



For Windows XP/Vista/7/8/8.1/10
DNC, Monitoring & Data Collection through your
Ethernet Network



Machine Monitoring
Solutions

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Introduction

Machine Monitoring gives the ability to Monitor live machine status of a machine tool. Monitoring includes (but not limited to);

- Cycle ON/OFF
- Feed-rate Override
- Feed-hold
- Spindle Override
- Alarm
- The ability to disable the Cycle Start until a reason is given for the machine being out of Cycle (Cycle Start Disable).

(WHAT can be monitored is dependent upon the amount of hardware [eMonitor boards] that is/are purchased per machine).

The eNETDNC software works together with the eMonitor board and eTerminal hardware devices to send real-time updates of the current machine status, called Monitoring Events. The system is EVENT-driven, so it is minimally invasive to your network, and changes to the machine status are in real time.

This manual is only a summary of the various features of the eNETDNC Monitoring. Updates to the software occur on a frequent basis, and all efforts will be made to update this manual at each update. The latest revision can be found at

www.enetdnc.com/downloads

Port CNC/eNETDNC is not liable for failure to update software. Contact your eNETDNC Reseller for a username/password to download the latest updates to software/firmware/manuals.

Monitoring

How eNETDNC software works with the hardware:

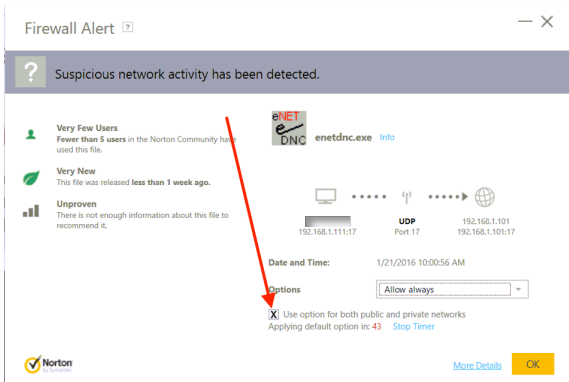
There are 3 pieces required for Machine Monitoring with eNETDNC, but not all are required at the same time:

1. eNETDNC Monitoring Software
2. eNETDNC communications hardware
 - xlConnect-2
 - xlConnect-W
 - xlConnect-U
 - eHUB/xlHUB
3. eMonitor Board / eTerminal

The eMonitor board communicates to the Hardware and/or eTerminal via Serial communication.

eNETDNC communicates to the hardware on your network via UDP Port 17. It is recommended that eNETDNC be installed on a stand-alone computer or server; dedicated for eNETDNC, and that either an exception is created for Windows Firewall/Antivirus software, or have these items disabled entirely. Ensure UDP Port 17 can listen as well. Other ports you may need to open are 21 for FTP, 80 for Web view, and 25 for email. The Web and email can use different ports if needed and are configurable in the eNETDNC software.

With Windows, certain versions (such as the example of WIN-8 / Antivirus below) will ask if you want to allow for public/private...it is advised to select for BOTH.



Initial Software Setup

eNETDNC software is a 'portable app' that needs to be installed **ONLY** in the following directory: **C:/_eNETDNC**

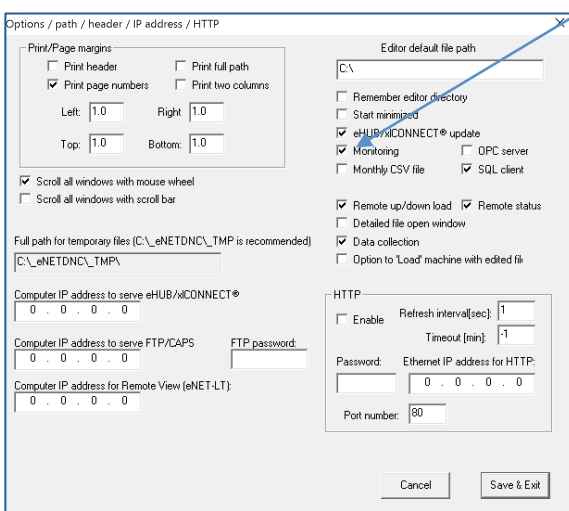
This directory can then be copied and moved to a new computer in the event that something happens to the installed computer. Simply move the _eNETDNC folder to a new computer's 'C' drive (it cannot be any other drive letter), and launch the .exe file. eNETDNC can have up to 128 machines connected, at which point a new instance of eNETDNC must run on a separate computer, with connected hardware with different IP's than the first 128 machines. Do not run an exact copied folder of eNETDNC on another computer, or system failure will occur. Also, install software for all users, not just a specific user.

Installation:

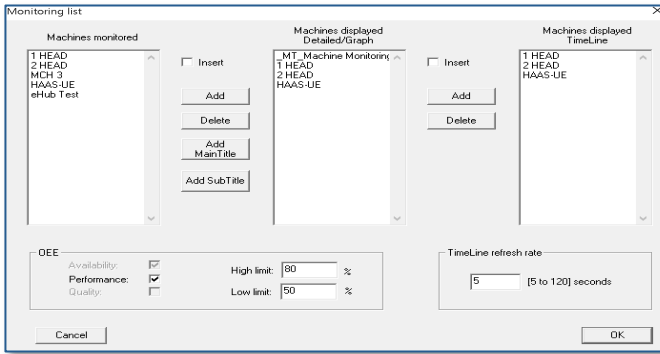
Install eNETDNC by double-clicking the eNETDNC Setup.exe and go through all the prompts until installation is complete.

Once installation is complete, the user will need to configure a minimum of (3) settings in order for Monitoring to function. As a note: eNETDNC must detect the hardware in order for some of the Menu items to become enabled (they are greyed out by default). You may be prompted that hardware is not detected.

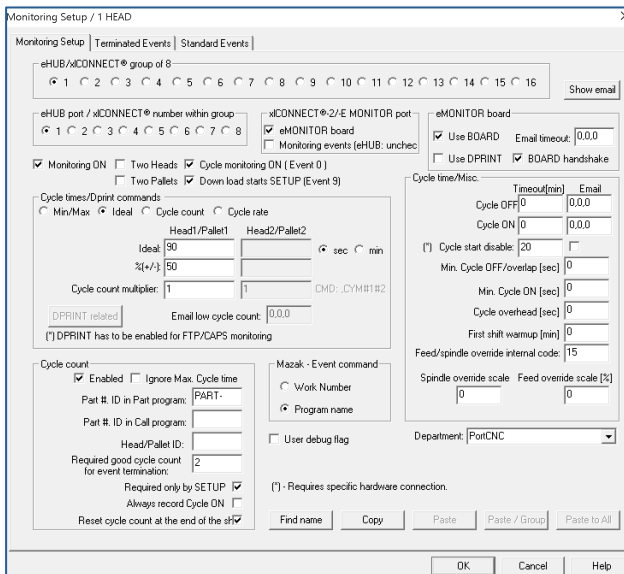
1. Enter 'Settings', 'Other Options' and select the 'Monitoring' checkbox, then press 'Save & Exit'.



- Enter **'Settings', 'Monitoring', 'Department/Shift'** and enter at least one Department with shift times. If shift times are left blank, the software will consider it as one 24 hour shift. Be sure to select each day of the week from the drop-down list to ensure each day is set up correctly. You are able to copy a day and paste to the next to ease in setup of each day.



- Enter **'Settings', 'Monitoring', 'General'** and select all the checkboxes in the top half of the below example. This will be a good starting point for an initial setup:



Read/Write Administrative Privileges

The C:_eNETDNC folder must have Read/Write privileges enabled for all users of the computer it is running on. The reason is that eNETDNC constantly reads/writes data to all of its sub-directories. If eNETDNC-LT is used, it needs to be able to read the information from these folders.

Monitoring Menu

Menu items across the top of the eNETDNC main screen:

Monitoring Menu

The user can view the monitored machines in real time with these menus. The menu opens up as a resizable window, where the monitored machines are listed by name. Each machine name is followed by its status, as defined in [Monitoring Setup](#). Once resized, pressing the red 'x' closes it and saves the sized/positioned setting.

Display machines/Detailed

The user can view the monitored machines in a graphical format which displays Machine Name, Status, Part Number, Cycle Count, Last Cycle, Current Cycle (as a timeline graph), and Elapsed Time since last Event. This view can also be accessed by the 4th icon from the right directly below the Menu.

Clicking on each of the following will produce different options:

Machine Name: will bring up a TimeLine view of just that machine, and up to 4 machine timelines can be displayed at once, for 4 different machines. For Dual Head/Pallet machines, a dialog will appear asking whether to show them separately or together.

Status: If the machine is NOT in Cycle ON, you can click on it's Status to display a list of Machine Statuses. Keep in mind that the Detailed Dashboard overrides all other screens on your display, so you must minimize it to display the Statuses available to select. If you close the dashboard, it will close the Status screen as well. You can then change the Status to any reason codes (Monitoring Events) that are saved in the Monitoring settings.

Part Number: Will open a Dialog that allows you to enter a Part Number, Cycle Time, %+/-, and Cycle Multiplier. Once again, the Status can NOT be Cycle ON to enter information.

OEE: See OEE Section (Page: 53)

Cycle Count: Will display the current cycle count for how many parts have been produced based on the Cycle Time criteria.

Last Cycle: Will display the previous Cycle time, and the color will display as either yellow (less than ideal time), green (within ideal range), or orange (more than ideal time).

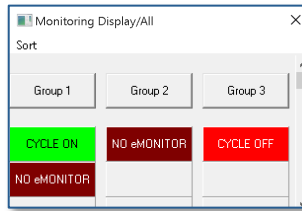
Current Cycle: Displays the Min/Max, Ideal, or Cycle Rate (depending on settings). During Cycle ON, a blue tick will slide across according to the current cycle time, and if the cycle ends within the green span, will count one good cycle (or however many are set in the Cycle Multiplier).

Elapsed Time: Shows the elapsed time since last Event or Cycle.

MACHINE NAME	STATUS	PART NUMBER	Avail/Perf. OEE [%]	CYCLE COUNT	LAST CYCLE	CURRENT CYCLE	ELAPSED TIME	FEED OVERRIDE
Machine Monitoring								
1 HEAD 2	ON OFF	12345	A:01100 P:0146	0/1	00:00:11 00:02:14	25 50 75 45 90 135	00:02:02 00:00:36	50 0 0 % 200 0 % 200
2 HEAD 2	CYCLE OFF		A:0 P:0 OEE:0	0	00:00:00	123 246 369	00:05:20	
HAAS-UE 2	CYCLE OFF		A:0 P:0 OEE:0	0	00:00:00	16 32 48	00:05:20	

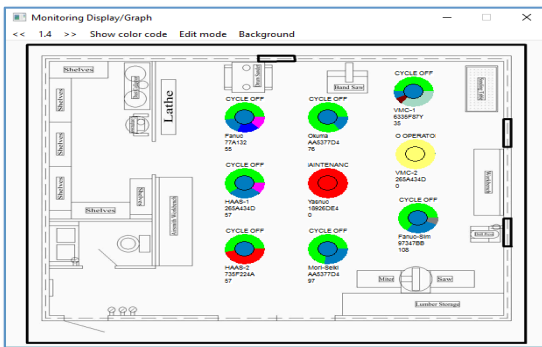
Display machines/All

The user can view the status of all monitored machine in a resizable window in real time. Machine names are not displayed in this view. It is a quick view to see the status of all machines quickly. By (left) clicking on the machine’s push button, the machine’s TimeLine view will be shown. CTRL (left) click will allow the user to view an earlier shift’s monitoring file.



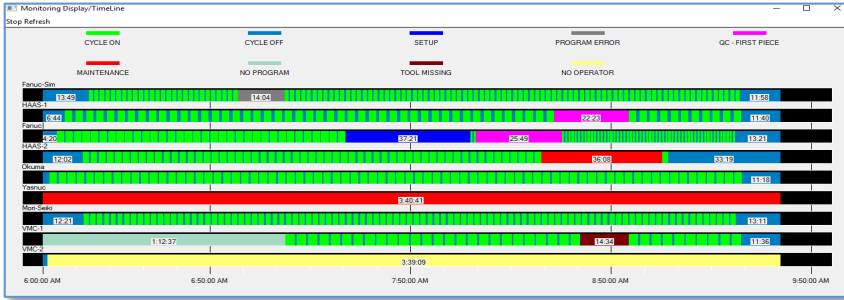
Display machines/Graph

The user can view the monitored machines in icon format instead of the detailed spreadsheet format. In this view each machine is represented as an icon. Icons can be re-ordered by pressing ‘Edit’, clicking on a machine icon and then clicking again in the desired location. The user can also select a background .bmp image by selecting ‘Background’ and then pathing to a valid image under 3mb in file size. This can be displayed as the actual shop floor plan, etc. This file must be a .BMP image.



Display machines/TimeLine

The user can view the monitored machines in a TimeLine view, where the entire shift is represented horizontally, and the selected machines (from the 'Create List to Display') vertically stacked. The font size can be changed by right-clicking anywhere within the TimeLine window. The TimeLine view can be zoomed in by pressing 'Stop Refresh' and then clicking your mouse, holding/dragging, and then letting go to zoom in.



Create List to Display

This dialog box allows the user to create a Machine list for the "monitored" machines. This machine list will appear in the same order as created in the [Display machines/detailed](#) menu.

Insert: Select this checkbox and then click on a machine name already in the Detailed/Graph or Timeline list to insert a machine above that selected machine.

Add: will add the selected machine on the left to the selected list.

Delete: Removes the selected machine from the selected box.

Add Main Title: will add Main Title(s) to be displayed.

Add Subtitle: will add Subtitle(s) to be displayed.

OEE: See OEE Section (Page: 53)

TimeLine Refresh Rate: Sets the refresh rate of the TimeLine view (5-120 seconds).

OK: will save the current list. If a “Display machines/Detailed” window is already open, close and re-open it for the new list to take effect.

Cancel: will discard the changes made.

View report - Graph command

The user can view a generated report here in graph form. The report has to be generated by eNETDNC system with the machine monitoring option installed.

View report - Pie chart command

The user can view a generated report here in pie chart form. The report has to be generated by eNETDNC system with the machine monitoring option installed. If the report was generated for multiple days, the user can use the PgUp/PgDn keys to view the various days.

View report - Using Excel command

This command will launch Excel to view a report generated by the eNETDNC software in .CSV format.

View detailed shift - Pie chart command (Monitoring menu)

The user can view detailed shift data in pie chart form. It works only with an eNETDNC system with the machine monitoring option installed.

View detailed shift - Current Shift command (Monitoring menu)

The user can view detailed current shift data by clicking Monitoring > View detailed shift > Current shift. It works only with an eNETDNC system with the machine monitoring option installed. The graph will show the various events during the current shift using the color code shown above the graph. If the user clicks on any of the colored labels (while the cursor is shown as a hand), only that event will be shown. Clicking on a nearby area (while the cursor is an arrow) will restore all events.

View report - OEE/Machine command (Monitoring menu)

This is a special command used to view an OEE report generated by the eNETDNC software for (1) machine.

View report - OEE - Overall command (Monitoring menu)

This is a special command used to view an OEE report generated by the eNETDNC software for all machines.

Requirements for proper OEE operations

Manual data input is required for the following items:

- 1) Total parts run
- 2) Total defects
- 3) Ideal cycle time.

- For 1) and 2) the operator is required to manually enter the totals when the job is finished or at the end of the shift.

(whichever comes first). Both the E-TERMINAL (used on the wired/wireless machines) and the eNETShell software (used on machines with computers) will allow manual data entry.

- The eNETDNC system deals with min/max cycle times. The Ideal cycle time would be taken as the average of the min/max cycle times: $\text{Ideal} = (\text{min} + \text{max})/2$. The user can notify the eNETDNC system three different ways about the min/max cycle time:

A. Using the E-TERMINAL or the eNETShell software the operator can put the machine into SETUP mode. At that time the operator is asked to enter the part number, minimum cycle time and maximum cycle time.

B. The operator can put the machine automatically into SETUP mode by downloading the part program. The first comment of the part program should contain the part number, the minimum cycle time and the maximum cycle time in the following format:

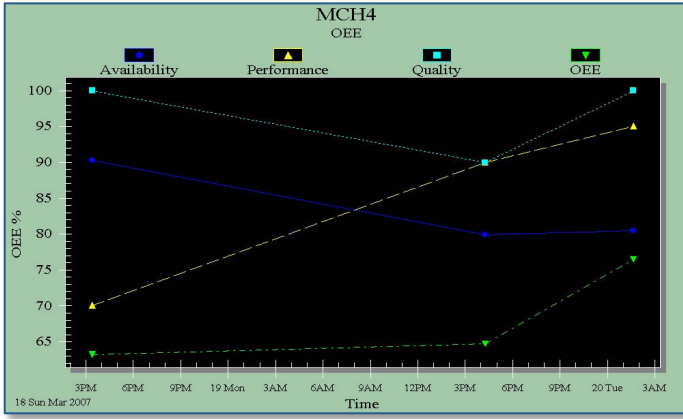
`%(XYZ123ABC,300,360)`

where XYZ123ABC is the part number, 300 is the minimum cycle time and 360 is the maximum cycle time.

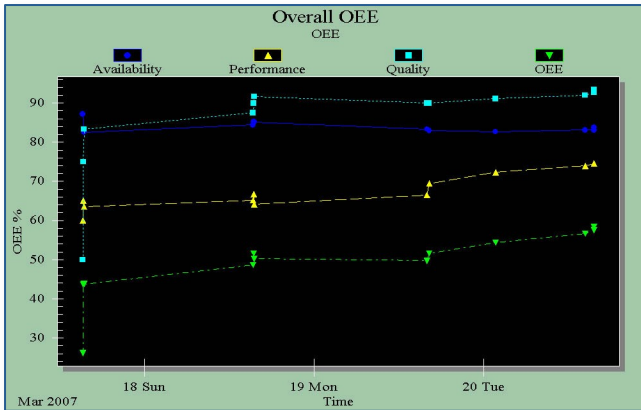
C. The operator can put the machine automatically into SETUP mode by downloading the part program. For each machine a lookup text file can be defined by the user, which includes the name of the program, the part number and the minimum/maximum cycle times.

Solutions b) and c) are similar – the difference is (b) requires data to be maintained within the program file, while (c) requires data to be maintained outside of the program file.

OEE/Machine:



OEE – Overall:



Excel: Export monitoring data to a Microsoft Excel spread sheet.

View detailed shift - Graph command (Monitoring menu)

The user can view detailed shift data in graph form by clicking on Monitoring > View detailed shift > Graph. It works only with an eNETDNC system with the machine monitoring option installed.

The graph will show the various events during the selected shift using the color code shown above the graph. If the user clicks on any of the colored labels (while the cursor is shown as a hand), only that event will be shown. Clicking on a nearby area (while the cursor is an arrow) will restore all events.

