



for Windows 7/XP/2003 and 2008 Server

Multi-DNC v8.0 [SPECTRUM-38B005](#991333-16-10-4) (Server)

File View Select Connection Operations Options Tools Monitoring Programs my Network Help

Open Compare Group Setup Send Remote Stop I Receive Job BASE Help Exit

Cell #2 - Monitoring - 5 Machines

- Monitored CNC #2: Haas VF-3 Mill
- Monitored CNC #3: Mitsubishi Mill, FANUC Series 0...

Monitoring [1021] COM100:9600,E71 | Data Recovery | Captured Data

Monitored CNC #2 Remote (0)
 Util=64.5% Perf=176.8% Parts=166 Total=13297 Part=Valve Body Operator=Mr. Richard Albert

Monitored CNC #3 Remote (0)
 Util=56.8% Perf=62.2% Parts=58 Total=4398 Part=56876-2 Operator=Mr. James Albert

N:\Tech Dept CNC Code\ 614.2311 REV B Send (2508,155247)
 HOLD1234combined.NC

26%

Haas VF-3 Mill Remote (0)

C:\Multi-DNC\Sendreceive simulator-bracket.nc Receive (53386)

Robert Glidewell

Event Log CNC Viewer Database (SpectrumDC\MDNC2) Connected Remote Commands by EMail

```

X2.6245 Y-0.0349 Z-0.0952
X2.6592 Y-0.0376 Z-0.0987
X2.694 Y-0.0383 Z-0.1022
X2.8932 Y-0.0393 Z-0.1199
X3.0976 Y-0.0404 Z-0.1351
X3.3023 Y-0.0414 Z-0.1474
X3.5074 Y-0.0424 Z-0.1568
X3.5359 Y-0.0409 Z-0.158
X3.5638 Y-0.0366 Z-0.1591
X3.5913 Y-0.0294 Z-0.1602
  
```

Single Block Block Skip Cycle Start

Single Block Drip Feed SUB Expand Block Skip Auto Split Safe Start

Multi-DNC v8.0 for Windows 7/XP/2003 and 2008 Server communications and file management system for simultaneous uploads and downloads to multiple CNC controls using RS-232, direct Ethernet, or wireless Ethernet connections. **Multi-DNC v8.0** includes a full featured CNC Program Editor, as well as an all new browser based **File Compare** utility. **Multi-DNC v8.0** is easily connected to CAD/CAM systems over industry standard networks and is also available in a Client-Server configuration. With the addition of the Spectrum **WiBox** and the Monitoring option, important Machine Event data such as which program is running, Cycle times and Machine Alarms are captured and written to an SQL database. Parts Count and OEE % are calculated automatically. Machine Monitoring Reports can be generated from an Internet Browser from anywhere in the world.

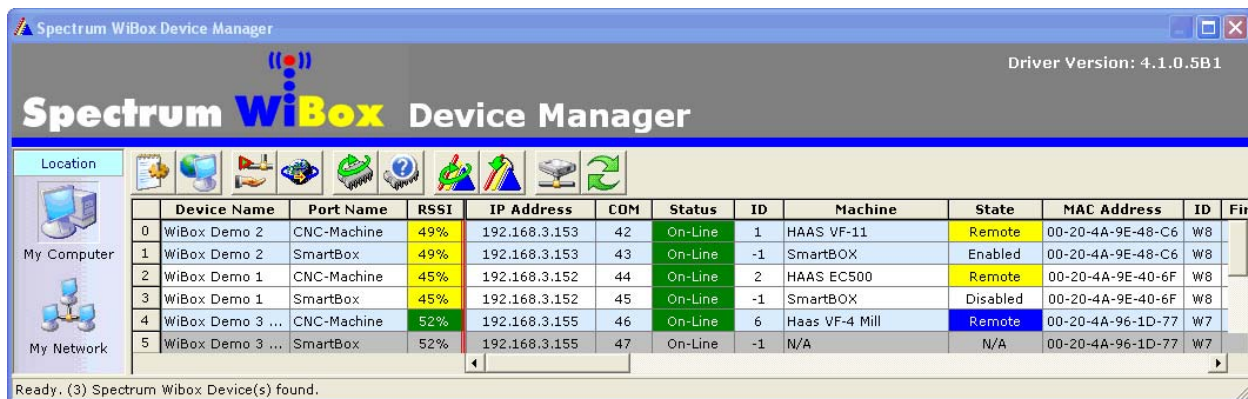
Communication Features

Up to 288 Ports of Simultaneous Communication

Simultaneous communication sessions with up to 288 CNC Machines from a single PC use either add-in RS-232 hardware or the **Control RocketPort** boards or Ethernet based hardware, as well as the Wireless Spectrum **WiBox** device. Direct Ethernet communication to those CNC Controls that support this is provided through a built-in ftp server.

