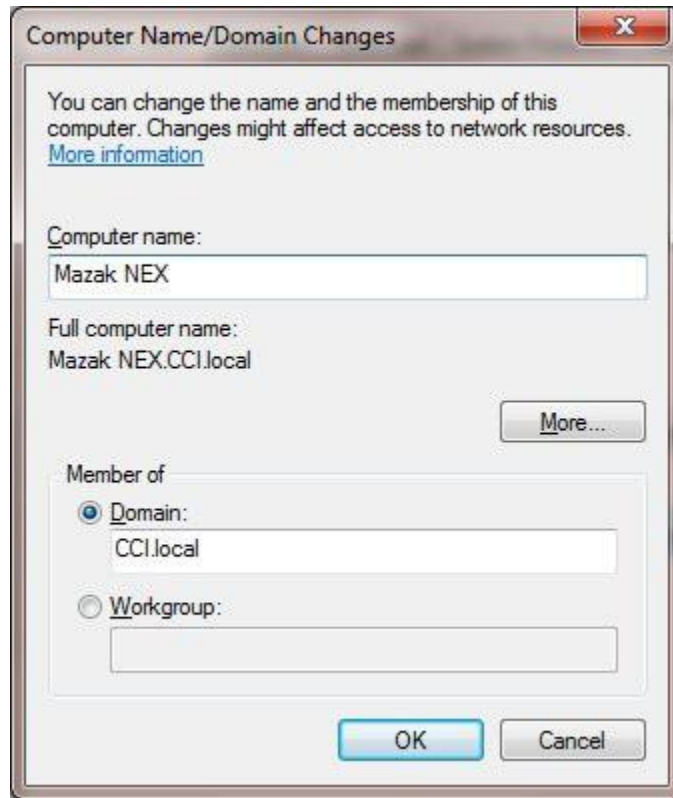
You can name the CNC computer anything you'd like (no spaces please) so long that it is a unique name in your local area network. You can have your CNC's computer join a Domain or have it just part of a workgroup. It is entirely up to the networking requirements of you facility. You will have to reboot the CNC computer for these changes to take effect. ***Before you do that, complete the next three sections.***

2.1.3 Creating a Network Share

The factory default shared folder to the part program storage on the CNC's hard drive is MC_DIRECT MODE PROGRAMS.

2.1.4 Create a dnc user and password

This CNC requires a login with password to access the shared folders. In the Control Panel/Users create a user called DNCUSER with password DNCUSER. (All upper case – it's easier.) Give DNCUSER full rights to the share folder.

2.1.5 Windows Firewall

Under certain circumstances it might be necessary to disable the Window Firewall on the CNC PC. For example, your CNC is on a different subnet than the computer hosting the SuiteFactory software. This should not be a security problem since it is not common to give the CNC internet access. If you are installing this CNC on a large factory network you will need your IT department to work with you.

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2.2 NOW REBOOT THE CNC PC.

2.3 Set Default Path to the DNC Files

On the CNC's Data I/O screen select pull down menu Setup/HD I/O Folder. This selects where the soft menu item DIR SELECT points to.

3 Setting up SuiteFactory for the Networked CNC

Login to SuiteFactory as administrator. At the main toolbar, click on Machines or select Configure/Machines. If this is a new machine, select New.
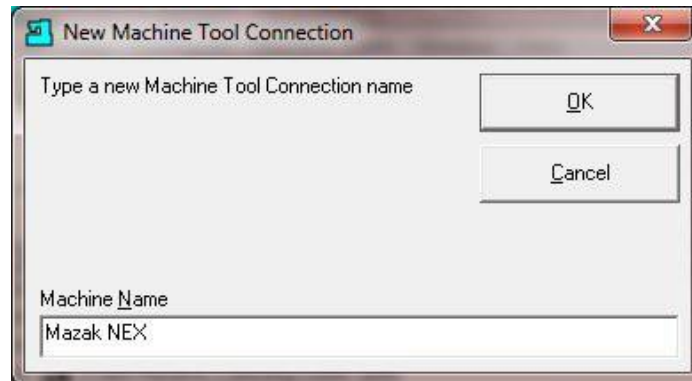

Enter the Machine's name. Click OK.

