# **MDC-Max Configuration Manual**

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## **Introduction**

MDC-Max is a software product that enables companies to monitor their machine tools in real time. It does this by generating messages each time an event occurs (such as the machine starting or stopping) and stores these messages in its database. The MDC-Max client is then used to generate real time status screens and historical reports of machine activity from this database.

In order for MDC-Max to function you must have already installed DNC-Max (version 5 or higher) and configured it to communicate with your machine tools. This manual assumes you have already done this. Many of our dealers have installed MDC systems on manual machines that do not require DNC at all. The process is the same – you must first install DNC-Max and create a working RS232 link to the machine. The DNC-Max server is the central data collection source for all MDC messages so you cannot run MDC-Max without it.

Machine status (running / stopped / alarm) is collected via an MDC box that converts 24v and 110v signals into RS232 status line signals. These are then transmitted via the RS232 interface to DNC-Max. A bar code reader can also be fitted to the MDC box to send additional text strings to DNC-Max (machine in setting mode for example). Some machine tools can print text out of the serial port while the program is running (eg DPRNT on Fanuc, Mazak and other controls) and these are collected by DNC-Max in the same way.

Whenever a string of text or line change is detected by the DNC-Max Server Software it converts these to an MDC-Max message. For example the CTS high signal could be converted to a CYCLESTART message to indicate that the machine is in cycle (running). When the CTS line goes low this could be converted to a CYCLESTOP message.

The first job when installing MDC-Max is to consider what status changes you want to collect from the machine and then what message you want them converted into. Most installations will include CYCLESTART, CYCLESTOP, and PARTCOMPLETE as a minimum.

The Examples in the following pages use three hardware signals:-

CYCLESTART (machine is running) CYCLESTOP (machine stopped) PARTCOMPLETE (program cycle complete and part finished)

We also use three signals generated by Bar code or Text Entry:-

SETTING (machine in setting mode) INSPECTION (machine in Inspection mode) OKTORUN (machine back in normal run mode)

# Chapter 1 – Configuring Messages in DNC-Max

In order for DNC-Max to generate the messages they must be configured in the DNC-Max Server. This is true for all barcode messages, DPRNT messages and hardware MDC messages.

First you must decide which messages you wish to use on the MDC-Max system, additional messages can be added at a later date, but initially the basic monitoring messages and any Bar-code/swipe card messages should be defined.

Let's begin by setting up three messages – CYCLESTART, CYCLESTOP and PARTCOMPLETE generated by the MDC hardware box.

## 1.1 Entering Cycle Start / Stop messages for the MDC hardware box

📼 CIMCO DNC-Max Server - Licensed to DEMO - NOT FOR RESALE - Cambridge Num... 📒 Setup Help 🗙 Clear Log DNC-Max Server V.5.10.97 992-2007 CIMCO Integration I/S Log Show Time Log Show Date - NOT FOR RESALE - Cambridge Numerical Control Log Shows Errors Only VGRAHAM01 🚰 Configure Server 🛃 Backup Configuration CLESTOP ^ Restore Configuration ISG [17:14:09] test 1: 011 170: CTCLESTOP 🛃 Restore Configuration [17:14:09] test1: Off 1/1: OMSG [17:14:13] test1: Port stopped. [17:14:13] test1: Port started successfully.

On the main DNC-Max Server screen click Setup, Configure Server

Click Events / Messages and tick Enable events. Click into the box below and click the + sign to add a message.

ierver configuration: DN	ICSERVER	?
Server configuration Directories Printers	Events/Messages Events/Messages	
- Port Logs	Enable events/messages	
NC-Base     MDC-Max	🔚 Program 🚱 Message	💽 Tag 🤷 🛖
Events/Messages     Variables (2-16)     Log export     Network I/O     E-Mail / SMS settings	Cycle Start Part Complete Cycle Stop No Resource Setting Job Start	CYCLESTART PARTCOMPLETE CYCLESTOP RESOURCE SETTING JOBSTART
- Web Monitor Port Settings	Reserved program name:	Message type:
Network settings		Operator message 🛛 🗸
	Trigger:	Extract value (\$MSGTEXT):
		Ignore 💌
	Message tag:	Operator trigger:
	CYCLESTART	
	Log Text:	Re-map message:
	Cycle Start	
	Must be inside first comment	Only use with DPRNT messages
	Add to port log	Save received file
	Help	Default Cancel OK

Set the following fields :-Message Type to Operator Message. Trigger to blank Message Tag to be CYCLESTART Log Text to Cycle Start Extract Value to Ignore Tick the "only use in DPRNT messages" box

Click the Plus sign again and enter the CYCLESTOP message as below :

- Server configuration	Events/Messages	
Directories Printers Port Logs	Events/Messages Enable events/messages	
MC-Base MDC-Max	🕅 Program 🚱 Message	💽 Tag 🤷 🕂
Events/Messages Log export	Cycle Start Part Complete Cycle Stop	CYCLESTART PARTCOMPLETE CYCLESTOP
Network I/O E-Mail / SMS settings Web Monitor	No Resource Setting Job Start	RESOURCE SETTING JOBSTART
Port Settings Network settings	Reserved program name:	Message type:
Network settings		Operator message 🗸 🗸
	Trigger:	Extract value (\$MSGTEXT):
		Ignore 🗸
	Message tag:	Operator trigger:
	CYCLESTOP	
	Log Text:	Re-map message:
	Cycle Stop	
	Must be inside first comment	Only use with DPRNT messages
	Add to port log	Save received file

This has now added the two messages generated when the machine starts or stops. We do need two messages as the machine is either running (CYCLESTART) or stopped (CYCLESTOP).

Events/Messages	
Events/Messages	
Program Development Cycle Start Part Complete Cycle Stop No Resource Setting Job Start	Tag CYCLESTART PARTCOMPLETE CYCLESTOP RESOURCE SETTING JOBSTART
Reserved program name: Trigger:	Message type: Operator message Extract value (\$MSGTEXT):
	Ignore 💌
Message tag: PARTCOMPLETE	Operator trigger:
Log Text: Part Complete	Re-map message:
Must be inside first comment	Only use with DPRNT messages Save received file
	Program     Cycle Stat     Cycle Stat     Cycle Stop     No Resource     Setting     Job Start  Reserved program name:     Trigger:     Message tag:     PARTCOMPLETE     Log Text     Part Complete     Must be inside first comment

Next we add the Message for PARTCOMPLETE as below :

Now let us explain what the individual fields mean :-

**Reserved Program** would be used if we wanted to generate a message by punching a program (eg 7990) from the machine so in this case it is blank.

**Trigger** is any text string that is sent down the RS232 line to generate the message (from a barcode or DPRNT). These three messages are generated by the MDC box directly (line status change) so there is no text and no trigger.

**Message tag** is the most important part – this is the name of the message itself and must be unique. This MUST be in UPPER case.

**Log Text** is the text that appears in the MDC-Max event log (not the port log) and is just a comment.

Add to Port log adds the actual message (eg CYCLESTART) to the log for this machine (this is useful for debug but you will probably want to turn this off once the system is running correctly).

**Only use with DPRNT** must be ticked for this type of message as this makes sure this message will not be triggered by a program transfer.

Ignore the other fields for now – we will use them later, just make sure they are set as above.

You now have the 3 basic messages setup and you skip to Chapter 2 if you want to get on with installing the MDC box in the machine.

# 1.2 Entering Cycle Start / Stop messages for DPRNT statements

Some machines have the facility to print text out of the serial port when a program is running (Fanuc with macro B, Fadal, Mazaks with macro option fitted and Mitsubishi are some that can). This method can be used to indicate when the machine starts and stops instead of a hardware box in the machine. But be aware this means these commands have to be added to each CNC program (DNC-Max can do this for you).

On the main DNC-Max Server screen click Setup, Configure Server. Click Events / Messages and tick Enable events.

Click into the box below and click the + sign to add a message as before but this time set it up as below

Server configuration: D	NCSERVER	? 🗙
Server configuration Directories Printers Port Logs ₩ NC-Base	Events/Messages Events/Messages Image Events/messages	
<ul> <li>MDC-Max</li> <li>Events/Messages</li> <li>Log export</li> <li>Network I/O</li> <li>E-Mail / SMS settings</li> <li>Web Monitor</li> </ul>	Program         Message         Tag           Cycle Start         CYCLESTART           Part Complete         PARTCOMPLETE           Part Complete         PARTCOMPLETE           Cycle Stop         CYCLESTOP           No Resource         RESOURCE           Setting         SETTING	+ + 0
Port Settings Network settings	Reserved program name: Message type: Operator message	~
	Trigger: Extract value (\$MSGTEXT): MAXCYCLESTART Ignore	~
	Message tag: Operator trigger: CYCLESTART Log Text: Re-map message:	B
	Cycle Start       Must be inside first comment       Add to port log   Save received file	
<b>CIMCO</b> Integration		ОК

Notice that the only difference to using the MDC-Max box is that the Trigger is set to MAXCYCLESTART, everything else is the same. This means that DNC-Max will look for the exact string "MAXCYCLESTART" coming out of the machine and then generate the CYCLESTART message. Don't confuse the Trigger string and the message name – they are similar but not the same.

Why MAX? - any text string from the machine or barcode reader that we want to treat as a message trigger has to have a unique prefix string of characters that would not normally appear in the first few lines of a CNC program. Otherwise you could find that receiving a CNC program generates MDC messages as well. We normally use the MAX prefix as it is unusual for this to be at the start of a CNC program but you can use any other unique prefix (avoid the use of MSG as it is used for comments on machines such as the GE2000).

The other messages can be setup in the same way as below

Server configuration: DN	CSERVER	?
Server configuration Directories Printers Port Logs	Events/Messages Events/Messages I Enable events/messages	
	Program  Cycle Start Part Complete Part Complete Cycle Stop No Resource Setting	Image: Cyclestart       PARTCOMPLETE       PARTCOMPLETE       Cyclestop       RESOURCE       SETTING
- Port Settings - Network settings	Reserved program name:	Message type: Operator message
	MAXCYCLESTOP	Ignore  Operator trigger:
	Log Text: Cycle Stop	🗎 🖻
	<ul> <li>Must be inside first comment</li> <li>✓ Add to port log</li> </ul>	Only use with DPRNT messages     Save received file
CIMCO Integration	Help	Default Cancel OK

Server configuration: D	NCSERVER	? 🛛
Server configuration Directories Printers NC-Base MDC-Max Events/Messages Log export Network I/O	Events/Messages Events/Messages Enable events/messages Program & Message Cycle Start Part Complete Part Complete Cycle Stop	CYCLESTART PARTCOMPLETE PARTCOMPLETE CYCLESTOP
	No Resource Setting Reserved program name:	RESOURCE SETTING Message type:
	Trigger:	Operator message   Extract value (\$MSGTEXT):
	MAXPARTCOMPLETE	Ignore 🗸
	Message tag:	Operator trigger:
	PARTCOMPLETE	
	Log Text:	Re-map message:
	Part Complete	
	Must be inside first comment	Only use with DPRNT messages
	Add to port log	Save received file
CIMCO Integration	Help	Default Cancel OK

Again the only difference between these setups and the hardware ones is the addition of the Trigger String starting with MAX.

# 1.3 Example Fanuc DPRNT Program

For this to work we must now enter the print commands into the CNC program – here is a Fanuc example (it is different for other types of control) :-

O1234 POPEN DPRNT[MAXCYCLESTART] PCLOS	<ul> <li>Open the RS232 port</li> <li>print MAXCYCLESTART</li> <li>Close the port</li> </ul>
Rest of CNC program	
POPEN DPRNT[MAXPARTCOMPLETE] G04 D1000 DPRNT[MAXCYCLESTOP] PCLOS M30	<ul> <li>Open the port</li> <li>print MAXPARTCOMPLETE</li> <li>delay for 1 second</li> <li>print MAXCYCLESTOP</li> <li>Close the port</li> </ul>

Warning : Using this method cannot tell you when the machine stops in the middle of a program as the MAXCYCLESTOP command will never be reached. MDC-Max can get around this by setting a maximum cycle time but it is not as accurate as using an MDC hardware box in the machine.

You can mix and match the hardware and software method on these types of controls. The box tells you when the machine starts and stops and a DPRNT is used to tell you when a palette machine changes palette or a part is completed.

#### 1.4 Entering Barcode messages

Some customers will not only want to know when the machine is running or stopped but also why the machine is stopped. To get this information you can use a bar code reader on each machine or a PC in each machine cell (it can have a touch screen or bar code reader as well).

Either way you have to agree with the customer what reasons they want to capture and create a new message for each reason.

Here we are going to add 2 downtime reason codes which are going to be scanned by barcode reader. The downtime reasons are Setting and Inspection.

		ay and setup as below:-
Server configuration: D	NCSERVER	· · · · · · · · · · · · · · · · · · ·
<ul> <li>Server configuration</li> <li>Directories</li> <li>Printers</li> <li>Port Logs</li> <li>MC-Base</li> </ul>	Events/Messages Events/Messages Events/Messages	
<ul> <li>MDC-Max</li> <li>Events/Messages</li> <li>Log export</li> <li>Network I/O</li> <li>E-Mail / SMS settings</li> <li>Web Monitor</li> <li>Port Settings</li> </ul>	Program Program Job Start Job Start Job Start bc 1st Off Inspection Tooling Issue Maintenance	Tag     SETTING     JOBSTART     JOBSTART     1STINSPECTION     TOOLING     MAINTENANCE
- Port Settings	Reserved program name:	Message type: Operator message Extract value (\$MSGTEXT):
	MAX8021	Operator trigger:
	Log Text:	B Re-map message:
	Must be inside first comment	Only use with DPRNT messages     Save received file
<b>CIMCO</b> Integration	Help	Default Cancel OK

The setup is almost the same as before, the message is SETTING but the Trigger is MAX8021 instead of MAXSETTING. We could have used MAXSETTING but it is best to keep barcode strings short as the printed barcode can become too long to scan.

In the dealer pack you will find a page of example downtime reason codes and their associated barcodes – all of which use a MAX80dd format (where dd is a two digit code). If you stick with this format you will never produce a barcode that is too long to scan.

Here is the setup for Inspection:-
------------------------------------

Server configuration: D	NCSRVTIM-NEW	? 🗵
Server configuration     Directories     Printers     Port Logs	Events/Messages Events/Messages I Enable events/messages	
<ul> <li>B - NC-Base</li> <li>MDC-Max</li> <li>Events/Messages</li> <li>Log export</li> <li>Network I/O</li> <li>E-Mail / SMS settings</li> <li>Web Monitor</li> </ul>	Program Progra	GOODPART OUTOFMATERIAL OPERATORLOGON OPERATORLOGOFF INSPECTION
Serial Test Port Settings Network settings	Reserved program name:	Message type: Operator message Extract value (\$MSGTEXT):
	MAX8022   Message tag: INSPECTION	Ignore  Operator trigger:
	Log Text: Inspection	Re-map message:
<b>CIMCO</b>	Must be inside first comment  Add to port log  Help	Only use with DPRNT messages     Save received file      Default     Cancel     OK

When the operator has finished setting he needs a way of telling MDC-Max. We could setup a "STOPSETTING" message and have a barcode for that but then we would also need a "STOPINSPECTION" message. If you have 8 downtime reasons (Eg Maintenance, Tooling Issue etc.) then this quickly becomes confusing and you run out of space on your barcode sheets.

In general the machine will either be in Setting or Inspection so we recommend a single OKTORUN message. This will be used to clear all the downtime reason codes in one go.

Server configuration: DN	CSRVTIM-NEW	? 🔀
Server configuration Directories Printers Port Logs	Events/Messages Events/Messages Enable events/messages	
<ul> <li>HC-Base</li> <li>MDC-Max</li> <li>Events/Messages</li> <li>Log export</li> <li>Network I/O</li> <li>E-Mail / SMS settings</li> <li>Web Monitor</li> </ul>	Program         Image: Program           OK to Run         Start New Job           Start New Job         Start: \$MSGTEXT           8001         Job Start: \$MSGTEXT           8002         Job Stop: \$MSGTEXT           Cycle Start         Cycle Stop	Tag     OKTORUN     JOBSTART     JOBSTART     JOBSTOP     CYCLESTART     CYCLESTOP     ✓
Serial Test Port Settings Network settings	Reserved program name:	Message type: Operator message
	Trigger: MAX8033	Extract value (\$MSGTEXT):
	Message tag: OKTOBUN	Operator trigger:
	Log Text:	Re-map message:
	Must be inside first comment	Only use with DPRNT messages     Save received file
EIMCO	Help	Default Cancel OK

Create this message as below:-

Now you are ready to print the barcode sheet to be used with the barcode reader – see the "Preparing Barcode Charts" section.

If you want to use a PC in a cell to generate these messages rather than a barcode reader see the section on Operator Screens later on.

#### 1.5 More advanced Messages - Job Number

Because MDC-Max is integrated with DNC-Max it stores the date and time that a program is sent to a machine and we can use this as the current program in reports.

Sometimes it is useful (and more accurate) to store a separate job number whenever a job is started (on a manual machine that has no DNC for example). You can do this by creating a separate MDC barcode for every job that will run on the machine but you will soon end up with pages of barcodes. It is better to create a single barcode to mean "Start New Job" and then scan a separate barcode (on the customer's paperwork) for the actual job.

These messages are setup in the same way as before but with one addition - Extract Value Field.

Here is the setup when printing an individual barcode for each job:-

Server configuration: D	NCSRVTIM-NEW	? 🔀
Server configuration Directories Printers Port Logs	Events/Messages Events/Messages Imable events/messages	
<ul> <li>NC-Base</li> <li>MDC-Max</li> <li>Events/Messages</li> <li>Log export</li> <li>Network I/O</li> <li>E-Mail / SMS settings</li> <li>Web Monitor</li> </ul>	Program         ✔         Message           Start.New Job         3001         Job Start: \$MSGTEXT           8002         Job Stop: \$MSGTEXT         Cycle Start           Cycle Stop         Part Complete         Part Complete	Tag JOBSTART JOBSTART JOBSTOP CYCLESTART CYCLESTOP PARTCOMPLETE
Serial Test Port Settings Network settings	Reserved program name:	Message type: Operator message
	MAXJS	After trigger
	Message tag: JOBSTART	Operator trigger:
	Log Text:	Re-map message:
	Start New Job	Only use with DPRNT messages
	Add to port log	Save received file
	Help	Default Cancel OK

You would then need to print a single barcode for each job of the form MAXJS1234 where 1234 is the unique job number. The Trigger is MAXJS (the unique string scanned by the barcode reader), the Extract Value is set to "After Trigger" to make sure DNC-Max extracts the 1234 of the barcode after MAXJS. The message then generated is JOBSTART and DNC-Max will store anything after MAXJS (1234 in this case) in the MDC database as a separate field (Log Variable 1) which can then be used later on in reports.

So scanning MAXJS1234 will result in the JOBSTART message being generated and 1234 being stored with that message.

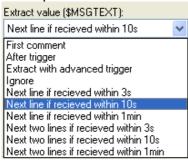
Server configuration: D	NCSRVTIM-NEW	? 🔀
Server configuration Directories Printers Port Logs	Events/Messages Events/Messages Events/messages	
<ul> <li>NC-Base</li> <li>MDC-Max</li> <li>Events/Messages</li> <li>Log export</li> <li>Network I/O</li> <li>E-Mail / SMS settings</li> <li>We Monitor</li> </ul>	Program         ✔         Message           Start New Job         3001         Job Start: \$MSGTEXT           8002         Job Stop: \$MSGTEXT         Cycle Start           Cycle Stop         Part Complete	Image: Tage    JOBSTART    JOBSTART    JOBSTOP    CYCLESTART    CYCLESTOP    PARTCOMPLETE
Serial Test Port Settings Network settings	Reserved program name: Trigger: MAXJS	Message type: Operator message  Extract value (\$MSGTEXT): Next line if recieved within 10s
	Message tag: JUBSTART Log Text: Start New Job	Operator trigger:
WCIMCO	Must be inside first comment	Only use with DPRNT messages Save received file Default Cancel OK

If you want to scan customers own job numbers then use the following setup:-

The operator scans the barcode MAXJS and then has 10 seconds (you can set this to 3 seconds as well) to scan the actual job number from another sheet. The only difference in setup is the Extract Value (Next Line if received within 10s).

Sometimes the customer will have paperwork where the jobname is made up from two barcodes. One is the Job or Part Number and the other is the Operation Number. In this case the operator would have to scan the MaxJS Start Job barcode then the Job Number then the Operation Number. MDC-Max can handle this by setting Extract Value to 'Next two lines if received within 10s'. MDC-Max appends the op number to job number and stores this in Log Variable 1. The individual Job number and Op Number are stored in Log Variables 2 and 3 respectively.

Example Extract Values.

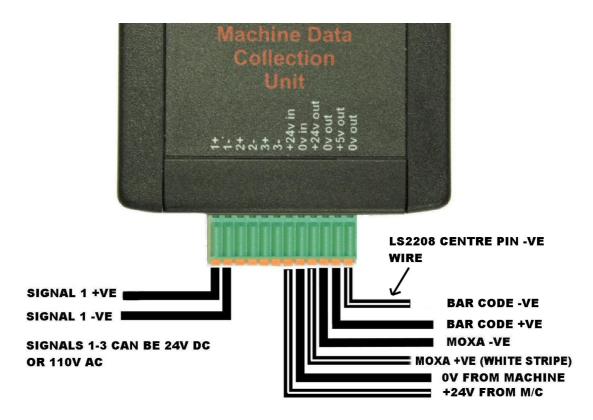


# Chapter 2 – Using the MDC box to collect machine signals

The MDC box has three RS232 connectors at one end which are used to connect the RS232 cables and explained later.

At the other end of the MDC box is a green removable spring terminal block. The green terminal block has 12 connectors, which are labelled

1+	5-50V DC or 50-110v AC Input 1
1-	Common 0V Input 1
2+	5-50V DC or 50-110v AC Input 2
2-	Common 0V Input 2
3+	5-50v DC or 50-110v AC Input3
3-	Common 0V Input 3
+24v in	this should be connected to a 24v source in the machine control
0v in	this should be connected to a 0v source in the control
+24v Out	This is a fused output for Moxa W2150 / NPort 5110 / DE311 units
0v Out	This is a 0v common rail for the above
+5v out	this is an isolated 5v bar code reader power supply see note below
0v out	this is an isolated 0v bar code reader power supply see note below



The MDC box is designed to be powered from the machine's 24v DC power supply – no other voltage will do. Connect the +24v terminal to the machine's 24v supply and the 0v to the machine's 0v supply. The MDC box then provides a 24v DC supply out to power a Moxa type RS232 hub and a 5v DC supply out to power a barcode reader.

Note: All bar code readers provided by Cimco take power via a 1.3mm plug where the centre pin is negative (0v). Most other devices (including the Moxa

hubs) have centre pin positive so it is important to get the wiring right for the bar code reader otherwise you may damage it.

If you bought your MDC box from Cimco as a kit with an LS2208 barcode reader then the MDC box comes with the cables already connected to the green connector. Each pair of black wires has a white stripe on one wire and this is normally connected to the +ve terminal. The exception is the LS2208 bar code reader where the white stripe on the wire provided is connected to the centre pin on the power plug and therefore the other end is connected to the 0v terminal on the MDC box.

Wires can be inserted by pushing the orange release clips towards the green connector and inserting the wire fully so no copper is exposed. Release the orange clip and give the wire a pull to make sure it is secure.

# 2.1 Wiring the MDC boxes to the machine outputs

**IMPORTANT NOTE** : wiring into the machine signals should only be carried out by a competent machine electrical engineer – never attempt to make live connections with the machine powered on. If the machine is still under warranty and you have to modify any connections in the machine you will have to get the machine tool company's permission and confirm that it does not void the warranty. In these instances it is often easier to ask the machine tool company or an authorised engineer to fit the MDC box.

The MDC box can accept 5 to 50v DC signals or 110v AC signals and will convert these to an RS232 level output. In practise nearly all signals are 24v DC or 110v AC (older machines). You do not need to use relays for the 110v AC signals – just wire them directly into the box.

Make the connections to the green connector and then push the connector firmly into the MDC box before powering up the machine.

To monitor the machine's status the MDC boxes should be wired into the machine's output signals.

1+ and 1- are normally connected across the machines 24V running lamp 2+ and 2- are normally connected across either the machines M02 (Program End) lamp, or across any 24V signal that operates once a cycle and indicates the end of a cycle (part counter, parts catcher, Colet open, parts conveyer etc). Because these signals are not always available it is often necessary to wire into the machine in other places, or to use the third input (3+ and 3-) to get a third signal for additional information about the machine state.

Ideally you would get the relevant connector signals from the machine tool builder or the machine's electrical schematic. If this is not possible then examine the machine while it is running to see which lights go on or off at the start and end of the cycle.

If you cannot find a light then it is often necessary to look at the I/O modules in the machine cabinet while it is running to spot suitable signals.

As a last resort you may have to check signal levels when the machine is running live. Always use an Oscilloscope, NOT a multimeter for this purpose as a multimeter only has about a 1K resistance – an oscilloscope normally has one MegaOhm. USB based oscilloscopes are readily available for under 100 Euros for laptops. You may have to get a Certificate of Live Working to prove you are qualified to do this before you are allowed to run the machine like this. Make sure you follow all relevant Health & Safety procedures (these vary according to country).

In the case of most milling machines, and a lot of lathes the easiest place to monitor the machine is directly across the light on the 'Cycle Start' light for the cycle start signal, and across the M30/M02 lamp (this can involve soldering across pins on the switch panel circuit board) for the part complete. If a bar feed is being used then look for a part catcher or part conveyor signal (often

this is only accessible in the hydraulics panel of the machine) or a hardware parts counter. Other signals such as pallet positioning switches, chuck open signals, or bar feeder request signals have also been used. It is sometimes easier to use software monitoring (see separate section) to use a DPRNT statement at the end of each component.