There are time intervals printed on the various events which indicate the duration of the specific event. If the user clicks on the “Cycle time” menu item, a cycle time dialog box will pop up – see “Cycle time dialog box”. The user can also click on the “Print” menu item as well to send the graph to a printer – however a color printer should be used to clearly understand the graph. There are time intervals printed on the various events which indicate the duration of the specific event. If the user clicks on the “Cycle time” menu item, a cycle time dialog box will pop up – see “Cycle time dialog box”. The user can click on the “Print” menu item as well to send the graph to a printer – however a color printer should be used to clearly understand the graph.

View detailed shift - Start of current shift command (Monitoring menu)

The user can view current shift data in a machine list that shows each machine with the shift start time and the first cycle start time. It works only with the machine monitoring option installed.

View detailed shift - Start of previous shift command (Monitoring menu)

The user can also select to view a previous shift machine list that shows each machine with the shift start time and the first cycle start time. The previous shift is selected by the user. It works only with the machine monitoring option installed.

Re-generate - Machine .CSV file

This allows the user to re-generate the monitoring machine .CSV files for the selected year from the individual monitoring files (.MON extension). The monitoring database file is located in the C:_eNETDNC_MONITORING directory and its name is _DATAYY.DAT, where YY is the two-digit year.

Re-generate - Part number .CSV file

This allows the user to re-generate the monitoring part number .CSV files for the selected year from the individual monitoring files (.MON extension). The monitoring database file is located in the C:_eNETDNC_MONITORING directory and its name is _DATAYY.DAT, where YY is the two-digit year.

Re-generate - Operator .CSV file

This allows the user to re-generate the monitoring operator .CSV files for the selected year from the individual monitoring files (.MON extension). The monitoring database file is located in the C:_eNETDNC_MONITORING directory and its name is _DATAYY.DAT, where YY is the two-digit year.

Re-generate - Operator .CSV file command (Monitoring menu)

This allows the user to re-generate the monitoring operator .CSV files for the selected year from the individual monitoring files (.MON extension). The monitoring database file is located in the C:_eNETDNC_MONITORING directory and its name is _DATAYY.DAT, where YY is the two-digit year.

Re-scan Cycle Count

This allows the user to re-generate Cycle Counts due to changes in the file.

Check .MON Files

This allows the user to Re-generate the .MON file(s) by year. Only available data can be updated.

Data Collection Menu

Generate report for Data Collection dialog box

The user can generate a report from the collected data. The generated report can then be imported into popular spreadsheet programs. The field delimiters are the same as they are specified in Data Collection Setup dialog box

If the Daily checkbox is checked for auto report generation, a report is automatically generated each day at the specified HR:MIN (24 hour format) or the first time the computer is turned on.

Full path for input file: This specifies the full path for the directory, where the collected data resides.

Full path for output file: This specifies the full path where the output file resides.

The generated report keeps the same file name as the original data, except adds the "REP" extension.

DBA format: If checked, the report is generated to work with the DBA software as follows:

The first field is employee ID, the second field ID is work number, the third field is operation sequence, the optional fourth field is parts made, the fifth field is parts scrapped and the sixth field is parts reworked. Report generation will sort out how many hours and minutes each employee spent on each work number and sequence number, and also how many parts, scraps and reworks were done.

Visual JS: If checked, the report is generated to work with the Visual Job Shop software.

Inv. Op. ID: This is used with inventory report formatting. The value in this field will be shown on the report as the "Inventory Operation Code ID".

Generate Labor: Will generate a labor report from the data file the user specifies.

Generate Inventory: Will generate an inventory report from the data file the user specifies.

Exit & Save: will record the new setup.

Cancel: discards all changes made.

Settings Menu

Settings - Monitoring - General

[Monitoring Setup Tab]

Caution: Be sure to select the proper eHUB/xlConnect group and proper port when performing setup.

Monitoring Setup / 1 HEAD

Monitoring Setup | Terminated Events | Standard Events

eHUB/xlCONNECT® group of 8
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 Show email

eHUB port / xlCONNECT® number within group
 1 2 3 4 5 6 7 8

xlCONNECT®-2/-E MONITOR port
 eMONITOR board
 Monitoring events (eHUB: unchec)

eMONITOR board
 Use BOARD Email timeout: 0,0,0
 Use DPRINT BOARD handshake

Monitoring ON Two Heads Cycle monitoring ON (Event 0)
 Two Pallets Down load starts SETUP (Event 9)

Cycle times/Dprint commands
 Min/Max Ideal Cycle count Cycle rate

Head1/Pallet1 Head2/Pallet2
 Ideal: 90 sec min
 %(+/-): 50

Cycle count multiplier: 1 1 CMD: _CYM#1#2

DPRINT related Email low cycle count: 0,0,0

(*) DPRINT has to be enabled for FTP/CAPS monitoring

Cycle count
 Enabled Ignore Max. Cycle time
 Part #. ID in Part program: PART-
 Part #. ID in Call program:
 Head/Pallet ID:
 Required good cycle count for event termination: 2
 Required only by SETUP
 Always record Cycle ON
 Reset cycle count at the end of the shift

Mazak - Event command
 Work Number
 Program name
 User debug flag

Department: PortCNC

Cycle time/Misc.

	Timeout(min)	Email
Cycle OFF	0	0,0,0
Cycle ON	0	0,0,0
(*) Cycle start disable:	20	<input type="checkbox"/>
Min. Cycle OFF/overlap [sec]	0	
Min. Cycle ON [sec]	0	
Cycle overhead [sec]	0	
First shift warmup [min]	0	
Feed/spindle override internal code:	15	
Spindle override scale	0	0
Feed override scale [%]	0	0

(*) - Requires specific hardware connection.

Find name Copy Paste Paste / Group Paste to All

OK Cancel Help

Monitoring ON This box needs to be checked to enable machine monitoring for the selected machine.

Two heads or Two pallets: Box should be checked if the machine has a two-head or two-pallet operation. When these are selected, the eMonitor board MUST be programmed for Dual Head/Pallet, or Monitoring will not function for the particular machine.

Cycle Monitoring ON: Box needs to be checked to enable Cycle ON/Cycle OFF monitoring for the selected machine. Cycle monitoring requires either the eMONITOR board to be installed on the machine tool itself, or for the machine's DPRINT feature to be utilized.

The xlConnect-2/-E MONITOR port has two check boxes. The eMonitor board checkbox should be selected if using an eMonitor board that is connected to the 'Monitor' port of an xlConnect-xx unit. The Monitoring Events should be checked if the eTerminal is connected to the 'Monitor' port of the unit. A related example would be if a -W unit was used where the eTerminal has to be connected to the 'Monitor' port because the 'Machine' port is Ethernet, and the eTerminal uses Serial connectivity (Port 2). Uncheck this box if connected to an eHUB.

Download starts SETUP: (Event 9) Box needs to be checked to automatically enter SETUP status upon a successful Part Program download request.

Use BOARD: If checked, the software will utilize the eMonitor board's ability to signal back the status of the machine tool.

Use DPRINT: If box is checked, the software will expect the control to issue statements via it's serial port about the in-cycle condition of the machine tool.

Email timeout: Will enable the software to send an email if the eMonitor board is not detected for 10 minutes. That may happen if the machine tool is powered down, in case of connection loss, (e.g. a cut cable or a defective eMonitor board). The format is setup to enable different email addresses for each shift. The email addresses for each shift are separated by commas. Up to 3 email addresses can be entered per shift separated by semi-colons.

BOARD handshake: Should be checked when using a monitoring board that has a version number of 1.3 or higher. The eMonitor board version number is shown on the 7 segment display right after power up. The software will also verify handshake capability in the event this checkbox is not set correctly.

Use DPRINT: See DPRINT Related

Min/Max: This setting allows for the input of two limits for identifying a good part. If they are set to 0, all parts are good. Note: These cycle times settings can be determined three possible ways: as discussed above under 1) Part number ID and 2) Head/Pallet ID; and as discussed in 3) Configure Transmit/Download dialog with connection of the _LOOKUP.TXT ID item. Cycle times can be specified separately for a 2 head/2 pallet machine tool. Also, they can be measured in seconds or minutes. Normally they are specified as Min/Max values.

Ideal: This setting allows the user to specify an ideal cycle time and a +/-% tolerance. If the actual cycle time measured falls within the +/- tolerance of the Ideal cycle time, the part is considered to be good.

Cycle count: This setting allows the user to specify a cycle count and a +/- % tolerance. This allows the cycle count to be tracked. Parts are counted when values are within the specified limits.

Cycle rate: This setting allows the user to specify a cycle rate and a +/- % tolerance. This allows the cycle rate to be tracked. Parts are counted when values are within the specified limits.

Cycle OFF Timeout: Is specified in minutes. A machine is considered to be idling if its cycle is off and no other specific reason is given why it is not running. If the idle time exceeds the specified maximum, any of the following may happen: 1) if the Email field is configured, a machine specific email notification will be sent to the appropriate email address(es).

Cycle start disable: 2) If this checkbox is checked, the machine's cycle start push button will be disabled. This feature is available only if the eMONITOR interface board is wired accordingly. Once the maximum Cycle OFF time is exceeded, the color of the status label on the monitoring screen will be changed to red.

Cycle ON Timeout: Is specified in minutes. This feature can be implemented in an attempt to avoid the situation where an operator puts the machine into some sort of “dummy” cycle (e.g. it appears to be running for a long time with no interruption). If the Email field is configured, a machine specific email will be sent to the appropriate email address(es) if the machine is cycling too long.

Minimum Cycle Off (Overlap) time: Specifies the cycle interruption time in seconds. Having a cycle interruption less than this setting will ignore the interruption and treat it as a continuous cycle.

Minimum Cycle On time: Specifies how long the cycle has to be on for it to register as a cycle ON condition. Any period less than the setting won't be recorded.

Cycle overhead: (in seconds) will add the set number of seconds to each cycle to see if the cycle falls between the Min/Max limits of an adequate cycle time.

First shift warm-up time: Is specified in minutes. Even if the machine is in cycle, it will be considered to be off, assuming that the machine is being warmed up. This applies only to the first shift.

Feed/spindle override scale: Is specified in a % value. It must be used with a monitoring board connected to either the feed override or spindle override selector switch. It should be set to the maximum value of the switch.

Feed/spindle override internal code: Is set to the number of switch positions for the feed override or spindle override selector switch. It must be used with a monitoring board connected to either the feed override or spindle override selector switch.

Enabled: If it is checked, the Cycle Count option is enabled.

Ignore Max. Cycle time: Will ignore the Max. cycle limit when it is determined if the part is good or not.

Part # ID in Part program: Is a string which will identify the part number. This ID and the part number itself need to be part of the program to be DOWNLOADED. See example below, where inside () would be the part number ID. The part number may be followed by two numbers, separated by commas. The first number specifies the minimum, the second number specifies the maximum cycle time for the part.

Example: O5555 P1234

(NEW-PART,30,40#2)

M30

In this example the call program is O5555, the program ID is P, therefore calling program 1234. The part number ID is the (specifying NEW-PART as the part number. The minimum cycle time for the part is specified at 30 seconds, the maximum is at 40 seconds. The head ID would be set to the # sign, specifying head/pallet number 2 in the example. The part number change is recorded into a data base for head two (assuming multiple head/pallet operation). Note here, that there can be a file defined in the machine specific Transmit\Download directory, called _CYCLE.TXT.

In this file every line starts with a part number, followed by two numbers (separated by commas) for minimum and maximum cycle times:

NEW-PART,12,24

ANOTHER

PART,120,240

If there is a download request with a part number definition, and this new part number has a matching line in the _CYCLE.TXT file, the newly defined minimum/maximum cycle times (in seconds) will overwrite the current min/max cycle times (see below).

Part # ID in Call program: is a string which will identify the part number. This ID and the part number itself needs to be part of the “Call Program”. The rules are pretty much the same as for the Part # ID in Part program.

Head/Pallet ID: is a string which will identify the head/pallet number for two head/pallet machines. In the downloaded program this ID is followed by the number 1 or number 2.

Required good cycle count for event termination: specifies how many consecutively made good parts (good cycle times) should terminate an event. The Cycle ON/Good part made event is considered to be Event 0. Any other event which is specified to be terminated by Event 0 will be affected by this item. A part is considered to be good if the cycle ON time falls between the specified minimum and maximum cycle times. Please, see the exception at the Terminating Events at [Monitoring Setup/Main events](#).

Required only by SETUP: If checked, then the required good parts will be effective only in SETUP mode. All other events will be terminated by any

CYCLE on condition.

Always record Cycle ON: If checked, the Cycle ON will be recorded while the Machine Status is set to SETUP. The benefit is that any Cycle ON during SETUP can be viewed but not counted towards PRODUCTION time.

Reset cycle count at the end of the shift: If checked, the Cycle Count will reset at the end of the shift.

[Mazak – Event command settings section]

Work number: If checked for event command, then the specific work number sent from the machine has to match the same number which is typed into the Event Command line to put the machine into that specific status.

Program name: If checked, the work number has to match the Call Work number, (see Configure Transmit/Download dialog), and the Program Name field on the MAZAK control has to match the Event Command line to put the machine into that specific status

User debug flag: Check this box to enable debugging. A file will then be created which can be used for Monitor debugging purposes. There is no benefit to the end user utilizing this feature.

Department: Specifies which department the machine belongs to. This is important only if email is utilized. See Email setup dialog.

Find name: Searches for a machine name and displays its monitoring setup. The search is case sensitive. It is enough to type in the beginning of the name to be able to find it.

Copy: copies the current setup on the clipboard.

Paste: copies the clipboard into the current setup.

Paste / Group: copies the clipboard into the current group (altogether 8 ports).

Paste to all: copies the clipboard into all the setups. Password protected.

OK: will record the new setup.

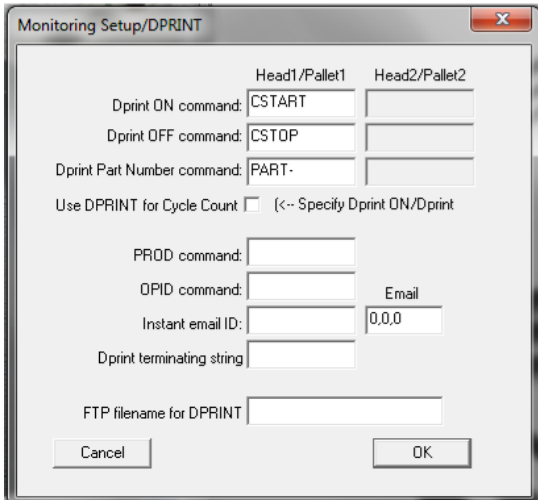
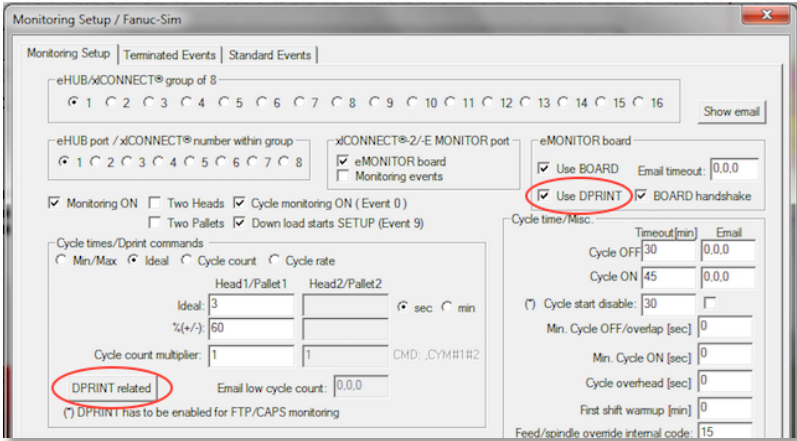
Cancel: discards all changes made.

DPRINT Related:

eNETDNC can monitor a CNC machine with an eMonitor board to detect signals, or with DPRNT statements sent from your G-Code program, or a combination of both.

To use DPRNTS with eNETDNC monitoring you must first turn on the option:

Use DPRINT: If box is checked, the ‘DPRINT related’ button will become selectable, allowing you to press the ‘DPRINT related’ button.



DPRNT ON Command: This command will override the signal from the eMonitor board and will tell eNETDNC that the machine is Cycle ON.
Recommended input: [CSTART].

DPRNT OFF Command: This command will override the signal from the eMonitor board and will tell eNETDNC that the machine is Cycle OFF.
Recommended input: [CSTOP].

-If you have only set a DPRNT OFF command, then eNETDNC will look for the signal from the board to start monitoring cycle on and would not show cycle off until it received the DPRNT OFF command.

The software will expect the control to issue statements via its serial port or Ethernet port about the in-cycle condition of the machine tool.

You can also set a DPRNT Part Number command to be able to change the part

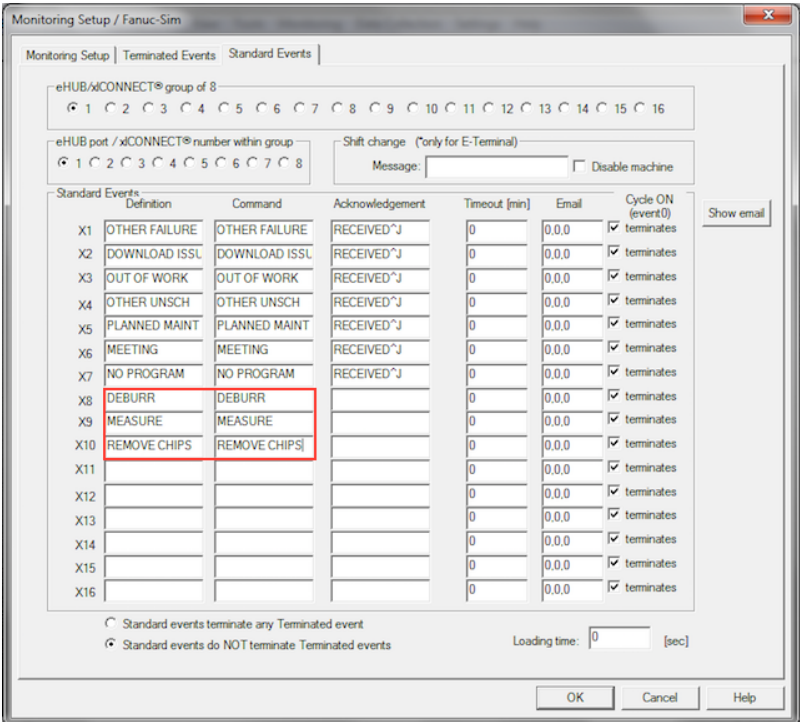
Dprint Part Number Command: Setting this will send a Part Number to eNETDNC, and will display on the Monitoring Dashboard as well as reports.

Dprint ON Command value determines the start of cycle for a machine and must match the same value in the DPRINT statement in the G-code.

Dprint OFF Command value determines the end of cycle for a machine and must match the same value in the DPRINT statement in the G-code.