If not new, select the machine from the tree and click Properties.
Now select the Protocol tab. Change both send and receive to Networked Controller UNC.
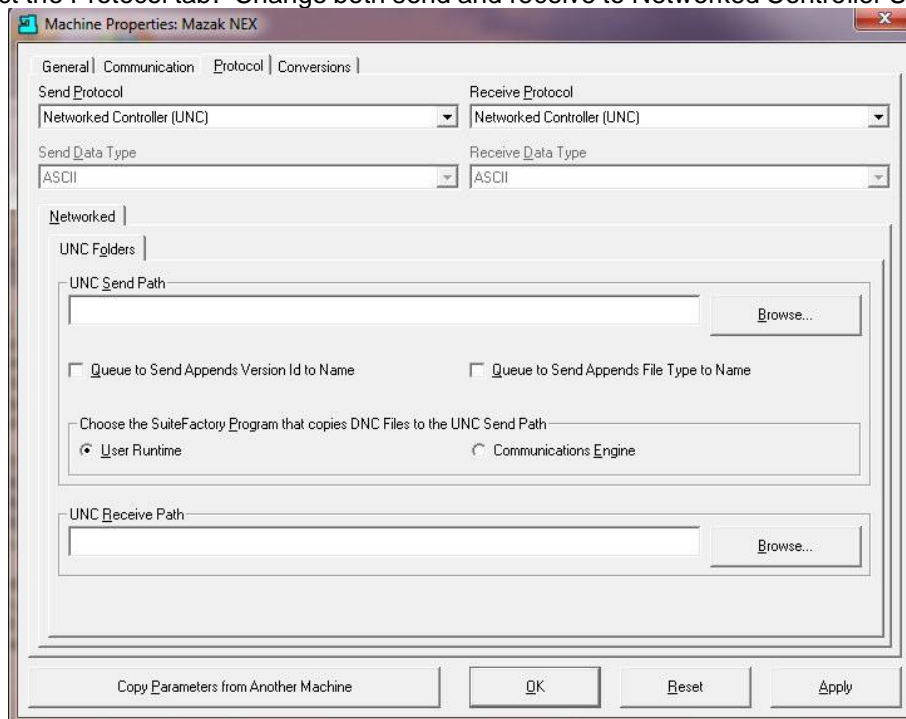
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For both the UNC Send Path and UNC Receive Path click Browse and enter the path to the share folder on the CNC. Using the CNC's IP address is the most direct way to its shared folder. You can use the CNC's computer name if it is on a network with DNS (Domain Name System) services. Click Browse and enter the path manually. Note! The OK button will not be enabled unless the path you've entered actually exists and is accessible from the PC you are using.
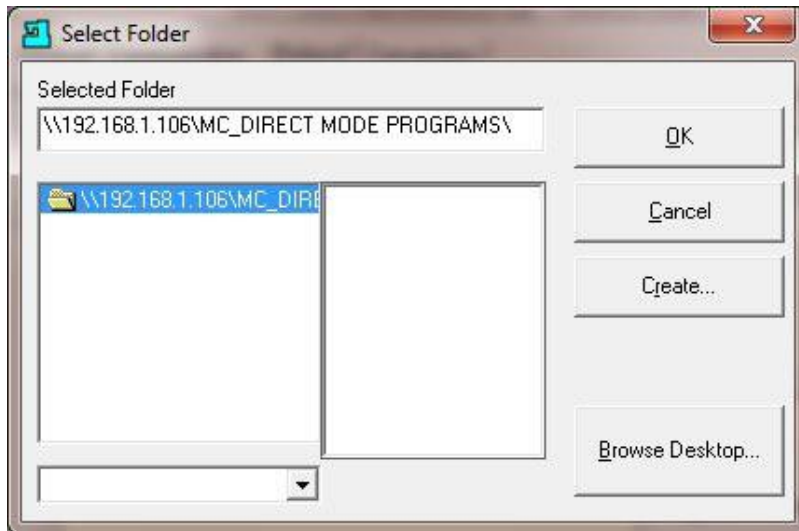
Click OK.
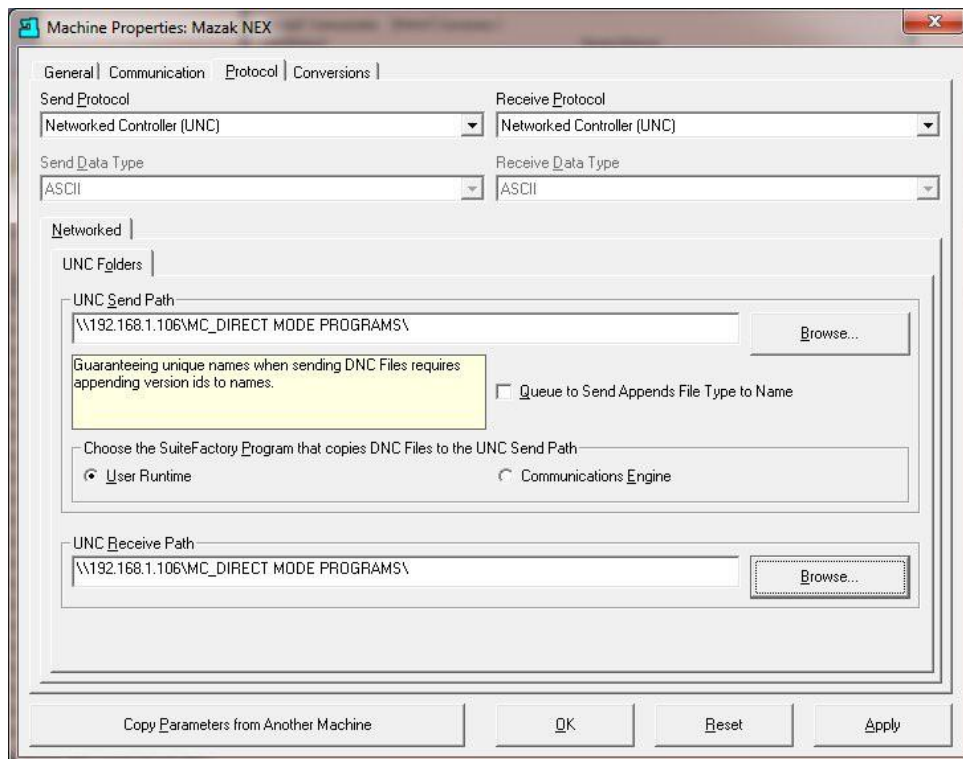
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Select "Queue to Send Appends Version Id to Name" if you have are set up as a multi-version system and you want to differentiate between versions sent to the CNC.