It is often necessary to wire the monitoring boxes into the pilot lamps on top of the machine, these are normally a green, amber (sometimes blue) and red lamp in a wand or beacon on top of the machine. If these are fitted and their connections can easily be found in the control cabinet they are often the easiest way to monitor the machines state.

In some cases the lamp signals flash to indicate a paused state (waiting for operator) on the machine. This can be picked up in the DNC-Max settings to give an extra message (see Chapter 1 for setting up messages).

# 2.2 Wiring the RS232 Connectors to the MDC Box

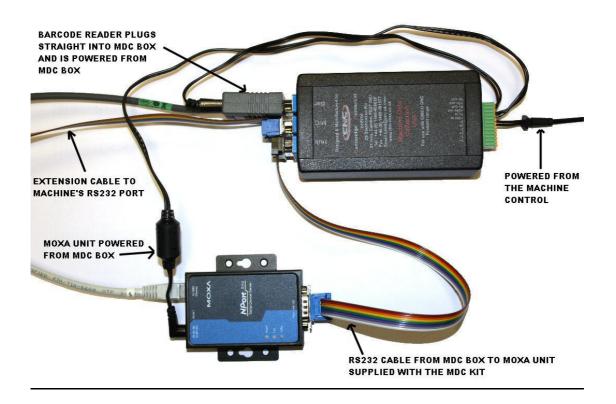
The RS-232 end of the 3 way box has three 9 way D-type connectors. These are labelled Hub, M/C and Bar.

The Hub connector is designed to plug into a Moxa 9 way serial port via a straight through 9 way cable which is supplied. This cable will also work for any other hubs that have a 9 way male serial port wired as a PC type interface (eg Quatech, Digi). Cimco have tested the following Moxa hubs; W2150+, NPort 5110 and DE-311.

If you are adding MDC to an existing DNC installation which is cabled to a remote multi-way hub (eg NPort 5610-16) or a PC with multi-way serial card (eg Moxa C168P) you will need to check that your existing cables have at least 7 wires in them and you will have to rewire both ends of the cable to carry the additional DCD and DSR signals. If in doubt contact Cimco before quoting as you may have to run all new cables.

The M/C connector is wired as a standard PC type serial port and should be used to connect to the machine via a standard 'Cross-over' or 'Laptop' cable unless you require 3 machine signals. If you require three signals you must link together RTS/CTS (normally pins 4 & 5) at the machine end of the cable and leave pins 7 and 8 disconnected at the MDC box end. This is because the third signal is passed back to DNC-Max via the CTS line on the Moxa hub and cannot be used for communications as well. Bear in mind that you will not be able to use hardware handshaking for that machine either.

The Bar connector is designed so that a 9 way RS-232 bar code reader can be plugged directly into it.



# 2.2.1 Configuring the internal MDC Box jumper settings

Depending on how you are going to use the MDC box you may have to change the internal jumper settings and fuse position. As standard the MDC box comes configured for 24v DC power input on the green connector and gives a 24v output for the Moxa unit and a 5v output for the barcode reader. If you are not going to use a barcode reader or you want to use a 24v source from a Fanuc RS232 connector YOU MUST open the box and change the settings.

## **Opening the MDC Box**



To adjust the links on a MDC unit the top of the box has to be removed. At the ends of the box near each corner there is a small rectangular hole. Insert a small screwdriver into each hole in turn while gently easing the box apart. The box should then come apart revealing the circuit board inside as below.



# MDC Unit Configuration.

There are three links (LK1, LK2 and LK3), two fuse positions (F1 and F2) and a jumper (J3) on the MDC circuit boards (Check the Part number is PCB-CNC003-2). These links are used to control how the unit routes RS232 data, 24v power in and out and 5v power out for a barcode reader.

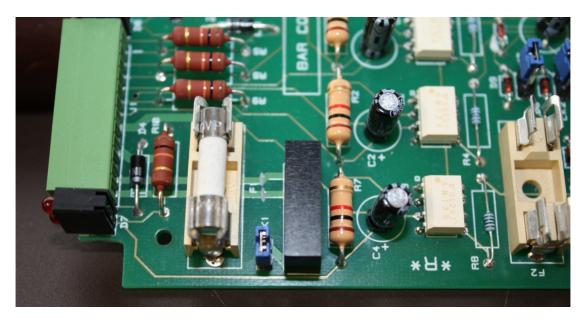
If the MDC unit is being used with a Moxa serial hub that is powered from the machine (using a Moxa PSU plugged into 110-24v socket) and there is no requirement for a barcode reader, then there is no need to connect 24v to the MDC box (+24v and 0v in connections).

If the MDC unit has to supply power to a barcode reader (+5v out) or a Moxa unit (+24v out) it will require a 24v supply connected from the machine.

This 24v input supply can be connected to the +24v in and 0v in sockets on the green connector, or in the case of most Fanuc controls from pin 25 on the machine's RS232 connector. Using pin 25 on the Fanuc control can cause occasional problems with some Fanuc based controls, in which case using the machines 24v supply is the better option.

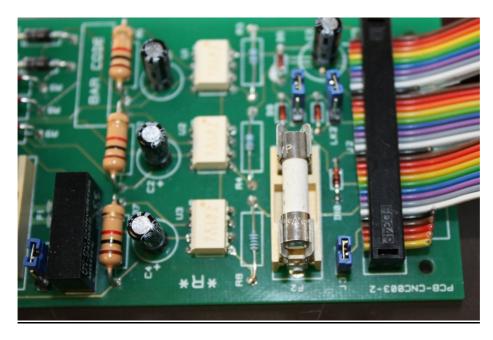
# Powering the MDC unit from the machines 24v supply (into the Green connector)

We supply the MDC unit configured for 24v supply on the green connector and 5v output for a barcode reader. This is done as follows. The 1Amp fuse is placed in F1 to use power from the green connector as the pictures below.



If the MDC unit is being used to power a barcode reader make sure link LK1 is in place, this sends the 24v input into the 5v converter (the black component beside the link) used to power the barcode reader. If the MDC unit is not being used to provide power for the bar-code reader LK1 <u>MUST</u> be removed to prevent damage to the 5v converter.

# Powering the MDC box from the Fanuc RS232 connector



If you want to power the MDC box from the Fanuc RS232 connector you need to make up a special RS232 cable as below. This cable takes the 24v from the Fanuc pin 25 and supplies 24v to pin 9 on the M/C connection on the MDC box. The fuse has to be moved to fuse holder F2 and the link J3 should be closed as the picture above. Again if the MDC box is being used to power a bar code reader make sure link LK1 is in place (see section above), this controls the 24v input into the DC/DC converter used to provide 5v for the bar code reader. If the MDC unit is not being used to provide power for the bar-code reader LK1 <u>MUST</u> be disconnected to prevent damage to the 5v converter.

Cable Spec, for powering the MDC unit from a Fanuc 25 way rs232 connector

# 9 way M/C connector on MDC box

# 25 Way Fanuc on Machine

(9 way female)		(25 way male)	
3	brown	3	
2	red	2	
7	blue	5	
8	white	4	
5	black	7	
1	Yellow	1	
9	Orange	25	
	5	6,8,20 Linked	

# Diode By-pass links for long cable runs

The MDC unit is designed to connect to a serial hub (wired or wireless) inside the control cabinet of a machine tool (eg Moxa W2150+), by a short ribbon cable. In some instances this is not possible, either the serial hub is not mounted in the machine cabinet, or the machine is cabled to a remote hub that serves multiple machines. The RS232 signals inside the MDC units have signal diodes in them to avoid RS232 conflicts between the bar-code reader and machine tool interfaces.

In some cases, if the serial hub is some distance from the machine, this can cause problems with signal strength on the RS232 signal line out of the MDC unit back to the serial hub.

You will notice that the RS232 data from the machine is corrupt. In most cases closing Link LK2 resolves the problem with the machine RS232 signal, in very rare cases this also affects the bar code reader signal, in which case LK3 should be closed as well.

This corruption can also be caused by poor machine control earthing and the installer may need to consider opto-isolation between the MDC unit and the machine control.

# 2.2.2 "Standard" wiring from the MDC box to the machine

A "standard" machine (ie Fanuc, Heidenhain etc.) will use one of the following cable specs :-

## Cable from MDC Box to MC (machine requires RTS/CTS handshake)

MDC box MACHINE

- (9 way female) (25 way male)
- 3 ------ 3
- 2 ------ red------ 2 7 ------ blue------ 5
- 5 ------ 7
  - -----Diack------- /

6,8,20 Linked on machine end

## Cable from MDC Box to MC (machine uses XOn XOff handshake)

- MDC box MACHINE
- (9 way female) (25 way male)
- 3 ------ 3
- 2 ----- red----- 2
- 5 ----- 7

4-5 linked on machine end 6,8,20 linked on machine end

#### Cable from MDC Box to MC (machine uses XOn XOff handshake) MDC box powered by the Fanuc RS232 24V supply on pin 25

- MDC MACHINE
- (9 way female) (25 way male)
- 3 ------ 3
- 2 ----- red----- 2
- 5 ------ black------ 7
- 9 ----- black----- 25

4-5 linked on machine end

6,8,20 linked on machine end

Note this assumes a Fanuc control with a working 24v supply on pin 25 of its serial port. To use this option it is necessary to open the MDC box and move the input fuse and connect a link. Contact CNC for details. The maximum current you can draw from the RS232 line is limited so you can only power the MDC box, a single Moxa port and a bar code reader from this source.

# 2.2.3 CE Approval for MDC Box

The MDC box now has CE Approval and this applies to all circuit boards bearing the PCB-CNC003-2 marking. There is a new self-adhesive label which can be fixed to all existing boxes bearing that part number. Please contact Cimco for details.

The CE Approval certificate is enclosed :



Barclay Phelps CE Marking Consultants, 196 High Road, London, N22 8HH, United Kingdom

#### **CERTIFICATE & DECLARATION OF CONFORMITY FOR CE MARKING**

#### Company contact details:

Cambridge Numerical Control Unit 8 Royce Court, St Ives, Cambridge, PE27 3NE, United Kingdom Tel: 01480 468639 Fax: 01480 301577 sales@cnc.uk.com www.cnc.uk.com

> Cambridge Numerical Control declares that their: Machine Data Collection Unit

Model CNC-MDC003A

is classified within the following EU Directives:

Low Voltage Directive 2006/95/EC Electromagnetic Compatibility Directive 2004/108/EC

and further conforms with the following EU Harmonized Standards:

EN 60950-1:2006+A12:2011 EN 55022:2010 EN 55024:2010

Dated: 28 September 2011 Position of signatory: Partner Name of Signatory: Tim Collett Signed below: p.p. Cambridge Numerical Control

# 2.3 Testing the Machine Outputs

Once you have found the machine outputs and wired them into the MDC box connector you can check them in two ways, by checking the LEDs on the box and by checking that the messages are being received by DNC-Max.

On the green connector end of the MDC Box there are 4 LED's. The Top right LED indicates that the box has power, this should always be on.

Top Left – Signal 1 Bottom Left – Signal 2 Bottom Right – Signal 3

These LED's will light each time a signal is active.

For example the In-Cycle Signal (normally signal 1) should be on all the time the machine is in cycle and the Part Complete Signal (signal 2) should flash once when a part is completed.

As long as you have configured the messages for each machine in the DNC-Max Server (see Section 1.2) and configured the message in the machine Port configuration (section 2.6) you should see the relevant message appear in the machine port log.

Open the DNC-Max client, select the machine and click the Log Tab and run the machine. You should see a CYCLESTART message every time the machine starts and a CYCLESTOP message each time the machine stops. You should also see a PARTCOMPLETE message when the job completes (assuming you setup that message).

If you can see the LEDs light on the MDC box but cannot see the messages in the machine log you need to investigate further. Click the Debug tab in the DNC-Max client and click Start Log to start a debug log then run the machine.

Each time the machine starts and stops you should see a change in the DSR status in the debug log. If you do not and you have a Moxa unit installed in the machine then you have a hardware fault (MDC box or Moxa hub). If you are using a multi-way hub wired to several machines (NPort 5610 etc.) it may well be a cable problem.

If you can see the DSR status change in the debug log and you are not seeing the CYCLESTART and CYCLESTOP messages in the Port log then your configuration is incorrect. See section 2.6 and check the minimum cycle time – you may need to increase this. Each DSR status change is timestamped in the debug log so you can work out the time taken to change states.

NOTE : if the machine is running a program continuously (eg bar fed lathe) you will not see a CYCLESTOP message until you physically stop the machine. You should see a single CYCLESTART followed by a PARTCOMPLETE each time the program repeats itself.

# 2.4 Configuring the hardware monitoring signals in DNCMax

Once the monitoring boxes are wired into the machine's electrical system and the indicator LEDs on the MDC box light up as required the next thing to do is to configure the DNC-Max serial protocol to respond to the signals.

Assuming that signal 1 on the MDC box is connected to the Cycle Start signal on the machine and Signal 2 is connected to the M30/M02 lamp, part catcher or cycle counter on the machine.

Open DNC-Max client, highlight the relevant machine and open the port settings (Port Configure Port) then click the + sign next to Messaging.

Standard serial protocol:	Mill1 - [DNCSRVTIM-NEW]	? 🔀
Serial Port     Transmit     Receive     Auto receive     Remote request     Remote Start/Stop     External Sub-programs	DSR Monitor DSR Monitor Image: DSR Signal messages Port:	
<ul> <li>Program Offset</li> <li>Machine Type</li> <li>Feed/Speed</li> <li>Directories</li> </ul>	Mil1 Input type: Switch Message when pulsing Minimum cycle time (ms): Minimum pulse count:	×
<ul> <li>Messaging</li> <li>Barcode / DPRNT</li> <li>Barcode Redirect</li> </ul>	500         2           Message (Low State):         Maximum pulse length (secs):	*
CTS Monitor <mark>DSR Monitor</mark> DCD/RLSD Monitor NC-Base Settings	CYCLESTOP 1 Message: Message (pulse): CYCLESTART	•
Serial Device Comment Version info	Log message when port starts     Debug mode     Log message when pin goes high     Poll pin status (check this to circumvent driver problems)	
CIMCO Integration	Global change Help Default Cancel	ОК

# 2.5 MDC Box Signal 1 (In Cycle)

The first signal on the MDC box is sent back to DNC-Max via the DSR line on the serial port and this is normally wired as In-Cycle. Click the DSR Monitor and tick Enable DSR signal. Set the input type to Switch (either on or off), the Message low state to CYCLESTOP and the Message (below) to CYCLESTART. Tick the Log Message when port starts box, this makes sure that the current state of the signal is sent when the machine port starts.

This setup will generate two messages, CYCLESTART when the machine is running and CYCLESTOP when the machine is not. It works like this :-

- The machine goes into cycle and generates a +ve signal on Pin 1+ on the MDC box input.
- The MDC box converts this to a +ve signal on the DSR line.
- DNC-Max detects this change in signal on the serial port and generates a CYCLESTART message.
- The machine stops and the +ve signal on the pin 1+ on the MDC box drops back to 0v.
- The MDC box drops the +ve signal on the DSR line.

• DNC-Max detects that the line has gone low and generates a CYCLESTOP message.

The minimum cycle time is the time taken for the machine to change state – leave this set to 500mS in most cases. This will filter out any electrical noise when the machine changes state.

Ticking the Debug Mode will force all messages to appear in the port log regardless of the setting in the DNC-Max server configuration. Once the system is working properly turn this off to avoid filling the port log.

# 2.6 Pulsing Signal on Haas Machines

Some machines (notably the Haas) will flash the in-cycle lamp when the part has completed. We can use this fact to generate a PARTCOMPLETE message on the same signal as the in-cycle signal.

Tick the "Message when Pulsing" box, set the minimum pulse count to 2 (to prevent a single flash from triggering a message) and the maximum pulse length to 1 second. Set the Message to PARTCOMPLETE.

Standard serial protocol:	Mill1 - [DNCSRVTIM-NEW]	? 🗙
<ul> <li>Serial Port</li> <li>Transmit</li> <li>Receive</li> <li>Auto receive</li> <li>Remote request</li> <li>Remote Start/Stop</li> <li>External Sub-programs</li> <li>Program Offset</li> <li>Machine Type</li> <li>Feed/Speed</li> <li>Directories</li> <li>Messaging</li> <li>Barcode / DPRNT</li> <li>Barcode Redirect</li> <li>CTS Monitor</li> <li>DCD/RLSD Monitor</li> <li>NC-Base Settings</li> <li>Serial Device</li> <li>Comment</li> <li>Version info</li> </ul>	DSR Monitor         DSR Monitor         Image: Port:         Mill         Input type:         Switch         Switch         Minimum cycle time (ms):         Solo         2         Message (Low State):         CYCLESTOP         Message (pulse):         CYCLESTART         PARTCOMPLETE         Log message when pin goes high         Poll pin status (check this to circumvent driver problems)	
CIMCO Integration	Global change Help Default Cancel	OK

If the light is flashing once a second you will need to increase the Minimum Cycle Time from 500mS to more than 1 second otherwise you will generate continuous CYCLESTART / CYCLESTOP messages.

Note that on some machines (eg DMU) a flashing in-cycle lamp means waiting for operator and you can use this to generate a different message (eg WAITINGOPER).

## 2.7 MDC Box Signal 2 (Part Complete)

The second signal on the MDC box is sent back to DNC-Max via the DCD line on the serial port and is normally used for Part Complete (unless you have a pulsing in-cycle lamp as above).

Click the DCD Monitor and tick Enable DCD signal. Set the Input Type to Push Button (signal Comes on for a short while then goes off) and the minimum cycle time in mS (the signal may come on for several seconds or it may just flash very quickly). Click the "Log message when Pin goes High" and set the Message to PARTCOMPLETE. You can also use a low signal state to generate a message (useful if the machine signal is always high except when a part is completed).

Bercial Port     Transmit     Transmit     Transmit     Proceive     Auto receive     Auto receive     Auto receive     Auto receive     Auto receive     Auto receive     Premote request     Remote start/Stop     Port     External Sub-programs     Program Offset     Input type:     Feed/Speed     Directories     Minimum cycle time (ms):     Destronds Pedirect     DOR/RLSD Monitor     DSR Monitor     DOR/RLSD Monitor     DSR Monitor     DOR/RLSD Monitor     Message:     Destronds Pedirect     DOR/RLSD Monitor     DSR Monitor     DOR/RLSD Monitor     DSR Monitor     DOR/RLSD MONITO     DOR/RLSD	
Auto receive     Remote Start/Stop     External Sub-programs     Program Offset     Machine Type     Feed/Speed     Directories     Minimum cycle time (ms):     Message when pulsing     Barcode R direct     Directories     Minimum cycle time (ms):     Minimum pulse count:     Z00     Z      Message (Low State):     DED/RLSD Monitor     DCD/RLSD Monitor     NCBase Settings     Setial Device     Comment     Z00     Z      Debug mode	
■ Remote request         ■ Remote start/Stop         ■ External Sub-programs         ■ Program Offset         ■ Machine Type         ■ Feed/Speed         ■ Directories         ■ Barcode / DPRNT         ■ Barcode / DPRNT         ■ Barcode Redirect         ■ Directories         ■ Sarcode Redirect         ■ CTS Monitor         ■ DCD/RLSD Monitor         ■ Service         ■ Service         ■ Comment	
- Remote Start/Stop       Fort:         - External Sub-programs       Mill         - Program Offset       Mill         - Machine Type       Input type:         - Feed/Speed       Push button         - Directories       Minimum cycle time (ms):         - Barcode / DPRNT       200         - Barcode / DPRNT       200         - DSR Monitor       PARTCOMPLETE         - DDS/R Monitor       Message:         - NC-Base Settings       Serial Device         - Comment       ✓ Log message when port starts	
External Sub-programs     Program Offset     Machine Type     Feed/Speed     Directories     Messaging     Disectories     Messaging     Barcode / DPRNT     Barcode / DPRNT     Barcode Redirect     OTS Monitor     DDX/RLSD Monitor     NC-Base Settings     Serial Device     Comment     Comment	
Program Offset       Mill         Machine Type       Feed/Speed         Feed/Speed       Push button         Directories       Minimum cycle time (ms):         Barcode / DPRNT       200         Barcode / DPRNT       Message (Low State):         OSR Monitor       DSR Monitor         DSR Monitor       PARTCOMPLETE         Serial Device       Message when port starts	
Machine Type       Input type:         Feed/Speed       Push button         Directories       Minimum cycle time (ms):         Messaging       200         Barcode / DPRNT       200         Barcode Redirect       Message (Low State):         OED/RLSD Monitor       PARTCOMPLETE         Serial Device       Message when put stats	*
Point Construction       Minimum cycle time (ms):       Minimum pulse count:         Messaging       Barcode / DPRNT       200         Barcode / DPRNT       Barcode / DPRNT       200         DSR Monitor       PARTCOMPLETE       Maximum pulse length (secs):         DDD/RLSD Monitor       Message:       Message (pulse):         NC-Base Settings       PARTCOMPLETE       Message (pulse):         Serial Device       Log message when port starts       Debug mode	
Messaging       Minimum cycle time (ms):       Minimum pulse count:         Barcode / DPRNT       200       2         Barcode Redirect       200       2         CTS Monitor       DDC/FLSD Monitor       Maximum pulse length (secs):         DCD:/FLSD Monitor       Message:       1         Serial Device       PARTCOMPLETE       Message (pulse):         Comment       Log message when port starts       Debug mode	
→ Ressaging       200       2         → Barcode / DPRNT       Barcode / DPRNT         → Barcode Redirect       Message (Low State):       Maximum pulse length (secs):         → DSR Monitor       PARTCOMPLETE       1         → DDD/RLSD Monitor       Message:       Message (pulse):         → NC-Base Settings       PARTCOMPLETE       ✓         → Serial Device       ✓       Log message when port starts       ✓	
Barcode / DFIN1     Message (Low State):     Maximum pulse length (secs):     Tors Monitor     DDS/RLSD Monitor     DDD/RLSD Monitor     Nc-Base Settings     Setial Device     Comment     Log message when port starts     Debug mode	\$
CTS Monitor     DSR Monitor     DDX/RLSD Monitor     NC-Base Settings     Serial Device     Comment     Comment     Comment	
DSR Monitor     DCD/RLSD Monitor     NC-Base Settings     Serial Device     Comment     Comment     Comment	\$
DCD/RLSD Monitor     NC-Base Settings     Serial Device     Comment     Comment     Comment	
NU-Base Settings     Serial Device     Comment     VLog message when port starts     Debug mode	
Comment V Log message when port starts Debug mode	
Version info	
Log message when pin goes high	
Poll pin status (check this to circumvent driver problems)	

# 2.8 MDC Box Signal 3 (Alarm, Doors Open etc.)

The CTS Monitor can be used to collect a third machine signal as required but only if the machine does not require hardware handshaking for the communications (Flow Control must be set to Software in the Serial Port section of DNC-Max). Most machine controls (Fanuc, Haas, Heidenhain) do not require this so can generate a third signal.

Click the CTS Monitor and tick Enable CTS signal messages. Setup the Input type in the same way as above and set the message to the one required (such as ALARM).

Make sure that you run a 3 wire cable from the MDC box to the machine and link out RTS/CTS (usually pins 4 & 5) on the machine end of the cable (along with any others needed for the control such as 6,8,20).

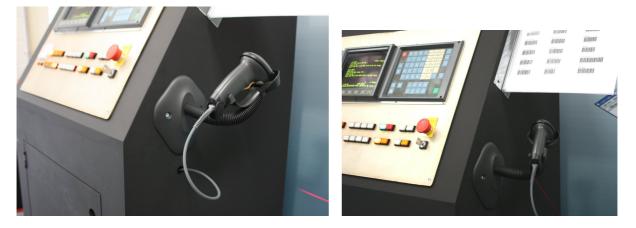
# Chapter 3 – Barcode Reader Installation on machines

## 3.1 Choosing the barcode reader

If you are buying your own barcode readers for use on each machine then make sure that they have an RS232 interface (often sold as an add-on module) that plugs into a standard PC 9 way serial port and that they require a 5v power supply (most do). Cimco recommend the Symbol LS2208 RS232 barcode reader and this can be bought complete with the RS232 module and mounting stand as a kit from Cimco if required.

## 3.2 Mounting the Barcode reader

The main consideration when mounting a bar code reader on a CNC machine tool is how the operator will have access to it. There is no point placing a barcode reader on the back of a machine tool if the operator has to leave the control to use it. In most cases the reader should be attached to the side or top of the control panel, near a flat surface to which a barcode chart can be attached.



Drill a hole in the machine cabinet big enough for the barcode reader end of the cable to pass through (it comes away from the barcode reader) and put a rubber grommet in the hole. The RS232 end of the cable plugs directly into the MDC box. Then feed the cable through the grommet and reconnect to the barcode reader. In some cases it will be necessary to extend the RS232 lead supplied with the bar code reader which should be done inside the machine cabinet. The flexible stand can then be fixed to the machine by screws or Velcro.

# 3.3 Configuring the baud rate on the bar code readers

Once you have setup the machine baud rate you must set the baud rate and stop bits on the bar code reader to match that of the machine. You can either do this on each machine one at a time where the barcode reader is powered from the MDC box or you can pre-program all the barcode readers before installation using an external power supply (Cimco supply one with the barcode reader for this purpose).

Setup is achieved by powering up the barcode reader and scanning a series of special purpose barcodes from the user manual.

You will need to print the relevant barcode pages from the barcode manual (you can laminate them for later use) in order to scan the baud rate settings. The Cimco dealer pack includes laminated copies of the relevant sections of the LS2208 user manual.

If you are using the Cimco LS2208 barcode reader print the following pages from the user manual and then scan the options as below :-

6-7	Host Type – scan Standard RS-232
6-9 & 6-10	Baud rate – scan the correct baud rate
6-11 & 6-12	Parity - scan parity code (normally Even)
6-13	Stop Bits / Data Bits

### Adding a CRLF to the end of the scan

Most barcode readers do not send an end of line (CRLF) by default after the scan. DNC-Max expects this at the end of a string so you will need to print the relevant pages from your manual to do this.