Wireless RS-232 Communications Using the Spectrum WiBox™

Wireless communication with your CNC Machines is done using the Spectrum **WiBox** device. Mounted inside each CNC Control and powered internally, the **WiBox** uses a short RS-232 cable to enable communications at the highest possible baud rate. Each CNC Control has its own IP Address on your company LAN. **WiBoxes** can also be used in a wired Ethernet configuration. The **WiBox** Device Manager application lets you administrate multiple **WiBox** devices.



	Device Name	Port Name	RSSI	IP Address	COM	Status	ID	Machine	State	MAC Address	ID	Fi
0	WiBox Demo 2	CNC-Machine	49%	192.168.3.153	42	On-Line	1	HAAS VF-11	Remote	00-20-4A-9E-48-C6	W8	
1	WiBox Demo 2	SmartBox	49%	192.168.3.153	43	On-Line	-1	SmartBOX	Enabled	00-20-4A-9E-48-C6	W8	
2	WiBox Demo 1	CNC-Machine	45%	192.168.3.152	44	On-Line	2	HAAS EC500	Remote	00-20-4A-9E-40-6F	W8	
3	WiBox Demo 1	SmartBox	45%	192.168.3.152	45	On-Line	-1	SmartBOX	Disabled	00-20-4A-9E-40-6F	W8	
4	WiBox Demo 3 ...	CNC-Machine	52%	192.168.3.155	46	On-Line	6	Haas VF-4 Mill	Remote	00-20-4A-96-1D-77	W7	
5	WiBox Demo 3 ...	SmartBox	52%	192.168.3.155	47	On-Line	-1	N/A	N/A	00-20-4A-96-1D-77	W7	

The Spectrum **WiBox** also has (8) digital I/O channels built in to connect to CNC Controls I/O for the purpose of Machine Monitoring.

Control Ethernet Based Hardware

The **Control Ethernet based hardware** consists of devices mounted on the shop floor with from 4 to 32 RS-232 ports per Hub connected by a single Ethernet cable to the LAN. **Multi-DNC** can use these “*virtual*” **COM ports** over the network. The advantage is shorter RS-232 cabling and centralized network management. Multiple hubs are used for large shops.

Client-Server Architecture

Client Server is an option that allows multiple **Multi-DNC** Clients to control one or more **Multi-DNC** Servers over a TCP/IP network. *Any* file can be sent to *any* CNC Control at *any time*!

Restart a Program Send

Allows the DNC operator to *restart a program from any point in the file* in case of tool breakage, or to re-cut parts of the program. There are multiple Restart methods to give CNC operators the maximum amount of flexibility. A **Safe Start Block Editor** lets you easily manipulate the initialization codes that you send before a Restart.

Sub-Program Expander

Sub Expand is a Direct DNC (drip feed) feature where Multi-DNC Sends a Main program and automatically expands out the sub-program calls just like a CNC control. The sub-program is then run in a Direct DNC (drip feed) mode. Multiple-level sub-programs and sub-program looping are supported.

Local Copy Before Sending

The Local Copy option automatically copies the CNC program from its normal position to the local hard disk before sending. This is important for Direct DNC (drip feed) if the CNC programs reside on a networked drive, so that any network problems will not affect the Direct DNC operation.

Diagnostic Tools Dry Run and Data Recovery

Multi-DNC has two diagnostic tools. **Dry Run** shows you exactly what is going to send from a Machine Connection when you send a single file or a multiple number of files, without actually sending the data. An HTML file is created and your Internet Browser shows the data. **Data Recovery** enables you to manage files on a per Machine Connection basis that have been received from CNC Controllers using **Remote Autaname** and were named according to the Date-Time format due to incorrect formatting or as Unknown Data Files.

Remote Features

Remote Uploads and Downloads Directly from the CNC Control

Remote mode is a unique feature that allows the CNC operator to upload, download, or run the CNC control in a direct (“drip feed”) DNC mode right from the control itself without requiring any add-on hardware. **Remote** also does (10) other unique functions besides the basic uploading and downloading of CNC programs.

The CNC Operator Does This...

To “*get*” a file at the CNC control, the CNC operator creates a simple 2 to 3 line **Remote** “Command” program that contains the name of the file within a comment line. The CNC operator then “*punches*” out this file and sets up the control to “*read*.” **Multi-DNC** receives the file request, finds the file, and automatically sends it back to the CNC. To *store* files at the DNC computer, the CNC operator just punches the file and it is automatically named, saved, and stored in the correct folder.