Dprint Part Number Command: Setting this value sets a new Part Number which will be displayed on the Monitoring Dashboard, as well as in any reports. It is very useful if running multiple pallets, or if the programs are kept in the CNC machine and you want to change the Part Number that is recorded in eNETDNC for the current running job.

PROD Command: This is to change the status in the middle of the program; an example would be if you have an M00 in your program because you always stop at a point in the program to measure a part or remove chips, you can set a Standard Event in eNETDNC and then send that command out with a DPRNT statement. Following is an example:



G-Code example:
 G-Code before
 POPEN
 DPRNT[DEBURR]
 PCLOS
 M00 G-Code after

OPID command value will identify the operator running the machine. The ID must be the same as used in the G-code. It can be in a separate file or in the current running file, or added to the call command.

Instant email ID: Will send an email immediately to the selected emails (configured in ‘Settings – Email - Recipients’)

DPRNT Terminating String: xxxxx

FTP terminating String: xxxxxxxx

PROGRAMING INSTRUCTIONS EXAMPLE USING DPRINT COMMANDS

```
%  
O1000  
POPEN  
DPRNT[CSTART]  
DPRNT[PART-MYPARTNUMBER,20]{This is your Part Number and Cycle  
Rate} PCLOS  
G-CODE  
\  
/  
\  
/  
POPEN  
DPRNT[CSTOP]  
PCLOS  
M30  
%
```

If you use the DPRINT Part number command you can specify the first value as the part number, the second value as the cycle time, and the third value as the multiplier which must start with CYM#.

Example:

DPRNT[ABC123,20,CYM#4] -This would have ABC123 as the part number, the cycle time would be 20 minutes, and there would be four parts complete at the end of the cycle.

DPRNT[XYZ555,19,21,CYM#2] -This would have XYZ555 as the part number, the cycle time would be 19 minutes minimum cycle and 21 minutes maximum cycle, and there would be two parts complete at the end of the cycle.

DPRNT[12345AA-20,6.5] -This would have 12345AA-20 as the part number, the cycle time would be 6.5 minutes, and there would be (1) part complete at the end of the cycle.

If no multiplier is specified, then (1) part is always assumed. If no cycle time is specified, then whatever is setup in the software is assumed.

For all of the above to work your machine must be able to send out DPRNT statements, in most machines this requires the "Macro Option" to be installed by the machine manufacture. If you're not sure if you have this option, you may need to contact your machine manufacturer.

DPRNT formats for different CNC Controls

<u>Fanuc - Starting Commands</u>	<u>Fanuc - Ending Commands</u>
POPEN;	POPEN;
DPRNT[CSTART];	DPRNT[CSTOP];
DPRNT[PART-partnumber];	PCLOS;
PCLOS;	

<u>Fadal - Starting Commands</u>	<u>Fadal - Ending Commands</u>
#WAIT	#WAIT
#SPRINT[CSTART]	#SPRINT [CSTOP]
#SPRINT[PART-partnumber]	

<u>Mori Seiki - Starting Commands</u>	<u>Mori Seiki - Ending Commands</u>
POPEN;	POPEN;
DPRNT[CSTART]	DPRNT[CSTOP]
DPRNT[PART-partnumber]	PCLOS;
PCLOS;	
(Note: The commands may need to be in a Sub Routine)	

<u>Okuma - Starting Commands</u>	<u>Okuma - Ending Commands</u>
PUT'CSTART]	PUT'CSTOP
PUT'PART-partnumber	WRITE 0
WRITE 0	
(Note: The commands may need to be in a Sub Routine)	

<u>Yasnac - Starting Commands</u>	<u>Yasnac - Ending Commands</u>
#3100=(CSTART)	#3100=(CSTOP)
#3100=(PART-partnumber)	

<u>Haas - Starting Commands</u>	<u>Haas - Ending Commands</u>
G103 P1	
DPRNT[CSTART]	DPRNT[CSTOP]
DPRNT[PART-partnumber]	

Settings - Monitoring – General

Caution: Be sure to select the proper eHUB/xlConnect group and proper port when performing setup.

[Terminated events Tab]

End of shift OPID reset: Checking this will reset the Operator ID at the end of the shift.

Status request command: is a command coming from the machine tool or eTerminal. Upon receiving this string, the Status response string will be sent back, specifying the actual status of the machine in place of ^S, otherwise the format is similar to the event Acknowledgement format.

Operator ID command: is used to identify the operator of the current cycle. If using an eTerminal this MUST be set as “**OPERATOR ID:**”.

Operator ID ack.: Is used with the callback file to determine the value of the Operator ID field.

Cycle count command: is a command coming from the machine tool/eTerminal. Upon receiving this string, the ‘Cycle count ack’ string will be sent back, signaling that the Cycle count was received. When the user sends the cycle count from the machine tool, it has to have the following format:

Example:

O5555

(PC,22,1)

Where PC would be the cycle count command specified, followed by a comma, then TOTAL parts made followed by a comma then BAD parts made.

Definition: Is a keyword to define a particular event, such as MAINTENANCE, NO MATERIAL, etc. This keyword will be carried over to the database file to identify the particular event. The database file is updated at the end of every shift.

Command: Is an ID string, which can be either issued from the machine tool or scanned from an eWand/eTerminal to initiate the particular event.

-Example: (MAINTENANCE)

When setting up a barcode sheet for scanning with an eWand/eTerminal, ensure that there are '*' on each side of the COMMAND, and use a '_' character for spaces (using the fonts provided by eNETDNC).

For the MAZAK: if the Work number is checked for event command, then the specific work number sent from the machine has to match the same number which is typed into the Event Command line to put the machine into that specific status. If the Program name is checked, then the work number has to match the Call Work number, (see Configure Transmit/Download dialog), and the Program Name field on the MAZAK control has to match the Event Command line to put the machine into that specific status. See the specific Mazak check under the "Monitoring Setup" tab.

Acknowledgement: Is a user defined string, which is issued by the eNETDNC program upon receiving the Event Command.

Example: %^JO1234^J(MAINT ACK)^J%^J

^J represents a line feed (end of block) character. If necessary, the ^M represents the carriage return character. This means that 'MAINT ACK' will be displayed on the eTerminal.

Termination is a list of numbers separated by commas to specify which event(s) will terminate the particular event. The numbers are the line numbers in front of the Event Definitions from 1 through 8. (Note: that 0 represents the Cycle ON/Part made condition and 9 represents SETUP.)

Terminated Events						
	Definition	Command	Acknowledgement	Termination	Timeout [min]	Email
(*)	PRODUCTION	PRODUCTION	(^S)^J			
1	MAINTENANCE	MAINTENANCE	RECEIVED^J	2	0	0,0,0
2	MAINT COMPLETE	MAINT COMPLETE	RECEIVED^J	0,1,3,4,5,6,7,8	0	0,0,0
3	PROGRAM ERRO	PROGRAM ERRO	RECEIVED^J	0,1,2,3,5,6,7,8	0	0,0,0
4	TOOL BREAKAGE	TOOL BREAKAGE	RECEIVED^J	0,1,2,3,5,6,7,8	0	0,0,0
5	QC - FIRST PIECE	FIRST PIECE	RECEIVED^J	0,1,2,3,4,6,7,8,9	0	0,0,0
6	QC - IN PROCESS	IN PROCESS	RECEIVED^J	0,1,2,3,4,5,7,8	0	0,0,0
7	NO OPERATOR	NO OPERATOR	RECEIVED^J	0,1,2,3,4,5,6,8,#	0	0,0,0
8	NO MATERIAL	NO MATERIAL	RECEIVED^J	0,1,2,3,4,5,6,7	0	0,0,0
9	SETUP	SETUP	RECEIVED^J	5	0	0,0,0

Example:

Event 1 is MAINTENANCE, (2)

Event 2 is MAINT COMPLETE, (0,1,3,4,5,6,7,8,9)

Event 5 is FIRST PIECE, (0,1,2,3,4,6,7,8,9)

Event 9 is SETUP, (5)

This means that only Event 2 can terminate Event 1, but any other event can terminate Event 2. Event 9 can only be terminated by Event 5, but anything can terminate Event 5.

The TERMINATION event setting for any particular event only affects that event. Keep in mind that in this example if you scanned/entered ‘MAINTENANCE’, the machine could still run a Cycle, but you would not capture that data until ‘MAINT COMPLETE’ was scanned.

Special Characters:

An asterisk: “*”, the monitoring event, “Required good cycle count for event termination” does not apply.

A pound sign “#”, the particular event will be the Starting event of a new shift, no matter how the old shift was finished. Normally a new shift inherits the machine status from the old shift.

An “@” (at symbol), the event will be considered an unmanned machine for OEE purposes.

An “&” symbol, the event signals that Cycle ON does not apply as a terminating event.

A “P” sends the Part Number with the email message.

A “^” signals that a pallet should retain event even if the other pallet is switched.

Timeout: Is specified in minutes and is important only if Email functions are used. For any of the events where the timeout is specified as non-zero and the Email field is configured and the machine is staying in the event over the specified timeout, then an email will be sent to the specified recipients.

Note: scheduled break times are not considered to be part of the event, so the break times will be discounted from the ongoing event. Also, the event timers are reset at shift change, so the timeouts need to be set to smaller than the shift time (minus break times).

Email field is configurable for three shifts, which are separated by commas. Up to 3 email addresses can be entered per shift separated by semi-colons.

Example:

1, 0, 0

The three numbers symbolize three shifts: 1st, 2nd, 3rd.

The "1" would be the first email recipient line that is set up in the "Settings", "Email", "Recipients" Settings. Zero means that no email is selected.

SETUP is credited for previous event checkbox: if this box is checked AND the user enters into SETUP mode, the monitoring also enters setup mode, however, it goes back and credits the very last event as SETUP as well.

-For example (if box is checked): NO OPERATOR started at 10:00 AM, SETUP was requested at 10:30 - for the monitoring records SETUP will start at 10:00 AM and not 10:30

Use FTP/CAPS file name as 'Command': On an RS232 machine, the content of an uploaded file will be evaluated as a MONITORING command as well. However, nearly all the time, the uploaded file contains the program number itself, so the user could decide if he wanted to use the program number (such as: O8000, O8001, etc..) or some other program content for various MONITORING events - it's just a matter what keyword is defined as MONITORING event.

-For FTP/CAPS machines it is not the same, as the program number/name is normally not part of the file. So the check box makes it user selectable whether to use the upload name of the file content as a MONITORING command, or the file content (where the file name does not matter).

OK: will record the new setup.

Cancel: discards all changes made.

Settings - Monitoring - General

[Standard events Tab]

Caution: Be sure to select the proper eHUB/xlConnect group and proper port when performing setup.

Similar to the 'Terminated Events' tab, but without Terminating ability.

Definition: Is a key word to define a particular event, such as MAINTENANCE, NO MATERIAL, etc. This key word will be carried over to the database file to identify the particular event. The database file is updated at the end of every shift.

Command: Is the ID string, which is issued from the machine tool or eWand/eTerminal to initiate the particular event. (For Example: MAINTENANCE)

For MAZAK: if the Work number is checked for event command, then the specific work number sent from the machine has to match the same number which is typed into the Event Command line in order to put the machine into that specific state. If the Program name is checked, then the work number has to match the Call Work number, (see Configure Transmit/Download dialog), and the Program Name field on the MAZAK control has to match the Event Command line in order to put the machine into that specific state. See the specific Mazak check under the "Monitoring Setup" tab.

Acknowledgement: Is a user defined string, which is issued by eNETDNC upon receiving the Event Command. (For Example: %^JO1234^J(MAINT ACK)^J%^J where ^J represents a line feed (end of block) character. If necessary ^M represents the carriage return character.)

Shift Change: Message is used with the eTerminal and displays the field value as a message at the shift change. This allows a Supervisor to enter a comment, and the Operator would then need to go to 'Option 7: Check Message' on the eTerminal.

Disable Machine: Allows a Supervisor to disable the machine if Cycle Start Disable is installed on the machine, until the message is read.

Loading Time: can be set in Seconds and allows a 'Loading Time' to be shown instead of 'Cycle OFF' to show a specified period of time that a part is being loaded instead of a Cycle OFF condition. The maximum time that can be set for 'Loading' is 900 seconds (15 minutes).

Standard events Terminate/do NOT terminate:

Standard events Terminate any Terminated event: Selecting this allows the Standard events to Terminate any of the Terminated events even if the terminated events are set up to not be terminated by other events.

Standard events do NOT terminate any terminated events: Selecting this will cause the Standard events to NOT be able to terminate any of the terminated events, except for PRODUCTION when in Cycle OFF.

OK: will record the new setup.

Cancel: discards all changes made.

Settings - Monitoring - Report Dialog box

This section references Report related setup.

Generate Auto reports for each head/pallet separate: If checked, reports are generated separate for two headed (or two pallet) machines. Machines with one head/pallet are not affected by this.

Do not display part count: If checked, the part number will not display on the "Detailed monitoring" report.

[Auto report/to view with eViewer settings section]

Enable: If checked, a custom report file will be automatically generated at the end of the shift according to the following rules:

Machine oriented: If box is checked, reports are generated per machine.

Part number oriented: If box is checked, reports are generated per part number.

Operator oriented: If box is checked, reports are generated per operator.

OEE: If checked, an OEE report is generated. Note: For OEE reports the operators must enter the TOTAL and DEFECTIVE parts every time they are done with either the shift or the particular part.

[Machine oriented auto report/to view with eNETDNC settings section]

Enabled: If checked reports will be created automatically.

End of shift: If checked the reports are generated at the end of the shift.

End of day: If checked the reports are generated at the end of the day as a summary for all shifts.

Weekly: If checked the reports are still generated at the end of the shifts, however they are appended to previous reports. New report files are opened each Monday morning.

Per shift: If checked the weekly reports are generated as above at the end of the shifts. If Per shift is not checked the weekly reports are generated at the end of the day as a summary for all shifts.

Daily: If checked the weekly reports are generated as above, but have a daily column for each day of the week.

Summary: If checked the weekly reports are generated as above, but have a summary end column for the week.

Viewing detailed shift settings section

Show 1 head/pallet at a time: If checked the report will generate the display showing 1 head/pallet at a time.

Show 2 heads/pallets at a time: If checked the report will generate the display showing 2 heads/pallets at a time.

Always ask: If checked the report generator will prompt the user to select for either the 1 head/pallet or 2 head/pallet display each time the report is viewed.

The generated reports are named automatically the following way:

Daily reports start with a date code (MM-DD-YY-).

Weekly reports start with MmmDD where Mmm is a three letter abbreviation of the month, followed by the DD day (two digits from 01 through 31).

Next comes the machine name (for machine oriented reports) or the part number (for part number oriented reports).

Then SHIFT1, SHIFT2 or SHIFT3.

The name may show an optional -1 or -2 for two headed machines.

All reports have a “.CSV” extension.

OK: Will record the new setup.

Cancel: Discards all changes made.

Settings - Monitoring - Department/shift Dialog box

This section references Department and Shift related setup.

Different departments can be setup with each Department having user configurable shift times for each day of the week.

	*Shift time span	*Break 1 time span	*Break 2 time span	*Break 3 time span
1st	8:00 - 12:00	8:45 - 9:15	12:00 - 12:15	13:45 - 14:00
2nd	12:00 - 24:00	19:00 - 19:30	0:00 - 0:00	0:00 - 0:00
3rd	23:00 - 8:00	0:00 - 0:00	0:00 - 0:00	0:00 - 0:00

(*) Time span should be specified in 24 hour
All three shifts should start the same day or may have 0:00 - 0:00 settings

Example 1: 6:00 - 14:00
Example 2: 14:00 - 22:30
Example 3: 22:30 - 6:00

The user can define up to three shifts start and end times. Within each shift there can be up to three breaks defined (in order). All times need to be specified using military time. The data file for machine monitoring is updated at the end of each shift. The data file is kept in the C:_eNETDNC_MONITORING directory, and named as _DATAYY.DAT, where YY is the two-digit year code.

-Type a user-defined Department into the bottom left box, and then press 'Add'.

-Select Day of week from drop-down, and then configure times. For 24 hour shift, leave all zeroes.

-Ease setup by pressing 'Copy 1 Day' and then selecting the next Day from drop-down and then press the 'Paste 1 Day'. Continue this until all days are completed.

When Department configuration is complete, machines must be assigned to a specific department via the "Settings", "Monitoring", "General" – "Monitoring Setup" tab.

OK: Will record the new setup.

Cancel: Discards all changes made.

Settings - Data Collection - General

This section references Data Collection setup. Since each data collection device may be different, setup should be performed individually for each port (Machine) which collects data. The copy/paste operation helps to speed up the setup process for the devices which are alike. For any particular data collection device setup, the user first needs to select the eHUB/xiConnect and Port where the device is connected to.

Data Collection Setup

Machine name:

eHUB/xiCONNECT® group of 8
 1 2 3 4 5 6 7 8
 9 10 11 12 13 14 15 16

Special hardware
 None
 E-Terminal/2 ports
 E-Terminal/3 ports

eHUB port / xiCONNECT® number within group
 1 2 3 4 5 6 7 8

Data Collection ON

Data file name
 Include mch. name
 New file
 Annually Montly Daily
 File prefix:
 Full data path:
 Extension:

E-TERMINAL display	Field ID in file
1 *Start Job	
2 Employee	Employee:
3 Job Number	Job Number:
4 Operation	Operation:
5 *Finish Job	
6 Employee	Employee:
7 Job Number	Job Number:
8 Operation	Operation:
9 ~Parts Complete	Parts:
10 ~Bad Parts	Bad:
11 Scrap Codes	Scrap Codes:
12	

Date Filed ID:
 Time Filed ID:

Data file fields
 Include mach. name
 Include date
 Include time
 Numerical data only
 Validate data

Delimiter
 Comma
 Tab
 Space
 Semicolumn

Use ~ character at the beginning of display line to specify keypad entry
 Use @ character at the beginning of display line to specify message only
 Use comma and a number for repeat entry

The Data Collection ON box must be checked if data collection is to be performed for the selected port.

The Special hardware group specifies if special hardware is used to collect the data. These settings include E-Terminal/2 Port & E-Terminal/3 Port. (See E-Terminal related issues)

The name of the file, where the data is saved, is created according to the following rules:

Include mch. Name: If checked, the file name starts with the machine name, specified in Configure Common dialog. If it is not checked, the user can type in the text value that the file name should start with.

New file creation options are Annually, which creates a new file for each calendar year, Monthly, which creates a new file for each calendar month, or Daily, which creates a new file for each day.

File Prefix specifies the prefix for the data file.

Full data path specifies the full path for the data file.

Extension specifies the file extension for the data file.

Settings in the Data file fields include:

Include mach. Name: If checked, the machine name is saved into the file every time data comes in.

Include date: If this option is checked, the date is saved into the file every time data comes in.