If you are using the Symbol LS2208 barcode scanner then you will need to print the following pages :-

13-6 to 13-8 Scan "SCAN OPTIONS", then "<DATA> <SUFFIX>" then "ENTER"

Once the barcode readers are setup the settings are kept in flash RAM so you can remove power from them and install them in the machines without losing the settings.

See "Appenix A – LS2208 Setup" for a two page document which can be printed with all the scan codes needed for the LS2208 barcode readers.

# 3.4 Testing the Barcode Readers

Once programmed connect the bar code reader into the MDC box in the machine. On the DNC-Max client, highlight that machine and click the Terminal tab, then on the machine try scanning some bar codes. Use the sample barcodes from the dealer kit or scan a code from the barcode manual. Scan a code and check that you are seeing the appropriate code (eg MAX8010) followed by newline (CRLF) on the DNC-Max terminal screen.

# Chapter 4 – Printing your own bar codes

# 4.1 Installing Bar Code Fonts on a Windows PC

You will need access to a PC with Microsoft Word and a printer to print bar codes for MDC-Max. This can be your own laptop or one of the customer's PCs (The customer will probably want to re-print the barcode sheets so let them have the install).

Run INSTALL.EXE file from the Bar Code Font Install folder on the MDC-Max dealer CD (You can also download it from www.idautomation.com/fonts/free). This installs a font into Windows that can be used in Microsoft Word (and other Windows applications) to create Code 39 Barcodes (also known in the US as "USD-3" and "3 of 9").

If the customer wants to scan their own paperwork it does not matter that their barcode is a different type as the bar code readers will read many different bar codes and still send the correct characters back to MDC-Max. As long as you can read their barcodes correctly you can still print your own MDC-Max barcodes in Code 39.

Code 39 includes the digits 0-9, the letters A-Z (upper case only), and seven special characters (-.\* $\$  and space). Each Code 39 barcode MUST begin and end with an asterisk (\*) in addition to the characters required – eg \*MAX8021\*

# 4.2 Printing Barcode sheets for MDC-Max

Once the messages have been set up in DNC-Max (see Section 1.5) the barcodes have to be printed for each downtime reason onto a single sheet that can be laminated and stuck or mounted on the machine.

Please follow these rules when printing barcodes:-

- The total width of the printed barcode should not exceed the width of the bar code scanner head (obvious really).
- Use a good quality laser or inkjet printer, blurred or poor quality barcodes will cause errors.
- Keep the font size large to get the best results.
- Leave plenty of space between barcodes so there is no chance of scanning the wrong code.
- Laminate the finished sheet using matt laminating pouches not gloss which is too shiny.

Start a new MS Word File, type the description for the operator in a large ARIAL font (16 point is OK), then press enter for a newline. From the Font box on the tool bar select the IDAutomationHC39 font and then type the DNC-Max code for that message.

For example if 'MAX8021' is the trigger set in DNC-Max as SETTING downtime reason, type SETTING in the Arial font, press enter for a new line, then change font to IDAutomationHC39 and type \*MAX8021\* (don't forget the \* at the beginning and end).



Please note that the second line above will only display as a barcode if you have the bar code font installed.

The barcode font produces the barcode and the text for the DNC-Max message. This makes it easy to check that you have printed the correct codes and edit them if necessary.

You can put several barcodes on a line together provided they are far enough apart :-

DOWNTIME REASON CODES – XYZ Engineering



















# 4.3 Barcodes for Job Names

If the customer wants to use barcodes to indicate the start of a new job (for example for manual machines) a job number barcode is required. To do this you can print a single barcode with a start job code followed by the actual job number or use two separate bar codes, one to mean start job and the other one could be on the customer's own paperwork (the customer's paperwork does not have to use the same type of bar code).

Setup the MAXJS message in DNC-Max (see Section 1.6) for individual jobs and print a single barcode for each job needed as follows :-



Where 123456 is the job number.

This is only useful if the customer is running a small number of specific jobs on a machine (manual presses for example).

In general it is more useful to print a separate bar code that means job start and then scan the customer's own paperwork for the actual jobnumber.

Setup the MAXJS message in DNC-Max (see Section 1.6) which waits for a second scan and print a single job start barcode :-

JOB START – (Scan this then scan Job No.)



This will send the JOBSTART message and, as long as the operator scans the relevant paperwork within 10 seconds the jobnumber is extracted from the second scan.

See "Apendix B – Example Barcodes" for an example bar code sheet.

## Chapter 5 – Configuring MDC-Max

Once you have installed the MDC hardware box or DPRNT messages and configured the messages in DNC-MAX, you can check that the MDC-Max Event Log is logging the messages correctly. Open MDC-Max Client (different to the DNC-Max client) and click Logs, Event Log and the screen should look similar to the one below:-

CIMCO MDC-Max Clien	t <del>v</del> 5							
<u>M</u> DC-Max <u>R</u> eports <u>E</u> x	port <u>S</u> tatus Log	s <u>S</u> etup <u>W</u> indow	Help					_ 8 :
🕞 Event Log								4 Þ 🗙
Time M	lachine	Message	Text	Program	File	Operator	Var 1	Var2 Var3
Tue 04/12/2007 14:50 C	ell6 Puma	CYCLESTART	Cycle Start					
Tue 04/12/2007 15:02 C	ell6 Puma	CYCLESTOP	Cycle Stop					
Tue 04/12/2007 15:02 C	ell6 Puma	CYCLESTART	Cycle Start					
ue 04/12/2007 15:03 C	ell6 Puma	CYCLESTOP	Cycle Stop					
Tue 04/12/2007 15:03 C	ell6 Puma	CYCLESTART	Cycle Start					
ue 04/12/2007 15:07 C	ell6 Puma	PARTCOMPLETE	Part Complete					
Tue 04/12/2007 15:07 C	ell6 Puma	CYCLESTOP	Cycle Stop					
Tue 04/12/2007 15:08 C	ell6 Puma	CYCLESTART	Cycle Start					
Tue 04/12/2007 15:14 C	ell6 Puma	CYCLESTOP	Cycle Stop					
Tue 04/12/2007 15:14 C	ell6 Puma	CYCLESTART	Cycle Start					
Tue 04/12/2007 15:15 C	ell6 Puma	CYCLESTOP	Cycle Stop					
Tue 04/12/2007 15:15 C	ell6 Puma	CYCLESTART	Cycle Start					
Tue 04/12/2007 15:15 C	ell6 Puma	CYCLESTOP	Cycle Stop					
ue 04/12/2007 15:16 C	ell6 Puma	CYCLESTART	Cycle Start					
ue 04/12/2007 15:19 C	ell6 Puma	PARTCOMPLETE	Part Complete					
Tue 04/12/2007 15:19 C	ell6 Puma	CYCLESTOP	Cycle Stop					
Tue 04/12/2007 15:20 C	ell6 Puma	CYCLESTART	Cycle Start					
Tue 04/12/2007 15:26 C	ell6 Puma	CYCLESTOP	Cycle Stop					
Tue 04/12/2007 15:26 C	ell6 Puma	CYCLESTART	Cycle Start					
Tue 04/12/2007 15:30 C	ell6 Puma	PARTCOMPLETE	Part Complete					
Tue 04/12/2007 15:30 C	ell6 Puma	CYCLESTOP	Cycle Stop					
Tue 04/12/2007 15:37 C	ell6 Puma	CYCLESTART	Cycle Start					
Tue 04/12/2007 15:44 C		CYCLESTOP	Cycle Stop					
Tue 04/12/2007 15:44 C		CYCLESTART	Cycle Start					
Tue 04/12/2007 15:45 C	ell6 Puma	CYCLESTOP	Cycle Stop					
Tue 04/12/2007 15:45 C	ell6 Puma	CYCLESTART	Cycle Start					
Lue 04/12/2007 15:49		PARTCOMPLETE	Part Complete					
Tue 04/12/2007 15:49 C	ell6 Puma	CYCLESTOP	Cycle Stop					
Tue 04/12/2007 15:51 C		CYCLESTART	Cycle Start					
Tue 04/12/2007 15:57 C		CYCLESTOP	Cycle Stop					
Tue 04/12/2007 15:57 C		CYCLESTART	Cycle Start					
Tue 04/12/2007 16:01 C		PARTCOMPLETE	Part Complete					
	ell6 Puma	CYCLESTOP	Cucle Ston					
Time:		Machine:			Entr	у Туре:		
Latest		Cell6	Puma		▼ All			•
					,			
Items: :	100 / 701ms			Licens	sed to Tim Collet Ti	est Key - NOT FOR RES	ALE	OVR

You can use the Machine drop down box at the bottom of the screen to filter by machine.

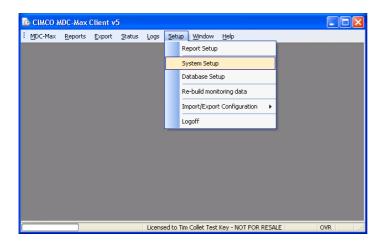
If you do not see these messages in MDC-Max you need to check the port logs in DNC-Max to diagnose the problem (see section 2.4).

## 5.1 Adding Timers

MDC-Max uses timers to count the time from the start of one event to another and it is these timers that generate the information that we use on the live screens and in reports. Our first timer will be called CYCLE and will be used to calculate the time from each CYCLESTART message to the following CYCLESTOP message.

Warning :- this setup will only work if the machine does not stop in the middle of a program (eg for a probe cycle).

This can be done as follows :-Click Setup in MDC-Max then System Setup.



### Click Timers on the left hand side and then click the ADD button on the right.

System and Table/Gra	ph Se	tup			? 🛛
Layout Period Columns	^	Timers Timer configuration			
- Log / Timeline		Timer	Description	Machine	Add
- Machines		TOOLING	Timer TOOLING	All	
- Operator		MAINTENANCE	Timer MAINTENANCE	All	Сору
- Program		BREAKDOWN	Timer BREAKDOWN	All	Delete
Job		MATERIAL	Timer MATERIAL	All	
- Targets		NOWORK	Timer NOWORK	All	🖌 🔂 🔽
Excel Exporting					
Switches		Description:		Machine / Group:	
Counters		Timer NOWORK		All	×
Timers OEE		Start condition:		Minimum value:	
- Operator Setup		MSG[NOWORK]			~
- Program Setup		Stop condition:		Maximum value:	
Job Setup		NCCINODMAL DUNIL OF	TIMERCOULTENDIOD MC		

This opens the new timer window – enter CYCLE for the new timer name.



You can select an individual machine or group but for now we leave this set to All. MDC-Max will then create a CYCLE timer for every machine automatically which is what we want as the cycle times on each machine will be different.

Click OK and you will see the next screen.

- Machines 🛛 🔥	Timers			
- Operator	<ul> <li>Timer configuration</li> </ul>			
- Program				
Job	Timer	Description	Machine	Add
- Targets	CYCLE	Cycle Time	All	Сору
Excel Exporting				
- Switches				Delete
Counters				
- Timers - OEE				
- Operator Setup	Description:		Machine / Group:	
- Program Setup	Cycle Time		All	~
Job Setup	Start condition:	Ignore when suspended	Minimum value:	
Schedule Setup	MSG[CYCLESTART]	Ignore when suspended	Minimum value:	
- Event Setup	MSG[UTULESTART]	2	1 L	*
Status Screens	Stop condition:	Ignore when suspended	Maximum value:	
- Real-time Values	MSG[CYCLESTOP]	J		*
- States - Lights / Indicators	Restart condition:	lanore when suspended	Action if greater than maximum:	
Machines / Groups				~
Operator Screens	Clear condition:	Ignore when suspended	Signal event when timer reaches:	
- Buttons	TIME/ISDAYEND1			~
- Show Values - Input Values	Use 'Clear Condition' on		Event	
- Show State		5.	CYCLEMAX	~
Machines / Groups			Evaluate after:	
Machines / Groups			Evaluate alter.	
Machine Variables				<u>~</u>
- Excel Variables			Sum/Interval length:	
Messages 📃				*

Click into description and set this to Cycle Time – this is just a comment. Next we have to describe the start and stop conditions for this timer. We will be using the messages generated by DNC-Max to start and stop the timers.

#### 5.2 Setting Timer Start and Stop Conditions

Click the search icon (magnifying glass) to the right of start condition and another box will appear.

Start condition			
Expression: MSG[CYCLESTART]	× / % = <> <=	< >>= \$ ? : <i>k</i>	AND OR TIMER[] COUNTER[] ! U
Expression	Data	Help	<u>~</u>
MSG[CYCLESTART]	CYCLESTART	Message	
MSG[CYCLESTOP] MSG[PARTCOMPLETE]	CYCLESTOP PARTCOMPLETE	Message Message	
MSG[BREAKSTART]	BREAKSTART	Message	
MSG[BREAKSTOP]	BREAKSTOP	Message	
MSG[LUNCHSTART] MSG[LUNCHSTOP]	LUNCHSTART LUNCHSTOP	Message Message	
MSG[SMEETING]	SMEETING	Message	
MSG[LIMEETING]	LIMEETING	Message	
MSG[LOGSTR] MSG[INFO]	INFO	DNC Log Message DNC Info message	
MSG[ERROR]	ERROR	DNC Error message	
MSG[PORTONLINE]	PORTONLINE	DNC Port online	×
<		ш	
			Insert <u>D</u> K <u>C</u> ancel

We want the timer to start when we get the message CYCLESTART from the machine. In MDC-Max all messages are denoted by MSG[nameofmessage]. Scroll down the list to the section that starts with MSG. Click on the MSG[CYCLESTART] (remember we setup the CYCLESTART message in section 1.2) and click the Insert button below so it appears in the Expression box, then click OK to be returned back to the timer screen.

Click the search icon to the right of the Stop Condition to open the Expression window again and find the MSG[CYCLESTOP] message. Click Insert and OK. This means the timer will stop when we get a CYCLESTOP message from the machine.

The restart condition is used to start a new cycle time even if the stop condition has not been reached. Leave this blank for now.

# 5.3 Setting Timer Clear Condition

When you are running a live screen you only want to see cycle times and accumulative totals from today – this is where the Clear Condition comes into play. Click into the Clear Condition, click the search icon and scroll to the bottom of the Expressions where you will find TIME. Select TIME[ISDAYEND] and OK.

TIME[ISDAYEND] is a binary condition - it is either TRUE (the current time is the end of the day) or FALSE (the current time is not the end of the day).

Setting the clear condition to TIME[ISDAYEND] means that the current timer (CYCLE in this case) will be reset to 0 at the end of the day. Note, however that the clear condition only clears the accumulated cycle timer for the live screen. If you tick the box below it will also clear all daily and weekly timers used for historical charts (don't do this unless advised by Cimco).

Click OK and the CYCLE timer is created and will start when the operator presses cycle start and stop when we get a part complete message. This timer setup is used for manually loaded machines.

Once a timer is created is generates several internal timer values. This timer serves several purposes as follows:-

- It times the current cycle and this can be reproduced on a livescreen by using the variable TIMERLAST[CYCLE]
- It stores the previous cycle time and this can be reproduced on a livescreen by using the variable TIMERPREV[CYCLE]
- It accumulates the total cycle time for a given period and this can be reproduced on a livescreen by using TIMER[CYCLE]. If you set the Clear Condition as above then the livescreen accumulated time will reset to 0 at the end of the day.
- It accumulates the total cycle time for charts and graphs which can have a longer period (eg a week or a month)
- It stores the Minimum, maximum and average cycle time for a given period which can be re-produced by the variables TIMERMIN[CYCLE], TIMERMAX[CYCLE] and TIMERAVG[CYCLE] on both livescreens and reports.
- It Stores the Count for a given timer period which can be reproduced by the variable TIMERCNT[CYCLE]. This is the number of cycles (parts) in this case.

There are also other uses but the above are the most frequently used.

## 5.4 Setting Timer Restart Condition (automatic or bar fed machines)

A bar fed machine will start a cycle and then continue in-cycle until the bar feed runs out or there is an error so we only ever get one CYCLESTART message for every batch of components. However we do get a PARTCOMPLETE message for each component (as long as you have set this up).

The Restart condition will stop the current timer, save the timer values and timer count and then start a new timer cycle.

- General 🔥	Timers			
Layout	Timer configuration			
- Period				
Columns	Timer	Description	Machine	Add
- Machines	CYCLE	Cycle Time	All	Сору
- Operator				
- Program				Delete
Job				
- Targets				
Excel Exporting				
- Switches	Description:		Machine / Group:	
- Counters	Cycle Time		All	×
Timers OEE	Start condition:	lanore when suspende	d Minimum value:	
- Operator Setup	MSG[CYCLESTART]			~
- Program Setup				
- Job Setup	Stop condition:	Ignore when suspende		
- Schedule Setup	MSG[CYCLESTOP]			~
- Event Setup	Restart condition:	Ignore when suspende	ed 📃 Action if greater than maximum	
Status Screens	MSG[PARTCOMPLETE]		Stop and set to average	~
- Real-time Values	Clear condition:	Ignore when suspende	d Signal event when timer reach	er:
- States	TIME[ISDAYEND]	Ignore when suspende		•
Lights / Indicators				Y
Machines / Groups	Use 'Clear Condition' on t	able/graphs	Event	
Operator Screens			CYCLEMAX	~
Buttons			Evaluate after:	
- Show Values 🛛 💳				
- Input Values				×
- Show State			Sum/Interval length:	
Machines / Groups				~

The setup for a bar fed or automatic machine should be as below:-

The start and stop conditions are the same, click into the Restart Condition box and set it to MSG[PARTCOMPLETE]. This way we can still store individual cycle times.

It is worth pointing out here that each on the 4 conditions on the left are either TRUE or FALSE. For example the machine either sends a CYCLESTART message or it does not.

The start and stop conditions are obvious, the Clear condition needs some explaining.

MDC-Max has built in functions that you can use to determine the current time, when a day starts and ends and other time related values. We want to clear our timer at the end of the day for the livescreen so we use the built in function TIME[ISDAYEND] – this is True when we get to the end of the day (see Schedule later on to determine the start / end of a day or shift).

## 5.5 Stopped Timer

Next we setup a Stopped timer to keep a record of the total downtime for each machine.

Click Setup System Setup, highlight the Timers section and then add a new timer as follows :-

- General 🔨 🔨	Timers			
- Layout	<ul> <li>Timer configuration</li> </ul>			
- Period	,			
Columns	Timer	Description	Machine	Add
- Machines	CYCLE	Cycle Time	All	Сору
- Operator	STOPPED	Timer STOPPED	All	
Program				Delete
Job				
Targets				
Excel Exporting				
Switches	Description:		Machine / Group:	
Counters	Timer STOPPED		All	
···· Timers ···· DEE	Start condition:	Ignore when suspended	Minimum value:	
	MSGICYCLESTOPI	-		
Operator Setup				
Job Setup	Stop condition:	Ignore when suspended		
- Schedule Setup	MSG[CYCLESTART]			•
- Event Setup	Restart condition:	Ignore when suspended	Action if greater than maximum:	
- Status Screens			P Stop Timer	
Real-time Values	Clear condition:	Ignore when suspended		
- States	TIME[ISDAYEND]		and a second sec	
- Lights / Indicators	· · ·			
Machines / Groups	Use 'Clear Condition' or	i table/graphs	Event	
Operator Screens			CYCLEMAX	
- Buttons			Evaluate after:	
- Show Values -			E valdato artor.	
- Input Values				
- Show State			Sum/Interval length:	
Machines / Groups				
— Machines / Groups 🛛 🞽				

The start and stop conditions are the reverse of the CYCLE timer. The timer starts when the machine is stopped and the ends when the machine starts. If you are not planning to use barcodes or a PC to enter downtime reason codes you can skip the next section and go straight to the Schedule setup.

### 5.6 Downtime Reason Timer Setup

Most customers will want to break down the stopped time (or downtime) by reason. To achieve this they must have a means of entering these downtime reasons which can be achieved by barcode readers on each machine, or a PC in each cell.

To start with you must configure a message for each downtime reason in DNC-Max and a message to put the machine back into normal run mode. See section 1 where we setup two downtime messages – SETTING, INSPECTION and the normal run message OKTORUN.

Now we have to setup a timer for each downtime message. Each downtime timer starts when the barcode (SETTING, INSPECTION etc.) is scanned and runs until the OK to Run barcode is scanned.

- General 🔥	Timers			
- Layout	Timer configuration			
Period	Timer conliguidadit			
- Columns	Timer	Description	Machine	Add
- Machines	CYCLE	Cycle Time	All	Сору
- Operator	STOPPED	Timer STOPPED	All	Copy
- Program	SETTING	Timer SETTING	All	Delete
Job				
- Targets	1 di li			
Excel Exporting				
Switches	Description:		Machine / Group:	
- Counters	Timer SETTING		All	×
Timers OEE	Start condition:	Ignore when suspended	Minimum value:	
- Operator Setup	MSG[SETTING]			~
- Program Setup	Stop condition:	Ignore when suspended		
Job Setup	MSGIOKTORUNI OR M			178
Schedule Setup	MSG[UKTURUN] UR M	ISG[INSPECTION]		~
Event Setup	Restart condition:	Ignore when suspended	Action if greater than maximum	
Status Screens			P Stop Timer	~
- Real-time Values	Clear condition:	Ignore when suspended	Signal event when timer reach	nes:
- States	TIME[ISDAYEND]			·····
Lights / Indicators	Use 'Clear Condition' of	No.		
Machines / Groups		un tablez graphs	Event	
Operator Screens			CYCLEMAX	2
- Buttons			Evaluate after:	
- Show Values				8
- Input Values			Sum/Interval length:	
- Show State Machines / Groups			Summerval length.	100
Machines / Groups				~

Here is the timer for Setting:-

The Start Condition is obvious – the timer starts when the operator scans the "Setting" barcode (and DNC-Max then generates the SETTING message).

The Stop Condition is not so obvious :--MSG[OKTORUN] OR MSG[INSPECTION]

We want the timer to stop when the operator scans "Ok to Run" OR when he scans ANY other downtime reason because the machine can only be in one downtime state at a time. If you had another downtime reason called NOWORK you would need to add OR MSG[NOWORK] as well.

Click into the Stop Condition field, click the search icon, find the MSG[OKTORUN] message and click the Insert button to get the first part of the condition. Then click the OR button which inserts the OR condition. Finally

find the MSG[INSPECTION] message, click the Insert button and then OK the box to add the condition.

The Clear Condition is set to TIME[ISDAYEND] to make sure that the machine is not still in Setting mode at the beginning of a new day. It is cleared for both livescreen and graphs (Use Clear Condition on Table / Graphs).

– Client Settings 🛛 🔥 🔥	Timers			
Tables/Graphs	<ul> <li>Timer configuration</li> </ul>			
General	_			
Layout	Timer	Description	Machine	Add
- Period	CYCLE	Cycle Time	All	Сору
Columns	STOPPED	Timer STOPPED	All	
- Machines	SETTING	Timer SETTING	All	Delete
- Operator	INSPECTION	Timer INSPECTION Timer OKTOBUN	All	
Program	UNTURUN	TIMEFORTORON	AL	
Job				
- Targets	Description:		Machine / Group:	
Excel Exporting	Timer INSPECTION		All	~
- Switches	Start condition:	Ignore when suspended	Minimum value:	
Counters	MSGIINSPECTIONI			~
Timers	Modinarection	<i>~</i>	<u>ع</u>	¥
OEE	Stop condition:	Ignore when suspended	Maximum value:	
Operator Setup	MSG[OKTORUN] OR MS	G(SETTING) 🛛 🔎		~
- Program Setup	Restart condition:	Ignore when suspended	Action if greater than maximum:	
Job Setup	nestan condition.	Ignore when suspended		
- Schedule Setup		<u></u>	Stop Timer	~
Event Setup	Clear condition:	Ignore when suspended	Signal event when timer reaches:	
Status Screens	TIME[ISDAYEND]	2		~
<ul> <li>Real-time Values</li> <li>States</li> </ul>	Use 'Clear Condition' or		Event:	
- Lights / Indicators			CYCLEMAX	
Machines / Groups			Evaluate after:	
- Operator Screens			E valuate arter.	P
Buttons				~
- Show Values			Sum/Interval length:	
- Input Values				~
Show State				

The setup for Inspection is similar:-

The Start Condition is MSG[INSPECTION] and the Stop Condition is:-MSG[OKTORUN] OR MSG[SETTING] - add this yourself.

Note : The Stop Condition for any downtime timer MUST include the Start condition for all the other downtime timers. Otherwise you would have two timers running for different downtime reasons at the same time.

### 5.7 OK to Run Timer Setup

Finally we create a timer for OKTORUN – this starts when the operator scans OKTORUN and stops whenever a downtime reason is scanned. We need this so we can ignore cycle times created when the machine is in setting as the operator may be running the program in single block mode and we would otherwise record several short cycles.

stem and Table/Grap	h Setup			?
General	Timers			
- Layout	Timer configuration			
Period				
- Columns	Timer	Description	Machine	Add
- Machines	CYCLE	Cycle Time	All	
- Operator	STOPPED	Timer STOPPED	All	Сору
- Program	SETTING	Timer SETTING	All	Delete
Job	INSPECTION	Timer INSPECTION	All	
- Targets	OKTORUN	Timer OKTORUN	All	Î Î I <p< td=""></p<>
Excel Exporting				
- Switches	Description:		Machine / Group:	
- Counters	Timer OKTORUN		All	~
Timers	Start condition:	Ignore when suspended	Minimum value:	
··· OEE			Minimum value:	
<ul> <li>Operator Setup</li> </ul>	MSG[OKTORUN] OR	TIME[ISDAYSTART]		~
<ul> <li>Program Setup</li> </ul>	Stop condition:	Ignore when suspended	Maximum value:	
Job Setup	MSG[SETTING] OR M	ISGIINSPECTION]		~
<ul> <li>Schedule Setup</li> </ul>				
Event Setup	Restart condition:	Ignore when suspended	Action if greater than maximum:	
Status Screens		$\mathbf{P}$	Stop Timer	~
<ul> <li>Real-time Values</li> </ul>	Clear condition:	Ignore when suspended	Signal event when timer reaches:	
- States		2		~
<ul> <li>Lights / Indicators</li> </ul>				
Machines / Groups	Use 'Clear Condition	r on table/graphs	Event:	
Operator Screens			CYCLEMAX	~
- Buttons			Evaluate after:	
- Show Values				
<ul> <li>Input Values</li> </ul>				
- Show State			Sum/Interval length:	
- Machines / Groups				*
Machines / Groups				
CIMCO Integration			Help Car	icel OK

Here is the setup for the OKTORUN timer:-

The timer starts when we receive the OKTORUN message (barcode) or the start of the day (we don't want the machine left in setting for several days). It stops whenever a valid downtime reason is swiped – make sure you put every downtime reason in here (separated by OR) as you can have multiple downtime reasons.