Remote Sends Back Directory Listings

The CNC operator can output a **Remote** “Command” program with the characters “*RMTDIR*” and the DNC system will send back a listing of all of the programs available for downloading in the form of a CNC program itself. The CNC operator then “marks” which program(s) he wants and sends the list back to **Multi-DNC**, which then sends the requested programs.

Remote Lets You Restart Programs

Remote also allows you to restart a program from the CNC control when a tool breaks during direct (drip feed) DNC. After the CNC operator stops the flow of data he sends a small program back to the DNC system to tell it to backup a given number of lines, backup to a block number, or backup to a Bookmark. A Block Number, Bookmark, or code for a number of Repeats can be sent before the requested file name so that you can also skip forward to start the file at a point other than the top of the file.

Sub-Folder Searching

An option in **Remote** automatically searches through multiple branching sub-folders for the requested CNC program. CNC programs can then be managed by customer or project, rather than just by Machine Connection.

Remote Wildcard Feature

Remote can use a **Wildcard** request for a file, which allows the use of just the first few characters of the file you want to get in your **Remote** request. This is very useful if you have long Windows file names for your CNC programs. If multiple files match the **Wildcard**, then a Remote Directory listing of the multiple files will be sent to the CNC Control in the form of a CNC program, so the CNC Operator can “mark” the correct program(s) and send the request back to **Multi-DNC**.

Remote Search by Text

Remote can also search for the correct program by specifying a string of text within the program such as an OP # or internal Job #.

Remote Capture Probe Data

Remote Capture can store data output from CNC Machine probes for measuring parts in-process on the CNC Machine. Each output of data is Date and Time stamped and can be stored locally on the **Multi-DNC** PC or on a networked drive.

More Remote Functions

Remote also allows you to print a hardcopy of the program you are requesting from the CNC Control. You can use **Remote** to Login the CNC Operator for the purpose of Monitoring. The CNC Operator can send **Remote Help requests** directly from their CNC Control that show up as e-mail or SMS text messages on cell phones.

File Management Features

Files, Packets or Jobs

Multi-DNC can send single or multiple CNC program files to a CNC Controller’s memory or run in a Direct DNC (drip feed) mode.

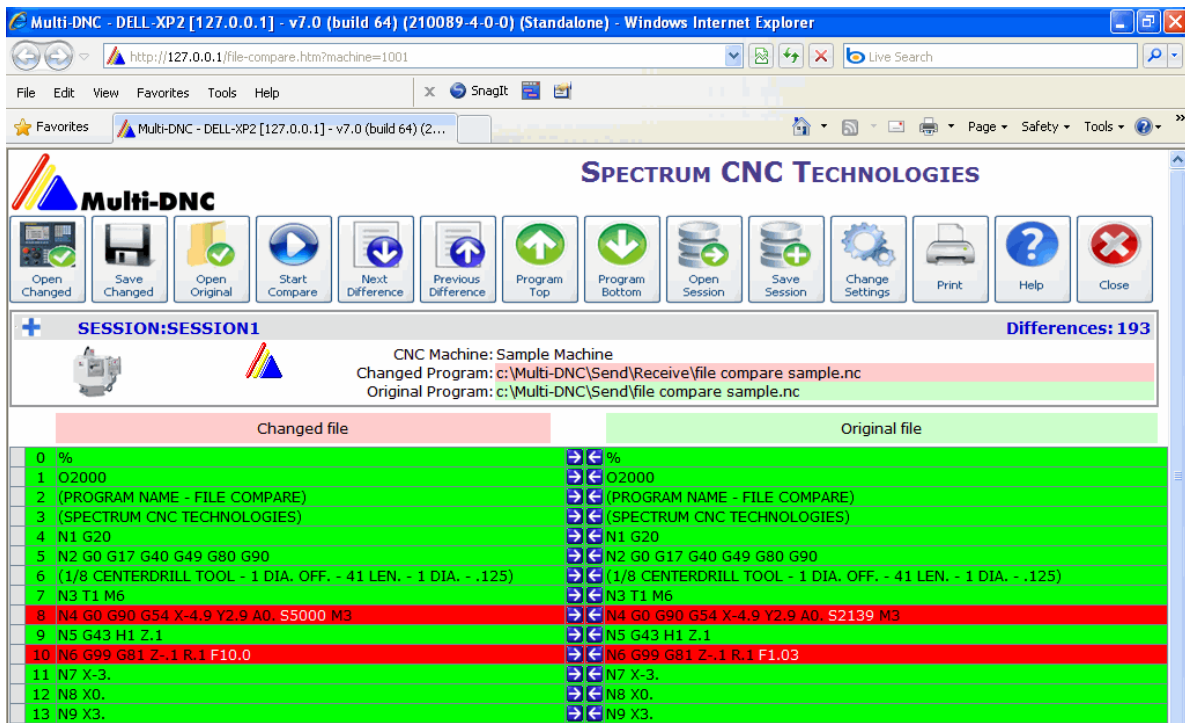
Or...Packets can be created in the Packet Manager and used in **Multi-DNC**. A **Packet** is a series of CNC programs that are associated together for a particular operation along with notes about the operation; or a series of CNC programs that must be run in a specific sequence – such as roughing programs before finishing programs.