Include time: If this option is checked, the time is saved into the file every time data comes in.

Note: You will always want to select E-Terminal/3-Ports if your doing Data Collection. The 2 Port Is only for backward compatibility for older units with 2 Ports and no eWand.

In eNETDNC you can collect Data in two formats to be collected for other systems. On the column labeled E-Terminal Display, this is what will be displayed on the E-Terminal. If the line starts with a * that will be a menu choice. If you are using menus they will show up first, then which every one you select the questions below it will be asked until you get to the next menu item. You can also use a ~ charter at the beginning of the line to specify keypad entry instead of scanning.

The column labeled Field ID in file is what the ID name will be in the data file collected by eNETDNC. If the file name ends in .CSV the file will be saved in this format:

```
MCH NAME,Employee:,Job Number:,Operation:,Parts:,Bad:,Scrap Codes:,Date:,Time:  
Fanuc Sim,USER1,87654B3622A,OP10,,,,,01/07/15,10:59:05  
Fanuc Sim,USER1,87654B3622A,OP10,33,1,SC05,01/07/15,10:59:26  
Fanuc Sim,USER1,87654B3622A,OP30,,,,,01/07/15,10:59:43  
Fanuc Sim,USER1,87654B3622A,OP30,20,0,SC09,01/07/15,11:00:21
```

If the file name ends with any thing else it will be in this format:

```
1:Fanuc Sim,Employee:USER1,Job Number:87654B3622A,Operation:OP10,Date:01/07/15,Time:10:56:47  
2:Fanuc Sim,Employee:USER1,Job Number:87654B3622A,Operation:OP10,Parts:33,Bad:1,Scrap Codes:SC05,Date:01/07/15,Time:10:57:10  
1:Fanuc Sim,Employee:USER1,Job Number:87654B3622A,Operation:OP30,Date:01/07/15,Time:10:57:28  
2:Fanuc Sim,Employee:USER1,Job Number:87654B3622A,Operation:OP30,Parts:20,Bad:0,Scrap Codes:SC09,Date:01/07/15,Time:10:57:51  
1:Fanuc-Sim,Employee:USER1,Job Number:87654B3622A,Operation:OP20,Date:09/02/15,Time:13:18:58
```

With the CSV format every line scanned will have its own line containing what was scanned. In any other format each line will start with the menu choice followed by the machine name, everything after that will have its header followed by the data collected.

On the right side of the screen you can select the file name and include extra data by checking the checkboxes.

Numerical data only: If checked, any non-numeric character is filtered out from the incoming data.

Validate data: If checked, data validation is performed according to the rules specified in the Data Validation dialog box. The data which does not conform to validation rules is rejected. If the checkbox is not checked, all data is accepted.

The Delimiter setting specifies a delimiter as the data comes in. The same delimiter is used when generating a report from the collected data – see Generate report.

E-Terminal display items: the user can specify text values to use as menu items for the E-Terminal, (if it is the data collection device). The E-Terminal will use the text values as a “Custom menu”. Normally, as each menu is executed in order, the E-Terminal will monitor for data input from an RS232 device, such as a bar code scanner, and passes the data as the next field. However, if the menu line starts with the ~ character, the E-Terminal will monitor for data coming from its key pad. Also, if the menu item starts with the @ character, the E-Terminal will prompt the user as a message only. When this occurs, if the user is ready to upload the information, the UPLOAD key on the E-Terminal will upload the data collected up to that point and jump to the first menu item. If the user is not ready to upload it is possible to continue with the menu upon pressing the ENT key.

Field ID in File This option allows the user to specify field IDs, which will be inserted into the file before each field item.

Find name: searches for a machine name and, if found, displays the respective setup. The search is case sensitive.

Copy: copies the current data collection setup to the clipboard.

Paste: pastes the clipboard into the current data collection setup.

Save & Exit: will record the new setup. If new data collection devices are setup the user may have to exit and re-enter the eNETDNC program. The user will be prompted if this is necessary.

Cancel: discards all changes made.

Settings - Data Collection - Data Validation

This section references Data Collection validation setup. The data validation is performed separately for each field, up to eight fields. Data validation rules are the same for all data collection ports, however validation can be turned off for individual ports. See [Data Collection Setup dialog box](#).

Enable: This box enables/disables data validation for the specific field.

Numbers only: If this box is checked, the field will be validated only if numeric digits come in (including +/- signs and the decimal point).

Length: If this value is blank, field length is not checked. If the value is one number, the field length must match that number to be validated. If the field contains two numbers separated by a comma, the field length is validated using the first number as a low limit and the second number as a high limit. The numbers are inclusive.

Save & Exit: will record the new setup.

Cancel: discards all changes made.

Settings - Email - Server

This section references Email related setup.

From: This value is a valid email address which is used to send the email. (For example: somebody@thiscompany.com.)

Mail server: This is the outgoing email server of the company. (For example: smtp.out.mail.com.)

The optional Account name is required if the mail server requires authentication. It is usually the same as the From value.

Password: This is required only if the mail server requires authentication.

OK: will record the new setup.

Cancel: discards all changes made.

Settings - Email - Recipients Dialog box

This section references Email recipient(s) settings. These options only need to be set if email is used in connection with a triggered monitoring event.

The idea behind the email message system is this: each machine belongs to a department (see “Monitoring setup dialog”). For each department there are emails which can be specified for each day (usually for the three shifts). Each day (Monday through Sunday) can be set individually as far as the (shift) times, and email addresses go. Any time an event is triggered which requires notification (email), the software will determine which email is affected and emails the correct one.

Each row can contain up to 3 email addresses separated by semi-colons.

OK: will record the new setup.

Cancel: discards all changes made.

Other Options - Menu

Settings - Other Options

Print header: If checked, the print operation will print the file name, print date as a header for each page.

Print page numbers: If checked, then the page numbers are also printed.

Print full path: If checked, the full path of the particular file will be printed in the header of every page. If it is not checked, only the name of the file will be printed.

Print two columns: If checked, the printer will print two columns on the same page (paper saving).

Page margins: Refers to print operations, and are measured in inches.

Scroll all windows for mouse wheel: If checked, then the text in all open edit windows will be scrolled by rolling the mouse wheel.

Scroll all windows with scroll bar: If checked, then the text in all open edit windows will be scrolled by scrolling any of the scroll bars.

Full path for temporary files: Specifies where the temporary files will be saved during eHUB related transmit and receive operations. This is shown for information only.

IP address for eHUBs: Should normally be set to all zeroes, unless the computer has multiple Ethernet cards. In such a case this should specify the static IP address of the Ethernet card which controls the connected eHUB(s)/xlConnect units.

If a group of machines is configured using the eNETDNC program as the FTP server, (see eHUB/Configure dialog), then the FTP IP address and the FTP password become effective. The FTP IP address should normally be set to zero, unless the DNC computer has two Ethernet ports installed. If the DNC computer does have two Ethernet ports, this IP address setting is for the port which connects directly to the machines.

FTP password: Is used when initiating FTP communications from the CNC machine. This password needs to be specified in the control.

The Editor default file path specifies the default directory for the editor.

Remember editor directory: Specifies if the editor remembers the last edited directory (checked), or always defaults to the above default path (un-checked).

Start minimized: If checked, the program will start running minimized after activation.

eHUB/xlConnect update applies only to 10/100 Mbits/s V.4.0 or later eHUBs. If checked, the eHUB/xlConnect units will be updated to the current firmware version via their respective upgrade process.

Monitoring applies only to systems equipped with eMonitor boards, and should be checked only for those systems.

Monthly CSV file applies only to systems equipped with machine monitoring cards. If checked, the _MACHINE_YYYY.CSV file in the C:_eNETDNC_REPORTS directory will be broken up into files per month instead files per year.

OPC server applies only to systems equipped with eMonitor boards. If checked, the monitoring system acts as an OPC server.

SQL client applies only to systems equipped with eMonitor boards. If checked, the monitoring system acts as an SQL client. (See Appendix A for detailed information on setting up a SQL Database).

Remote up/down load works with connection of eNETDNC-LT systems. If checked, it allows remote machine loading using eNETDNC-LT program(s) running on the same network.

Remote status applies only to systems equipped with eMonitor boards. If checked, the monitoring system will allow a remote eNETDNC-LT to change the monitoring status of a machine.

If Detailed file open window is checked will show files in detailed view in the "File -Open" dialog box.

If Data Collection is checked the Data Collection option is enabled. It uses additional memory and should only be turned on if it is configured to be used.

Option to "Load" machine with edited file If this is checked eNETDNC will cue up the last edited file when selecting a file to manually send to the machine.

HTTP Server

The HTTP Server can display the Monitoring dashboard on a Webpage; on any computer or connected device (cellphone, tablet, etc.) that is connected to the site's LOCAL network. A VPN type connection can be set up by your site's IT department that can allow remote connections to this LOCAL network, so that the dashboards can be viewed remotely.

There are two types of viewable web pages: Basic and Advanced. Basic gives a very basic display, and is included free of charge with every eNETDNC installation. Advanced is a purchasable option, and must have a USB dongle to enable the option.

The Ethernet IP address for HTTP: Should normally be set to zero, unless the DNC computer has two network cards installed. If the DNC computer does have two network cards, this IP address setting is for the network port which connects to the network.

Cancel quits without saving.

OK saves the current setting.

BASIC

Enable HTTP Basic Server: If checked, the machine up/download and machine monitoring actions can be viewed with a WEB browser. The only criteria is that the DNC computer should be reachable by the WEB browser. (For example: both computers are on the same network. The DNC computer's IP address is 192.168.1.100. On the browser computer the user should type into the address bar: <http://192.168.1.100> and issue the request. The DNC computer will respond with a password request, and from there on the user can choose what to view. The DNC computer can serve up to 5 viewing requests the same time.)

Refresh interval specifies the browser refresh rate in seconds if the browser user clicks on the Auto Refresh button.

Timeout specifies in minutes the Auto refresh timeout.

Password specifies the browser password.

ADVANCED (Currently in Beta)

Enable Advanced HTTP Server: **Purchasable Option** If checked, the machine up/download and machine monitoring actions can be viewed with a WEB browser. Furthermore, the Timeline view of selected machines can be viewed as well. The Advanced acts exactly the same as the Basic in regards to being on a LOCAL network.

Entry into Advanced is accomplished by one of two ways (A licensed USB Dongle must be installed prior to starting eNETDNC):

1. Enter the IP address that eNETDNC is running on into your browser (or enter the IP address that is input into the 'Ethernet IP Address' if using multiple network cards on the eNETDNC computer). The format MUST be like this: **10.0.0.99/Adv.html** or **10.0.0.99:xx/Adv.html** (If a different Port is used than the default '80', where 'xx' is the Port number).

Once the IP address is entered, there are two selections; Monitoring and Timeline. Select the radio button that you would like to view, and then enter a pre-set Username and Password, then press Enter.

2. Enter the following strings, depending on the display to view:

-For Monitoring Dashboard:

<http://YOURIPADDRESS/Adv.html/User=USER1&Password=1234&SEL=-1>

-For Timeline:

<http://YOURIPADDRESS/Adv.html/User=USER1&Password=1234&SEL=-2>

USER1 = Replace with the actual Username

1234 = Replace with the actual Password

User Logins: Once a User is logged in, eNETDNC will not allow two Users logged in with the same name, whether it is on the same computer, or a different computer. To log out, the User needs to close the browser window(s). If eNETDNC determines there is more than one of the same User trying to log in, it will 'bump' the first User off, and send a message that a new User has logged on, and ask to try logging on again. Generally the new User would need to try logging in again. If a User switches from the Dashboard, to the Timeline view, two attempts will be needed to 'bump' the original login, and then the 2nd attempt will actually log that User in.

Machines Monitored: Displays a list of available machines that can be displayed.

User Machine List: The user can select a machine from the ‘Machines Monitored’, and then press ‘Add Machine’, ‘Insert Machine’, or ‘Delete Machine’, to be added to the ‘User Machine List.

Selected User: A Drop-down list of created Users.

Add/Update User: Type in a Name and Password and then press this button to create a new/update User.

Delete User: Select a User and then press this to delete that User.

Password: Enter a password for logging into the Advanced webpage.

Refresh Interval (seconds): Sets the refresh rate of the webpage.

Machines per page: Select 0 for all, or a specific number for how many machines to be viewed per page.

Font Multiplier (50-200%): Sets the font size for the numbers/letters that are displayed.

Title: Allows to set a Title for the webpage display.

Logo: Allows to set a logo to be displayed on the webpage.

Currently Connected User List: Displays a list of all currently connected Users.

-Refresh: Refreshes the Currently Connected User List.

-Remove: Select a Currently Connected User and then press ‘Remove’ to remove that current User.

Help Menu

Settings - Help - Help Topics

Displays the opening screen of the Help menu. From the opening screen, you can jump to step-by-step instructions for using the program, as well as various other types of reference information. Once Help is opened, click the Contents button to return to the opening screen.

Note: Help files are not supported by Microsoft from Windows 8.1 to current versions, so Help files are unavailable for these newer versions, although everything documented in the Help file can be found in this manual (which is more current).

Settings - Help – Version

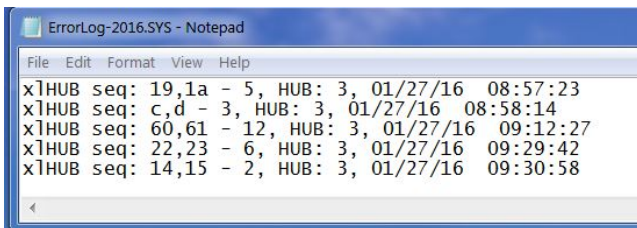
This displays the current version of the eNETDNC software, followed by all hardware. This is helpful if viewing current hardware versions, and will indicate (by comparing to the version of the hardware itself to what is documented here) if an update is needed.

Error Logging

C:/_eNETDNC/_LOGFILES

Within the above directory can be found several types of log files, including the following:

- 1. EmailLog-20xx**
-This log displays all emails that are sent from eNETDNC.
- 2. ErrorLog-20xx**
-Shows the timing of UDP packet transmissions.
- 3. LOGFILE-20xx**
-This logfile shows all program uploads/downloads, useful to determine whether a program was ever uploaded/downloaded, and to which machine.
- 4. RelayStatus.txt**
-This file simply displays the current onboard Cycle Start Disable relay status. It has no value to the end user.
- 5. ResetLog-20xx**
-This log can be very useful for troubleshooting, as it shows every time that a hardware communication device loses connection and reconnects to the eNETDNC software. In the following example; the hardware is displayed, followed by two sequence numbers. The first number is what eNETDNC expects it to be, and the second is what actually is received from the hardware (this is in Hex). The file entry ends with the date/time.



```
File Edit Format View Help
x\HUB seq: 19,1a - 5, HUB: 3, 01/27/16 08:57:23
x\HUB seq: c,d - 3, HUB: 3, 01/27/16 08:58:14
x\HUB seq: 60,61 - 12, HUB: 3, 01/27/16 09:12:27
x\HUB seq: 22,23 - 6, HUB: 3, 01/27/16 09:29:42
x\HUB seq: 14,15 - 2, HUB: 3, 01/27/16 09:30:58
```

- 6. ShiftLog-20xx**
-This displays the shift changes for each machine.

OEE

OEE (Operational Equipment Efficiency) can help to evaluate/calculate the efficiency of the Machine(s) through the use of the eNETDNC Monitoring system.

The following features, which will be displayed on the 'Display Machines – Detailed' view, are available:

***AVAILABILITY:** Always monitored- Ratio of actual Production Time vs. Total Available Production Time.

***PERFORMANCE:** User settable: Check box - ratio of Actual Cycle Count vs. Ideal Cycle Count during production time. If disabled (in Setup), internally it's regarded as 100% for the Total calculation.

***QUALITY:** Currently not monitored, and pre-set to 100%. Each Customer may enter scrap in a different way, contact eNETDNC to discuss. –Ratio of Scrap vs. Total parts made.

****TOTAL:** Availability * Performance * Quality

Notes:

-In Setup, the high limit and low limit determine the background color of the OEE label. If Total (T) is equal/above high limit, the color will be Green.

Below limit, color will be Red. Between the limits, color will be Orange.

-New Part Number will reset OEE monitoring. End of shift resets OEE only if "Part Number count is reset at the end of the shift" is checked in Monitoring settings.

-Break times are excluded from monitoring, except if Cycle ON during the break time.

-None of the OEE components can exceed 100% (even if ideal cycle times are set too low for Performance).

Quitting and re-entering the program loses carry over from previous shift (if any), and loses real time monitored break time. (Those two are maintained real time in memory while the program is running uninterrupted). Also, If SETUP is scanned, it is then assumed that a new Part Number is entered, even if the same number was entered, which will reset the OEE as a new Part being run.

eTerminal

This section describes Setup and Operation of the eTerminal for Machine Monitoring/Data Collection.

eTerminal

The E-Terminal is a handheld unit with a two-line LCD display and a 20-key keypad. The user can rotate through the letters on the keys which makes it possible to enter all alphanumeric/other characters. The E-Terminal unit has three serial ports. One connects to an eHUB/Wireless unit, one to an eWand/barcode scanner, and the third to a machine tool Serial Port. Through its middle serial port connection, the eTerminal unit is also able to supply operating power to the eWand. The E-Terminal can download a “custom menu” from the eNETDNC program. This custom menu is created as shown in the [Data Collection Setup menu](#), under the [E-Terminal display](#) items. The user can type in specific text as menu items for the E-Terminal as well. Normally, as each menu is executed in order, the E-Terminal will monitor for data input from an RS232 device, such as an eWand, and pass the data as the next field. However, if the menu line starts with the ~ character, the E-Terminal will monitor for data coming from its keypad. Also, if the menu item starts with the @ character, the E-Terminal will prompt the user as a message only. When this occurs, if the user is ready to upload the information, the UPLOAD key on the E-Terminal will upload the data collected up to that point and jump to the first menu item. If the user is not ready to upload it is possible to continue with the menu upon pressing the ENT key. After an upload attempt, the E-Terminal will prompt the user to press the ESC key. Once that key is pressed, the E-Terminal will indicate if the upload process was successful or not. Typical upload failures include data transmission error or invalid data (see [Data Collection Validation dialog](#)). If an upload failure occurs, the user will have to repeat the data entry process until it is successful.

The eTerminal has 8 options:

1. UPLOAD

-See eNETDNC User Manual

2. DOWNLOAD

-See eNETDNC User Manual

3. MONITORING

-Once eNETDNC is configured, and the hardware is able to communicate to the software, pressing Option 3 and then the ENTER key should display: ‘SCAN MON. EVENT’. (If it does not, then it means that the Event Menu was not downloaded; most likely due to a communication or setup issue). Depending on how the eTerminal is set up, the Operator can then scan a barcode, or press the up/down arrows to select a Monitoring Event. After scanned or selected, press the ENTER key and ‘ENTER COMMENT’ is then displayed. If the user scans or types a comment, it will be passed to the .MON file/SQL Server, but will NOT show up on the Monitoring Dashboards. You can leave this blank, and then press ENTER. If successful, the acknowledgement set up in the Settings – Monitoring –

General –Terminated Events tab should be displayed on the eTerminal. Simply press the ESC button to return to the Main Menu. When SETUP is scanned, the following prompts will be displayed one after another:

-PART NUMBER –Enter or Scan your Part Number here. Part Numbers are normally added to job sheets.