### 5.8 CYCLE Timer modified to ignore Downtime

Now we can modify our CYCLE timer so that it does not run when the machine is down for any reason. We do this by modifying the Start Condition to check that the "OK to Run" timer is running. The variable in MDC-Max for this is TIMERRUNS[timername] and it returns True (timer is running) or False (timer is not running).

Highlight the CYCLE timer and modify the start condition as follows:-

General	Timers			
Layout	Timer configuration			
- Period	- Inter configuration			
- Columns	Timer	Description	Machine	Add
- Machines	CYCLE	Cycle Time	All	Сору
- Operator	STOPPED	Timer STOPPED	All	
Program	SETTING	Timer SETTING	All	Delete
Job	INSPECTION	Timer INSPECTION	All	
- Targets	OKTORUN	Timer OKTORUN	All	
Excel Exporting				
- Switches	Description:		Machine / Group:	
Counters	Cycle Time		All	~
Timers	Start condition:	Ignore when suspended	Minimum value:	
OEE		TIMERRUNS[OKTORUN]		
<ul> <li>Operator Setup</li> </ul>	MSGCTCLESTARTJAN			~
Program Setup	Stop condition:	Ignore when suspended	Maximum value:	
Job Setup	MSG[CYCLESTOP]	2		~
- Schedule Setup	Bestart condition:	lanore when suspended	Action if greater than maximum:	
Event Setup	riestalt condition.	Ignore when suspended		
Status Screens			Stop and set to average	
- Real-time Values	Clear condition:	Ignore when suspended	Signal event when timer reaches:	
- States	TIME[ISDAYEND]	P		~
<ul> <li>Lights / Indicators</li> <li>Machines / Groups</li> </ul>	Use 'Clear Condition' or	table/graphs	Event	
Operator Screens				
Buttons				
- Show Values			Evaluate after:	
- Input Values				2
- Show State			Sum/Interval length:	
Machines / Groups				~
Machines / Groups				

Notice the use of AND in the expression. MSG[CYCLESTART] AND TIMERRUNS[OKTORUN]

This makes sure that the cycle timer will only start when it receives a CYCLESTART message from the machine AND the OKTORUN timer is running.

### 5.9 Schedule Setup

Before you can produce any reports or graphs you must setup a shift schedule – this tells MDC-Max when each shift starts and ends. You can have a different shift setup for every day of the week or several days with the same shifts. You can also have non production days (eg Sunday).

Click Setup System Setup and click Schedule Setup on the left.

Start with Monday and enter the start and end of each shift in the day (if you want to report based on shift) or just enter the total working hours.

Enter any breaks that you don't want to be included in the OEE calculations into Break1 Start/ End.

If the company allows 15 minutes of non production time at the start of the shift (for machine warmup) enter the actual end time of that period in Lead. If the company allows cleandown time then enter the actual start time of this period into Trail:-

System and Table/Graph Se	tup					? 🛛
General 📐	Schedule S	etup				
Layout	- Schedule Settin	Schedule Settings				
Period	Settings for se	lected day:			Weekday:	
Columns	Monday			~	Defined below	~
- Machines	monday				Denned below	
Operator	Shift #1					
Program	Start:	End:	Lead:	Trail:	Break 1 Start/End	Break 2 Start/End
Job						break 2 StatyEnd
- Targets	07:30	18:00	07:4	17:45	10:00 10:15	
Excel Exporting	Total:	Prod. Tin	ne:	Breaks:	Break 3 Start/End	Break 4 Start/End
Switches	10:30	09	:45	00:45		
Counters				I		
- Timers	Shift #2					Same as shift #1 📃
OEE	Start:	End:	Lead:	Trail:	Break 1 Start/End	Break 2 Start/End
- Operator Setup 📃						
- Program Setup	Total	Prod. Tin	ne:	Breaks:	Break 3 Start/End	Break 4 Start/End
- Job Setup	T Utal.	FIGU. TH	IC.	DIEdKS.		
Schedule Setup						
- Event Setup	Shift #3					Same as shift #2
Status Screens	Start:	End:	Lead:	Trail:	Break 1 Start/End	Break 2 Start/End
- Real-time Values	Start.	Eriu.	Leau.		Bleak I Stat/End	Dieak 2 StativEnu
- States						
- Lights / Indicators	Total:	Prod. Tin	ne:	Breaks:	Break 3 Start/End	Break 4 Start/End
Machines / Groups						
Operator Screens	· · · · · · · · · · · · · · · · · · ·					
Buttons	Shift #4					Same as shift #3 📃
- Show Values -	Start:	End:	Lead:	Trail:	Break 1 Start/End	Break 2 Start/End
- Input Values						
- Show State	Total:	Prod. Tin	ne:	Breaks:	Break 3 Start/End	Break 4 Start/End
Machines / Groups	T OVGI.			erodito.		
Machines / Groups 🛛 🞽						
Mintegration					Help	Cancel OK

If you don't enter any more data Tuesday to Friday will inherit the same shift pattern and Saturday / Sunday will be non production days. Click the drop down box for selected day to fill in different shift patterns for other days.

It is important to point out that if your last shift ends at 6 am the next morning this is counted as the day end and any reports and the livescreens will run from the start of Shift 1 until the end of the last shift.

Shifts cannot overlap but the start of shift 2 can be the same as the end of shift 1.

## 5.10 Setting the Current Job Number

Many customers want to report on each job and to do this we have to have the current jobname running on each machine. This can be done by using the last filename transferred via DNC-Max to the machine or by using a barcode scanner to scan the start of a new job.

These Jobnames can then be used on livescreens and reports.

### 5.11 Setting the Current Job Number from a DNC-Max transfer

Click Setup, System Setup in MDC-Max. Click Job Setup on the left and click the Add button on the right.

stem and Table/Graph Se	tub.		?
- General 🔥	Job Setup		
Layout	Extracting Job Name		
- Period			
Columns	Condition	Field	Database Field Add
- Machines	MSG[SENDSTART]	Log Filename	
- Operator			Сору
Program			
Job			Delete
Targets			
Excel Exporting			
- Switches			
- Counters			
- Timers	When condition is true:		
OEE	MSGISENDSTART1		
- Operator Setup	MSG[SENDSTART]		
Program Setup	Set job to field:		Set DBVAR[1] to:
Job Setup	Log Filename	×	Do not set variable 😽
Schedule Setup	Using:		
Event Setup	Filename without path and extension	~	Do not set variable
Status Screens	Filename without path and extension	•	
<ul> <li>Heal-time Values</li> <li>States</li> </ul>	Trigger:		Set DBVAR[3] to:
<ul> <li>States</li> <li>Lights / Indicators</li> </ul>		9	Do not set variable 😽
Machines / Groups	Lookup in NC-Base:		Set DBVAR[4] to:
Operator Screens	Do no use NC-Base	~	Do not set variable
Buttons	Set job to:		
- Show Values -	Database Program name	~	Set job name to 'NONE' when program empty
- Input Values	Database Program name	×	
- Show State	Test data:		Job:
Machines / Groups	C:\DATA\MOULD.NC		MOULD
Machines / Groups 🏾 🕙			

Set the condition to MSG[SENDSTART] – this condition will be true when DNC-Max transfers a new file to the machine.

Set job field to Log Filename – this tells MDC to grab the filename of the file transferred.

Setting the Using Field to "Filename without path and extension" tells MDC to strip the path and file extension so we end up with the filename only.

Note that this method will only work if the operator transfers the program each time they start a new job. If they leave the program in the machine and do not transfer it then this will not work.

#### 5.12 Setting the Job Number from a scanned barcode

Many customers use a barcode to denote the start of a job (see section 1 for details of how to setup these barcode messages) and this is how to set it up:-

stem and Table/Graph S	ietup			?
General	Job Setup			
Layout	Extracting Job Name			
- Period	Exuacung JOD Name			
Columns	Condition	Field	Database Field Add	
Machines	MSG[SENDSTART]	Log Filename		_
- Operator	MSG[JOBSTART]	Log Variable 1	Сору	
Program				_
Job			Delete	e
- Targets				_
Excel Exporting				
Switches				L
Counters				_
- Timers	When condition is true:			
- OEE				
Operator Setup	MSG[JOBSTART]			P
Program Setup	Set job to field:		Set DBVAR[1] to:	
Job Setup	Log Variable 1	*	Do not set variable	~
Schedule Setup	Usina:		Set DBVAR[2] to:	
Event Setup	Entire Field		Do not set variable	
Status Screens	Entire Field	×		~
- Real-time Values	Trigger:		Set DBVAR[3] to:	
- States		9	Do not set variable	~
<ul> <li>Lights / Indicators</li> <li>Machines / Groups</li> </ul>	Lookup in NC-Base:		Set DBVAR[4] to:	
Operator Screens	Do no use NC-Base	*	Do not set variable	~
- Buttons	Set job to:			
- Show Values	Database Program name	~	Set job name to 'NONE' when program empty	
- Input Values				
- Show State	Test data:		Job:	
Machines / Groups	C:\DATA\MOULD.NC		C:\DATA\MOULD.NC	8
Machines / Groups				

Set the condition to MSG[JOBSTART] (setup in section 1).

Set the "Set Job to field" to Log Variable 1 - this is the first variable stored by DNC-Max when it extracts the jobname from the barcode (also in section 1). We use the entire variable this time as the scanned jobname does not include any filenames paths etc.

This is how it works :-

The user scans the start new job barcode (MAXJS) then scans the actual job number from their paperwork (eg 1234).

DNC-Max generates the JOBSTART message and stores 1234 in the Log as variable 1. MDC-Max sees the JOBSTART message and sets the job name to variable 1 which is 1234 in this case.

#### Chapter 6 - Setting up a live data screen

Once the timers are setup we can display their values on a real time live screen in MDC-Max.

Open MDC-Max Client and then click Setup, System Setup and click on the Status screens section on the left. Click the Add button to the right to add a new status screen and enter the name for the first status screen in the Description: (call it 'Live Screen').

System and Table/Graph Se	tup	? 🔀
General 🔨	Status Screens	
Layout	Beal-time Status Fields	
- Period	nearuine status neus	
Columns	Description	Type Add
- Machines	Live screen	Dia Caraan
- Operator		Copy
Program		Delete
Job		
Targets		
Excel Exporting		
Switches	Description:	
- Counters	Live screen	
- Timers		
OEE	Display in 'list' mode	
- Operator Setup		
- Program Setup	Minimum rows:	Main Bar font size:
Job Setup	6	Large
- Schedule Setup		
Event Setup	Maximum rows:	Bottom Bar font size:
Status Screens	10	Large 💙
Real-time Values	Minimum columns:	Light / Indicator size:
States	1	Normal
- Lights / Indicators	Maximum colums:	Scroll time:
Machines / Groups		
Operator Screens	1	3
- Buttons	Hide 'Idle' state	
- Show Values -		
- Input Values	Only show 'Always Show' states when screen is full	
- Show State		
Machines / Groups		
Machines / Groups 🎽		
CIMCO Integration		Help Cancel OK

Leave the default rows etc as they are – we will change them later.

#### 6.1 Adding the machine name to the live screen.

Click on the Real Time Values section on the left below Status Screens and click on Add to the right.

- General A	Real-time Valu Real-time Status Fie	es: Live screen ds		
Columns Machines Operator Program Job Targets	Title	Value		Add Copy Delete
Excel Exporting Switches Counters	Value:			
- Timers OFF	Title:		Field width:	
- Operator Setup =				
Program Setup	Format:		Location:	
Job Setup			Main Bar	
- Schedule Setup		<u> </u>		<u> </u>
- Event Setup			Title Size:	
Status Screens Reaktime Values States Lights / Indicators Machines / Groups	Left Show '???' whe	n value is undefined	Small	<u>v</u>
Operator Screens     Buttons     Show Values     Input Values				
Show State Machines / Groups Machines / Groups				

Click on the search icon at the end of the Value bar and this will then bring up the Value screen below, Scroll down to the bottom of the list of values and double click 'TEXT(PORTNAME)'. This will display the name of the machine as you entered it in DNC-Max.