Select "Queue to Send Appends File Type to Name" if your CNC requires a specific .ext. You can change the file type in the "Manage DNC Files" window.

Select "User Runtime" if you send and receive DNC files manually at a shop floor workstation.

Select "Communications Engine" if you use SuiteFactory's Remote Request feature from your CNC control panel.

Click OK.

3.1   Sending and Receiving Programs

3.1.1 To get a program from the DNC

At the DNC computer, queue up the program you want to send to the Mazak CNC. If you have the right you can use SuiteFactory's filter function to create a list of files you wish to send. Click Send to send one file. Click Send All Listed DNC Files to send all the files in the list. The file(s) will be copied into the configured shared CNC folder.
At the Mazak console select DATA I/O. ***Note: At the top of the DATA I/O screen the pull-down menu Setup/HD I/O selects where the DIR.SELECT initially points to. You want this to be the shared folder, MC_DIRECT MODE PROGRAMS which is the folder share on the network.*** Select HARD DISK then HD CONTENT. The list of files stored in that folder, including the ones sent from the DNC database, appear. Pressing START will load selected ones into CNC active memory.

3.1.2 To send a program to save in the DNC database

At the DNC computer, go to Manage DNC files. Select the machine. Enter the program name you to be fetched from the Mazak CNC. Click Receive. The list of files in the shared CNC folder will appear. Select the program to be saved and click Receive.

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Appendix A

3.2 Installing a USB to RS-232 Converter

DO NOT PLUG IN THE CONVERTER UNTIL YOU INSTALL THE DEVICE DRIVER
SOFTWARE AS DESCRIBED BELOW!

3.2.1 Install the Device Drivers

The Mazatrol Matrix software is an application that runs on Windows XP.

Download or copy the device drivers for the specific converter you have into a folder on a USB memory stick.