Or...Jobs can be created in **Job BASE** and used in **Multi-DNC**. **Jobs** are linked CNC programs, CAD drawings, Tool lists, Setup sheets, Digital pictures, Word documents, PDF files, Excel spreadsheets, and all can be viewed as part of a **Job** in **Job BASE**.

File Compare – now Browser based

Multi-DNC has a specialized **File Compare utility** that is designed to highlight the differences between an original file sent to a CNC Control vs. a changed file sent back to the DNC system. Because **File Compare** is now browser based, it can run from any PC on your network.

File Compare can be run in a manual (you choose the two files) or an automatic mode where the returned file from the CNC Control is automatically setup to compare to the original file sent and the differences between the two files are sent to you in an e-mail report. If there are no differences, the returned file can be automatically deleted.



Edit in File Compare

Compared lines can be edited, either from the Changed or Original files. Entire lines can easily be copied from one side to the other. No need to launch the **Multi-DNC** Editor for simple edits.



Show only differences

Just the lines that are different between two compared files can be shown and/or printed.

8	N4 G0 G90 G54 X-4.9 Y2.9 A0. S5000 M3	↔	N4 G0 G90 G54 X-4.9 Y2.9 A0. S2139 M3
10	N6 G99 G81 Z-.1 R.1 F10.0	↔	N6 G99 G81 Z-.1 R.1 F1.03
30	...	↔	N26 M01
31	(27/64 DRILL TOOL - 8 DIA. OFF. - 48)	↔	(27/64 DRILL TOOL - 8 DIA. OFF. - 48 LEN. - 8 DIA. - .42188)
91	(7/16 BULL ENDMILL 0.125 RAD TOOL)	↔	(7/16 BULL ENDMILL 0.125 RAD TOOL - 3 DIA. OFF. - 43 LEN. - 3 DIA. - .4375)
93	N83 G0 G90 G54 X2.9684 Y.7377 A0. S1050 M3	↔	N84 G0 G90 G54 X2.9684 Y.7377 A0. S1222 M3
96	N86 G1 Z-.75 F18.0	↔	N87 G1 Z-.75 F8.41
222	N212 G28 X0. Y0.	↔	N213 G28 X0. Y0. A0.

Printer friendly hardcopy

You can print the two compared files and show them side by side with all the differences highlighted in red. This is displayed with less colors than the screen display to save on printer ink.

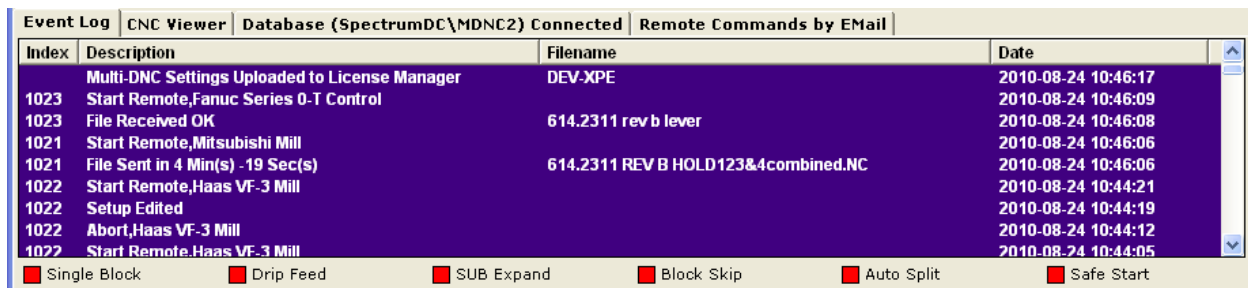
Changed file		Original file	
0	%		%
1	O2000		O2000
2	(PROGRAM NAME - FILE COMPARE)		(PROGRAM NAME - FILE COMPARE)
3	(SPECTRUM CNC TECHNOLOGIES)		(SPECTRUM CNC TECHNOLOGIES)
4	N1 G20		N1 G20
5	N2 G0 G17 G40 G49 G80 G90		N2 G0 G17 G40 G49 G80 G90
6	(1/8 CENTERDRILL TOOL - 1 DIA. OFF. - 41 LEN. - 1 DIA. - .125)		(1/8 CENTERDRILL TOOL - 1 DIA. OFF. - 41 LEN. - 1 DIA. - .125)
7	N3 T1 M6		N3 T1 M6
8	N4 G0 G90 G54 X-4.9 Y2.9 A0. S5000 M3		N4 G0 G90 G54 X-4.9 Y2.9 A0. S2139 M3
9	N5 G43 H1 Z.1		N5 G43 H1 Z.1
10	N6 G99 G81 Z-.1 R.1 F10.0		N6 G99 G81 Z-.1 R.1 F1.03
11	N7 X-3.		N7 X-3.