lue		
Expression		
TEXT[PORTNAME]		
[TEXT[FORTHAME]		
	* / % = 🔿	<= < > >= \$ ? : AND OR TIMER[] COUNTER[]
	````` <u>```````</u>	
Expression	Data	Help
1M0	1M0	1 month
10	10	1 guarter
1Y	1Y	1 year
MCHVAR[1]	MCHVAR[1]	Machine variable
MCHVAR[2]	MCHVAR[2]	Machine variable
MCHVAR[3]	MCHVAR[3]	Machine variable
MCHVAR[4]	MCHVAR[4]	Machine variable
DBVAR[1]	DBVAB[1]	Database variable
DBVARI2	DBVAB[2]	Database variable
DBVAR[3]	DBVAR[3]	Database variable
DBVAR[4]	DBVAR[4]	Database variable
TEXT(PORTNAME)	PORTNAME	The name of the port
TEXT[OPERATOR]	OPERATOR	The current operator
TEXTUOB	JOB	The current job
TEXTIPROGRAMI	PROGRAM	The current program
TEXTIDNCGROUPI	DNCGROUP	The name of the DNC-Max group the port belongs to
TEVTINDCCROUPI	NDCCROUR	The same of the MDC May may the part belongs to

Click on OK to save the value, click into format field and set it to TEXT. This will display the DNC-Max Port name (eg PUMA1) in text format. If you enter a title this will be displayed above the Port name. In general we would leave the title blank as it saves space on the live screen.

System and Table/Graph	Setup	? 🛛
General	Real-time Values: Live screen	
Layout	Real-time Status Fields	
Period		
Columns	Title Value	Add
- Machines	MACHINE TEXT[PORTNAME]	Сору
- Operator		
- Program		Delete
Job		
- Targets		
Excel Exporting		
- Switches	Value:	
Counters	TEXT[PORTNAME]	$\sim$
Timers	Title: Field width:	
- OEE	MACHINE 10	\$
- Operator Setup		· · · · · · · · · · · · · · · · · · ·
Program Setup Job Setup	Format: Location:	
- Schedule Setup	TEXT Main Bar	~
Event Setup	Align: Title Size:	
Status Screens	Left Small	~
Real-time Values		
States	Show '???' when value is undefined	
- Lights / Indicators		
Machines / Groups		

#### 6.2 Adding Cycle times to the live screen

Click on Add, click on the search icon at the end of the Value bar, to display the list of possible values. Double click 'TIMER[CYCLE]' and click OK.

Value		
Expression: TIMER[CYCLE]	• / % = 🗘	C S S S S S S S S S S S S S S S S S S S
Expression	Data	Help
SWITCH[SPINDLE] COUNTER[CYCLECOUNT]	SPINDLE CYCLECOUNT	The state of the switch 'SPINDLE'. When 0 the switch is off, otherwise the switch is on The current count for counter 'CYCLECOUNT'
TIMER[CYCLE] TIMERMINICYCLE1	CYCLE	The total running time for the timer 'CYCLE' The minimum time for one cylce of the timer 'CYCLE'
TIMERMAXICYCLE1	CYCLE	The maximum time for one cylice of the timer 'CYCLE'
TIMERAVG[CYCLE]	CYCLE	The average/mean cycle time for the timer 'CYCLE'
TIMERSTDDEV[CYCLE] TIMERCNT[CYCLE]	CYCLE CYCLE	The standard deviation for the average/mean time for the timer 'CYCLE' The number of cycles for the timer 'CYCLE'
TIMERRUNS[CYCLE]	CYCLE	0 if timer 'CYCLE' is stopped, 1 when timer is running.
TIMERFIRST[CYCLE]	CYCLE	The run time for the first cycle for the timer 'CYCLE'
TIMERLAST[CYCLE] TIMERPREVICYCLE]	CYCLE CYCLE	The run time for the last/current cycle for the timer 'CYCLE'. The run time for the last completed cycle for the timer 'CYCLE'
TIMEDEIDETETADTIC/CLE1	CACIE	

Type in the Title you want to appear on the live screen and set the format to HMS (hours minutes seconds) and alignment to Left.

Title	Value		Add
MACHINE	TEXT[PORTNAME]		Сору
Running Today	TIMER[CYCLE]		
			Delete
Value:			
TIMER[CYCLE]			J.
<b>T</b> 14		Field width:	
Title:			
Fitte: Running Today		10	\$
		10 Location:	٥
Running Today	~	Location:	
Running Today Format:	¥	Location:	

Click OK to close the screen. You have now added a live screen that displays the machine name and the total cycle time so far today. To display this live screen click Status on the MDC-Max client menu, then Live Screen – you will see a screen similar to the one below :-

CIMCO MDC-Max Client v5	
<u>MDC-Max Reports Export Status Logs Setup Window Help</u>	_ 8
Live Screen Zive Screen 🕞 Event Log	٩ ۵>
Machine	Riiilig Today
DMC 50H	0:00:00
Macilie	Renning Today
DMC 60H	0:00:00
Masilie	Renning Today
DMP60S-FD-1	0:00:00
Machine	R i i lig Today
DMP60S-FD-2	0:00:00
Machine	Ruulig Today
DMP60S-FD-3	0:00:00
Mactine	Rining Today
L20	0:00:00
Machine	Runing Today
1.25	0.00.00

Next we will add the Current Cycle time to the screen.

Click Setup, System Setup, Real-time values, click the Add button and use the search icon in the value box to add TIMERLAST[CYCLE] and click OK.

alue		
Expression:		
TIMERLAST[CYCLE]		C
	/ % = 🗘	(=<>>= \$ ? : AND OR TIMER[] COUNTER[] I U
Expression	Data	Help
SWITCH[SPINDLE]	SPINDLE	The state of the switch 'SPINDLE'. When 0 the switch is off, otherwise the switch is on
COUNTER[CYCLECOUNT]	CYCLECOUNT	The current count for counter 'CYCLECOUNT'
TIMER[CYCLE] TIMERMIN[CYCLE]	CYCLE CYCLE	The total running time for the timer 'CYCLE' The minimum time for one cylce of the timer 'CYCLE'
TIMERMAXICYCLE1	CYCLE	The maximum time for one cylce of the timer 'CYCLE'
TIMERAVG[CYCLE]	CYCLE	The average/mean cycle time for the timer 'CYCLE'
TIMERSTDDEV[CYCLE]	CYCLE	The standard deviation for the average/mean time for the timer 'CYCLE'
TIMERCNT[CYCLE]	CYCLE	The number of cycles for the timer 'CYCLE'
TIMERRUNS[CYCLE]	CYCLE	0 if timer 'CYCLE' is stopped, 1 when timer is running.
TIMERFIRST[CYCLE]	CYCLE	The run time for the first cycle for the timer 'CYCLE'
TIMERLAST[CYCLE]	CYCLE	The run time for the last/current cycle for the timer 'CYCLE'. The run time for the last completed cycle for the timer 'CYCLE'
TIMERPREV[CYCLE] TIMERFIRSTSTART[CYCLE]	CYCLE	The start time for the first cycle for the timer 'CYCLE'
TIMETITINGTSTATT[CTCEE]	CICLE	The start time for the mist cycle for the timer CTCLL

Set the title to "This Cycle" and set the format to HMS.

System and Table/Grapt	n Sei	tup			?
General	~	Real-time Values:	Live screen		
- Layout Period		Real-time Status Fields			
- Columns		Title	Value		Add
Machines		MACHINE	TEXT(PORTNAME)		
- Operator		Running Today	TIMER[CYCLE]		Сору
- Program		This Cycle	TIMERLAST[CYCLE]		Delete
Job					
Targets					[1°] (↓)
Excel Exporting					
- Switches		Value:			
- Counters		TIMERLAST[CYCLE]			
- Timers		Title:		Field width:	
- OEE					
<ul> <li>Operator Setup</li> </ul>		This Cycle		10	\$
- Program Setup		Format:		Location:	
- Job Setup		HMS	~	Main Bar	~
- Schedule Setup		41		701.01	
- Event Setup		Align:		Title Size:	
Status Screens		Left	*	Small	~
Real-time Values		Show '???' when v	alter in conside Grand		
- States		snow '???' when v	alue is underined		
<ul> <li>Lights / Indicators</li> </ul>					
Machines / Groups					

Next add the STOPPED timer with title "Stopped Today" in the same way.

- General	Real-time Values: I	Live screen		
- Layout	Real-time Status Fields			
- Period				
— Columns	Title	Value		Add
- Machines	MACHINE	TEXT[PORTNAME]		Сору
- Operator	Running Today	TIMER[CYCLE]		
- Program	This Cycle	TIMERLAST[CYCLE]		Delete
Job	Stopped Today	TIMER[STOPPED]		
- Targets				1
Excel Exporting				
- Switches	Value:			
- Counters	TIMER[STOPPED]			
- Timers	Title:		Field width:	
- OEE				
- Operator Setup	Stopped Today		10	÷
<ul> <li>Program Setup</li> </ul>	Format:		Location:	
– Job Setup	HMS	~	Main Bar	*
- Schedule Setup				
- Event Setup	Align:		Title Size:	
Status Screens	Left	~	Small	*
- Real-time Values	Show '???' when val			
- States	Show 777 when val	ue is underined		
<ul> <li>Lights / Indicators</li> </ul>				
- Machines / Groups				
Operator Screens				
- Buttons				
- Show Values				
- Input Values				
- Show State				
- Machines / Groups				
- Machines / Grouns				

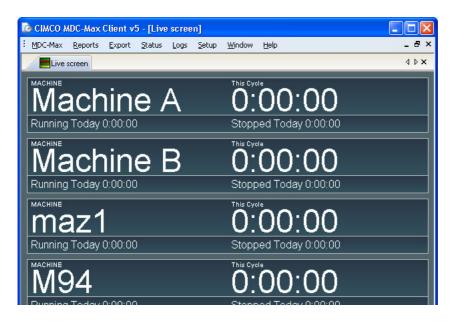
OK these settings and view the live screen - it should look like:-

CIMCO MDC-Max Client v5 - [Live screen] : MDC-Max Reports Export Status Logs Setup Wind	ow Belo		_ <b>.</b>
Live screen MACHINE	Running Today	This Cycle	4 ▷ × Stopped Today
Machine A	0:00:00	0:00:00	0:00:00
Machine B	0:00:00	0:00:00	0:00:00
machine maz1	0:00:00	0:00:00	0:00:00
Machine M94	0:00:00	0:00:00	0:00:00
Mill1	Running Today	0:00:00	21:43:40
			Licensed to Tim Collet Test Key - NOT FOR RESALE OVR

You will soon find that there is too much information to display on one bar on the screen so you can reconfigure the Running Today and Stopped timers to be displayed below the other data in smaller text (referred to as the bottom bar). Change the Stopped Today and Running Today values as follows:-

- General 🔥	Real-time Values: L	ive screen		
Layout Period	Real-time Status Fields			
- Columns	Title	Value		Add
- Machines	MACHINE	TEXT[PORTNAME]		
- Operator	Running Today	TIMER[CYCLE]		Сору
- Program	This Cycle	TIMERLAST[CYCLE]		Delete
Job	Stopped Today	TIMER[STOPPED]		
- Targets				1
Excel Exporting				
Switches	Value:			
Counters	TIMER[STOPPED]			2
Timers				
OEE	Title:		Field width:	
Operator Setup	Stopped Today		10	\$
Program Setup	Format		Location:	
Job Setup	HMS	~	Bottom Bar	~
Schedule Setup				
Event Setup	Align:		Title Size:	
Status Screens	Left	~	Small	~
	Show '???' when valu	a is undefined		

The real time display should now look like this:-



# 6.3 Changing colour according to machine state

It is useful to change colour depending on the machine state. This gives a quick visual display when you have a lot of machines. For example Green to indicate that the machine is running and Orange that it is stopped. Click Setup, System Setup, then states under Status Screens. Click the Add button to the right to add the running state as below:-

General     States: Live screen       Layout     States:       Period     States:       Columns     Title       Machines     Title       Operator     Title       Program     Ob       - Job     Title       - Targets     Title RRUNS[CYCLE]       Cory     Delete       - Ob     Title RRUNS[CYCLE]       - Ob     Title RRUNS[CYCLE]       Operator     Title RRUNS[CYCLE]       Program     Ob       - Ob     Title RRUNS[CYCLE]       Program     Ob       - Ob     Title RRUNS[CYCLE]       Program     Ob       - Ob     Ob       - Ob     Title RRUNS[CYCLE]       Program     Ob       - Ob     Ob       - Obe     Pluming       Operator Setup     Color       - Schedule Setup     States       - States     Ob       - States     Always show	System and Table/Grap	h Set	up		? 🛽
Period     Period       Columns     Machines       Machines     Program       Operator     Program       - Job     Program       - Job     TiME RUNS[CYCLE]       Counters     TimERRUNS[CYCLE]       - Targets     Excel Exporting       - Counters     TimERRUNS[CYCLE]       - Timers     Description:       - OEE     Period       - Organs Setup     Color       - Job Subup     Steaus Screens       - Frank Setup     Status Screens       - Status     Always show	General	~	States: Live scr	en	
Period     File     Value       - Columes     Title     Value       - Machines     Burning     TIMERRUNS[CYCLE]       - Program     - Job       - Program     - Job       - Tagets     Excel Exporting       - Switches     Value       - Countes     TIMERRUNS[CYCLE]       - Times     Description:       - Operator Setup     Period       - Operator Setup     Color       - Job Setup     Status Screens       - Status Screens     Always show       - States     Always show					
Machines     Numing       Operator     Ruming       Operator     Ruming       Program     Copy       Job     Images       Excel Exporting     Images       Excel Exporting     Images       Counces     TIMERRUNS[CYCLE]       Times     Description:       Operator Setup     Description:       Operator Setup     Color       Job Setup     Steen       Status Screens     Always show       Status Screens     Always show					
Operator     Copy       Program     Descriptions       - Jod     Descriptions       - Switches     Value:       - Countries     TimeRNUS(CYCLE)       - Timers     Descriptions       - Operand Setup     Color       - Job Setup     Glore       - Status Screens     - Always show       - Status Screens     - Always show			Title	Value	Add
Operator       Operator         Program       Images         Job       Images         Excel Exporting       Images         Switches       Value:         Counters       TIMERRUNS(CYCLE)         Timers       Description:         Operator Setup       Running         Program Setup       Color         Job Setup       Steen         Status Screens       Always show         Status Screens       Always show			Running	TIMERRUNS[CYCLE]	Conu
Image: Setup       Image: Setup         Operator Setup       Color         Job Setup       Color         Job Setup       Color         Job Setup       Color         Job Setup       Fiscen         Status Screens       Always show         Status Screens       Always show					
Targels       Image: Constraint of the second					Delete
Images     Images       Excel Exporting     Value:       Switches     Value:       Counters     TimERRUNS(C/CLE)       Times     Description:       OEE     Description:       Operator Setup     Running       Program Setup     Color       Job Setup     Sizeon       Schedule Setup     Sizeon       Event Setup     Flash       Status Screens     Always show       States     Always show					
Switches     Value:       Counters     TIMERUNS(CYCLE)       Timers     Description:       OEE     Running       Opgrant Setup     Color       Job Setup     Color       Status Screens     Flash       Status Screens     Always show       Status Screens     Always show					
Counters     [TIME RRUNS[CYCLE]       Timers     Description:       OEE     Description:       Operator Setup     Running       Program Setup     Color       Job Setup     Giteen       Schedule Setup     Fiscen       Status Screens     Always show       Status States     Always show					
Times     Times       OEE     Descriptor:       Operator Setup     Running       Program Setup     Color       Job Setup     Gieren       Schedule Setup     Fisch       Status Screens     Always show       - Real-time Values     Always show					
OEE     Description:       Operator Setup     Running       Program Setup     Color       Job Setup     Color       Schedule Setup     Internet       Status Screens     Always show       Status States     Always show			TIMERRUNS[CYCL	=]	
Operator Setup     Operator Setup     Operator Setup     Operator Setup     Operator Setup     Operator Setup     Status Screens     Operator Setup     Status Screens     Operator Setup     Status Screens     Operator Setup     Operator			Description:		
Job Setup     Green       Schedule Setup     Image: Status Screens       Status Screens     Always show       Status Status     Always show			Running		
- Job Setup     Green       - Schedule Setup     ■ Flash       Status Screens     ■ Always show       - States     ■ Always show	- Program Setup		Color		
Status Screens Real-time Values Always show Status Screens Always show Status Screens	Job Setup		Green	<b>v</b>	
Status Screens Aways show Aways show States			Ferroon		
Real-line Values Always show			Flash		
- States			Aluque about		
			Aiways show		
Lights / Indicators Machines / Grouns	<ul> <li>Lights / Indicators</li> </ul>				

Make sure when you click the search icon for the running state that you choose the value TIMERRUNS[CYCLE]. This is true when the CYCLE timer is running and false when stopped. Add the Stopped state in the same way but choosing TIMERRUNS[STOPPED] for the value and Orange for the colour.

em and Table/Grap	h Setup	?
General	States: Live screen	
Layout Period	States	
Columns	Title Value	Add
Machines	Running TIMERRUNS[CYCLE]	
- Operator	Stopped TIMERRUNS[STOPPED]	Сору
Program		Delete
Job		
- Targets		1
- Excel Exporting		
- Switches	Value:	
- Counters	TIMERBUNS[STOPPED]	P
- Timers		
- OEE	Description:	
<ul> <li>Operator Setup</li> </ul>	Stopped	
- Program Setup	Color	
Job Setup	Orange 🗸	
Schedule Setup		
Event Setup	🗌 Flash	
Status Screens		
Real-time Values	Always show	
States		
Lights / Indicators		

The Real Time Screen should now look like the picture below, with the coloured bar changing from orange to green as the machine stops and starts.

Running Today 0:00:00	Stopped Today 0:00:00
machine maz1	0:00:00
Running Today 0:00:00	Stopped Today 0:00:00
Machine M94	0:00:00
Running Today 0:00:00	Stopped Today 0:00:00
Mill1	0:00:00
Running Today 0:00:00	Stopped Today 21:55:29

We now want to make the machine flash red if the machine has been stopped for more than a certain time. To do this we need to add a third state as below. In this case we are not just picking a value from a list, we are entering an expression that can be true or false. Use the search icon to pick the TIMER[STOPPED] value and then add > 5s. This state will be displayed if the stopped timer has run for more than 5 seconds (in a real installation this would be 5m but we use 5seconds so we can easily test this state).

System and Table/Grap	h Set	tup		? 🛛
General	~	States: Live scr	een	
Layout		States		
- Period	_			
Columns		Title	Value	Add
- Machines		Running	TIMERRUNS[CYCLE]	Com Com
- Operator		Stopped Over 5	TIMER[STOPPED] > 5s	Сору
- Program		Stopped	TIMERRUNS[STOPPED]	Delete
Job				
- Targets				
Excel Exporting				
Switches		Value:		
Counters		TIMER[STOPPED]	> 5s	
- Timers		Description:		
OEE				
<ul> <li>Operator Setup</li> </ul>		Stopped Over 5		
Program Setup		Color		
Job Setup		Red	×	
Schedule Setup				
Event Setup		🗹 Flash		
Status Screens		Always show		
Real-time Values		Anvays show		
States				
— Lights / Indicators				
Machines / Groups				
Operator Screens				

Once you have created this state you need to change the position in the list. Highlight the Stopped Over 5s and then click the Up Arrow button so it is as above.

### 6.4 Machine State Order on the live screen

MDC-Max will only display one machine state and it does it by checking each state starting from the top and displays the FIRST state that is true, the rest are ignored. So if Stopped comes before Stopped over 5s then Stopped over 5s will never be displayed and the display will not flash after 5 seconds.

## 6.5 Adding the jobname to the live screen

Click Setup, System Setup, Realtime values, click the Add button and add the Job:-

- General	^	Real-time Values: L	ive screen		
- Layout Period		Real-time Status Fields			
- Columns		Title	Value		Add
<ul> <li>Machines</li> </ul>		MACHINE	TEXT[PORTNAME]		
<ul> <li>Operator</li> </ul>		This Cycle	TIMERLAST[CYCLE]		Сору
- Program		Running Today	TIMER[CYCLE]		Delete
- Job		Job	TEXT[JOB]		
<ul> <li>Targets</li> </ul>		Stopped Today	TIMER[STOPPED]		1
<ul> <li>Excel Exporting</li> </ul>					
- Switches		Value:			
- Counters		TEXT[JOB]			₽
- Timers		Title:		17 11 1N	
- OEE				Field width:	
<ul> <li>Operator Setup</li> </ul>		Job		10	\$
- Program Setup		Format:		Location:	
-Job Setup -Schedule Setup		TEXT	~	Main Bar	~
– Schedule Setup – Event Setup		Align:		Title Size:	
- Status Screens		Left	~	Small	~

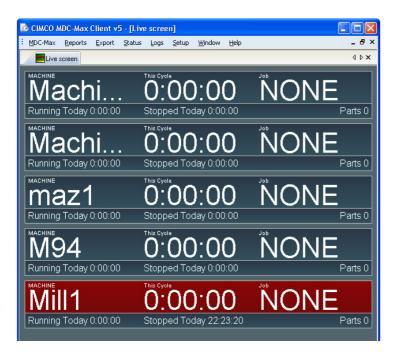
## 6.6 Adding the Part Count to the live screen

Add a new value called Parts and choose the value TIMERCNT[CYCLE] and set the Format to I (for integer) as below:-

System and Table/Graph S	Seti	up.			? 🛛
General	~	Real-time Values: L	ive screen		
- Layout	- 1	Real-time Status Fields			
- Period					
Columns		Title	Value		Add
- Machines		This Cycle	TIMERLAST[CYCLE]		Сору
- Operator		Job	TEXT[JOB]		Copy
- Program		Running Today	TIMER[CYCLE]		Delete
Job		Stopped Today	TIMER[STOPPED]		
- Targets		Parts	TIMERCNT[CYCLE]		Ť 🖳
Excel Exporting					
- Switches		Value:			
Counters		TIMERONT[CYCLE]			
- Timers		Title:		Field width:	
OEE		Parts		10	\$
- Operator Setup		Falls		10	¥
- Program Setup		Format:		Location:	
- Job Setup		1	~	Bottom Bar	~
- Schedule Setup		Align:		Title Size:	
- Event Setup					
Status Screens		Right	*	Small	×
- Real-time Values		Show '???' when valu	a is undefined		
- States			e la diridente di		
- Lights / Indicators					
Machines / Groups					
Operator Screens					

## 6.7 Changing the position of text on the live screen

The position of each of the above values on the live screen is determined by their order in the list and by the location field. To change the position, highlight the value in the list and use the Up or Down arrows to the right. Here is an example where we have moved the current cycle and Job Name to the main bar and set the order as Machine Name, then Current Cycle then Job Name:-



There are many other states and values that can be added to the live screen (eg operator, program etc).

#### 6.8 Running a live screen automatically

Most customers will one or more PCs to run a live screen automatically when the MDC-Max client starts (and you can add the client to the Startup group so the client starts when the user logs in).

To do this Open the MDC-Max client, click Setup, System Setup and click Client Settings top Left.

System and Table/Graph	ı Seti	ıp		? 🗙
Client Settings	^	Client Settings		
General				
Layout		Language:	Slideshow time: 3	
Period		US English 💙	3	\$
Columns		Start maximized	Only administrators can access 'System Setup'	
- Log / Timeline - Machines		<u> </u>	<ul> <li>Only administrators can access system setup</li> </ul>	
- Operator		Remember password	🔲 Only administrators can access 'Machine Setup'	
Program		Pre-process data to get accurate historical information	Only administrators can access 'Report Setup'	
Job				
- Targets		Report directory:		
Excel Exporting				
- Switches				
- Counters		Startup real-time screens		
- Timers				
- OEE		Show real-time screens when program starts	Show real-time screens in full screen mode	
Operator Setup		Description	Ture	
- Program Setup Job Setup		Description	Туре	
Schedule Setup		🗹 Real Time	Big Screen	
Event Setup		Real Time stopped reasons	Big Screen	
Status Screens		Test	List	
Real-time Values		Operator	Operator Screen	
- States				
- Lights / Indicators				
Machines / Groups				
Operator Screens				
Buttons				
- Show Values				
Input Values				
CIMCO Integration			Help Cancel	ок

Tick either "Show real-time screens when program starts" or the full screen option to the right to run full screen. Tick the live screen that you want displayed on startup and then OK. Now each time you start that client the ticked live screen will show. If you select more than one live screen they will rotate from one screen to the next according to the time interval set under "Slideshow time".

Each MDC-Max client can display a different screen on startup. So if you have 5 MDC-Max clients they can all display a different screen.

Most customers will require a general screen that shows the runtime today for each machine and its current state. The production office will want to know what job is running on each machine and how many parts have been produced. Each machine cell may well want a screen specific to their group of machines – all of these are possible.

So far we have only created a single live screen but you can create multiple screens and display each one on a separate PC. This is done in the same way we created the first live screen.

### Chapter 7 – Setting up Operator Screens for Downtime Reasons

Operator screens enable the operator to enter Operator ID, Job Name, Scrap Part and any Downtime Reasons into the MDC-Max system. The operator screen is created in a similar way to the live screen but now has entry boxes and buttons for data entry. These boxes and buttons can be made large for use with a touch screen PC so that no mouse or keyboard is required.

To set an operator screen up first click Setup, System Setup and click 'Operator screens' on the left. Click the Add button to the right and enter the name for the operator screen in the Description (we have called it Operator Screen). For the time being leave the 'Multiple machines on one screen' box un-checked.

System and Table/Graph	Setup	<b>N</b>
General	Operator Screens	
Layout	Real-time Status Fields	
- Period		
Columns	Description	Type Add
- Machines		Operator Screen Copy
- Operator		Copy
···· Program		Delete
Job		
- Targets		
Excel Exporting		
- Switches	Description:	
Counters	Operator	
- Timers		
- OEE	Multiple machines on one s	screen
- Operator Setup		
- Program Setup		
- Job Setup		
- Schedule Setup		
Event Setup		
Status Screens		
- Real-time Values		
States		
— Lights / Indicators		
Machines / Groups		

## 7.1 Adding a Button for Setting Downtime

Go to the buttons menu on the left and click the Add button to the right.

General	Buttons: Operat	tor		
- Layout	Buttons			
- Period	Duttoris			
Columns	Title	Message		Add
- Machines	Setting	SETTING		
- Operator	ooning	0211110		Сору
- Program				Delete
Job				
- Targets				
Excel Exporting				
- Switches	Description:		Push button message:	
- Counters	Setting		SETTING	~
- Timers	o o tang		Jerrind	
OEE				
- Operator Setup 📃	Show indicator			
Program Setup	Color		Improve visual feedback:	
-Job Setup	Blue		V Turn on indicator light	~
- Schedule Setup			- Tamor indicator light	
- Event Setup	Value:			
Status Screens	TIMERRUNS[SET1	TING]		2
- Real-time Values				
States				
- Lights / Indicators				
- Machines / Groups				
Operator Screens				
Buttons				
- Show Values				
- Input Values				
- Show State				
Machines / Groups				
Machines / Groups				

Enter the description as Setting (this text will appear on the button itself) and then click on the Push Button message drop down box. These are a list of the messages that exist in DNC-Max that we created in Section 1 (without the MSG[...]). When we press this button we want it to send the SETTING message that will start the Setting timer so we choose the SETTING message from the drop down box. If you click OK at this point you will get an operator screen with a single button that says "Setting" on it and sends the SETTING message to MDC-Max when pushed.

Ticking the 'Show Indicator' box will light up the button pressed so the operator gets a confirmation of the Setting downtime reason.

Tick the box and set the indicator colour the same as you did for your Setting state on the live screen (if you put setting on your live screen).

Under Value you enter a timer value for Setting that indicates when the button should light up (as opposed to immediately you press it). In this case we want the button to light up when we are in setting mode (remember that another operator on another screen could have pressed setting for our machine). We are in setting when the setting timer is running so the value we enter is TIMERRUNS[SETTING].