-CYCLE TIME (min OR sec) – Enter a best guess or known Cycle time, or leave blank and the default setting from ‘Settings – Monitoring – General – Cycle time’ will be used.

-If Cycle Multiplier is turned on in Option 8: Settings, then you will have the option of adding a Multiplier, which will then multiply the Parts count by that many after one Cycle is counted thereafter. Leaving blank defaults it to 1. If this option is turned off in the settings, then it will not be displayed.

-Please wait will then be displayed, and an acknowledgement will then be displayed as to whether it was received good or bad. Press ESC to return to the Main Menu.

4. OPERATOR ID

-Select this option and type or scan a barcode for the Operator’s ID, then press the ENTER key. A ‘PLEASE WAIT’ message will be displayed until it has been transmitted and a “received” response is received. Press the ESC key to return to the Main Menu.

5. PARTS

-Select this option to enter TOTAL PARTS MADE/BAD PARTS MADE for OEE collection.

6. DATA COLLECTION

-Select this option to be prompted to enter Data that is set up in the ‘Settings – Data Collection – General’ settings. This information will then be saved to a specified file/location that was setup in the Data Collection – General setup.

7. CHECK MSG

-A message can be sent by a Supervisor from the Settings – Monitoring – General – Terminated Events tab, where the Cycle Start Disable can be enabled as well. The Operator must enter Option 7 in order to view the message, it does not pop-up on it’s own.

8. SETUP

-This option allows the user to set up the eTerminal with the following items: (to change a setting, select the item you would like to change and then press 1, 4, 7, in consecutive order, then use the right arrow key to change to the desired setting, then press the ENTER key and then unplug and plug back in the ‘COMP’ RJ45 connector -on the top right of the eTerminal).

a) Comp. Baud – Sets the Baud rate for the eTerminal to pass data to/from the eNETDNC computer (this is set up in the ‘Settings – DNC eHUB/xCONNECT Settings).

b) Mch. Baud – Sets the Baud rate for the eTerminal to pass data to/from

the Machine tool's RS232 port.

c) Scanner Baud – Generally this should be fixed at 9600 unless using an xlConnect-U1 unit which needs the Baud rate to be set to 38400.

d) Code – Default is ISO, but other selections are BIN and, XMDM.

e) Name ID: - Default is '*', but nearly anything can be set here...but it must match in the DNC settings.

f) Directory ID: - Default is blank, but nearly anything can be set here...but it must match in the DNC settings.

g) UPLOAD REQUEST: - Default is 'DELAYED', but 'IMMEDIATE' is a second option. DELAYED means that the eTerminal will not send the File Name that you type until the file starts uploading. IMMEDIATE means that the File Name gets sent immediately.

h) MONITORING: - Default is 'SCAN', but 'KEYPAD' is a second option, and would be used where an eWand is not connected to scan events, etc. In this case, selecting Option 3: MONITORING will bring up a selectable list of all the Monitoring Events that can be selected, simply by pressing the up/down arrows and then pressing ENTER to select the event.

i) MCH. STOP BITS: - Can select 1 or 2.

j) UPDATE – Used for updating the eTerminal Firmware to the most current version.

-eTerminal firmware must be at Version 4.00 or above.

-Ensure the latest eNETDNC Software is installed on the computer.

-MONITORING must be enabled for the machine/hardware connected to eNETDNC via 'Settings – Monitoring - General'.

-eTerminal must be connected to the 'MACHINE' port on the hardware (not applicable for eHUB...just connect directly to eHUB port).

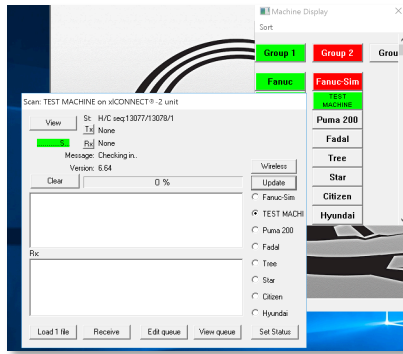
-Baud rate must match what is set in the eNETDNC settings.

How to update the eTerminal:

Once the previous conditions are met, use the following steps to update the eTerminal to the latest firmware:

1. On the eTerminal under 'SETUP – UPDATE', Press 1, 4, 7 and then: 'ENT TO UPDATE' will display on the screen.
2. Press ENTER and: 'UPDATE REQUEST'.. "Please wait" will be displayed. It will take a few minutes to fully update, and will then restart once complete. You can view the update by opening the Machine's terminal window:

NOTE: If the eTerminal is at a firmware version below 4.00, it cannot be upgraded by the end user. In this case, it can be sent in for refurbishment, where the internal chip is upgraded, and housing/keypad replaced; if needed. Contact your eNETDNC Reseller for information/pricing.



k) UPLOAD ACK.: - Default is ON, but OFF can be selected. Shows an acknowledgement of whether a Part Program was uploaded successfully by pressing ESC after it was uploaded. It will return a “Received Good or Bad” response.

l) CYC. MULTIPLIER: - Default is OFF, but ON can be selected. This allows a MULTIPLIER to be added as a last step when scanning SETUP.

Hardware Installation

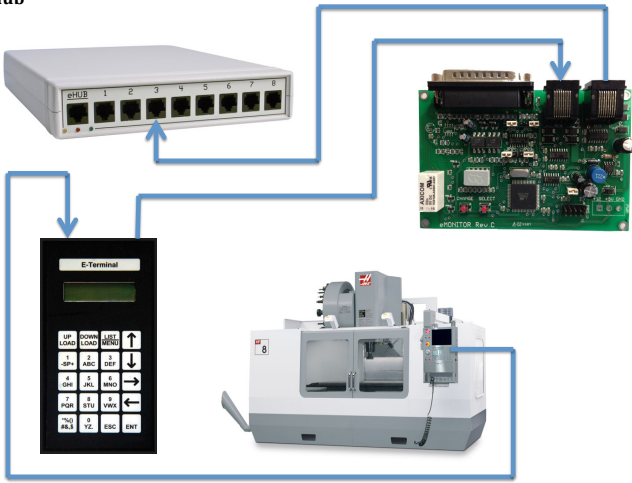
Typical hardware installations include an eMonitor board, and either an xlConnect wireless unit, or eHUB/xlConnect wired unit. The following diagram shows typical installation flows for both types of units. The eTerminal can be bypassed, but you lose the functionality of: manually inputting Events, Data Collection, and OEE. Generally, the Cycle Start Disable cannot be utilized, except by enabling the Cycle Start from eNETDNC, which seems counter-productive, and may not account for correct down time.

Typically, most new installations will use new wireless hardware which will have one Serial Port for connecting to the Machine tool and one Monitoring port for connecting to the eMonitor board. Generally, the eTerminal will be connected between the Machine tool and Machine port of the xlConnect unit.

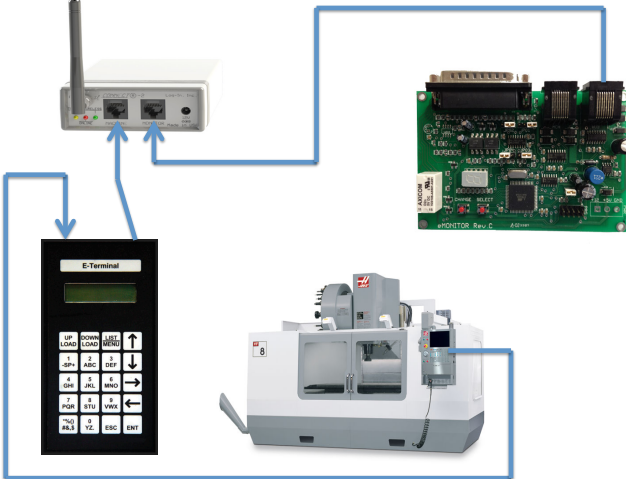
For wired installations, the eMonitor board will be first connected to the hardware device (eHUB/xlConnect-E/-W, followed by the eTerminal, and then the Machine tool.

Typical Cable Connections for Monitoring:

eHub



xlConnect-2/-E



The eMonitor Board

The eMonitor board has a 7-segment LED display that can display different pieces of information. The default display is a blinking dot, which indicates Cycle OFF. When powering on the eMonitor board (plugging hardware via CAT5 cable to the eHUB port of the eMonitor board), the board firmware is displayed (3.xx), each number displayed one after the other.



Other status indications of the 7-segment LED are variations of the outer segments ‘walking’ around in a circle:

- 1) -‘Walking’ around outside segments: **Cycle ON**
- 2) -‘Walking’ around to inner half segment: **Cycle ON; Pallet/Head A or B** (depending on which Pallet/Head is on will determine which half will be ‘walking’).
- 3) -‘Walking’ around outside segments with solid center segment: **ALARM**
- 4) -A flashing exclamation: **Cycle Start Disable enabled**= machine locked

The eMonitor board has three connections (SERIAL comm. ONLY!):

1. A DB25 connector; for connecting Inputs/Outputs
2. An RJ45 ‘MCH’ Output; for connecting to either an eTerminal or Machine’s Serial port (DB25-RJ45 adapter is needed on the machine RS232 connection).
3. An RJ45 ‘eHUB’ Input; for connecting to eNETDNC Hardware. The eMonitor board receives 12vdc power via this connection.

The eMonitor board can pass part programs between the Machine Tool and eNETDNC hardware, and has the following selectable Baud Rates:
300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 115200.

-These can be selected by pressing the red ‘Select’ button one time until a ‘b’ is displayed. Pressing the ‘Change’ button will change the Baud rate in consecutive order with each button press. (The factory default is 9600). To Save the change, press the ‘Select’ button 3 times, until a flashing red dot is shown in the 7-segment display, and then unplug the outer RJ45 ‘eHUB’ connector and plug back in to restart. (9600 must be selected for board programming).

The eMonitor board communicates to the eNETDNC software every two minutes, unless an event occurs (Machine Status changes, or an Operator scans/types an event), at which point the board will send an update immediately. If eNETDNC does not receive a response from the eMonitor board after 10 minutes, it will display 'NO EMONITOR'. Also, if a network error occurs, etc., then the eMonitor will issue an update within 2 minutes for any failed transmissions. If this occurs, the current status of the machine may not update until this 2 minutes has elapsed.

A Note on Monitoring with eNETDNC/eMonitor boards: ONLY tie into machine tool OUTPUTS. NEVER tie into PLC Inputs, as the eMonitor board can affect the PLC! The board can handle ONLY DC voltage from 0-30vdc.

(Review the 'eMonitor Settings Reference Sheet' at end of this section)

The eMonitor board provides up to 4 Digital inputs at one time. (meaning there is a constant, non-changing voltage. [5vdc, 24vdc, -10vdc, etc]), and 2 optically isolated inputs that sense current for LED's/Multi-plexed LED's.

-Pins 1 – 4: are Voltage sensing inputs, and go through Jumpers that can be set to compare a difference between the Input and internal characteristics of the eMonitor board circuit.

-Pins 5 – 6: are Current sensing inputs, and go through 4N35 Opto-isolators. This is useful when there is a regular/matrixed LED. Examples are older Fanuc controls, where you'd have 3.3vdc on one leg of the lamp, and 2.8vdc on the other. Another example is many of the newer Mori-Seki controls that have a bunch of solder connections for the LED Cycle ON lamp (like a 7 segment LED).

-By using a 10k ohm resistor from Pin 18 or 19 (or both, depending on which of pins 5/6 you are using) to Ground (Pins 14-17) we can change pins 5/6 from Current sensing to Voltage sensing.

The Jumpers work as follows:

-No Jumper: Pins 1-4 need to be driven by the monitored signal above or below 1.6vdc. Used for smaller voltages, or when using a Solid State Relay where the signal path completes to the ground on the eMonitor Pins 14-17. Most commonly, you'll use this configuration for monitoring 0vdc, or with proximity sensors.

-Jumper on Pins 1-2: Acts as a threshold level shifter (pulls up 5vdc). Used for monitoring signals that are normally high, but an Active (monitored condition) will be LOW. (Monitored signal is a negative voltage).

-Jumper on Pins 2-3: Acts as a voltage divider (pulls down to ground). Used for monitoring signals that are normally low, but an Active (monitored condition) will be HIGH. (Monitored signal is a + voltage).

-Pins 7 – 8/20 – 21: There are also 2 additional inputs that are designed as Analog inputs, but are not fully developed for use. By Analog, it is meant that there is a varying voltage, ie; 0v moving up to 30vdc, etc. -Pins 9 – 10: The eMonitor board then has an Open Collector Output on Pins 9/10 for driving an LED for Cycle Start Disable indication, where Pin 9 connects to the Anode (+) of an LED, and 10 to the Cathode (-)

-Pins 12 OR 13 and 25: Are used as the onboard Relay connection for the Cycle Start Disable. 12 is used for a NC relay, while 13 for a NO relay.

NOTE: Using the Jumpers in the stated settings of the ‘eMonitor Settings Reference Sheet’ will provide the most transparent state of the eMonitor board to the Machine Tool, with the best protection against affect/damage.

Additionally, a four I/O Opto-Isolated auxiliary board is available if the first four inputs need to be optically isolated.

There are currently 3 versions of eMonitor boards

-v1.xx – There are actually 2 versions of this, a larger older style and the new style, smaller board (Both are similar in terms of pre-programmed settings). These boards cannot be programmed and hold specific programs for certain monitoring conditions. These boards have the ability to change the polarity condition of the monitored signal.

-v2.xx – These boards support programming of the board, but do not have the ability to monitor 2 head/pallets, or pulsing (punch presses).

-v3.xx – These boards support programming of the board, including 2 head/pallet, as well as pulsing (punch presses).

Manual Machines:

Most Manual Machines require the use of PLC devices to detect ON/OFF states, unless there is an output indicator that it is in Cycle ON.

Also, for Cycle Start Disable on machines that have 110vAC and above, the Customer will be responsible to provide an AC relay and 24vdc that enables the eMonitor board to send 24vdc to enabled/disable the high voltage relay.

A 90-280vAC Solid State Relay may be required in certain circumstances and is an added charge. The recommended Solid State Relay to use is a Crydom DC60SA3. Do not use a solid contact relay as it may ‘chatter’ which may affect the machine tool, as well as have a shorter life cycle.

Feed-rate/Spindle Override:

When connecting to a Feed-rate Override/Spindle Override/ Rapid Override, keep in mind that they may use anywhere from 3-6 inputs. If you run out of inputs, you CAN daisy-chain eMonitor boards together, but then the additional eMonitor board(s) must be used. Most of the time, installations will require 1-2 inputs for Cycle ON, as well as 4 for the Feed-rate/Spindle Override, which may only allow feed rates to reach 150% when they actually go to 200%. ONLY binary type switches can be used, and generally you will need to have the following to be able to monitor the feed/spindle switch: 1 (least significant bit), 2, 4, 8/16 (most significant bit). The normal order on the switch is: A=1, B=4, C=16, E=8, F=2 D is generally disregarded as it is common. There are certain binary switches that have a + or – pulsing, and an oscilloscope must be used to see this. It will be quite easy to determine in that generally any setting of the switch will have an active HIGH signal. The pulse goes to ground. eNETDNC does have an additional auxiliary board designed for such cases. Contact your eNETDNC Reseller for additional information/pricing.

Dual Inputs:

There are times where the machine being monitored may need 2 inputs to ensure that the Cycle ON/OFF conditions are correct even when the machine is turned OFF. An example of this would be if you are monitoring a signal that goes Active LOW when Cycle ON, and when Cycle OFF, the signal is HIGH (24vdc, etc). In this case, we need to send the board a 2nd signal that is Active HIGH (such as a 5vdc constant ON), so that if the machine powers off, the eMonitor board will lose that signal and realize that it is still Cycle OFF, because without it, powered off it would see your 1st input as LOW and assume the machine as Cycle ON still.

There are also older machines that drive an LED or bulb at around 3vdc, but you'll read around the same voltage on either side. In this case, there is usually a 300-10k resistor somewhere on one leg of the lamp, so you could either find that resistor and tie into the voltage drop side/ground side, or add a resistor of your own in parallel to the wire, try to verify the resistance value, or add a 10k resistor to be safe.

Grounds:

It is imperative that the same ground is utilized for both the eMonitor board as well as the machine tool outputs. Many controls/pallets utilize separate ground systems. Keep in mind that even RS232 may have a separate ground if going through the eMonitor board. Opto-inputs may be needed in these cases, and if so, a 10k resistor in series with ground wire and Pin(s) 18/19 must be used to keep from burning out the opto-isolator.