Password Protection

Password protection of up to 24 different Multi-DNC functions can be set up for restricted Users. For example, to guard against unauthorized editing of Machine Connection setups, or to restrict what files are allowed to send to a CNC Machine, or what days of the week or time of day that certain restricted Users are allowed to logon to **Multi-DNC**.

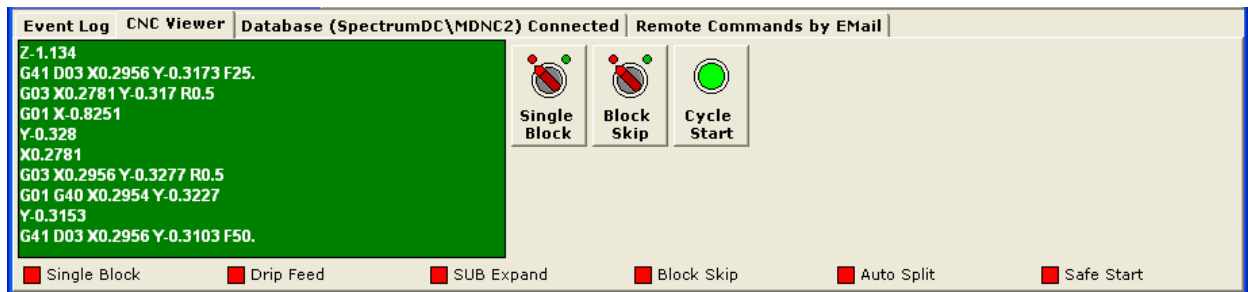
Event Logs – CNC Viewer




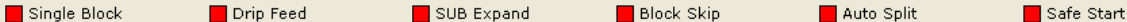
Multi-DNC keeps an on-going **Event Log** for every Machine Connection as well as an overall "System" event log. The Event Log gives a view of your overall shop's DNC system activities on a real-time basis and you can also see the specific events for each Machine Connection. The **CNC Viewer** window shows the "live" CNC code as it is sent or received and allows you to stop and start the data flow for Drip Feed DNC operations.



Index	Description	Filename	Date
	Multi-DNC Settings Uploaded to License Manager	DEV.XPE	2010-08-24 10:46:17
1023	Start Remote,Fanuc Series 0-T Control		2010-08-24 10:46:09
1023	File Received OK	614.2311 rev b lever	2010-08-24 10:46:08
1021	Start Remote,Mitsubishi Mill		2010-08-24 10:46:06
1021	File Sent in 4 Min(s) -19 Sec(s)	614.2311 REV B HOLD123&4combined.NC	2010-08-24 10:46:06
1022	Start Remote,Haas VF-3 Mill		2010-08-24 10:44:21
1022	Setup Edited		2010-08-24 10:44:19
1022	Abort,Haas VF-3 Mill		2010-08-24 10:44:12
1022	Start Remote,Haas VF-3 Mill		2010-08-24 10:44:05

System Event Log shows all Events – date and time stamped.



Event Log	CNC Viewer	Database (SpectrumDC\MDNC2) Connected	Remote Commands by EMail	
<pre>Z-1.134 G41 D03 X0.2956 Y-0.3173 F25. G03 X0.2781 Y-0.317 R0.5 G01 X-0.8251 Y-0.328 X0.2781 G03 X0.2956 Y-0.3277 R0.5 G01 G40 X0.2954 Y-0.3227 Y-0.3153 G41 D03 X0.2956 Y-0.3103 F50.</pre>		 Single Block	 Block Skip	 Cycle Start
				

CNC Viewer showing "live" CNC Code sending to a CNC Control.

Event Logs Can Be Printed or Exported as HTML Files

The **Event Log** can also be printed to the current Windows printer or exported as an HTML formatted file to send to Technical Support to diagnose system issues.