The Improve Visual Feedback' menu has a series of options. Because there is always a short delay between the button being pressed and the setting timer running and the system visually responding to it there are several options to enhance the display. 'NO' just leaves the delay as it is, 'Turn on indicator light' turns the light on immediately which prevents the operator clicking several times on the same button.

### 7.2 Adding the OK to Run Button

If the Operator screen is being used for downtime reasons then it should always have an OK to Run button as well. Otherwise the machine will stay in Setting. Here is the setup for the OK to Run button:-

E	uttons: Operator				
В	uttons				
	Title Setting Ok to Run	Message SETTING NORMALRUN			Add Copy Delete
	Description: Ok to Run		_	Push button message: NORMALRUN	~
	☑ Show indicator Color			Improve visual feedback:	
	Green	•	~	Turn on indicator light	*
1	Value:				
	TIMERRUNS[OKTORUN]				$\mathbf{P}$

Add this button, OK the settings and then display the Operator screen (Click Status, Operator Screen: Operator Screen from the menu).

The Operator Screen should look like:-

CINCO NDC-Max Client v5 - [Operator: BF1]		
i MDC-Max Beports Export Status Logs Setup Window Help		đ×
Real Time stopped reasons H Real Time SDparator BF1	4	ÞΧ
	Setting	
	Security	
	Old to Durp	
	Ok to Run	
	Licensed to Tim Collet Test Key - NOT FOR RESALE OVR	

### 7.3 Adding other Downtime buttons

You can now add new buttons to the screen for all the machine downtime reasons. In the Operator screens/buttons menu highlight the Setting button and click 'Copy' on the right.

Buttons: Operator				
Buttons				
Title Setting Setting Ok to Run	Message SETTING SETTING NORMALRUN			Add Copy Delete
Description:			Push button message:	
Setting			SETTING	~
🗹 Show indicator				
Color			Improve visual feedback:	
Blue		*	Turn on indicator light	*
Value:				
TIMERRUNS[SETTING	]			$\mathbf{P}$

Enter the description (Inspection), choose a colour and chose the message (INSPECTION).

Title	Message		Add
Setting	SETTING		Сору
Inspection	INSPECTION		
Ok to Run	NORMALRUN		Delete
			1
escription:		Push button message:	
Inspection		INSPECTION	
Show indicator			
Color		Improve visual feedback:	
Orange	~	Turn on indicator light	

Repeat the procedure for all the other machine stopped reasons and you will get a screen similar to the one below:-

	Hent v5 - (Operator: CNC 1)	
BDC-Max Beports	inal of a grant marketary present 🔜 Red Fare - Statestary Data 1	- 8
	Setting	
	Inspection	
	Tooling	
	Maintenance	
	Breakdown	
	Material	
	Ok to Run	

Our example screen has 4 other downtime reasons on it – yours will just have Setting and Inspection.

### 7.4 Adding machine information box to the Operator Screen

It is useful to have the current machine, operator and job on the Operator Screen and these can be added as below. Edit the operator screen, click on Show Values on the left and click the Add button on the right.

stem and Table/Graph S	tup	2
General August	Show Values: Operator Show Values	
- Columns - Machines - Operator - Program - Job - Targets - Excel Exporting	Title Value Machine TEXT(PORTNAME)	Add Copy Delete
- Switches - Counters - Timers - OEE - Operator Setup - Program Setup	Value: [TEXT[PORTNAME] Title: Machine Format:	P
-Job Setup -Schedule Setup -Event Setup -Status Screens -Real-time Values	Align:	
States     States     Lights / Indicators     Machines / Groups     Operator Screens     Buttons     Show Values     Input Values     Show Value	Show '??' when value is undefined	
Machines / Groups		Help Cancel OK

Under Value click the search icon and scroll down to TEXT[PORTNAME], set the title as Machine and the Format as TEXT.

perator screen sl	nould look similar to th	is:-
 opert Status Logi Setup Window Belp easons <b>H</b> Real Time <b>St</b> Operator: DNC * <b>St</b> Operator: BF1		- @ ×
Setting	Machine BF1	
Inspection		
Tooling		
Maintenance		
Breakdown		
Material		
Ok to Run		
	Licensed to Tim Collet Test Key - NOT FOR RESALE	OVR

### 7.5 Adding Current Job and Operator ID to the Operator Screen

Add two more values by copying the machine value above. Set the value to TEXT[JOB] for the jobname and TEXT[OPERATOR] for operator name and set the format to TEXT.

The end result should look like this:-

CIMCO MDC-Max Client v5 - [Operator: BF1]		- 6 🛛
i MDC-Max Beports Export Status Logs Setup Window Help  Real Time stopped reasons Real Time stopped reasons Real Time \$\$ Operator DIC * \$\$ Operator BF1		- # ×
Setting	Machine BF1	
Inspection	Operator NONE	
Tooling	<sub>зоб</sub> 544664	
Maintenance		
Breakdown		
Material		
Ok to Run		
	licensed to Tax Collet Test Key - NOT FOR RESAUE	098

### 7.6 Adding a data entry box to the Operator Screen

Operator screens can be used to enter text information into MDC-Max (such as job number or operator name). Edit the operator screen, click Input Values on the left and click the Add button on the right.

System and Table/Graph S	etup			? 🛛
General Cayout Period Columns Machines Operator Program Job Targets Excel Exporting Switches Counters Timers OEE Operator Setup Program Setup Job Setup Schedule Setup Status Screens Real-time Values States Lights / Indicators		Value OPERATORLOGON	Message: DPERATORLOGON Show 'Enter Button' Clear when input completed Assume barcode input Submit on 'Enter]	Add Copy Delete
	Validation trigger:	त		

Set the Description to Operator and set the Message to OPERATORLOGIN The description will appear above the data entry box on the operator screen. The auto submit field will press enter for you if you do not (useful where you only have a number keypad for data entry). The clear field will clear the contents of the box if you do not press enter. The Validation trigger and other fields are for advanced use so leave them blank for now.

The 'Show the enter button' check box puts a mouse clickable enter button beside the input box. 'Clear when input completed' and 'Submit on Enter' are self explanatory.

The result should look like this:-

Image: Setting     Machine       Setting     BF1       Inspection     Operator       FRED BLOGGS
Setting BF1
Increation
Tooling 544664
Maintenance         Operator           FRED BLOGGS         <
Breakdown
Material

## 7.7 Adding Job Name data entry box to the Operator Screen

Edit the operator screen, click Input Values, click the Operator value and click Copy. Enter the following information for Job Name :

stem and Table/Graph Set	up			?
Machines     Operator     Program     Job     Targets     Excel Exporting     Switches     Counters	Input Values: Operator States Title Operator New Job	Value OPERATORLOGON JOBSTART		Add Copy Delete
Timers OEE Operator Setup Program Setup	Description:		Message:	
Job Setup	New Job		JOBSTART	*
- Schedule Setup - Event Setup	Auto submit after (secs):		Show 'Enter Button'	
Status Screens	0	\$	Clear when input complete	d
- Heal-time Values States	Clear fields after (secs):		Assume barcode input	
- Lights / Indicators	-	\$	Submit on 'Enter'	
Machines / Groups	Set focus after (secs): 0	•	Submit on Enter	
Operator Screens     Buttons		*		
- Show Values	Validation trigger:			
Input Values		<u> </u>		
- Show State				
Machines / Groups	When input start matches:	When input start matches:	When input start matches:	When input start matches:
Machines / Groups				
	Send this message:	Send this message:	Send this message:	Send this message:
- Excel Variables	OPERATORLOGON V	OPEBATOBLOGON 🗸	OPERATORLOGON	OPERATORLOGON 🗸

## Your new Operator Screen should look like this:-

: MDC-Max Reports Export Status Logis Setup Window Help	_ 6 ×
Real Time stopped reasons Real Time 😫 Operator: CNC * 😫 Operator: BFI 🔗 Event Log	4 b <b>x</b>
Setting	Machine BF1
Inspection	Operator FRED BLOGGS
Tooling	BMWR80-7
Maintenance	Operator <
Breakdown	New Job
Material	
Ok to Run	]
Itens: 11 / 313ns	Licensed to Tim Collet Test Key - NOT POR RESALE OVR

## 7.8 Downtime Shortcuts on the Operator Screen

Sometimes it is useful to use a single entry box for multiple downtime reasons without having to setup a button for each. Edit the System Setup and click Input Values and highlight New Job. At the bottom of the screen are a series of "When Input Start Matches" boxes and these can be used to setup upto 4 messages on a single input.

The Example below would enable you to enter just S for Setting, I for Inspection and O for OK to Run.

System and Table/Graph Se	tup	? 🛛
Layout	Input Values: Operator States	
— Columns — Log / Timeline — Machines — Operator — Program — Job — Targets	Title Value Operator OPERATORL Job JOBSTART	OGON Add Copy Delete
Excel Exporting Switches Counters	Description: Job	Message: JOBSTART
Timers OEE Operator Setup Program Setup	Auto submit after (secs): 0	Show 'Enter Button'
- Job Setup - Schedule Setup - Event Setup ⊟ Status Screens	Clear fields after (secs): 0 Set focus after (secs):	Clear when input completed  Assume barcode input  Submit on 'Enter'
- Status Sciences - Real-time Values - States - Lights / Indicators	0 Validation trigger:	<del>،</del>
Machines / Groups Dperator Screens Buttons	When input start matches: When input start	
	S T Send this message: Send this mess SETTING TOOLING	age: Send this message: Send this message:
Machines / Groups Machines / Groups		Help Cancel OK

Using an operator screen on a PC in a cell can be much cheaper than fitting bar code readers to every machine. The PC itself can then be fitted with a USB bar code reader (cheaper than the RS232 version) for entry of jobnames and operator ID (you can print a barcode sheet for operator ID and leave it at the PC).

### 7.9 Adding a Machine State bar to the Operator Screen

The current machine state can also be displayed on the operator screen, the setup for this is the same as the states in the live screen setup. Click Setup, System Setup, and then states under Operator Screens. Click the Add button to the right to add the running state as below:-

System and Table/Graph	i Set	up		? 🗙
General	^	Show State: Op	erator	
Layout	-	States		
Period		States		
Columns		Title	Value	Add
- Machines		Running	TIMERRUNS[CYCLE]	
- Operator		Stopped	TIMERRUNS[STOPPED]	Сору
- Program				Delete
Job				
- Targets		1		
Excel Exporting				
- Switches		Value:		
- Counters		TIMERRUNS[CYCL	_E]	
- Timers		Description:		
- OEE				
- Operator Setup		Running		
Program Setup		Color		
- Job Setup		Green	~	
- Schedule Setup				
- Event Setup		Flash		
😑 Status Screens				
- Real-time Values				
- States				
<ul> <li>Lights / Indicators</li> </ul>				
Machines / Groups				
Operator Screens				
Buttons				
- Show Values				
<ul> <li>Input Values</li> </ul>				
- Show State				
Machines / Groups	_			
- Machines / Groups	~			

Make sure when you click the search icon for the running state that you choose the value TIMERRUNS[CYCLE]. This is true when the CYCLE timer is running and false when stopped. Add the Stopped state in the same way but choosing TIMERRUNS[STOPPED] for the value and Red for the colour, checking the Flash option makes the red indicator flash to attract the operators attention.

System and Table/Graph	Set	tup			? 🛛
General	~	Show State: Operator			
- Layout		States			
- Period	_				
Columns		Title	Value		Add
- Machines		Running	TIMERRUNS[CYCLE]		Сору
- Operator		Stopped	TIMERRUNS[STOPPED]		
Program					Delete
Job					
- Targets					
Excel Exporting					
- Switches		Value:			
- Counters		TIMERRUNS[STOPPED]			$\mathbf{P}$
- Timers - DEE		Description:			
Operator Setup		Stopped			
Program Setup				J	
Job Setup		Color		1	
- Schedule Setup		Red	*		
Event Setup		✓ Flash			
Status Screens		- Hash			
Real-time Values					
- States					
- Lights / Indicators					
Machines / Groups					
😑 Operator Screens					
- Buttons					
- Show Values					
- Input Values					
- Show State					
Machines / Groups					

The Real Time Screen should now look like the picture below, with the coloured bar changing from red to green as the machine stops and starts.

Ro CIMCO MDC Max Client v5 - [Operator: BF1] i IgDC-Max Reports Export Status Logs Setup Window Help	- 6 ×
Real Time stopped reasons 📕 Real Time Stopperator: CNC * Stopperator: BF1 🚱 Event Log	46×
Sto	pped
Setting	Machine BF1
Inspection	Operator FRED BLOGGS
Tooling	BMWR80-7
Maintenance	Operator
Breakdown	New Job
Material	
Ok to Run	Licensed to Tim Collec Text Key - NOT FOR RESILE OVR

### 7.10 Displaying Multiple Machines on the Operator Screen

So far the operator screen we have created will ask for a machine name before it displays the screen. But if we have a single PC in a cell serving 4 machines we need to be able to change between machines.

To do this click the check box on the main operator screens menu page that allows multiple machines on one screen.

- Machines	Operator Screens	
- Operator		
Program	Real-time Status Fields	
- Job	Description	Type Add
- Targets	Operator	
Excel Exporting	operator	Uperator Screen Copy
- Switches		Delete
Counters		
- Timers		↓ <b>1</b>
OEE		
Operator Setup	Description:	
Program Setup	Operator	
Job Setup	a barara.	
- Schedule Setup	Multiple machines on one screen	
-Event Setup		
- Status Screens		
- Real-time Values		
- States		
- Lights / Indicators		
- Machines / Groups		
Derator Screens		
- Buttons		
- Show Values		
- Input Values		
- Show State		
- Machines / Groups		
Machines / Groups		
Machine Variables		
- Excel Variables		
- Messages 🚽 🗸		
CIMCO		

If this is checked the operator screen will have a list of selectable machine names on the left of the screen as per the following screen.

🙆 CIMCO MDC-Max Client v5 - [Operato	d	
: MDC-Max Reports Export Status Log	is Setup Window Help	_ & ×
Real Time stopped reasons 📕 Real Tim	🥐 😫 Operator	4 Þ ×
Machine           BF1           BF2           BF3           BF4           CNC1           MILL 1           MILL 2           MILL 3           Peruce DM           SIM1	Sto	pped
DF2 DF3 DF4 DF4ULL1 DFMILL1 DFMILL2 DFMILL3 text1 text2	Setting	Machine Fanuc OM
	Inspection	Operator NONE
	Tooling	Job 1234
	Maintenance	Operator
	Breakdown	New Job
	Material	
	Ok to Run	
Items: 11 / 313ms		Licensed to Tim Collet Test Key - NOT FOR RESALE OVR

By default the operator screen will display all the machines. In most cases we want to limit the machine choice to those in the current cell. Edit the operator screen and click Machine / Groups on the left and tick the machines to be displayed on this screen.

System and Table/Graph	ı Se	tup			? 🛛
- Machines Operator Program Job Targets Excel Exporting	^	Machines / Groups: Operate Machines / Groups Machines / Groups: Selected machines			
- Switches - Counters		Machines / Groups To Include BF1 BF2	NC-Base Group BF1	DNC-Max Group Cell a	MDC-Max Group
Timers OEE Operator Setup		<ul> <li>✓ BF2</li> <li>✓ BF3</li> <li>✓ BF3</li> </ul>	BF2 BF3	Cella Cella	A C
- Program Setup Job Setup			BF4 CNC Control	Cella Cella	D Cell C
Schedule Setup		DF1     DF2     DF3	DF DF DF	Drip feed Cell Drip feed Cell	D
<ul> <li>Status Screens</li> <li>Real-time Values</li> </ul>		DF3     DF4     DFMILL1	DF DF DF	Drip feed Cell Drip feed Cell	D
States Lights / Indicators			DF DF DF	Drip feed Cell Drip feed Cell	D
Machines / Groups		Fanuc OM	SIM MILL 1	Drip feed Cell Cell C Cell B	D A
Buttons Show Values		MILL 1 MILL 2 MILL 3	MILL 2 MILL 3	Cell B Cell B Cell B	B
- Input Values - Show State		SIM1	SIM	Cell C	BC
Machines / Groups Machines / Groups Machine Variables		test1		Drip feed Cell Drip feed Cell	Drip feed Cell Drip feed Cell
Excel Variables Messages		MDC-Max Group DNC-M	1ax Group NC-Base Group	Select None	Select All
CIMCO Integration				Help	Cancel OK

### Chapter 8 – Table Reports in MDC-Max

There are 4 different types of report built into MDC-Max and it also has the ability to create customised spreadsheets directly from MDC data. MDC-Max installs several default reports which you can copy and modify. Here we explain how to setup the 4 built in types from scratch.

#### 8.1 Setting up machine % utilisation table report

A table contains rows and columns of data for each machine such as run time today, machine efficiency today, stopped time by reason code and so on.

For our first table we will create a simple machine utilisation table. On the main MDC-Max screen click Setup, System Setup then click on the 'Tables/Graphs' link on the left.

Client Settings Client Setting Client Seting Client Setting Client Setting Cl	System and Table/Graph Se	up		? 🗙
Program Setup - Job Setup - Schedule Setup E Vent Setup	Client Settings	Table / Graphs       Table / Graph setup       Title     Type       W Weekly Machine Utilisation     Table       Ø Daily report: Knr/Max Dycle Times     Graph       Ø Monthly report: Machine Utilization     Table       Ø Monthly report: Cycle Times     Table	Selected Day Selected Day Selected Day Selected Month Selected Month	_
Status Screens     Read-time Values     States     Lights / Indicators     Machines / Encode     Buttons     Buttons     Show Values     Input Values     Thom Values     Thom Values     Delete     Copy     Add     Copy     Add     K	Program Setup     Job Setup     Schedule Setup     Event Setup     Status Screens     Status Screens     Status Screens     Uights / Indicators     Machiner / Groups     Departor Screens     Show Values     Input Values     Show Value     Show Val			16

Click the Add button to see the screen below and type a description in the Description field – this is the name of the table. Type a title in the Title field – this is what is displayed on the actual table (they can be the same as below).

System and Table/Graph Set	tup	? 🛛
Centrol     Layout     Period     Columns     Columns     Operator     Operator     Operator     Targets     Excel Exporting     Switches     Counters     Targets     Counters     Counters     Operator Setup     Operator Setup     Schedule Setup     Schedule Setup     Status Screens     Real-time Values	General       General Settings       Table / Graph:       Daly Machine Utilisation       Description:       Daly Machine Utilisation       Table       Day Machine Utilization       Type:       Table       Image: Compact headers	

Leave the type set to Table – this produces a simple two dimensional table in a grid form.

# 8.2 Formatting the Table Report

Click on the Layout menu on the left of the screen and the layout page will appear

System and Table/Graph	Set	up				? 🛛
Client Settings	~	Layout				
Tables/Graphs		Layout Settings				
General		Table / Graph:				
Layout Period		Daily report: Machine Utilizati	on			~
- Columns						
Machines				_		
- Operator		Disable color printing		Remove empty	rows / 'column groups'	
- Program						
Job		Table Layout				
- Targets		Print composite header		Average title:		
Excel Exporting				Average		
Switches		Show undefined values as	m	Total title:		
Counters		Show Average		Total		
- Timers		Show Total				
OEE		Show I otal				
- Operator Setup		Table column header / Graph	la new of the	and black for a day		
- Program Setup		\$BEPORTMACHINE	iegena (ie	eave blank for autoj:		
Job Setup		SREPURIMACHINE				$\mathbf{P}$
Schedule Setup						
Event Setup Status Screens		Graph Layout				
Status Screens		X-Axis Title:	Y-Axis T	Title:	Y-Axis minimum value:	Y-Axis major.
- States						
- Lights / Indicators		Legends position:	Y-Axis fi	ormat:	Y-Axis maximum value:	Y-Axis minor:
Machines / Groups	-	Auto		~		
Operator Screens						
Buttons						
- Show Values						
- Input Values						
Show State	~					
CIMCO Integration					Help	Cancel OK

The layout determines how the data will be laid out on the screen and whether the average and total values are to be displayed. For our simple utilization table we set the table column header to be \$REPORTMACHINE (use the search button at the end of the line to pick this). Each column in our table will then be named by machine name.

# 8.3 Setting the table time period

Click on the Period menu on the left to determine the time period of the table.

System and Table/Grap	oh Set	tup					<u>?</u> ×
General	~	Period					
Layout		Period / Interval					
Period	-	Table / Graph:					
- Columns		Daily Machine Utilisation					~
Machines		Daily Machine Oulisation					×
- Operator							
Program		Remove empty interval	s		Number of intervals	per table/graph (0=unlimited):	
Job					0	per capier graph (e. en innicea).	\$
Targets		No time/interval heade	r on tables/gra	phs	· · · · · ·		Y
Excel Exporting							
Switches		Start time:		Day start:		Interval length:	
Counters		Selected Day	~	TIME[DAYSTART]	~	1 Hour	~
Timers OEE		Duration:		Dayend:		Interval title:	
Operator Setup		1 Day	~	TIME[DAYEND]	~		*
- Program Setup							
Job Setup		Interval title:					
Schedule Setup		\$INTERVALSTARTH - \$I		ιн			
- Event Setup							<u> </u>
😑 - Status Screens							
— Real-time Values							

"Start Time" and "Duration" determine the total period of the table. Selected Day means that when we run the table the user will be able to select a day from a calendar. We want to report on a single day so the duration is 1 day. The interval length determines how many rows of data will be generated for each machine per day. If we set this to 1 Day then we will get a row per machine for the total utilization for that day. We can refine this down to 15 minute intervals but for now set this to 1 hour. This means we will get one row for every hour of the scheduled day (see earlier section on setting schedule). The "Day Start" field is set to TIME[DAYSTART] – this means the table will start at the beginning of the first shift.

The "Day End" is set to TIME[DAYEND] so the table ends at the end of the final shift.

If your first shift starts at 6 am and you run three shifts ending at 6 the next morning, the table above will run from 6 to 6, not from Midnight to Midnight.

The smaller interval title field determines the column period title on the table (this will default to time if you leave it blank. The large interval title field determines what is displayed in the period column (in this case the hour at the start and end of the interval – eg 06-07), the search icon gives a list of suggestions. If you set the large interval title to \$INTERVALSTARTHH:\$INTERVALSTARTM - \$INTERVALENDHH:\$INTERVALENDM then the time will be displayed as 06:00-07:00 which is better.

# 8.4 Adding Data to a Table Report

tem and Table/Grap	h Set	up					?
Client Settings	~	Columns					
Tables/Graphs/Logs		Columns					
General							
- Layout		Table / Graph:					_
Period		Daily report: Machine Utilization (Table)					~
Columns							
- Log Events		Remove empty columns		N 1 7 1		r 5 0	
- Machines		I nemove empty columns			ms per table/graph (0:	=uniimitea):	
- Operator		No column titles on tabels/graphs		0			-
- Program							
Job		Value		Title	Format	Ad	łd
- Targets		(TIMERICYCLE1/TIME/PERIODLEN])*100		Machine Utiliz			
Excel Exporting		(interforcee) intel entopeerig too		indernite etaile		Co	nu
- Switches							P.9
- Counters						Del	ete
- Timers							
- OEE							
<ul> <li>Operator Setup</li> </ul>							
<ul> <li>Program Setup</li> </ul>							
Job Setup							
Schedule Setup							
Event Setup							
Status Screens							
- Real-time Values		Title:		- ·			
- States				Format:			
<ul> <li>Lights / Indicators</li> </ul>		(TIMER[CYCLE]/TIME[PERIODLEN])*100	$\mathbf{P}$	%			~
Machines / Groups		Title:					
Operator Screens		Machine Utilization		Default		~	Set
- Buttons			<u> </u>				
<ul> <li>Show Values</li> </ul>		Leave 0 fields empty					
- Input Values							
CIMCO Integration					Help Ca	ncel	OK

Click on the Columns menu on the left to determine what values are displayed

Each table can display multiple columns of data per machine but in this example we only want the utilization as a percentage. Click on the first Title value and then use the search icon to select TIMER[CYCLE]. This would give us the actual run time in minutes and seconds in that hour.

What we actually want is the percentage runtime in each hour so we must enter a formula to give us this. The formula we want is : (TIMER[CYCLE] / TIME[PERIODLEN])\*100

le divide the actual runtime by the interval time (1 hour) and then multiply by 100 to get a percentage. Always use TIME[PERIODLEN] for the total time in any interval – then if you change the interval to 15M or 1 Day the formula will still work.

Use the search icon to edit the Title value and then scroll to the bottom of values to find TIME[PERIODLEN] and double click to add this into the formula and then type the brackets and the \*100.

The Format determines how the data is to be displayed (the drop down menu icon gives a series of valid formats) in this case we use % to display a percentage.

Other typical values for the title and format are :

TIMER[CYCLE] to give the total running time (set format to MS for minutes/secs)

TIMERMIN [CYCLE] to give a minimum cycle time (format MS) TIMERMAX[CYCLE]to give a maximum cycle time (format MS) TIMERAVG[CYCLE] to give an average cycle time (format MS) TIMERCNT[CYCLE] to give a part count (format I for integer)

### 8.5 Selecting which machines to display in a Table Report

Finally click the Machines menu on the left to edit machine info. This page determines how the data is displayed by machine and what machines to include.

System and Table/Graph	i Seti	пb			? 🛛
General	~	Machines			
Layout	-	Machines			
Period	_	Table / Graph:			
Columns					
Machines		Daily Machine Utilisation			*
Operator					
Program		Include machine information		Number of machines/groups p	er table /eraph:
Job				Number of machines/groups p	er tablezgraph.
- Targets		No machine/group names on table:	s/graphs	U	<b>*</b>
Excel Exporting		Remove inactive machines/groups			
- Switches					
Counters		Machine column header:			
- Timers		\$BEPOBTMACHINE			
- OEE					<b>*</b>
<ul> <li>Operator Setup</li> <li>Program Setup</li> </ul>		Machines / Groups			
Job Setup		Generate information for each machin	e		~
Schedule Setup					
- Event Setup		Selected machines/groups only			
Status Screens					
- Real-time Values		Machines / Groups To Include	NC-Base Group	DNC-Max Group	MDC-Max Group