Shutdown the Mazatrol software to be able to access Windows XP as follows:
Press the DIAGOS menu key
Press the VERSION menu key
Press the right end menu key
Type 1131 and press INPUT to get into the privileged mode
Move the mouse pointer to the bottom edge of the message column. See diagram below.
  Press the right mouse button to get the pull down menu as shown. Select exit with the
  mouse. The Mazatrol software will stop and a Windows XP screen will be exposed.
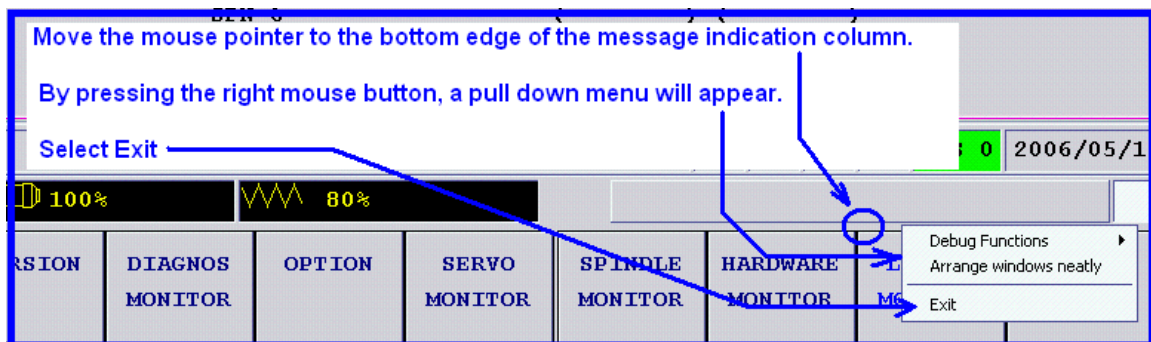
Plug the USB memory stick into one of the USB ports on the Matrix. Windows will detect it and it will show up as a drive letter in Windows Explorer (My Computer).
Run the driver software as instructed by the USB to RS-232 converter manufacturer. It will probably ask you to reboot the PC. Let it reboot.
Shutdown the Mazatrol software again, as described above.
Now plug the USB to RS-232 Converter into one of the Matrix's USB ports. Windows will detect the new hardware and either informs you that it has found your device or it might just install it silently.

To check that it is installed and to accept or change the COM port number, go to Windows Device Manager. (Control Panel/System/Hardware/Device Manager.) Look under Ports and verify that your device is installed. See diagram below where the device is shown installed and assigned COM3. You can change the COM assignment by right clicking on the device manager item and selecting Properties. Different manufacturers

For more information call, email or visit our web site:
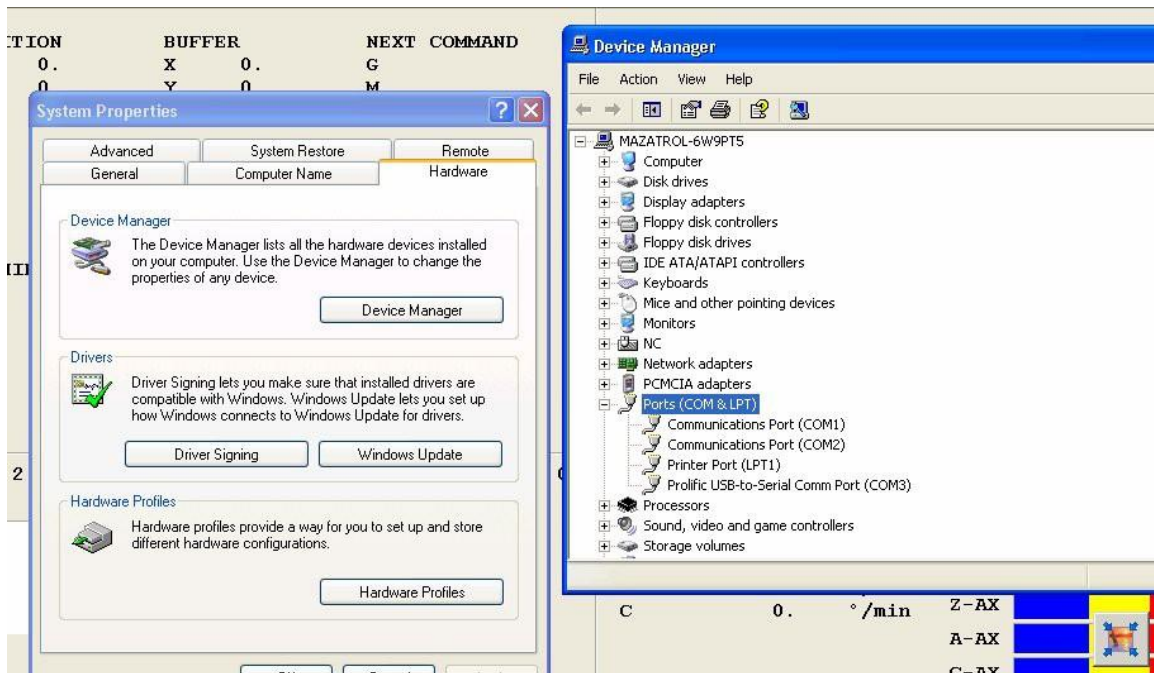**CAD/CAM Integration, Inc.**
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will have different ways of setting the port number. Just make sure that the Matrix DATA I/O Settings select this COM port.