The Editor Features

Multi-DNC CNC Editor for Large CNC Programs

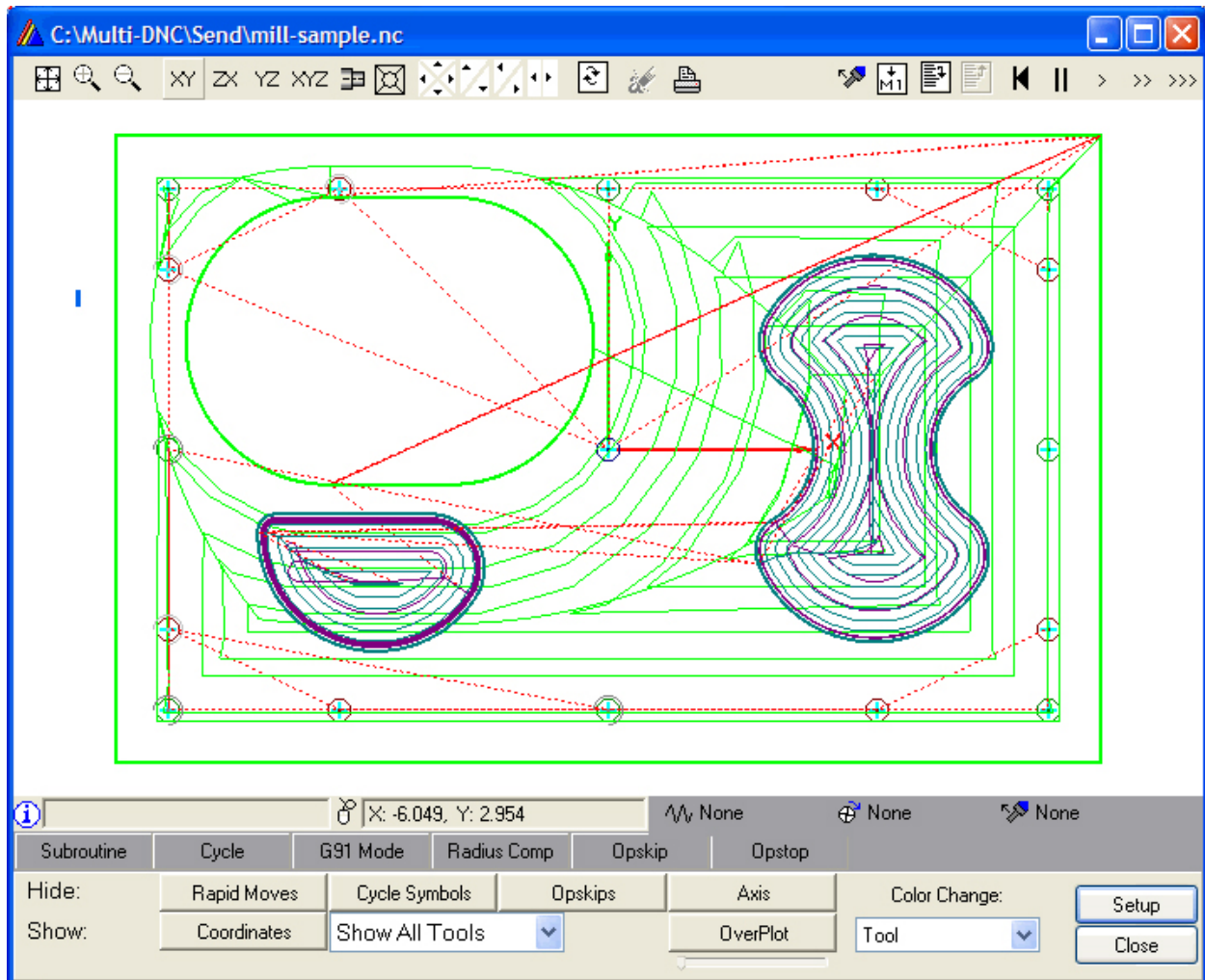
Very large CNC code programs (up to 90 MB) can be edited using virtual memory. Virtual memory is fast: a 16 MB CNC program (900,000 lines) is loaded and ready to edit in 3 seconds, and there are no artificial limitations to the number of lines in a CNC program.

Standard Windows Layout

The **Editor** uses all of the *standard Windows interface* functions, so that if you are familiar with using Windows word processors, it will be easy to learn. But many specialized functions for editing CNC programs have been added such as *3-D Backplotting, Resequencing, and Colorizing*.

Resequence

Allows you to re-sequence the Program "N" blocks for a selected block or the *entire file*. There are many options for suppressing N blocks on certain lines or only numbering Tool Change lines.