States		M94		HUB 2	HUB 2
- Lights / Indicators		Machine A		Default Group	Default Group
Machines / Groups		Machine B		Default Group	Default Group
Operator Screens		🔲 maz1		Default Group	Default Group
Buttons		🔲 Mill1		HUB 2	HUB 2
- Show Values					
- Input Values					
- Show State					
Machines / Groups	-	Select MDC Group Select DNI	C Group Select NC-	Base Group Select None	Select All
- Machines / Groups	<b>×</b>				
CIMCO Integration				Help	Cancel OK

Tick the "Include machine information" field and this will break the table into individual machine totals.

The "Number of machines/groups per table/graph" field determines how many machines will be displayed on each page. If you have a large number of machines, set this to 8 and you will only get 8 machines per table.

Ticking "Remove inactive machines/groups" stops the table displaying empty columns for inactive machines where there is always zero utilisation. The 'Machine column header' determines what is displayed at the top of each column.

Set the "Machine/groups" field as follows :-

Generate information for each machine – all machines are displayed in DNC-Max order.

Generate info for each – group by DNC-Max – all machines are displayed, one table per DNC-Max group (eg Milling & Turning).

If the 'Selected machines/groups' field is ticked you can select the machines to be displayed from the list below. This is useful if you want to report on an individual cell.

Here is the chart generated by the settings in our screen shots:

CIMCO MDC-Max Client	v5 - [Machir	e Utilizat	ion - 14/1	0/2008]					D
MDC-Max Reports Export	Status Lo	gs <u>S</u> etup	<u>W</u> indow	Help					_ 6 :
Real Time stopped reaso	m Machine	e Utilization -	14/10/2008						∢≬×
Machine Utilization - 14/10/2008									
Time	BF1	BF2	BF3	BF4	MILL 1	MILL 2	MILL 3	SIM1	Fanuc
07:00 - 08:00	66%	73%	89%	0%	87%	61%	56%	0%	0%
08:00 - 09:00	58%	86%	80%	0%	84%	57%	51%	0%	0%
09:00 - 10:00	58%	88%	66%	0%	78%	60%	56%	0%	51%
10:00 - 11:00	61%	90%	82%	0%	86%	49%	56%	0%	100%
11:00 - 12:00	66%	70%	88%	0%	78%	58%	56%	0%	512
12:00 - 13:00	59%	67%	93%	0%	75%	57%	52%	0%	02
13:00 - 14:00	64%	85%	86%	0%	88%	58%	55%	0%	00
14:00 - 15:00	82%	96%	85%	0%	93%	79%	31%	0%	0
15:00 - 16:00	100%	100%	100%	0%	100%	100%	0%	0%	02
16:00 - 17:00	100%	100%	100%	0%	100%	100%	0%	0%	02
17:00 - 18:00	100%	100%	100%	0%	100%	100%	0%	0%	0
Average	74%	87%	88%	0%	88%	71%	38%	0%	183
			Licensed t	o Tim Colle	t Test Key -	NOT FOR RE	SALE	OVE	2

### 8.6 Displaying Run time in Min/Secs in a Table Report

To create a table of actual run times in minutes seconds change the Column settings to:

- General 🔨 🔨	Columns	
Layout	Column Settings	
Period		
Columns	Table / Graph:	
Machines	Daily report: Machine Utilization	×
- Operator		
Program	Remove empty columns	
Job	E Hemove empty columns	Number of colums per table/graph (0=unlimited):
- Targets	No column titles on tabels/graphs	0
Excel Exporting		
- Switches	Column 1 value: Column 1 ti	title: Format 1: Color 1:
Counters	TIMER[CYCLE] P Machine L	Utilization 🔲 MS 👽 Default 👽
- Timers		
- OEE	Leave 0 fields empty Stack	
- Operator Setup		
- Program Setup	Column 2 value: Column 2 ti	
- Job Setup		Default 🗸
- Schedule Setup	Leave 0 fields empty Stack	
- Event Setup		
Status Screens		title: Format 3: Color 3:
- Real-time Values		Default 🗸
States	Leave 0 fields empty Stack	
- Lights / Indicators	Leave Uneids empty Stack	
Machines / Groups		
Operator Screens	Column 4 value: Column 4 ti	
Buttons		Default 🗙
- Show Values -	Leave 0 fields empty Stack	
- Input Values		
- Show State		
Machines / Groups		Column 1 - 4
— Machines / Groups 🛛 💆		

The Column 1 values is just TIMER[CYCLE] and the format is MS.

#### The resulting table will look like:-

CIMCO MDC-Max Clier	nt v5 - [Machi	ne Utiliza	tion - 14/1	0/2008	]				
MDC-Max Reports Exp	ort <u>S</u> tatus L	ogs <u>S</u> etup	<u>W</u> indow	Help					- 8
Real Time stopped rea	isons Machir	e Utilization	- 14/10/2009	Mac	hine Utilizatio	n - 14/10/20	108		4 ۵
Machine Utilization - 14/10/2008									
Time	BF1	BF2	BF3	BF4	Fanuc	MILL 1	MILL 2	MILL 3	SIM
07:00 - 08:00	39:41	43:57	53:31	00:00	00:00	52:09	36:50	33:47	00:0
08:00 - 09:00	34:40	51:49	48:09	00:00	00:00	50:19	34:05	30:32	00:0
09:00 - 10:00	34:42	52:59	39:21	00:00	30:40	46:57	36:07	33:46	00:0
10:00 - 11:00	36:39	53:43	49:15	00:00	60:00	51:24	29:13	33:41	00:0
11:00 - 12:00	39:29	42:06	53:00	00:00	30:40	46:35	35:03	33:48	00:0
12:00 - 13:00	35:13	40:19	55:48	00:00	00:00	45:10	34:22	31:02	00:0
13:00 - 14:00	38:34	51:01	51:51	00:00	00:00	52:47	34:45	33:15	00:0
14:00 - 15:00	49:23	57:30	51:04	00:00	00:00	55:56	47:22	18:22	00:0
15:00 - 16:00	60:00	60:00	60:00	00:00	00:00	60:00	60:00	00:00	00:0
16:00 - 17:00	60:00	60:00	60:00	00:00	00:00	60:00	60:00	00:00	00:0
17:00 - 18:00	60:00	60:00	60:00	00:00	00:00	60:00	60:00	00:00	00:0
Average	44:24	52:08	52:54	00:00	11:02	52:51	42:32	22:34	00:0
-									
			Licensed t	o Tim Coll	et Test Key -	NOT FOR RE	SALE	OVR	

# 8.7 Machine Utilisation broken down by Shift

Change the Period screen to the following:

System and Table/Graph	i Set	up					? 🔀
General	~	Period					
Layout		Period / Interval					
- Period	_	Table / Graph:					
- Columns		Daily report: Machine Utilization b					~
- Machines		Daily report: Machine Utilization E	oy shirt				×
Operator							
Program		Remove empty intervals			Number of interval-	s per table/graph (0=unli	nited):
Job					0	s per table/ graph (o-anii	¢
- Targets		No time/interval header on tab	les/graph	IS	0		¥
Excel Exporting							
Switches		Start time:		Day start:		Interval length:	
Counters		Selected Day	~	TIME[DAYSTART]	~	1 Shift	*
- Timers - OEE		Duration:		Dayend:		Interval title:	
- Operator Setup		1 Day		TIME[DAYEND]	~	SHIFT	~
- Program Setup							
Job Setup		1					
Schedule Setup		Interval title:					
Event Setup		\$INTERVALSTARTTIMEHM					$\mathbf{P}$
Status Screens							
Beal-time Values							
States							
- Lights / Indicators							
Machines / Groups							
Operator Screens							
Buttons							
- Show Values							
- Input Values							
- Show State							
Machines / Groups							
- Machines / Groups	×						
CIMCO Integration						Help Cancel	ОК

We changed the interval length to 1 Shift, the interval title to SHIFT and the large interval title to \$INTERVALSTARTTIMEHM, the table looks like :

🖻 сімсо і	MDC-Max Client v	/5 - [Machine	Utilizatio	m - 14/10/20	08]					
: <u>M</u> DC-Max	<u>R</u> eports <u>E</u> xport	<u>S</u> tatus Logs	<u>S</u> etup	<u>W</u> indow <u>H</u> elp						- 8 ×
Rea	I Time stopped reasor	ns 🔲 Machine U	tilization - 1	4/10/2009	Machine U	tilization - 14/10	/2008			4 Þ 🗙
		Ma	achine	e Utilizat	ion -	14/10/2	008			
SHIFT		BF1	BF2	BF3	BF4	Fanuc OM	MILL 1	MILL 2	MILL 3	SIM1
07:00		74%	87%	88%	0%	18%	88%	71%	38%	0%
18:00		100%	100%	100%	0%	0%	100%	100%	0%	0%
	)			Li	censed to "	Fim Collet Test I	key - NOT FOR	RESALE	OVR	

#### 8.8 Machine Utilisation by week and month

First Copy the Daily utilization table as follows:

In System Setup click Tables/Graphs on the left and then highlight Daily Report: Machine utilization then click the Copy button below.

Client Settings	Tables/Graphs		
😑 Tables/Graphs	Tabel / Graph setup		
- General			
- Layout	Title	Туре	Period 🔼
- Period	Daily report: Machine Utilization	Table	Selected Day
Columns	Daily report: Machine Utilization by shift	Table	Selected Day
- Machines	Test	Table	Selected Day
- Operator	Daily report: Machine Utilization by shift	Graph	Selected Day
- Program - Job	Daily report: Machine Utilization by SHIFT1	Graph	Selected Day
- Job Targets	Daily report: Machine Utilization by SHIFT 2	Graph	Selected Day
Excel Exporting	Daily report: Cycle Times	Table	Selected Day
Switches	Daily report: Cycle Times by job	Table	Selected Day
Counters	Weekly report: Cycle Times by job	Table	Selected Week
Timers	Daily report: Min/Max Cycle Times	Graph	Selected Day
- OEE	Daily DEE	Table	Selected Day
- Operator Setup	Weekly report: Min/Max Cycle Times	Graph	Selected Week
- Program Setup	Daily Report - Downtime by reason (time)	Graph	Selected Day
- Job Setup	Daily Report - Downtime by reason Table (time)	Table	Selected Day
- Schedule Setup	Daily Report - Downtime by reason (%)	Graph	Selected Day
- Event Setup	Daily Report - Downtime by reason by machine	Graph	Selected Day
Status Screens	Weekly report: Machine Utilization	Graph	Selected Week
- Real-time Values	Weekly report: Machine Utilization - Core Time	Graph	Selected Week
<ul> <li>States</li> <li>Lights / Indicators</li> </ul>	Weekly report: Min/Max Cycle Times	Graph	Selected Week
- Lights / Indicators	Weekly Report - Downtime by reason (time)	Graph	Selected Week
Operator Screens	✓ Weekly Report - Downtime by reason (%)	Graph	Selected Week
Buttons	Monthly Report - Downtime by reason (time)	Graph	Selected Month
- Show Values	I Handle Dates Dates Contraction (94)	C	Calanda Maria
- Input Values		Delete	Copy Add
- Show State			

Edit the description to say Weekly report and add - \$REPORTENDDATE to the title.

System and Table/Graph	Setup	? 🔀
Client Settings Tables/Graphs - General - Layout - Period - Columns - Machines - Operator - Program - Job - Targets	Description: Weekly report: Machine Utilization Table:	
Lexcel Exporting Switches Counters DEE OEE Operator Setup Job Setup Schedule Setup Event Setup	Table Machine	•

The title of the table will now be of the form "Machine Utilisation - 13/10/2008 - 17/10/2008" which is the start and end date of the selected week.

Click Period on the left and change to the following:

System and Table/Graph	h Setup	? 🗙
Client Settings Tables/Graphs General Layout Period Columns Machines	Period     Period     Period     Period     Interval     Table / Graph:     Weekly report: Machine Utilization	×
- Operator Program Job Targets Excel Exporting	Remove empty intervals     Number of intervals per table/graph (0=unlimited):       No time/interval header on tables/graphs     0       Statt time:     Day statt	•
- Switches - Counters	Selected Week         TIME[DAYSTART]         I Day           Duration:         Day end:         Interval title:           I Week         TIME[DAYSTARD]         Day	~
- Timers - DEE - Operator Setup - Program Setup - Job Setup - Schedule Setup - Event Setup	Interval title: \$INTERVAL STARTDATEAA	

The changes are Start Time Selected week, Duration to 1 week, Interval length to 1 day, Title to Day and interval title to \$INTERVALSTARTDATEAA which gives the day of the week.

Click OK to save then generate a table which looks like :

MDC-Max Reports Expor	t Status Logs S	jetup <u>W</u> indow	Help						- 8
Real Time stopped reaso	or 🔲 Machine Utiliza	ation - 13/10/200	18 · 18/						∢ ⊳ ×
	Mac	hine Util	ization -	13/10/2	2008 - 18/	10/2008			
Day	BF1	BF2	BF3	BF4	Fanuc OM	MILL 1	MILL 2	MILL 3	SIM
Monday	63%	68%	77%	32%	0%	81%	59%	49%	0
Tuesday	88%	94%	95%	0%	8%	95%	87%	17%	02
Wednesday	75%	87%	88%	56%	0%	88%	73%	39%	13
Thursday	62%	81%	82%	86%	0%	82%	57%	55%	0
Friday	58%	81%	82%	89%	0%	82%	63%	56%	02

Changing this to monthly is achieved by copying the table again, changing the title to Monthly and setting the period as follows:

System and Table/Graph S	ietup	? 🔀
Client Settings	Period     Period / Interval     Table / Graph:	
Period Columns Machines	Monthly report: Machine Utilization	~
Operator Program Job	No time/interval header on tables/graphs 0	\$
- Targets Excel Exporting Switches	Start time:         Day start:         Interval length:           Selected Month         ▼         TIME[DAYSTART]         ▼         1 Day           Duration:         Day end:         Interval title:         1	~
Counters Timers OEE	Databank Ogy et al. TiME[DAYEND] Day	~
···· Operator Setup ···· Program Setup ···· Job Setup	Interval title: \$INTERVALSTARTDATE	
Event Setup Event Setup Status Screens		

### 8.9 Cycle times and Cycle Times by job Table Report

Click Setup, System Setup, highlight Tables/Graphs on the left and click the Add button.

#### Add the following:-

System and Table/Graph	ı Seti	up	? 🗙
Client Settings Diable://Graphs - General - Layout - Period - Columns - Machines - Operator - Program - Job - Targets		General         Settings           Table / Graph:         Daily Report - Cycle Times           Daily Report - Cycle Times         Daily Report - Cycle Times           Table / Graph:         Daily Report - Cycle Times           Table / Export - Cycle Times         Tible;           Cycle Times - \$REPORTSTARTDATE         Export - Cycle Times	
Excel Exporting Switches			
- Switches - Counters - DEE - Operator Setup - Program Setup - Job Setup - Schedule Setup - Event Setup - Event Setup		Column	
- Status Screens - Real-time Values			

Click Layout on the left and fill out as below:-

System and Table/Grap	h Sei	tup		? 🔀
Client Settings Tables/Graphs General Layout Period Columns	^	Layout Layout Settings Table / Graph: Daily Report - Cycle Times		~
		Disable color printing	Remove empty rows / 'column groups'	
- Job - Targets - Excel Exporting		Table Layout  Print composite header  Show undefined values as '???'	Average title: Average	
Switches Counters Timers		Show Average Show Total	Total Total	
- OEE Operator Setup - Program Setup Job Setup		Table column header / Graph legend (k	save blank for auto):	
Schedule Setup Event Setup Status Screens		Graph Layout X-Axis Title: Y-Axis T	litle; Y-Axis minimum value; Y-Axis major;	

Notice here that we have ticked Show Average and Show Total. The average is only really useful if the machine is running the same job continuously. The total will give you the total runtime that day.

Click Period on the left and fill out as below (this is the same as the Period for the daily machine utilization table).

System and Table/Grapt	h Set	up				? 🛿
- Client Settings	~	Period				
🖨 Tables/Graphs		Period / Interval				
- General		Table / Graph:				
Layout		Daily Report - Cycle Times				~
Period		Daily heport - cycle hines				
Columns						
Machines		Remove empty intervals		Number of intervals	per table/graph (0=unlimited):	
Operator				0		\$
- Program Job		No time/interval header on tables/grap	ns			
- Targets		Start time:	Deve at a star		Internal law attac	
Excel Exporting			Day start:		Interval length: 1 Hour	
Switches		Selected Day	TIME[DAYSTART]	~	1 Hour	*
- Counters		Duration:	Dayend:		Interval title:	
Timers		1 Day 🗸	TIME[DAYEND]	*	Time	*
OEE						
Operator Setup		Interval title:				
- Program Setup		\$INTERVALSTARTHH: \$INTERVALSTAR	ты			$\square$
Job Setup		and ETTALS TALT HH. AINTERVALS TAP	11179			<u></u>
- Schedule Setup						
- Event Setup						
😑 Status Screens						

Click Columns on the left. In the machine utilization table we only had one value, for the cycle times it would be useful to have the minimum, maximum and the average cycle time. We will also add the part count to the same table.

Click into Column 1 Value and use the search icon to add TIMERMIN[CYCLE], set the title to Min Cycle and the format to MS.

Add the Max and average yourself - it should look like below:-

- Client Settings 🛛 🔻	Columns					
Tables/Graphs	Column Settings					
General						
- Layout	Table / Graph:					
- Period	Daily Report - Cycle Times					~
- Columns						
- Machines	Remove empty columns		Number of colum		-1. (0	
- Operator	Tremove empty columns			s per table/gra	spri (u=uniimitea)	
- Program	No column titles on tabels/graphs		0			43
- Job						
- Targets	Column 1 value:	Column 1 title:		Format 1:		
- Excel Exporting	TIMERMIN[CYCLE]	Min Cycle		MS	✓ Default	~
- Switches	Leave 0 fields empty Stack					
Counters						
- Timers	Column 2 value:	Column 2 title:		Format 2:		
- OEE		Max Cycle		MS	Default	~
- Operator Setup			$\mathbf{P}$	MD	Derauit	×
- Program Setup	Leave 0 fields empty Stack					
— Job Setup — Schedule Setup						
- Schedule Setup - Event Setup	Column 3 value:	Column 3 title:		Format 3:		
- Status Screens	TIMERAVG[CYCLE]	Avg Cycle	$\sim$	MS	✓ Default	~
Beal-time Values	Leave 0 fields empty Stack					
- States						
Lights / Indicators	Column 4 value:	Column 4 title:		Format 4:	Color 4:	
Machines / Groups					V Default	~
Operator Screens	Leave 0 fields empty Stack					
Buttons	Leave o neids empty Stack					
- Show Values					_	
- Input Values					Column	1.4
- Show State						-

Finally we add the cycle count in column 4 as TIMERCNT[CYCLE], the title as Cycle Count and the format as I (for integer) as below:

- States - Lights / Indicators - Machines / Groups - Operator Screens - Buttons	Column 4 value: TIMERCNT[CYCLE]	Column 4 title:	Format 4:	Color 4:
- Show Values - Input Values			[	Column 1 - 4

Click Machines on the left and tick include machine information and OK the setup.

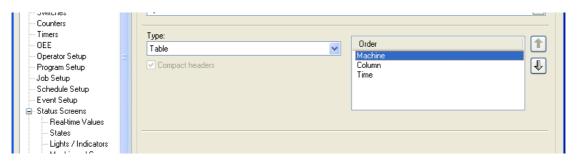
CIMCO MI	DC-Max Client v	5 - [Cycle Time	s - 14/10/2008	1								_	
MDC-Max	<u>R</u> eports <u>E</u> xport	Status Logs	<u>S</u> etup <u>W</u> indow	Help									- 8
📕 Real 1	Time 🔲 Cycle Tim	es - 14/10/2008											4 Þ X
				Cycle T	'imes - 14	/10/2008							
Machi	Min Cycle 07:00	Min Cycle 08:00	Min Cycle 09:00	Min Cycle 10:00	Min Cycle 11:00	Min Cycle 12:00	Min Cycle 13:00	Min C	Min C	Min C	Min C	Min C	Min
BF1	03:48	03:49	03:48	03:48	03:48	03:49	03:48	03:49					
BF2	03:39	03:39	03:38	03:49	03:46	03:40	03:39	03:39					
BF3	03:48	03:49	04:45	03:48	03:49	03:48	03:48	03:49					
CNC 1			00:36	00:47	00:02	00:47	00:09	00:04					
MILL 1	05:01	05:01	06:20	06:20	06:20	07:16	07:16	07:17					
MILL 2	03:41	03:40	03:40	03:40	03:40	03:40	03:40	03:40					
MILL 3	03:40	03:40	03:41	03:40	03:41	03:40	03:40	03:40					
Fanuc					121:20								
Avera	02:57	02:57		03:14	18:18	03:20	03:15	03:15	00:00	00:00	00:00	00:00	00
Total	23:37	23:38	26:28	25:52	146:26	26:40	26:00	25:58	00:00	00:00	00:00	00:00	0
							icensed to Tim Colle	L T	NOTIO	DECALE	1	OVR	_

#### Click Report, Generate table and you will see :-

This is not what we want as it gives us an individual column for the first value (Min Cycle) for each time interval, followed by an individual column for the second value (Max Cycle) for each time interval and so on. What we really want is Min, Max, Avg and cycle count for each machine in successive columns.

### 8.10 Altering the order of items in a Table Report

Edit the table and click General on the left and change the order to Machine, Column, Time using the arrow keys as follows:



#### Generate the report again to see:-

MDC-Max	Reports Export	Status Logs	Setup Windov	Help							
📕 Rea	al Time 🔲 Cycle Ti	mes - 14/10/2009	Cycle Times -	4/10/2008							
		Cycle Times - 14/10/2008									
Time	BF1 Min Cycle	BF1 Max Cycle	BF1 Avg Cycle	BF1 Cycle Count	BF2 Min Cycle	BF2 Max Cycle	BF2 Avg Cycle	BF2 Cycle Count	BF3 Min Cycle	BF3	BF3.4
07:00	03:48	03:51	03:49	10	03:39	03:51	03:46	12	03:48	03:51	03:
08:00	03:49	03:51	03:49	10	03:39	03:49	03:40	14	03:49	04:46	04:
09:00	03:48	03:51	03:49	9	03:38	03:51	03:44	14	04:45	04:51	04:
10:00	03:48	03:51	03:49	9	03:49	03:51	03:49	14	03:48	05:16	04:
11:00	03:48	03:51	03:49	10	03:46	03:50	03:49	11	03:49	03:51	03:
12:00	03:49	03:51	03:50	10	03:40	03:51	03:48	11	03:48	03:51	03
13:00	03:48	03:51	03:49	10	03:39	03:44	03:40	14	03:48	03:51	03
14:00	03:49	03:51	03:49	6	03:39	03:49	03:41	8	03:49	04:46	04
15:00			00:00	0			00:00	0			00
16:00			00:00	0			00:00	0			00
17:00			00:00	0			00:00	0			00
18:00			00:00	0			00:00	0			00
19:00			00:00	0			00:00	0			00
20:00			00:00	0			00:00	0			00
21:00			00:00	0			00:00	0			00
22:00			00:00	0			00:00	0			00
23:00			00:00	0			00:00	0			00
00:00			00:00	0			00:00	0			00
01:00			00:00	0			00:00	0			00
02:00			00:00	0			00:00	0			00
03:00			00:00	0			00:00	0			00
04:00			00:00	0			00:00	0			00
05:00			00:00	0			00:00	0			00
06:00			00:00	0			00:00	0			00
Avera	01:16	01:17	01:16	3.08	01:14	01:17	01:15	4.08	01:19	01:28	01
Total	30:27	30:48	30:33	74	29:29	30:36	29:57	98	31:24	35:03	32

Notice now that we now have each column value in turn (Min, Max Avg, Count) for the first machine, followed by the next machine and so on.

#### 8.11 Creating a separate table for each machine

Edit the table, click Machines on the left and set the number of machines per table to 1 and re-generate the table as below

CIMCO MDC-Max Client	v5 - [Cycle Times - 14/10/	2008]		
: <u>M</u> DC-Max <u>R</u> eports <u>E</u> xpor	t <u>S</u> tatus Logs <u>S</u> etup <u>W</u> ir	idow <u>H</u> elp		_ 8 ×
📕 Real Time 🔲 Cycle T	imes - 14/10/2008			4 Þ ×
	Cycle Times - 1	4/10/2008		1/8
Time	BF1 Min Cycle	BF1 Max Cycle	BF1 Avg Cycle	BF1 Cycle Count
07:00	03:48	03:51	03:49	10
08:00	03:49	03:51	03:49	10
09:00	03:48	03:51	03:49	9
10:00	03:48	03:51	03:49	9
11:00	03:48	03:51	03:49	10
12:00	03:49	03:51	03:50	10
13:00	03:48	03:51	03:49	10
14:00	03:49	03:51	03:49	6
15:00			00:00	0
16:00			00:00	0
17:00			00:00	0
18:00			00:00	0
19:00			00:00	0
20:00			00:00	0
21:00			00:00	0
22:00			00:00	0
23:00			00:00	0
00:00			00:00	0
01:00			00:00	0

Now we have a have an individual table for each machine with the average and total. Wherever there is an empty space in the table it means the machine was not running.

#### 8.12 Adding Jobname info to Cycle times Tables

Copy the existing Daily Report - Cycle Times Table and call it Daily Report – Cycle Times by Job. Change the Table type to Compact Table – this enables us to display more information in a single table.

System and Table/Graph	) Setup	? 🛛
System and Table/Graph  □ Cleint Settings □ Tables/Graphs □ General □ Layout □ Period □ Period □ Columns □ Machines □ Operator □ Program □ Job □ Targets □ Courters □ Othes □ Courters □ Othes □ Ourters □ Othes □ Ot	Setup	
Event Setup Status Screens		

Before we add the job information click Machines on the left and set the number of machines per table back to 0 and generate the table. See how it looks now :

CIMCO MDC-Max Clier	nt v5 - [Cycle Tim	ies - 14/10/2008]			
MDC-Max Reports Exp	ort <u>S</u> tatus <u>L</u> ogs	<u>S</u> etup <u>W</u> indow	Help		- 8
📕 Real Time 🔲 Cycle	e Times - 14/10/2009	Cycle Times - 14/	10/2008		4 Þ 3
	Cycle	Times - 14/	10/2008		
Machine	Time	Min Cycle	Max Cycle	Avg Cycle	Cycle Count
BF1	07:00	03:48	03:51	03:49	10
	08:00	03:49	03:51	03:49	10
	09:00	03:48	03:51	03:49	9
	10:00	03:48	03:51	03:49	9
	11:00	03:48	03:51	03:49	10
	12:00	03:49	03:51	03:50	10
	13:00	03:48	03:51	03:49	10
	14:00	03:49	03:51	03:49	6
	15:00			00:00	0
	16:00			00:00	0
	17:00			00:00	0
	18:00			00:00	0
	19:00			00:00	0
	20:00			00:00	0
	21:00			00:00	0
	22:00			00:00	0
	23:00			00:00	0
	00:00			00:00	0
	01:00			00:00	0
	02:00			00:00	0
	03:00			00:00	0
	04:00			00:00	0
	05:00			00:00	0
	06:00			00:00	0
BF2	07:00	03:39	03:51	03:46	12
	08:00	03:39	03:49	03:40	14
	09:00	03:38	03:51	03:44	14
	10:00	03:49	03:51	03:49	14
	Lic	ensed to Tim Collet Te	st Key - NOT FOR I	RESALE	OVR

Notice now that the machine appears in the table contents itself (machine 1 followed by machine two down the table) and the other columns are the same

as before. This format is useful if you want to export the data to an Excel spreadsheet (see section 8.14).

Now we need to add the job information to the table, edit the table and click Job on the left and then tick include job information. Generate the table and it will look like below:-

	Export Status Logs									
Real Time	Cycle Times - 14/10/2008					_ é				
						41				
	Cycle Times - 14/10/2008									
fachine	Time	Job	Min Cycle	Max Cycle	Avg Cycle	Cycle Count				
F1	07:00	544674	03:49	03:51	03:50	4				
		2311223	03:48	03:51	03:49	(				
		5446432	00:00	00.00	00:00	1				
		544666	00:00	00:00	00:00					
		544434	00:00	00:00	00:00	1				
		54443	00:00	00:00	00:00	1				
		544664	00:00	00:00	00:00	1				
		544-545464	00:00	00:00	00:00	1				
		5446-543	00:00	00:00	00:00	1				
		544-542464	00:00	00.00	00:00	1				
		544-542135-4	00:00	00:00	00:00	1				
		UYTUY	00:00	00:00	00:00	1				
	08:00	544674			00:00					
		2311223	03:49	03:51	03:49	1				
		5446432	00:00	00:00	00:00	1				
		544666	00:00	00:00	00:00	1				
		544434	00:00	00:00	00:00	1				
		54443	00:00	00:00	00:00					
		544664	00:00	00:00	00:00					
		544-545464	00:00	00:00	00:00					
		5446-543	00:00	00:00	00:00					
		544-542464	00:00	00:00	00:00	1				
		544-542135-4	00:00	00:00	00:00	1				
		UYTUY	00:00	00:00	00:00					
	09:00	544674			00:00					
		2311223			00:00					
		5446432	00:00	00:00	00:00					
		544666	00:00	00:00	00:00					
		544434	00:00	00:00	00:00					
		54443	00:00	00:00	00:00					
		544664	03:48	03:51	03:49					
		544-545464	00:00	00:00	00:00					
		E440 E40	00-00	00-00	00-00					

The machine is listed first then the time (1 hour intervals) then the job. So we get one entry for each 1 hour interval per job. We would rather see 1 entry per machine per job per day.

Edit the table and click Period on the left. Change the Interval Length to 1 day and tick the No time interval header on table (we don't need a separate column for the time interval at the moment as the table will only be for one day). Generate the table and it will look like below :-

IMCO MDC-Ma IDC-Max Report	x Client v5 - [Cycle Times - 14/1) s Export Status Logs Setup \								
	Cycle Times · 14/10/2008				4 0 3				
Cycle Times - 14/10/2008									
4achine	Job	Min Cycle	Max Cycle	Avg Cycle	Cycle Count				
3F1	544674	03.48	03:51	03:49	23				
	2311223	03:48	03:51	03:49	19				
	5446432	00:00	00:00	00:00	0				
	544666	00:00	00:00	00:00					
	544434	00:00	00:00	00:00	ő				
	54443	00:00	00:00	00:00	0				
	544664	03:48	03:51	03:49	32				
	544-545464	00.00	00:00	00:00	0				
	5446-543	00:00	00:00	00:00	ő				
	544-542464	00:00	00:00	00:00	ő				
	544-542135-4	00:00	00:00	00:00	0				
	UYTUY	00:00	00:00	00:00	Ū.				
F2	544674	00:00	00:00	00:00	0				
	2311223	00:00	00:00	00:00	ů				
	5446432	03:38	03:51	03:45	40				
	544666	03:39	03:51	03:44	58				
	544434	00:00	00:00	00:00	0				
	54443	00:00	00:00	00:00	ů				
	544664	00:00	00:00	00:00	ő				
	544-545464	00.00	00:00	00:00	ő				
	5446-543	00.00	00.00	00:00	0				
	544-542464	00.00	00.00	00:00	ő				
	544-542135-4	00:00	00:00	00:00	0				
	UYTUY	00:00	00:00	00:00	0				
F3	544674	00:00	00:00	00:00	0				
	2311223	00:00	00:00	00:00	0				
	5446432	00:00	00:00	00:00	0				
	544666	00:00	00:00	00:00	0				
	5444434	03:48	05:16	04:20	37				
	544443	03.48	03.51	03:49	55				
	544664	00.00	00:00	00:00	0				