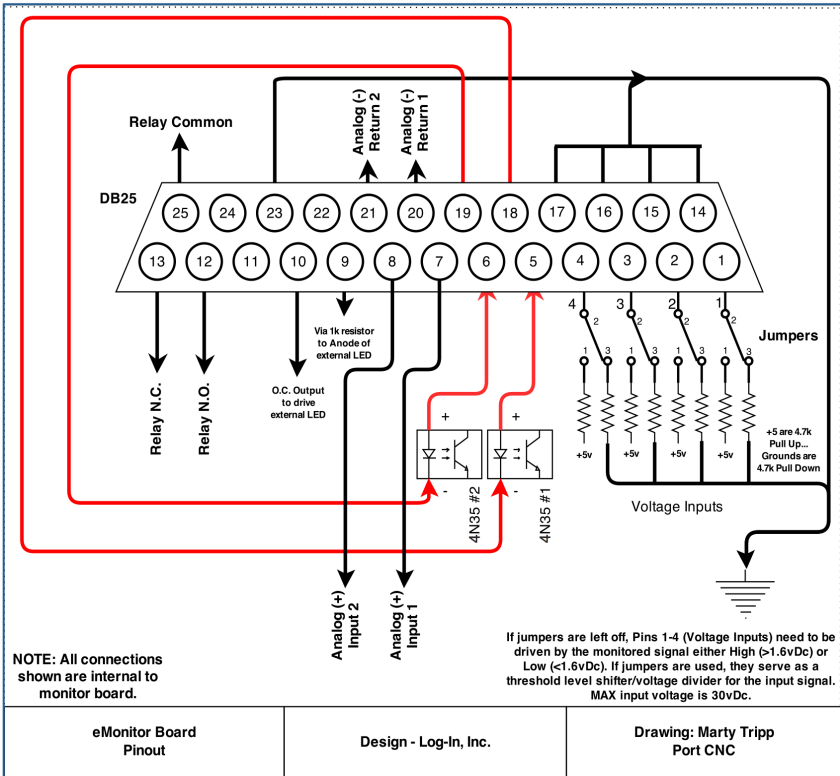
eMonitor Settings Reference Sheet (eMonitor Board v2.xx-3.06):

eMonitor Settings Reference Sheet: v2.xx - v3.02 eMonitor board

CONDITION(S)	MONITORED VOLTAGE	Connections	Polarity	JUMPER POSITION	ACTIVE HIGH/ LOW (Set in eMonitor Setup)	NOTE:	Jumper Test (Puts into Cycle) TEST ONLY WITH DB25 DISCONNECTED!	What the test does (with no input)
Output from machine tool ABOVE 1.6vdc	1.6vdc to 30vdc	IN 1-4	+	2-3	HIGH	Looks for a change from pull-down to Ground on board	NONE / 1-2	None-Sees internal 2.4vdc. 1-2-Pulls up 5v internal
Output from machine tool 0vdc	0vdc	IN 1-4	N/A	NONE	LOW	Looks for a change from internal board voltage	2-3	Pulls to Ground (Internally)
Output from machine tool Negative vdc Voltage	-1 to -30vdc	IN 1-4	-	1-2	LOW	Looks for a change from pull-up to 5vdc on board	2-3	Pulls to Ground (Internally)
Solid State Relay ON (Needed for 110vac)	110vac-Relay	+ Connects to IN, - Connects to Ground 14-17	-	NONE	LOW	When relay is energized it grounds Jumper Pin 2	2-3	Indicates Cycle ON
Solid State Relay OFF (Needed for 110vac)	110vac-Relay	+ Connects to IN, - Connects to Ground 14-17	+	NONE	HIGH	When relay is de-energized the board sees 2.4v internal	NONE / 1-2	Indicates Cycle OFF
Matrixed LED (No ground on LED) IN 5/18 or IN 6/19	Up to 30vdc	Anode connects to Pin 5/6 Cathode to Pin 18/19	N/A	N/A	HIGH	IN 5/6 are current sensing, but you must use +/- in/out	N/A	N/A
Using IN 5/6 for Voltages (Feed Rate, Spindle, etc)	Up to 30vdc	See Note if more than 4 outputs into eMonitor	N/A	N/A	HIGH/LOW	Connect 10k Resistor from Pin(s)18/19 to any of 14-17	N/A	N/A

NOTE: USE ONLY THE JUMPER CONDITIONS SPECIFIED. THESE ARE PULL UP/DOWNS FOR RESIDUAL VOLTAGES, AND PROVIDE CIRCUIT PROTECTION TO THE MACHINE TOOL. AS STATED ABOVE, WHEN TESTING WITH JUMPERS, ONLY PERFORM TESTING WITH DB25 CONNECTOR DISCONNECTED!!

eMonitor Board Pin out

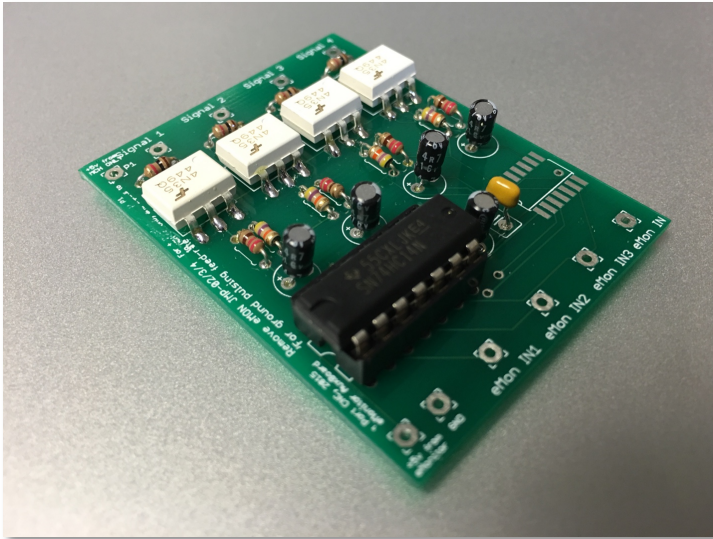


eMonitor Opto-Auxiliary Board

The eMonitor Opto-Auxiliary board can be used in conjunction with the eMonitor board's inputs 1-4 to create optical isolation between the machine tool and the eMonitor board.

The primary design of this circuit is to allow connection to pulsing Feed-rate Override switches such as that on a Niigato or Syntec control. The pulse width is approximately 100hz, and a 47k ohm resistor is used. For faster pulse widths, a 4.7k ohm resistor can most likely be used.

The opto-aux board is configured for ground pulses, as it's intent was for the Niigato control.

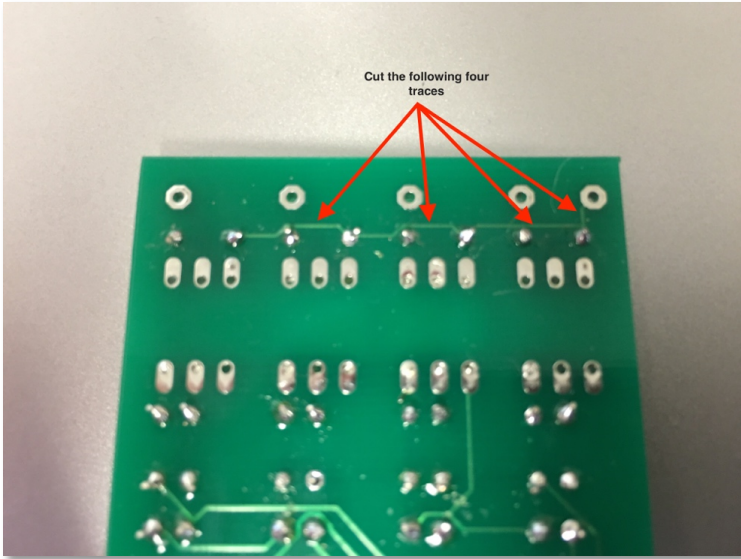


The board has four distinct opto-isolators which can be used independently of each other. The connections are as follows:

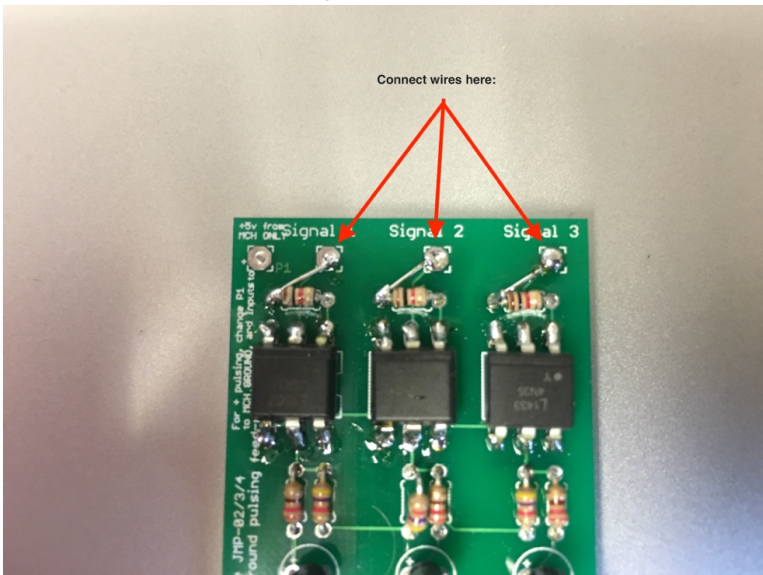
1. Top Left connection –Labeled **+5v MCH ONLY** – This would be connected to a 5vdc source on the machine. If using higher voltages, a divider resistor must be used (calculate with a slightly higher value to facilitate voltage fluctuation).
2. **Signal 1-4** – These are the inputs which will pulse to ground when that particular connection needs to be monitored.
3. On the bottom left: Labeled **+5v from eMonitor / GND**. Connect these two to the eMonitor board bottom right **5vdc and GND** connections (use solder).
4. **eMon IN1 – 4**: These will connect to the eMonitor board inputs 1-4 (not all are needed). You must then remove the jumper on the eMonitor board and set it to Active HIGH.

The opto-aux board can be set to reverse polarity (so that it sees positive pulses) by performing the following: (the board used is a 3-input, but still the same as the 4 input.

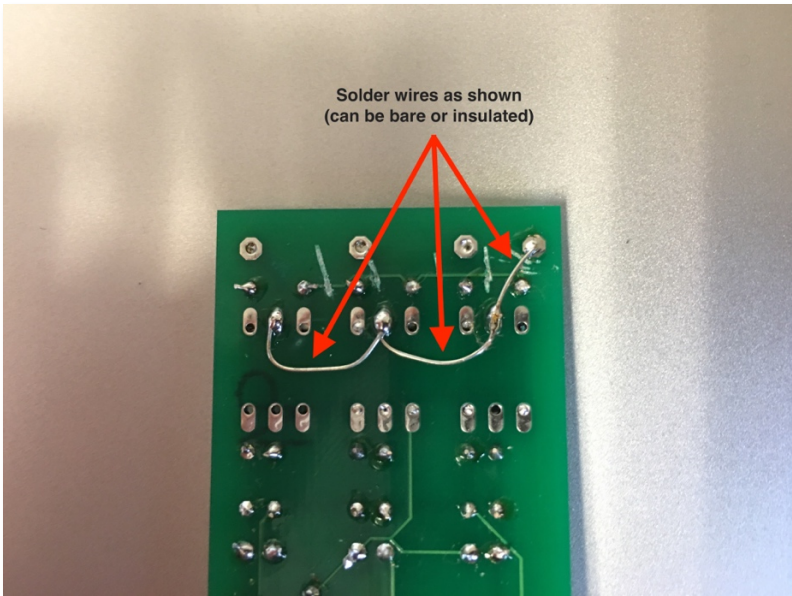
1. Cut the following traces using a knife, blade, screwdriver, etc:



2. Solder wires to the following:



Continued on from previous page:



3. You will then connect the machine Ground to the Top Left +5v from MCH **ONLY** connection.
4. Connect the pulsing voltage (5vdc) to **Signal 1 – 4**

NOTE: If connecting signals beyond 5vdc to the opto-isolators, you must calculate the resistance needed to drop the voltage to 5vdc at the input of the opto-isolator (Signal 1-4), otherwise the opto-isolator will be destroyed. The easiest way to accomplish this is start with a 10k ohm resistor in series with each INPUT on the Signal 1 – 4. To be safe, measure the voltage drop across this 10k ohm resistor. You can also change the resistors at the top of the board (they are 1k ohm resistor value).

eMonitor Board Programming

Initial Setup of the eMonitor board for updating programming:

-Connect a USB to Serial adapter (Cables-to-Go cable) to your computer (ensuring that the driver for it is installed).

-Connect a 9 pin to RJ45 adapter to the serial end of the cable (ensure this adapter is wired per Port CNC's adapter pin-out [See eNETDNC User Manual]), and then connect a standard CAT5 cable from the RJ45 end to the eMonitor 'MCH' port and then connect the eMonitor 'HUB' port to an eHUB, or xIConnect unit to power the eMonitor board (It does not have to be connected to a network for programming, the device is strictly to power the eMonitor board).

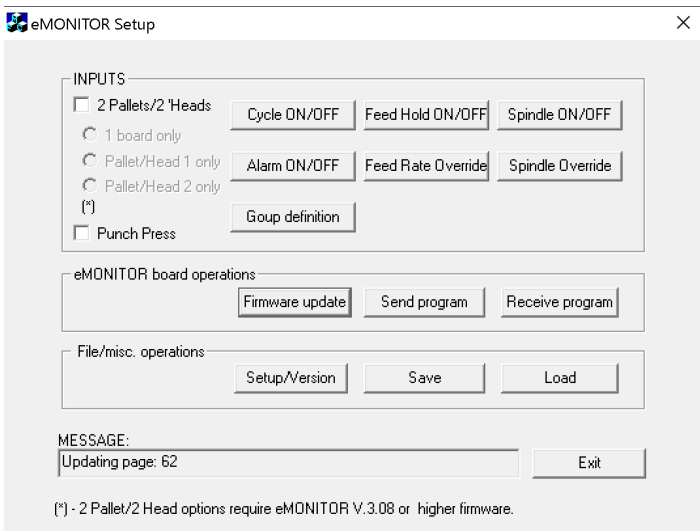
Ensure that you have installed the USB-Serial drivers, and that the device is recognized under Device Manager ->Ports. The device should be listed. Verify which COMM Port it is using as well (normally shown in parenthesis).

Programming the eMonitor board:

Note: Ensure the eMonitor board is set to 9600 Baud Rate.

1. On the eMonitor board, Press the ‘Select’ button below the 7 segment LED 2 times, or until it displays ‘P, 0, P, 0...’
2. Press the ‘Change’ button 1 time, or until it flashes ‘P, 1, P, 1...’
3. Press the ‘Send Program’ button on the eMonitor Setup screen. The eMonitor display will flash ‘P, 1, P, 2, P, 3’. After it flashes P, 3, cycle power by unplugging the ‘HUB’ port on the eMonitor board and plugging back in.
-If the eMonitor board continues to show ‘P, 1...’ after pressing ‘Send Program’, then you may need to cycle power on it, shut down the eMonitor Setup Utility, and unplug/plug in the USB to Serial adapter, then start back at step 1. If it continues to fail, try restarting your computer, and check that the USB to Serial adapter shows up under Hardware on your computer (verify COMM port as well).
4. Using the eMonitor Settings Reference Sheet (located at the end of this appendix), test the eMonitor board for correct operation, per your setup.

Open the eMonitor Setup



2 Pallets/Heads: Will currently grey out Feed/Spindle Overrides, but will then allow the Cycle ON Pallet/Head 1/2 to be selectable. Select the Pin, and whether it is Active HIGH/LOW, then select which Pallet/Head for the particular pin by checking the appropriate box.

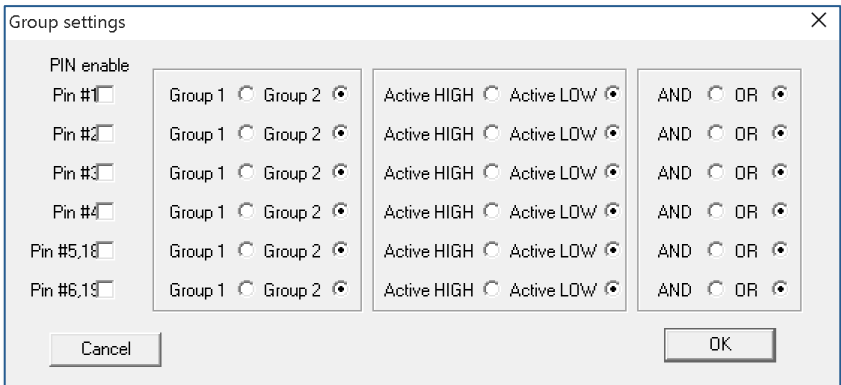
-The 2 Pallet/Head must also be configured under ‘Settings – Monitoring – General’ in the eNETDNC settings. If not configured here, the eMonitor board will not be detected by the software and a ‘NO EMONITOR’ will be displayed.

*Starting with F/W v3.08, the eMonitor board now supports Dual Head/Pallet WITH Feed-rate override. This also allows the option to set two eMonitor boards to facilitate two Head/Pallets each with their own Feed-rate Override. Spindle override is NOT supported with this setup.

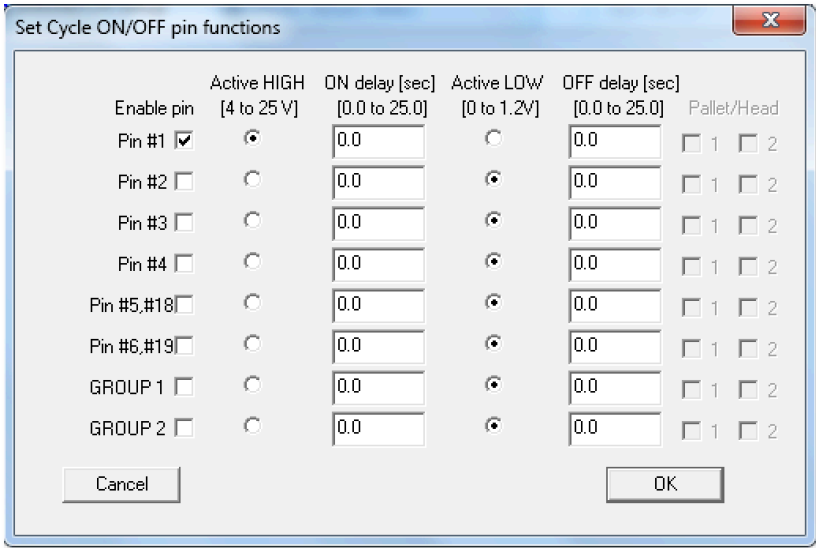
Punch Press: Selecting this will grey out everything except Cycle ON. The eMonitor board can then monitor punch press type machines with a very fast pulsing/punch rate. Under ‘Settings – Monitoring – General’ select ‘Cycle Rate’.

Group definition: Used for defining multiple conditions that can be ‘OR’ or ‘AND’ to be a Cycle ON event. This can be useful when Pin 1 AND Pin 2 must both be Active HIGH/LOW. Or, if an Active HIGH/LOW can be Pin 1 OR Pin 2. You could then use this in conjunction with Pin 3 always needing to be Active HIGH/LOW, along with the Group.

Define the Group by selecting the Pin(s) and which group they will be a part of, then whether the Pin(s) need to be Active HIGH/LOW, and finally if the Pin(s) need to be an AND or OR. Once you press OK, you will then need to enter the Cycle ON section and set the Group to Active HIGH/LOW.



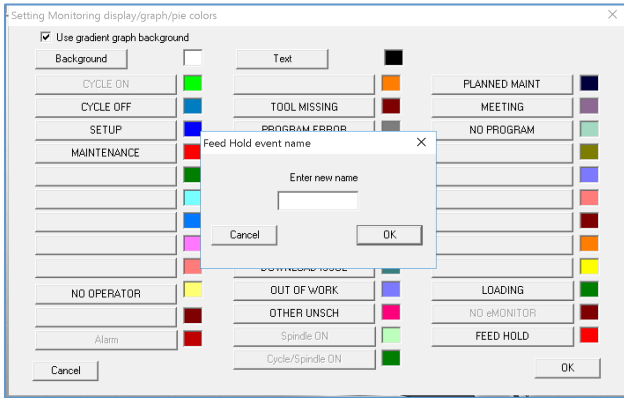
Cycle ON/OFF: Sets the input pin(s), as well as Active HIGH/LOW.



On Delay [sec]: Setting this to any number from 0.0-25 seconds in .1 second increments has the effect of the board needing to see a steady Active HIGH/LOW signal for that amount of time before displaying as Cycle ON. A good example is most Haas machines have a green stack light that flashes when Cycle OFF, and without setting this to 2 seconds, would cause the board to show Cycle ON (or flash ON/OFF) all the time.