Integrated 3D Backplotting

Displays graphic wireframe tool paths with many viewing options. *Graphic manipulation* is easy with dynamic zoom, pan, and rotation. Program can be single stepped both forwards and backwards. Partial toolpaths (such as a single tool) can be easily shown to lessen the complexity of wireframe graphics. Rapid moves are shown as dashed lines and each tool shows as a different color. Or different colors can be shown based on feedrate or speed changes within the CNC program. Canned cycles can be shown as symbols at each hole location as in the example above.

Graphical Icons for Simplicity

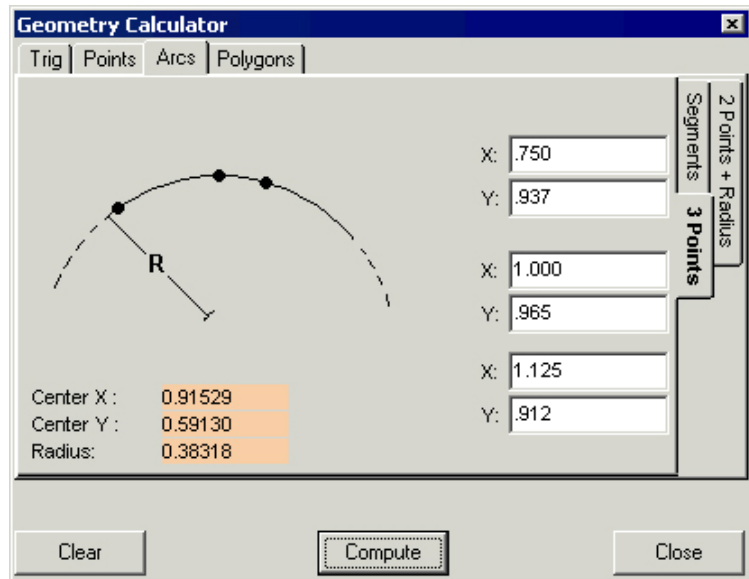
Multiple files can be open in the **Editor** concurrently, and graphical icons support all of the most used functions of the **Editor**, such as searching for the next Tool Change, Speed Change, or Feedrate Change, or instantly go to the top or bottom of a file.

Graphic Calculators

The **Editor** has *graphic calculators* to help with right angle or oblique triangle solutions, as well as distances between two points and several arc calculators such as calculating an unknown radius from three points on an arc. All of the calculator “answers” can be pasted back into a CNC program.

Analysis of CNC Programs

The **Editor** has an *analysis tool* that determines the approximate time that a CNC program will take to run, including individual times for all of the Rapid, Linear, and Circular moves in a CNC program.



“Colorizing” of Text

Allow the use of “*Colorizing*” to show different colors for “G” codes, “M” codes or Comments, making it easier to visually locate particular types of Word Address codes as you are editing the files. The *Colorizing* is for display purposes only and will not be printed or saved with the CNC code.

HELP!

Context sensitive pop-up help is available throughout the DNC system. It documents the setup and usage of all aspects of **Multi-DNC** and the **Multi-DNC Editor**, and is also a *valuable reference guide* for connecting computers to CNC machine tools.

Monitoring

Monitor All or Any of Your CNC Machines

The Monitoring option for **Multi-DNC** adds the ability to monitor what is actually happening on your CNC Machine Tools in near real-time. Data on Machine Events is automatically written to a Microsoft SQL database and **Multi-DNC** provides an internal Web Server and a full suite of Management Reports to view the data.