Off Delay [sec]: Setting this to any number from 0.0-25 seconds in .1 second increments has the effect of the board needing to see a steady opposite state from that which is selected (Active HIGH/LOW) for that amount of time, before showing as Cycle OFF. An example would be a Doosan control that has a green stack light that flashes when Cycle ON, and without setting this to 1.5-2 seconds, would cause the board to show Cycle ON/OFF flashing back and forth instead of Cycle ON.

Feed Hold On/Off | Spindle On/Off: This option allows to set a specific input to display either Feed Hold on/off or Spindle on/off on the Monitoring Dashboard. You must connect a specific output from the Machine Tool to the particular pin. Feed Hold can be re-named to anything the user wishes it to be, and is set by going to 'Settings – Monitoring – Graph/Pie Colors' and then clicking on 'Feed Hold' and creating a new name. (See following example).



Alarm: Allows to connect to an Alarm and have it display as ‘Alarm’ on the Monitoring Dashboard.

Feed Rate Override, or Spindle Override: Both of these have a similar setup. -‘%’ must be set up the same as on the Machine Tool. Example: If the Feed-Rate Switch goes from 0-150% in 10% increments, you would set it up as the following example. But, if it goes 0, 2, 4, 8, 10, 25, 35, 50, etc...you would need to input those numbers into the ‘% [0-50]’ section.

-The active pins are selected based on which inputs are used on the board, in the following example, Pins 3-6 are used. The check boxes in the example are for when there is an active HIGH voltage between 1.6-30vdc. You must meter out the switch to determine which pin/position is active HIGH before checking the boxes.

-Once set up, you must set the maximum % in ‘Settings – Monitoring – General’ in the respective Feed-rate or Spindle rate input box. Feed/Spindle will only be displayed on the dashboard when the machine status is Cycle ON.

-To test operation on the eMonitor board, make all connections and program the board. Then, with the machine tool in Cycle OFF, rotate the Feed/Spindle switch knob to ZERO. The eMonitor board should then display a ‘0’ for about a second. Each rotation of the knob should incrementally display:

-0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F (for up to 150%)

-0, 1, 2, 3, 4, 5, 6, 7, 8, 9, A, B, C, D, E, F, 0, 1, 2, 3, 4 (for up to 200%), etc.

Set Feed Rate table

	PIN #1 Active HIGH	PIN #2 Active HIGH	PIN #3 Active HIGH	PIN #4 Active HIGH	PIN #5,#18 Active HIGH	PIN #6,#19 Active HIGH	% [0 TO 250]
	<input type="checkbox"/> Enable	<input type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	<input checked="" type="checkbox"/> Enable	
0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
1	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	10
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	20
3	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	30
4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	40
5	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	50
6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	60
7	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	70
8	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	80
9	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	90
10	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	100
11	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	110
12	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	120
13	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	130
14	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	140
15	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	150
16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
17	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
18	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
19	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
20	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
21	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
22	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
23	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
24	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0
25	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0

Cancel OK

Firmware Update:

NOTE: Only eMonitor boards with v3.04 can be updated (firmware) using the eMonitor Setup utility. All previous versions must be returned to Port CNC for updating; contact your eNETDNC Reseller for information/pricing.

1. Verify the version of the eMonitor board by powering it on via the 'HUB' port. It will read out, one at a time, V, 3, 0, 2 (example). If you missed it, simply unplug the 'Hub' connection and plug back in.
2. Press the 'Select' button 3 times, or until a 'U' is displayed on the 7-segment LED.
3. Press the 'Change' button 1 time, or until the display flashes 'U,1,U,1...'
4. On the eMonitor Setup utility, Press the 'Firmware Update'. The eMonitor board will display 'U, 2, U, 2...' and the software utility will display approximately 76 pages being flashed. It will then state that the update is complete. This will take approximately 2 minutes to complete. Do NOT disturb power to the eMonitor board during this time. Doing so may cause the eMonitor board to become unresponsive and needing repair.
5. Cycle power by unplugging the 'HUB' port on the eMonitor board and plugging back in.
6. Verify operation of the board, and then update programming per the 'Programming the eMonitor board'.

Send Program: Sends the created program to the eMonitor board, using the Programming instructions at the beginning of this Appendix.

Receive Program: Can Receive a previously programmed eMonitor board's program by performing the following steps:

1. On the eMonitor board, Press the 'Select' button below the 7 segment LED 2 times, or until it displays 'P, 0, P, 0...'
2. Press the 'Change' button 1 time, or until it flashes 'P, 1, P, 1...'
3. Press the '**Receive Program**' button on the eMonitor Setup screen. The eMonitor display will flash 'P, 1, P, 2, P, 3'. After it flashes P, 3, cycle power by unplugging the 'HUB' port on the eMonitor board and plugging back in. The received program can be viewed by selecting the different options, which the program can then be saved as a file.

Setup/Version: Displays the current version of the utility and also allows the user to set the COMM port of where the USB-Serial adapter is connected.

Save: The Program can be saved by selecting 'Save' on the utility. Select the path and name the file to save it. Selecting 'Load' can load the program back into the utility for later use, to program other boards, etc.

Appendix A

SQL Add-On

eNETDNC SQL – Remote Data Interface (SQLRD) To activate your SQL Client Interface for *Customer Name*

In eNETDNC go to Settings - Other options. Click on the check box: “SQL Client” and you will be asked for your password.

Enter Your Password = “**xxxx**” and press **OK**. This feature must be purchased prior to receiving a code: Request code from your eNETDNC Reseller.

Setting up your SQL Client

To insure that the SQL interface is working correctly, the following steps need to be taken: 1) The Database path needs to be set in the SERVER@NAME format.

User name and password to log into the database needs to be specified, as well as the database TABLE name. The login must be the Database login not the Windows login, usually = **sa**

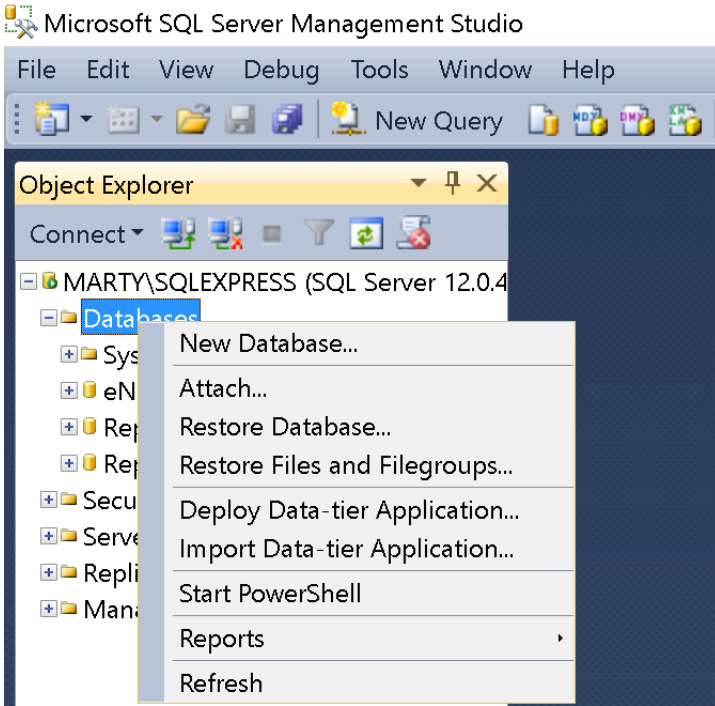
2) In the SQL database make sure that it consists of 9 fields. The fields in the eNETDNC software are defined in: Part number ID, Machine ID, Shift ID, Status ID, Employee ID, OpSeq ID, Pallet/Head ID, DATE/TIME ID, Comment ID.

Shift is an integer (1,2 or 3) Date/Time is date/time and the rest are strings. Each field ID in the database has to match exactly the field ID set in the eNETDNC software.

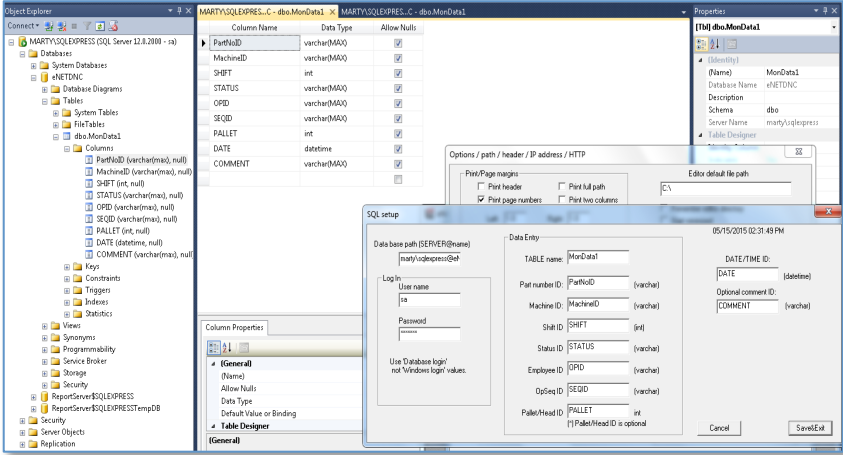
****It is up to the end-user to know and understand how set up a SQL Database.****
Port CNC does not provide Database Setup support.

Following is a screenshot of using the SQL Management studio and creating a new database:

Right-click on 'Databases', then select 'New Database':



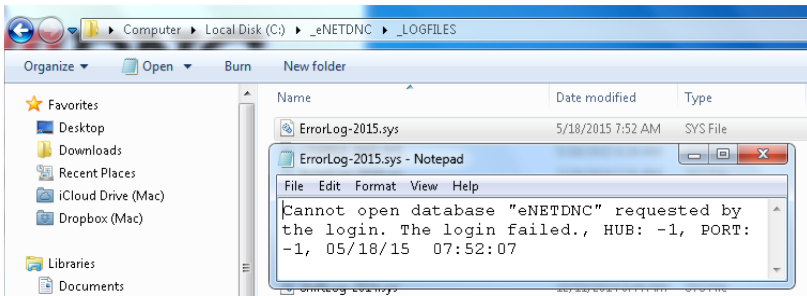
Screenshot of a sample setup:



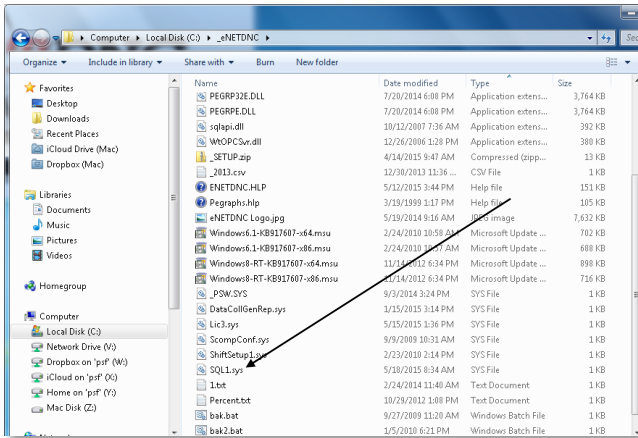
The picture in the lower right corner is the eNETDNC SQL Setup page. The picture behind it is the SQL server.

Troubleshooting tips:

1. When you launch eNETDNC if it takes awhile to load up it is most likely something wrong with your Database path, User Name or Password. If any of these are wrong then eNETDNC will keep trying to log-in which is why you will see the delay. The first thing you want to do is check the error log file located in the C:_eNETDNC_LOGFILES directory. The file will be named ErrorLogK and the current year. If you see an error like this one go back and check the Database path, User Name or Password. The tips on the next page may also help with this.



2. Every time an event occurs in eNETDNC, an **SQL1.sys** file is created in the c:_eNETDNC directory. This file should then disappear after a few seconds of the event occurring. If it does not, then that means that one of the settings are not set up properly, because the data cannot be moved into the Database.



Check the error log for an error to help solve why this entry cannot be written/communicated to the database. Once again, this is most likely due to settings not set up properly such as the Table name or Field names. If the problems you are having are related to the **SQL1.sys** file, make sure to delete it before trying again. The reason for deleting this file is because after you correct the problem in the configurations, this file will still contain the wrong entries.

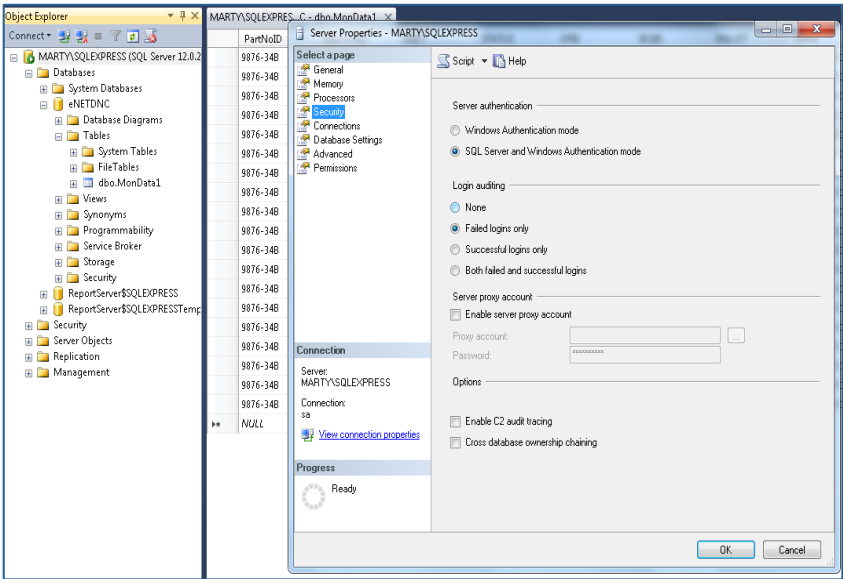
The following pertains to SQL Server Management Studio, but MAY be useful for setting up others:

Using SQL Server Management Studio

To change security authentication mode:

1. In SQL Server Management Studio Object Explorer, right-click the server, and then click **Properties**.
2. On the **Security** page, under **Server Authentication**, select the new server authentication mode, and then click **OK**.
3. In the SQL Server Management Studio dialog box, click **OK** to acknowledge the requirement to restart SQL Server.
4. In Object Explorer, right-click your server, and then click **Restart**. If SQL Server is running, it must also be restarted.

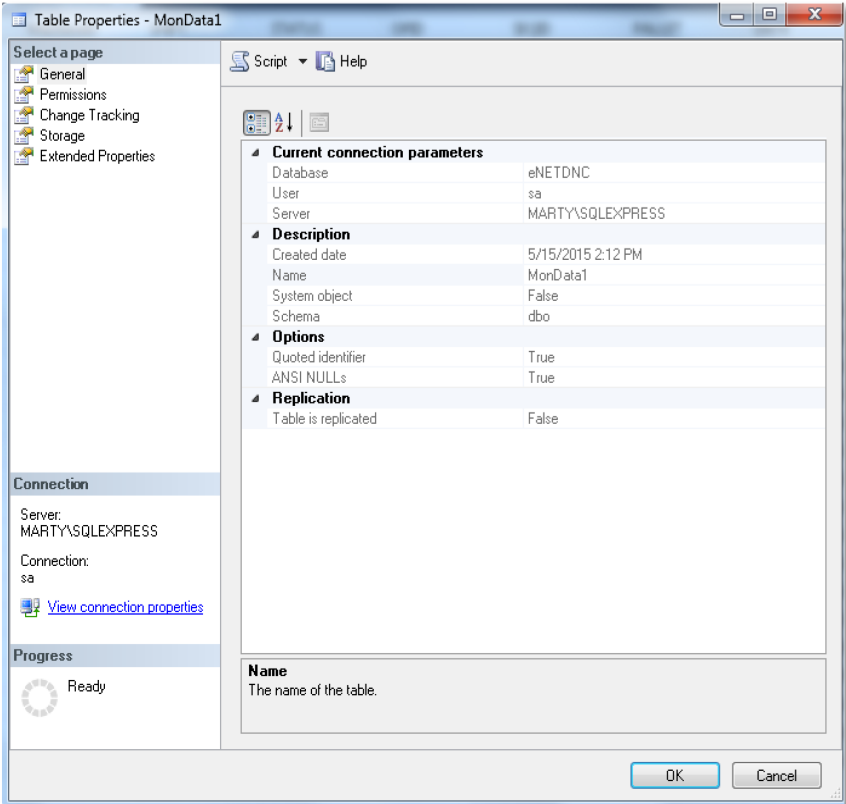
To enable the sa login: 1. In Object Explorer, expand **Security**, expand **Logins**, right-click **sa**, and then click **Properties**. 2. On the **General** page, you might have to create and confirm a password for the login. 3. On the **Status** page, in the **Login** section, click **Enabled**, and then click **OK**.



When setting up your SQL Database, the most important things to set up are the following:

1. Database: In the example it is: **eNETDNC**.
2. User: Use '**sa**' unless you setup a different user.
3. Server: The name of your Server. Generally, it is going to start with your Computer Name/the Server; in the example above it is **MARTY\SQLEXPRESS**.
4. Name: This is the Database name; in the example, it is **MonData1**.

-In the SQL Setup, the example Database path would be:
marty\sqlexpress@eNETDNC



Within the SQL Server Management Studio if you right-click on your Database name, and select 'Select Top 1000 Rows', you should see information populated such as the next example:

The screenshot shows the SQL Server Enterprise Manager interface. The 'Object Explorer' on the left shows the 'MARTYSQLEXPRESS' server. The 'Query Editor' in the center contains a T-SQL query:


```

    ***** Script for SelectTop1000Rows command from SSMS *****
    SELECT TOP 1000 [PartNoID]
    , [MachineID]
    , [SHIFT]
    , [STATUS]
    , [OPID]
    , [SEQID]
    , [PALLET]
    , [DATE]
    , [COMMENT]
    FROM [eNETDNC].[dbo].[NonData1]
    
```

 The 'Results' pane at the bottom displays the following data:

PartNoID	MachineID	SHIFT	STATUS	OPID	SEQID	PALLET	DATE	COMMENT
23	9876-34B	1 HEAD	2 _COFF		0		2015-05-15 14:59:31.000	
24	9876-34B	1 HEAD	2 _CDN		0		2015-05-15 15:11:14.000	
25	9876-34B	1 HEAD	2 _COFF		0		2015-05-15 15:11:34.000	
26	9876-34B	1 HEAD	2 MAINTENANCE		0		2015-05-15 15:15:21.000	DOWN
27	9876-34B	1 HEAD	2 MEETING		0		2015-05-15 15:28:42.000	
28	9876-34B	1 HEAD	2 MEETING		0		2015-05-15 15:29:52.000	
29	9876-34B	1 HEAD	2 PLANNED MAINT		0		2015-05-15 15:30:20.000	
30	9876-34B	1 HEAD	2 _CDN		0		2015-05-15 15:31:47.000	
31	9876-34B	1 HEAD	2 _CDN		0		2015-05-15 15:31:49.000	
32	9876-34B	1 HEAD	2 _CDN		0		2015-05-15 15:31:50.000	
33	9876-34B	1 HEAD	2 _CDN		0		2015-05-15 15:31:52.000	
34	9876-34B	1 HEAD	2 _CDN		0		2015-05-15 15:31:53.000	
35	9876-34B	1 HEAD	2 _CDN		0		2015-05-15 15:31:55.000	
36	9876-34B	1 HEAD	2 _CDN		0		2015-05-15 15:31:55.000	

 A 'Machine Monitoring' summary table is also visible in the top right corner:

MACHINE NAME	STATUS	PART NUMBER	CYCLE COUNT	LAST CYCLE	CURRENT CYC
1 HEAD 2	CYCLE OFF	9876-34B MARTY	0	00:00:21	45 90 1:35
2 HEAD 2	NO-MONITOR		0/0	00:00:00	1:24:08.5 1:12:34

 The status bar at the bottom indicates 'Query executed successfully.' and '36 rows'.