Monitoring Connections to CNC Machine Tools

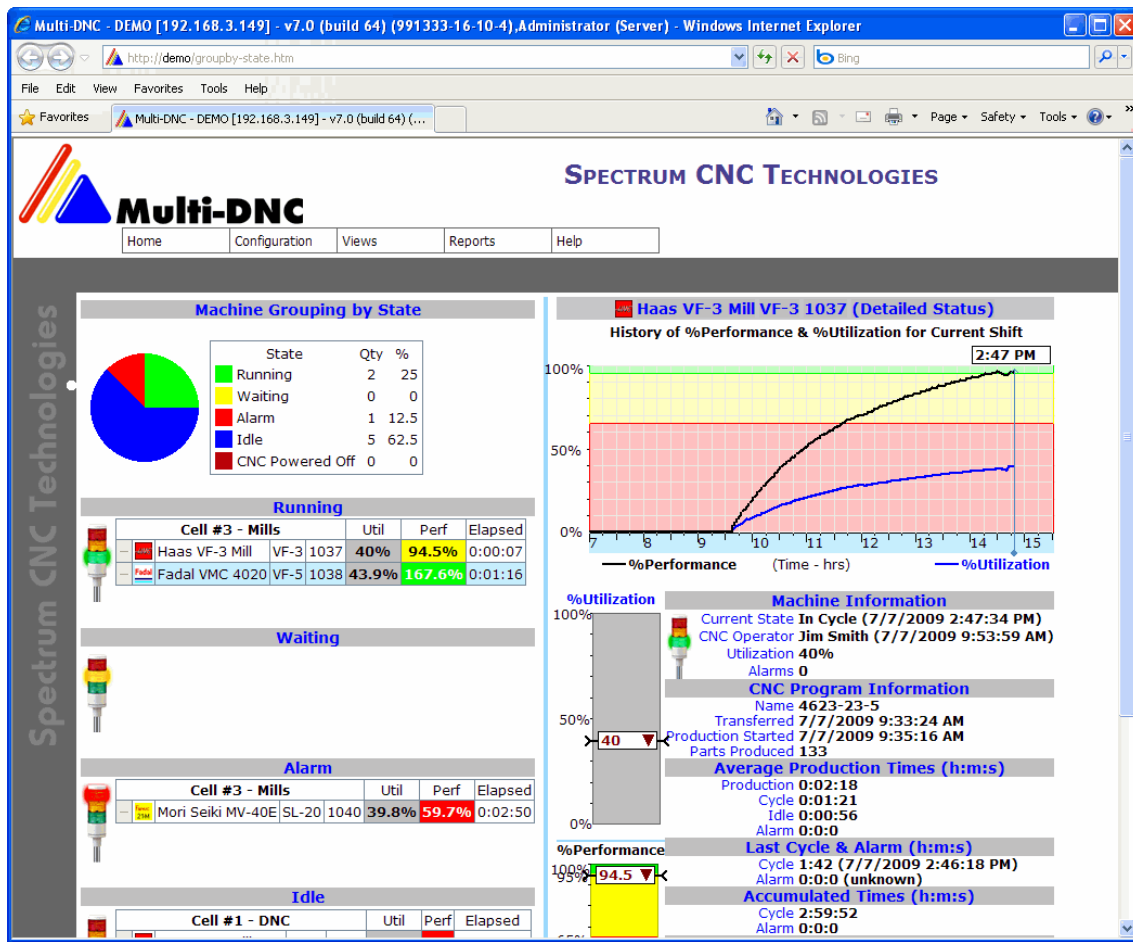
Monitoring is implemented using the Spectrum **WiBox** device which has a built in PLC that is connected to the CNC Controllers internal I/O signals to capture events such as Cycle Start/Stop, Alarms and Power On/Off conditions. Parts Count, Cycle vs. Idle times, and OEE % are calculated from the received data.

Monitoring Database for Parts and CNC Operators

Monitoring also provides an internal database for monitored parts that lets you set up performance goals so that you can track how well the CNC Operators are running their jobs.

Monitoring also tracks downtime reasons

With the addition of the Spectrum **SmartBox**, a Monitoring system can accept and track production downtime reasons input by CNC Operators directly from their CNC Controls.



Monitoring helps with Preventive Maintenance

Monitoring can also set up schedules for checking preventive maintenance items on the monitored CNC Machines. Schedules can be set up based on the number of Power ON hours, the In-Cycle time, or the number of Tool Changes. Maintenance personnel can be automatically e-mailed when a maintenance item is due.

The "Maintenance Item Settings" dialog box shows a "Time Remaining: 500:00:00 (h:m:s)" and a counter at 0. The settings include: Name "Gearbox Oil Replace", Enabled checked, Tracked By "Power-On Time", Threshold "500 (hours)", E-Mail(s) "maintenance@company.com", Visiplex Pager(s) empty, SMS Text Message "5558675309 @ vttext.com", Action "Email Notification", and Last Occurred "Never Occurred". Buttons for "Reset", "Trigger & Reset", "Cancel", and "OK" are visible at the bottom.

Monitoring Reports for Management

Monitoring provides a full suite of Reports to show many aspects of the received data. Utilization Reports for individual CNC Machines or Groups of CNC Machines can be shown. You can see Production Reports over any time period, including full Production details of each Machine Cycle. Reports are provided for Machine Alarms, CNC Program Transfers and CNC Operator Logins. Reports of Job performance on a per Shift basis, and CNC Operator Production Worksheets as well as long-term (Year to Date) Reports of Machine Utilization are all available to any authorized user on your network.

Web Site: www.multi-dnc.com Phone: 1-877-882-MDNC (6362)