The 'SQL setup' dialog box is shown with the following configuration:

- Data base path:** (SERVER@name) \\DELL-8\SQL2008@master
- Log In:** User name: sa, Password: [masked]
- Use 'Database login' not 'Windows login' values:** [checked]
- TABLE to write to:** Write enable: [checked], MonTable: [empty]
- TABLE to read from:** Read enable: [checked], CycTable: [empty]
- Permanent write fields:**
 - Part number ID: PART (varchar)
 - Machine ID: MCH (varchar)
 - Shift ID: SHIFT (int)
 - Status ID: STATUS (varchar)
 - Date/Time ID: DATE (datetime)
 - Comment ID: COMMENT (varchar)
 - Employee ID: EMPLOYEE (varchar)
 - OpSeq ID: OPSEQ (varchar)
- Optional write fields:**
 - Pallet/Head ID: [empty] (int)
 - Feed override ID: [empty] (int)
 - Spindle override ID: [empty] (int)
- Read fields:**
 - Item ID: PARTNUMBER (varchar)
 - Cycle time ID: CYTIME (int) [sec]
 - Cy. tolerance ID: CYTOL (int) [%]
 - Cy. multiplier ID: CYMULT (int)
 - Description: DESC (varchar)
 - Machine ID: MACHINE (varchar)
 - Locked ID: LOCKED (byte/byteint)
 - Status ID: STATUS (varchar)
 - Created ID: DATE (datetime)

Updated SQL Setup Screen 1

Cycle Time Read Fields:

- 1) Only one SQL data base can be opened at a time (with Database name and log-in info).
- 2) Two tables can be specified: one for reading, (bottom half in SQL setup) the other for writing (top half).
- 3) The checkboxes for table writing and/or reading specifically need to be checked – it's not enough just to specify a table name. The Setup will remember all the Table data even if reading/writing is disabled....
- 4) If data base reading is enabled, the specified Table data will determine the cycle time related info. However, originally the machine in Monitoring Setup needs to be checked either for Min/Max or Ideal cycle times. If the machine is checked for other type (Cycle rate, etc..) the SQL will ignore that machine for this purpose.
- 5) Every time a machine gets its cycle data from SQL, it will automatically switch that machine to Ideal cycle (from Min/Max – if applicable) and also to [sec] unit from [min].
- 6) Currently the tolerance accepted between 1% and 99%, and the Cycle multiplier between 1 and 100.
- 7) Every time a new part number is specified in any way (even manually from the dashboard), the database is searched for a match for the Machine name and Part number, and it will retrieve the Cycle data from the SQL database. Whether it will find the very first occurrence in the data base is most likely SQL server dependent – Only one line should be there with a specific machine name, and a specific part number, and in such a case it finds only that one line.
- 8) If a match is not found in the database, the current method will be used to determine cycle related info.
- 9) This works for both 1 and 2 pallet/head machines – two different part numbers can be set and it will fetch the cycle times accordingly...
- 10) As the SQL retrieves the data, it will refresh the monitoring dash board (if open) and it will also update the cycle related info in Monitoring Setup. If in monitoring setup, the cycle data is adjusted afterwards: It will be in effect (always the last modification).
- 11) For reading there is no separate file created – like the SQL1.sys for writing. However, the logs in the ErrorLog file should give a good indication as to what goes wrong when it does.
- 12) It is possible that the eNETDNC software loses connection with the data base. In such a case it will try to re-log every 15 minutes.

eViewer Software

New Installation

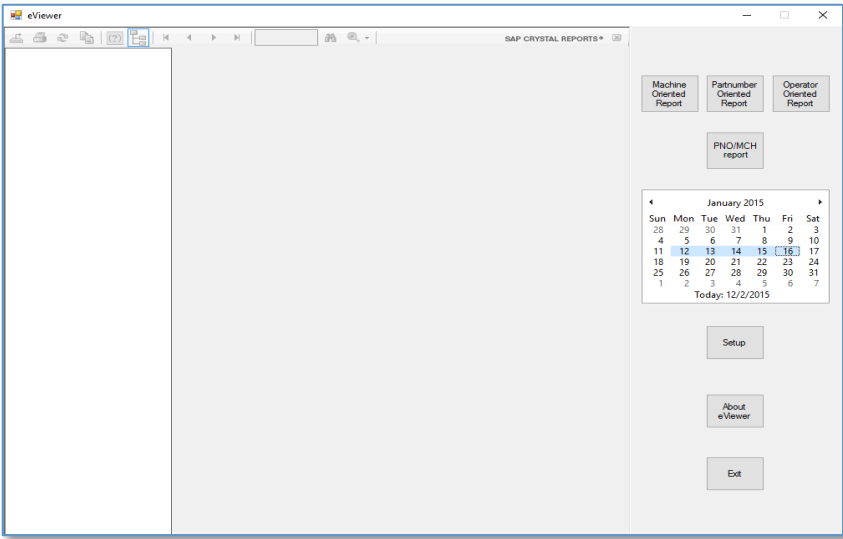
- 1) Make sure that you have 'Administrator' privileges on the computer.
- 2) Make sure that 'Microsoft Framework V2.0' or higher is installed on the computer. You can check if it is installed in the 'Control Panel', 'Add/Remove programs'.
- 3) Execute the 'eViewerInstall.exe' software. It has two parts, the second part is a 'Windows installer'. To automatically execute the 2nd part just leave the 'Launch eViewer' checkbox checked.
- 4) Ensure that 'SQL server' is installed on the computer. If the SQL server is installed, it should be found in the 'Control Panel' 'Add/Remove programs' list. If it is not installed, download a free version of SQL Server 2008 Express Edition from the following Microsoft WEB site:
<http://msdn.microsoft.com/vstudio/express/sql/download/default.aspx>
(If there is a trace of previous SQL server versions, the new will not install.)
- 5) a) For 32 bit install: Go to 'Control Panel'. Select 'Administrative Tools'. Double click on 'Data Sources'.
b) For 64 bit install: execute C:\WINDOWS\SysWOW64\odbcad32.exe
- 6) Select 'System DSN'. Click on the 'Add' button.
- 7) On the list scroll down and find the 'Microsoft Text Driver (*.txt;*.csv)' item and click: 'Finish'.
- 8) For 'Data source name' enter: TEXT
- 9) Uncheck the 'Use current directory' checkbox. Click on 'Select directory' and find the 'C:_eViewer' directory and select it and press OK.
- 10) If Part Number Oriented reporting is used, repeat steps 6) to 9) using 'Data source name'
 1. **TEXT-P**
- 11) If Operator Oriented reporting is used, repeat steps 6) to 9) using 'Data source name'
 2. **TEXT-O**
- 12) If PNO/MCH Oriented reporting is used, repeat steps 6) to 9) using 'Data source name'
 3. **TEXT-P-M**
- 13) Click all **OK** buttons until all open windows are closed. You can now close all open windows, including the 'Control panel'.
- 14) Installation is now complete – run eViewer: The executable can be found at C://_eViewer. Click on 'SETUP' and set the path to the: _MACHINE_YYYY*.CSV file (this file is in the eNETDNC computer C:_eNETDNC_REPORTS directory). Next, set the 'from-to' date, click on 'Machine Oriented Report', select machine(s) and shift(s) and the report will be generated. Note here that to be able to access the above .CSV file across the network, the user on the eViewer computer needs to have Read/Write to the eNETDNC computer C:_eNETDNC directory.

eViewer software update

- 1) Ensure that you have 'Administrator' privileges on the computer.
- 2) Open 'Control Panel', 'Add/Remove programs', and 'Remove' eViewerInstall program.
- 3) Execute Step 3) from previous section. You do not need to execute any other steps. **PAY ATTENTION WHEN SELECTING INSTALL DIRECTORY!**
- 4) During the second part of install just check 'Reinstall' if necessary.

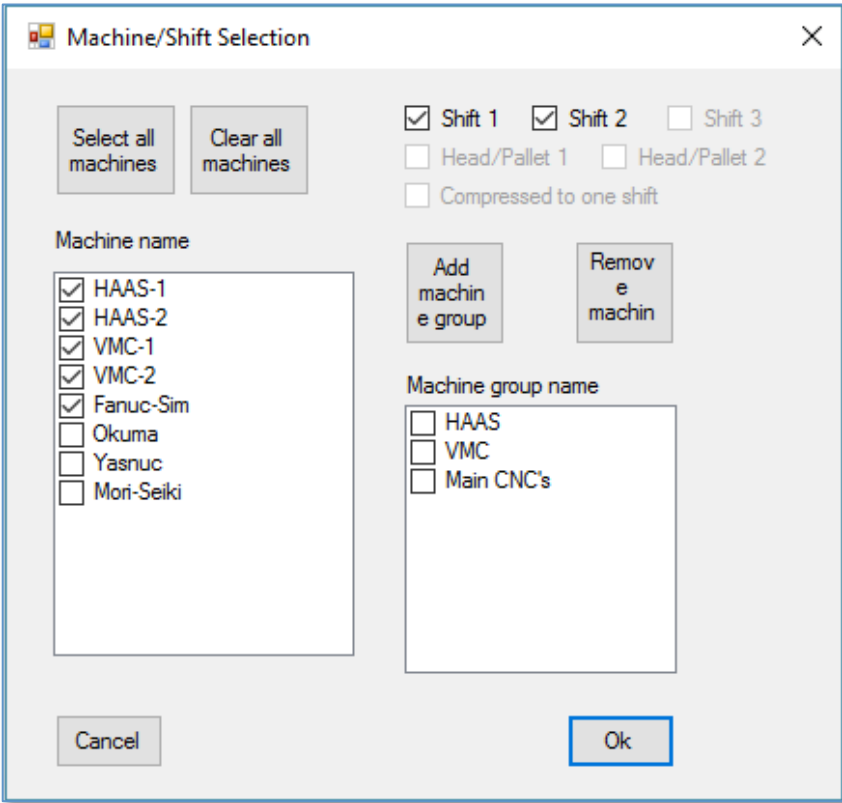
Using the eViewer Software

eViewer is a Crystal Reports based reporting package to use with eNETDNC Machine Monitoring to utilize data captured from the CNC machines. To use the software; after launching, a similar screen to below should be displayed:



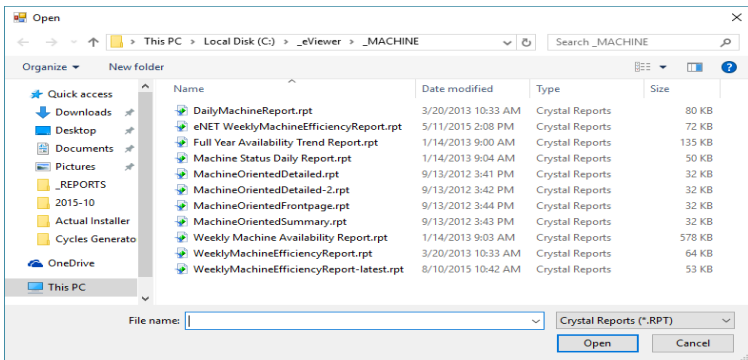
First, select the Date(s) of the report. Click the Forward/Backward arrows on the calendar to select the month, or click on the month at the top of the calendar to select the month / year. Once the month is selected, select a Day or Date range by clicking/holding and dragging the mouse from the Start to End date.

Next, select the type of Report by selecting one of the four buttons at the top right of the screen. (The Machine Oriented Report is used in the following example). Once the type of report is selected, a window opens, allowing you to select which Machine(s), and Shift(s) you would like included in the report. See the following example:

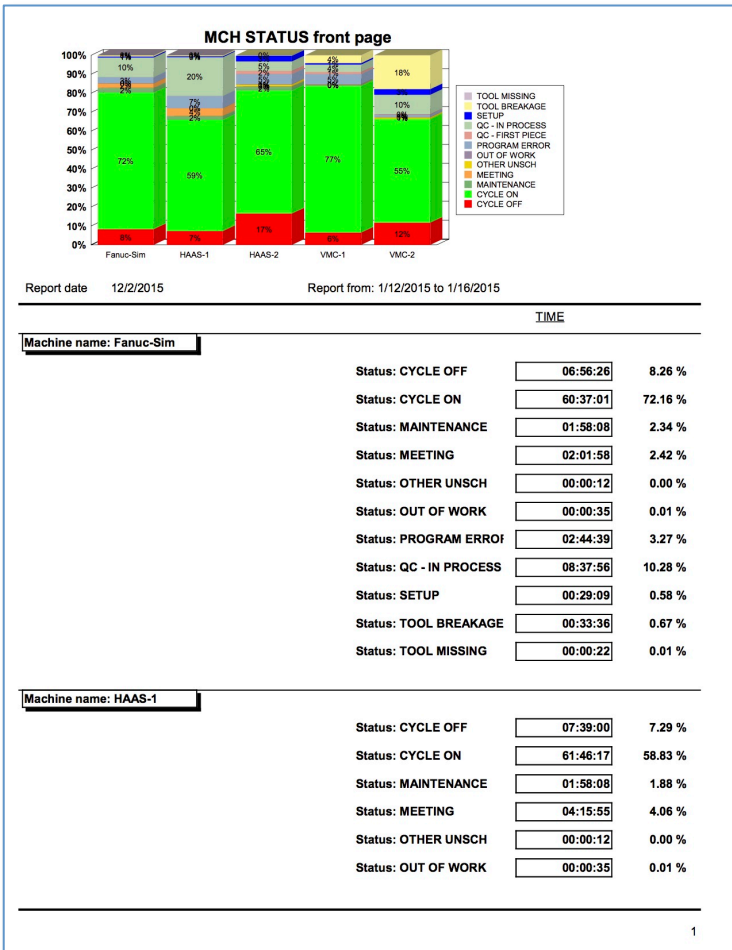


Groups can be created by selecting the Machines from the left side, and then selecting the ‘Add machine group’ button. This will make it easier to select the same group of machines each time.

Next, press the OK button, and a dialog box will display, allowing you to select the report to create, similar to the following example:



Once you select the report, it will be displayed in the main window. It can then be printed, similar to the following example:



Since eViewer uses a 'shell' to generate reports with Crystal Reports, you will need to click on the magnifying glass and select 'View Whole Page', otherwise, only a portion of the report will be displayed.

Saving / Exporting Reports

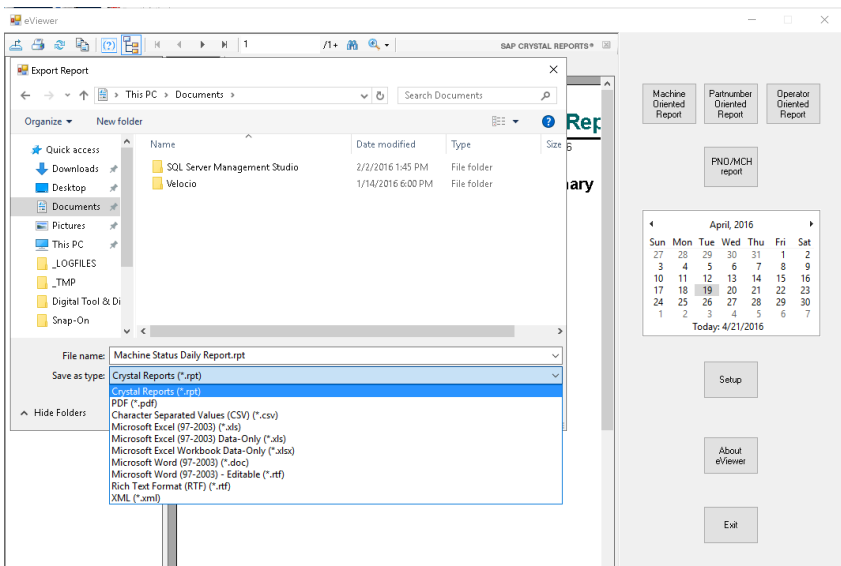
If you would like to create another report, simply reselect the Date(s) and Report type you would like to view.

Since the reports are Crystal Reports based, anyone that owns the full version of Crystal Reports can create their own, customized reports by using it.

One Seat of eViewer is included with the eNETDNC Monitoring system. For additional Seats contact your local eNET Reseller for pricing.

Reports can be exported by clicking on the far left icon. You must then do the following:

1. Type in a name for the file that you are exporting.
2. Select a folder path location. The default location is where the different report templates are stored, so you'll want to change it to your documents/desktop, etc.
3. Click the drop-down arrow to select the type of report to be saved.
4. Click 'Save' to save the generated report.

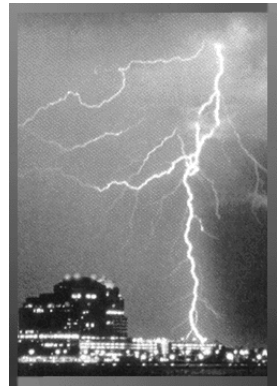




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TRANSIENT VOLTAGE SURGE SUPPRESSION

High technology is bringing more specialized and more sensitive electronic equipment into the workplace and the home. As products and components are produced smaller and smaller, they also use lower and more regulated voltage and are more vulnerable to surge-related over-voltage damage. These products are also getting more expensive and more difficult to repair. Sometimes the downtime of being without a certain piece of electronics is more expensive than the repairs to the voltage damaged equipment.



Transient voltage surges are voltage spikes that come into your facility from outside events such as lightning or power outages, or can even be generated from inside your facility by something as simple as turning on a light or motor. These voltage surges can be measured in nanoseconds, yet they can do great damage. Obviously large events such as lightning can do terrific immediate damage, while smaller spikes damage a little at a time. The small surges can cause seemingly minor damage to microprocessors that accumulates and will eventually cause a failure. Surge damage can cause computer data losses, scrambled data, excessive light and motor replacements, and may shorten the life of most any and all electrically operated equipment.

Port CNC strongly recommends protecting your eNETDNC system with surge suppressors.

Sincerely,
The Port CNC Staff