	544-545464	00:00	00:00	00:00	0				
	044-040464 E440 E40	00.00	00.00	00:00	0				

Now we have machine followed by job and the Min, Max etc. but notice that there is one entry per job for each machine regardless of whether that job ran

on the machine. To fix this we must change the order of the columns in the table. Edit the table click General on the left and modify the order as follows :

System and Table/Graph	i Set	tup	?×
General     Layout     Period     Columns     Machines     Operator     Program     Job     Targets     Excel Exporting     Switches		General         General Settings         Table / Graph:         Daily Report - Cycle Times by Job         Description:         Daily Report - Cycle Times by Job         Title:         Cycle Times - \$REPORTSTARTDATE	
<ul> <li>Counters</li> <li>Timers</li> <li>OEE</li> <li>Operator Setup</li> <li>Job Setup</li> <li>Schedule Setup</li> <li>Event Setup</li> <li>Status Screens</li> <li>Beal-time Values</li> </ul>		Type: Compact Table Compact headers Compact headers Compact headers Column Column Column Column	₽ ₽

Click Period on the left and tick Remove Empty intervals and No time interval on table. Click OK and generate the table and you will get:

CIMCO MDC-Max	Client v5 - [Cycle Tir	nes - 14/10/20	08]			
MDC-Max Reports	Export Status Logs	<u>S</u> etup <u>W</u> indo	w <u>H</u> elp			- 8
📕 Real Time 📃	Cycle Times - 14/10/2008	3				4 Þ >
	C	Cycle Tim	ies - 14/10/20	008		
Machine	Job	Time	Min Cycle	Max Cycle	Avg Cycle	Cycle Cour
BF1	544674	07:00	03:48	03:51	03:49	2
	2311223	07:00	03:48	03:51	03:49	1
	544664	07:00	03:48	03:51	03:49	3
BF2	5446432	07:00	03:38	03:51	03:45	
	544666	07:00	03:39	03:51	03:44	Ę
BF3	544434	07:00	03:48	05:16	04:20	3
	54443	07:00	03:48	03:51	03:49	5
CNC 1	2311223	07:00	00:02	879:57	06:11	16
	544443	07:00	00:04	01:35	00:46	2
	5446-543	07:00	00:48	00:48	00:48	
MILL 1	544-542464	07:00	07:16	07:20	07:17	1
	544-542135-4	07:00	05:01	06:22	05:36	:
MILL 2	5446-543	07:00	03:40	04:09	03:45	
MILL 3	544-545464	07:00	03:40	03:43	03:41	6
Fanuc OM	UYTUY	07:00	121:20	121:20	121:20	
			Licensed to Tim Collet Te	st Key - NOT FOR R	ESALE	OVR

### 8.13 Adding Shift Information to Cycle times Tables

We can further refine this to display the shifts separately. Click Period on the left and select an interval length of 1 shift and edit the Interval title to say Shift, the interval title should be set to \$INTERVALSTARTTIMEHM - \$INTERVALENDTIMEHM to display the shift information as below

•						
System and Table/Graph	Setu	цр				? 🗡
General	^	Period				
Layout		Period / Interval				
Period		Table / Graph:				
Columns		Daily Report - Cycle Times by Job				~
Machines		Daily hopoir by or by or by				
- Operator						
- Program		Remove empty intervals		Number of intervals	per table/graph (0=unlimited):	
Job		No time/interval header on tables/grap		0		\$
- Targets Excel Exporting		No time/interval header on tables/grap	ons	-		
			<b>N</b>		т. н. а	
- Counters		Start time:	Day start:		Interval length:	
Timers		Selected Day 🗸 🗸	TIME[DAYSTART]	]	1 Shift	*
- OEE		Duration:	Dayend:		Interval title:	
- Operator Setup		1 Day 🗸	TIME[DAYEND]	~	Shift	~
Program Setup						
Job Setup		Interval title:				
- Schedule Setup		\$INTERVALSTARTTIMEHM - \$INTERV				
- Event Setup			Sector infertion			<u> </u>

MDC-Max <u>R</u> eports	Export Status Logs	<u>S</u> etup <u>W</u> indow <u>H</u> elp				- 8
Real Time stopp	ed reasons 🔲 Cycle Times	- 14/10/2009 Cycle Times	- 18/11/2008			4 Þ :
		Cycle Tim	ies - 18/11/200	08		
Machine	Job	Shift	Min Cycle	Max Cycle	Avg Cycle	Cycle Cou
3F1	2311223	07:00 - 18:00	03:48	4904:44	310:08	
		18:00 - 07:00	03:48	03:51	03:49	
	544664	07:00 - 18:00	03:48	03:51	03:49	
		18:00 - 07:00	03:48	03:51	03:49	
	544674	07:00 - 18:00	03:49	03:51	03:50	
		18:00 - 07:00	03:48	03:51	03:49	
BF2	544666	07:00 - 18:00	03:39	4902:34	143:43	
		18:00 - 07:00	03:39	03:51	03:44	
	5446432	07:00 - 18:00	03:38	03:51	03:46	
		18:00 - 07:00	03:38	03:51	03:46	
3F3	544434	07:00 - 18:00	03:48	4902:24	157:21	
		18:00 - 07:00	03:48	05:16	04:15	
	54443	07:00 - 18:00	03:48	03:51	03:49	
		18:00 - 07:00	03:48	03:51	03:49	
3F4	544-5544	07:00 - 18:00	03:48	4903:09	185:57	
		18:00 - 07:00	03:48	05:29	05:05	1
	544-55344	07:00 - 18:00	03:56	04:00	03:57	
		18:00 - 07:00	03:55	04:00	03:57	
AILL 1	544-542464	07:00 - 18:00	06:20	4908:17	139:22	
		18:00 - 07:00	07:16	07:21	07:16	
	544-542135-4	18:00 - 07:00	05:01	06:22	05:23	
MILL 2	54-312364	07:00 - 18:00	02:46	02:47	02:46	
		18:00 - 07:00	02:46	04:09	03:36	1
	5446-543	18:00 - 07:00	03:40	04:09	03:47	
MILL 3	5446-5574	07:00 - 18:00	04:34	4903:45	127:03	
		18:00 - 07:00	04:34	04:37	04:35	
	544-545464	18:00 - 07:00	03:40	03:42	03:41	

Click OK and generate the table and you will get:-

This is exactly what we want -a table showing the jobs run on each machine with the cycle times for those jobs for each shift.

# 8.14 Exporting a Table Report into Excel

The values on any table can be exported into an excel spreadsheet for further analysis. This will enable the end user to generate reports based on their own Excel template.

This is configured in the Eyeal Ey	norting agotion of the table actur
	porting section of the table setup.

ystem and Table/Graph S	etup			?
- Layout	Excel Exporting			
- Period	Machines			
Columns				
- Log / Timeline	Table / Graph:			
- Machines	Daily report: Cycle Times	(Table)		*
Operator				
Program	Data starts at column:	Data starts at row:	Template file:	
Job	2	3 🗘	CIMCO Template	
- Targets	Blank cols between data:	Blank rows between data:	Filename:	
Excel Exporting				
- Switches	0	0	Cycletimes \$REPORTSTARTDATECLEAN	2
- Counters	Blank cols between pages	Blank rows between pages:	Worksheet name:	
- Timers	0			
- OEE		- · · ·		
- Operator Setup	Set columns per page	Set rows per page	🛛 🗹 Make new worksheets as copy of first she	eet
- Program Setup	Number of cols. per page:	Number of rows per page:	All tables on a single worksheet	
-Job Setup	100	100	Number of a set of designs. Descent set	
- Schedule Setup			Number of pages down: Pages over	r, then down
- Event Setup	Show page title		3	\$
🖨 Status Screens	Title column:	Title row:	Compact Table / Event Log rows per page:	
- Real-time Values	1	1	10	*
States		× [		¥
- Lights / Indicators	Show column headers		Compact Table new page for each:	
Machines / Groups			Machine	*
Operator Screens	2	~		
Buttons		V		
- Show Values	Show row titles		Title auto-span columns	
- Input Values				
- Show State	Row title column:			
- Machines / Groups	1	*		
— Machines / Groups 🛛 🞽				

Choose the table to export from the drop down box and then click the Browse button next to the 'Template File' to select the customer's spreadsheet template file (or one you have already created in Excel for them). Store the template on a network share that every client has access to and use a UNC name (<u>\servername\sharename\filename</u>) rather than a mapped drive (F:\filename) as each MDC-Max client must be able to access the spreadsheet.

The template may be a simple spreadsheet or a highly customised one using macro's to generate complex graphs and tables from the information that MDC-Max inserts.

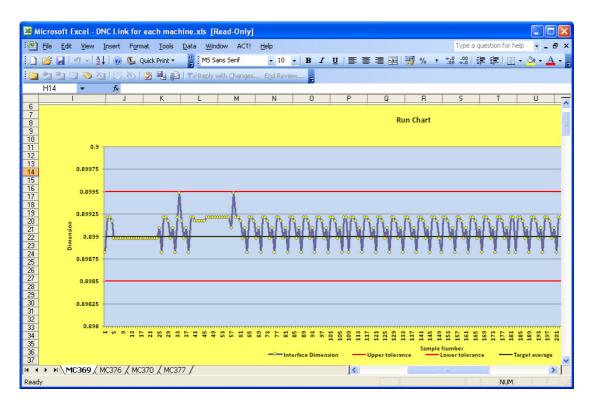
MDC-Max will create a use the template to create a new spreadsheet and you put this filename into the 'Filename' box. In the example above the name of the file is 'Cycletimes \$REPORTSTARTDATECLEAN'. This generates a new file each day (if the report is a daily report) of the form :-Cycletimes 15-12-2009.xls (see the sample below)

\$REPORTSTARTDATECLEAN is a system variable that gives a date in the form "12-12-2010" so we don't get extra "/" characters in the filename.

		12-2009.xls								
	A	В	C	D	E	F	G	Н	1	
1	Cycle	times	15/12/20	09						
2										
3		Machine	Time	Job	Min Cycle	Max Cycle	Average	Cycle Count		
4		BF1	07:00 - 18:00	544664	03:48	03:51	03:49	36		-
5				544674	03:48	03:51	03:49	38		-
3				2311223	03:48	03:52	03:49	32		
7			18:00 - 07:00	544664	03:48	03:51	03:49	64		
3				544674	03:48	03:51	03:49	38		-
3				2311223	03:49	03:51	03:49	23		
0										
1										
2										
3										
4		Machine	Time	Job	Min Cycle	Max Cycle	Average	Cycle Count		
5		BF2	07:00 - 18:00	5446432	03:38	03:51	03:47	68		
6				544666	03:38	03:51	03:45	70		
7			18:00 - 07:00	5446432	03:38	03:51	03:46	64		
8				544666	03:38	03:51	03:45	99		
9										_
0										
1				2			-			-
2							-			
3										
4										_
5		Machine	Time	Job	Min Cycle	Max Cycle	Average	Cycle Count		-
6		BF3	07:00 - 18:00	54443	03:48	03:51	03:49	60		_
7				544434	03:48	15:22	04:47	66		_
8			18:00 - 07:00	544443	03:48	03:51	03:49	74		-
9				544434	03:48	15:22	04:46	73		

The 'Data starts at column' and 'Data starts at Row' boxes determine where the table will be inserted in the spreadsheet.

It is not always possible to know how much data you are going to generate so it is useful to create a spreadsheet template file with two sheets and reserve the first sheet for the MDC-Max table data. The second sheet can then be used for the graphs which are generated from the data as follows :-



You can expand this method to generate a separate sheet for each machine with a chart alongside the data if you wish.

#### Chapter 9 – Graph Reports in MDC-Max

A Graph is a bar chart of data for each machine such as run time today, machine efficiency today, stopped time by reason code and so on.

#### 9.1 Machine Utilisation Bar Chart

For our first Graph we will create a simple machine utilisation graph. On the main MDC-Max screen click Setup, System Setup then click on the 'Tables/Graphs' link on the left.

System and Table/Graph	) Setup		?
System and Table/Graph Client Settings Tables/Graphs - General - Layout - Period - Columns - Machines - Operator - Porgam	Tables/Graphs     Tabel / Graph setup     Tabel / Graph setup     Title	Type Table Table Graph Table	Period Selected Day Selected Day Selected Month
Job Targets Excel Exporting Switches Counters Timers Operator Setup Job Setup Schedule Setup Event Setup Status Screens Bestime Values	✓ Monthly report: Cycle Times ✓ Monthly report: Min/Max Cycle Times	Table Graph	Selected Month Selected Month
States Lights / Indicators Lights / Indicators Generations / Groups Derator Screens Butons Show Values Input Values Show Valu	•	Delete	Copy Add

Click the Add button to see the screen below and type a description in the Description field – this is the name of the graph. Type a title in the Title field – this is what is displayed on the actual Graph in this case the \$REPORTSTARTDATE will display the date on the top of the graph.

System and Table/Graph Set	tup	<b>?</b> ×
Client Settings Client Settings General Layout Period Columns Machines Operator Program Job Targets Excel Exporting Switches Counters Counters Timers OEE Operator Setup Program Setup Schedule Setup Schedule Setup Schedule Setup	General         General Settings         Table / Graph:         Daily Machine utilisation         Description:         Daily Machine utilisation         Title:         Daily Machine Utilisation - \$REPORTSTARTDATE         Type:         Graph         © Compact headers	

### 9.2 Formatting the Graph Report

The type must be set to Graph – this produces a bar chart.

Click on the Layout menu on the left of the screen and the layout page will appear

stem and Table/Graph Se	tup				?		
Client Settings	Layout						
Tables/Graphs	Layout Settings						
General							
Layout	Table / Graph:						
Period	Daily Machine utilisation				~		
- Columns							
- Machines	Disable color printing		Demous amph	rows / 'column groups'			
- Operator	Disable color phinting		I nemove emply	rows / column groups			
- Program	Table Layout						
Job	Table Layout						
- Targets	<ul> <li>Print composite header</li> <li>Show undefined values as '???'</li> </ul>		Average title:				
Excel Exporting			Average Total title:				
- Switches							
Counters	Show Average		Total				
Timers	Show Total						
OEE							
Operator Setup							
Program Setup	Table column header / Graph	i legend (li	eave blank for autoj:				
Job Setup					$\mathbf{P}$		
Schedule Setup							
Event Setup	C Graph Layout						
Status Screens	X-Axis Title:	Y-Axis 1	Fitle:	Y-Axis minimum value:	Y-Axis major:		
- Real-time Values							
- States	Legends position:	Y-Axis f		Y-Axis maximum value:	Y-Axis minor:		
— Lights / Indicators 📃					T-AXIS MINOT:		
Machines / Groups	Above graph 🛛 👻	%	*	100			
Operator Screens							
Buttons							
- Show Values							
- Input Values Show State							
CIMCO				Help	Cancel OK		

The layout determines how the data will be laid out on the graph. For our simple utilization graph we leave the graph legend blank, set the Legends position to 'Above Graph' set the Y-\Axis format to % and set the Y-axis maximum value to 100. This will display the utilization as a percentage with 100% as the maximum value on the graph. Each column in our graph will then be named by machine name.

Click on the Period menu on the left to determine the timescale of the Graph.

System and Table/Graph	n Set	чр				_ 🖆 🔼
Client Settings Tables/Graphs General	^	Period Period / Interval Table / Graph:				
Layout <mark>Period</mark> Columns		Daily Machine utilisation				~
Machines Operator		Remove empty intervals		Number of intervals	; per table/graph (0=unlimited);	
Program Job		No time/interval header on tables/graph	5	0		\$
- Targets			Day start:		Interval length:	
Excel Exporting Switches			TIME[DAYSTART]	~	1 Day	*
- Counters			Dayend:		Interval title:	
- Timers - OEE		1 Day 💌	TIME[DAYEND]	*		~
- Operator Setup - Program Setup		Interval title:				
Job Setup						$\mathbf{P}$

"Start Time" and "Duration" determine the total period of the Graph. Selected Day means that when we run the graph the user will be able to select a day from a calendar. We want to report on a single day so the duration is 1 day. The interval length determines how many rows of data will be generated for each machine per day. If we set this to 1 Day then we will get a row per machine for the total utilization for that day. The "Day Start" field is set to TIME[DAYSTART] – this means the graph will start at the beginning of the first shift.

The "Day End" is set to TIME[DAYEND] so the graph ends at the end of the final shift.

If your first shift starts at 6 am and you run three shifts ending at 6 the next morning, the graph above will run from 6 to 6, not from Midnight to Midnight.

# 9.3 Adding Data to a Graph Report

Click on the Columns menu on the left to determine what values are displayed

ystem and Table/Graph	i Seti	up				?
- Client Settings		Columns				
- Tables/Graphs/Logs						
General		Columns				
- Layout		Table / Graph:				0
Period		Daily Machine utilisation (Graph)				*
Columns						
Log Events						
Machines		Remove empty columns			olums per table/graph (0=	
Operator		No column titles on tabels/graphs		0		\$
- Program						
Job		Value		Title	Format	Add
- Targets		(TIMER[CYCLE] / TIME[PERIODLEN])*100		Title	*	Au
Excel Exporting		(TIMEN(CTCLE)/TIME(FERIODLEN)) TOO			10	Сору
Switches						Copy
Counters						Delete
Timers						Delete
OEE						
- Operator Setup						
- Program Setup						
Job Setup						
- Schedule Setup						
- Event Setup						
Status Screens						
<ul> <li>Real-time Values</li> </ul>				-		
- States		Title:		Format:		
<ul> <li>Lights / Indicators</li> </ul>		(TIMER[CYCLE] / TIME[PERIODLEN])*100	$\mathbf{P}$	%		*
- Machines / Groups		Title:		Color:		
Operator Screens				Default		V Set
- Buttons		1		Dordalit		
- Show Values	~	Leave 0 fields empty				
- Input Values						
CIMCO Integration					Help Car	ncel OK
miegration						

Each graph can display multiple columns of data per machine but in this example we only want the utilization as a percentage. Click into the first Title value and then use the search icon to select TIMER[CYCLE]. This would give us the actual run time in minutes and seconds in that hour.

What we actually want is the percentage runtime for the whole day so we must enter a formula to give us this. The formula we want is :

#### (TIMER[CYCLE] / TIME[PERIODLEN])\*100

le divide the actual runtime by the interval time (1 day) and then multiply by 100 to get a percentage. Always use TIME[PERIODLEN] for the total time in any interval – then if you change the interval to 15M or 1 Day the formula will still work.

Use the search icon to edit the Title value and then scroll to the bottom of values to find TIME[PERIODLEN] and double click to add this into the formula and then type the brackets and the \*100.

The Format determines how the data is to be displayed (the drop down menu icon gives a series of valid formats) in this case we use % to display a percentage.

TIMERCNT[CYCLE] to give a part count (format I for integer)

Ticking the No Column Titles on Graphs/graphs cleans up the graph display

### 9.4 Adding Machine Information to a Graph Report

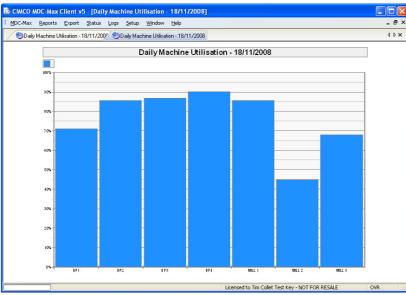
Finally click the Machines menu on the left to edit machine info. This page determines how the data is displayed by machine and what machines to include.

System and Table/Grapi	h Set	up	? 🛛
General	~	Machines	
- Layout		⊘ Machines	
Period	-	Table / Graph:	
Columns		Daily Machine Utilisation	*
- Machines		Daily Machine Utilisation	~
Operator			
Program		Include machine information Number of machines/groups per table/graph:	
Job			\$
- Targets		No machine/group names on tables/graphs	Y
Excel Exporting		Remove inactive machines/groups	
- Switches			
- Counters		Machine column header	
Timers		\$BEPORTMACHINE	
- OEE - Operator Setup			
Program Setup		Machines / Groups	
- Job Setup		Generate information for each machine	~
Schedule Setup			
Event Setup		Selected machines/groups only	
Status Screens			
Beal-time Values		Machines / Groups To Include NC-Base Group DNC-Max Group MDC-Max Group	
- States		M94 HUB 2 HUB 2	
Lights / Indicators		Machine A Default Group Default Group	
Machines / Groups		Machine B Default Group Default Group	
Operator Screens		maz1 Default Group Default Group	
Buttons		MIII HUB 2 HUB 2	
- Show Values			
Input Values			
- Show State			
Machines / Groups		Select MDC Group Select DNC Group Select NC-Base Group Select None Select A	
Machines / Groups	~	Select More aloup [ Select Nore aloup ] Select Nore Select Nore	
CIMCO Integration		Help Cancel	ОК

Tick the "Include machine information" field and this will break the graph into individual machine totals.

The "Number of machines/groups per graph/graph" field determines how many machines will be displayed on each page. If you have a large number of machines, set this to 8 and you will only get 8 machines per graph. Ticking "Remove inactive machines/groups" stops the graph displaying empty columns for inactive machines where there is always zero utilisation. The 'Machine column header' determines what is displayed at the top of each column.

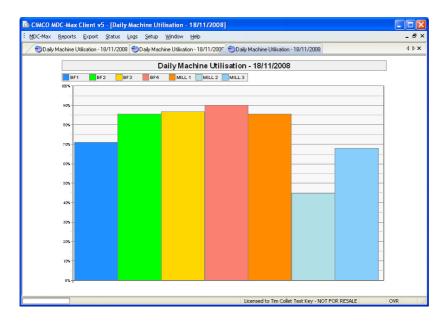
Here is the chart generated by the settings in our screen shots:



This has the machine names across the bottom of the graph. This can be further refined by going to the general menu and changing the Order to put the machines first as below.

System and Table/Graph S	etup	? 🗙
General	General General Settings Table / Graph:	
Columns Machines Operator	Daily Machine utilisation	~
	Description: Daily Machine utilisation	
Excel Exporting Switches	Title: Daily Machine Utilisation • \$REPORTSTARTDATE	$\mathbf{P}$
Edunatis     Timers     OEE     Operator Setup     Job Setup     Schedule Setup     Event Setup	Type: Graph ✓ Compact headers ✓ Compact headers ✓ Compact headers	•
Event Setup     Status Screens     Real time Makes		

This then produces a graph with the machine names on a colour coded legend

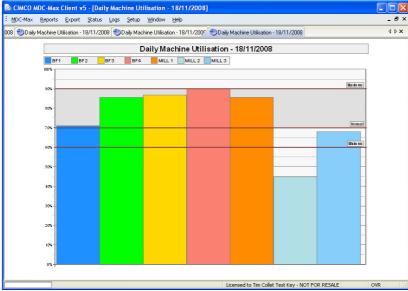


## 9.5 Adding Targets to Graph Reports

Since these graphs will often be used for motivational purposes, targets can be added to the graphs. Edit the graph report and click Targets on the left. The example below shows target 1 being used to set a normal and maximum target and target 2 being used to set a minimum target.

- General 🔨	Targets	
Layout	<ul> <li>Layout Settings</li> </ul>	
- Period	Table / Graph:	
Columns	Daily Machine utilisation	
Machines	Daily Machine utilisation	
- Operator		
- Program	Enable target # 1	
Job		
Targets	Use min/max values for target # 1	
Excel Exporting	Target # 1 minimum value:	Target minimum title:
Switches		Normal
Counters		
Timers	Target #1 maximum value:	Target maximum title:
OEE	90	V Maximum
Operator Setup		
Program Setup		
Job Setup	Enable target # 2	
Schedule Setup		
Schedule Setup Event Setup	Use min/max values for target # 2	
Schedule Setup Event Setup Status Screens		Target tille:
Schedule Setup Event Setup Status Screens Real-time Values	Use min/max values for target # 2 Target # 2 value:	Target tille:
Schedule Setup Event Setup Status Screens Real-time Values States	Use min/max values for target # 2 Target # 2 value: 60	Minimum
- Schedule Setup - Event Setup - Status Screens - Real-time Values - States - Lights / Indicators	Use min/max values for target # 2 Target # 2 value: 60 Target # 2 maximum value:	Minimum     Target maximum title:
- Schedule Setup - Event Setup - Status Screens - Real-time Values - States - Lights / Indicators - Machines / Groups	Use min/max values for target # 2 Target # 2 value: 60 Target # 2 maximum value:	Minimum
- Schedule Setup - Event Setup - Status Screens - Real-time Values - States - Lights / Indicators - Machines / Groups - Operator Screens	Use min/max values for target # 2 Target # 2 value: 60 Target # 2 maximum value:	Minimum     Target maximum title:
Schedule Setup     Event Setup     Status Screens     Real-time Values     States     Lights / Indicators     Machines / Groups     Operator Screens     Buttons	Use min/max values for target # 2 Target # 2 value:	Minimum     Target maximum ble:     Maximum Target
- Schedule Setup - Event Setup - Status Screens - Real-time Values - States - Lights / Indicators - Machines / Groups - Derator Screens - Buttons - Show Values	Use min/max values for target # 2 Target # 2 value:	Minimum     Target maximum title:
- Schedule Setup E vent Setup 9 Status Screens - Real-time Values - States - Lights / Indicators - Machines / Groups - Operator Screens - Buttons - Show Values - Input Values	Use min/max values for target # 2 Target # 2 value:	Minimum     Target maximum ble:     Maximum Target
Schedule Setup     Event Setup     Status Screens     Status Screens     Lights / Indicators     Machines / Groups     Derator Screens     Buttons     Show Values     Input Values     Show State	Use min/max values for target # 2 Target # 2 value:	Minimum     Target maximum ble:     Maximum Target
- Schedule Setup E vent Setup 9 Status Screens - Real-time Values - States - Lights / Indicators - Machines / Groups - Operator Screens - Buttons - Show Values - Input Values	Use min/max values for target # 2 Target # 2 value:	Mininum     Target maximum ble:     Maximum Target

The resultant graph shows the following.



The Target1 settings have produced the Maximum and Normal lines on the graph and the grey area between them. The Target2 settings have produced the minimum line.

### 9.6 Adding Shift Information to Graph Reports

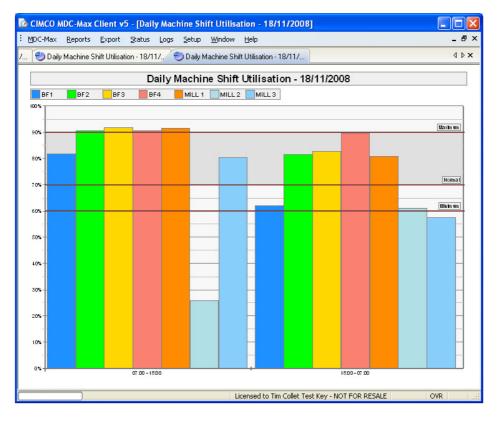
If a graph of utilisation on a shift basis is required it will be necessary to produce a different type of graph. Normally this can be done by copying an existing graph and modifying it. Go to the main Graphs/Graphs menu, select the graph we have just created and click the COPY button.

System and Table/Graph Se	etup	?	X	3
Client Settings	General General Settings Table / Graph: Daily Machine Shilt Utilisation	~		
	Description: Daily Machine Shift Uhilisation Title: Daily Machine Shift Utilisation - \$REPORTSTARTDATE		]	
Switches     Switches     Counters     Timers     Operator Setup     Program Setup     Job Setup     Schedule Setup	Type: Graph Compact headers Graph Column Time	1		

Edit the Description and Title to indicate this will be per Shift graph Go to the Period menu and edit the interval length to '1 Shift' and edit the Interval Title to \$INTERVALSTARTTIMEHM - \$INTERVALENDTIMEHM

Program Job Targets Excel Exporting	Remove empty intervals	n tables/graphs	Number of interv 0	als per table/graph (0=unlim	ited):
- Switches	Start time:	Day start:		Interval length:	
Counters	Selected Day	TIME[DAY]	START] 🗸 🗸	1 Shift	~
···· Timers ···· OEE	Duration:	Day end:		Interval title:	
🗆 Operator Setup 📃	1 Day	V TIME[DAY	END] 🔽		*
Program Setup					
Job Setup	Interval title:				
Schedule Setup	\$INTERVALSTARTTIMEH	4 - \$INTERVALENDTIME	НМ		
Event Setup					
🚍 Status Screens					

The resulting graph should look like the following.



With a separate set of columns for each shift (we are running a two shift system in this example).

### 9.7 Creating one Graph per machine

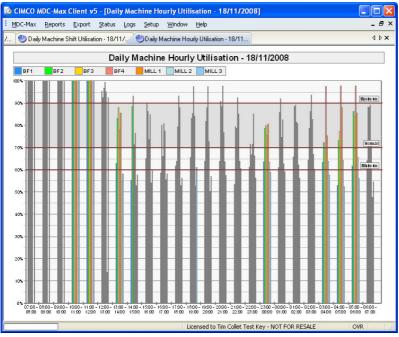
To separate the graph into smaller time intervals it is normally necessary to produce one graph per machine.

To do this go to the main Graphs/Graphs menu, select the graph we have just created and click the COPY button.

System and Table/Graph Se	etup.		? 🗙
Client Settings Tables/Graphs Tables/Graphs Cournes Columns Operator Period Period Period Program Job Program Job Courters Courters Courters Courters Operator Setup Operator Setup Job Setup Job Setup Schedule Setup Schedule Setup	General General Settings Table / Graphx Daily Machine Hourly Utilisation Description: Daily Machine Hourly Utilisation Title: Daily Machine Hourly Utilisation - \$REPORTSTARTDATE Type: Graph ✓ Compact headers	Order Machine Column Time	

Edit the Description and Title to indicate this will be an hourly graph

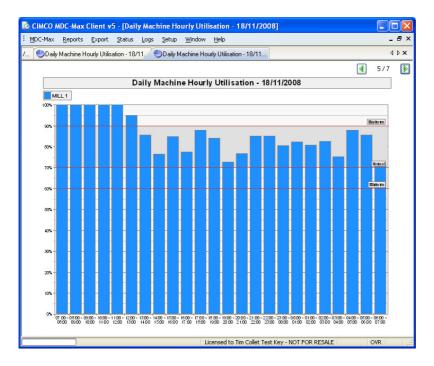
Go to the Period menu and edit the interval length to '1 Hour' and check the Interval Title is set to \$INTERVALSTARTTIMEHM - \$INTERVALENDTIMEHM as before. The resulting graph will now look unreadable as per the graph below.



Now go to the machines menu and change the 'Number of machines/groups per table/graph to 1

System and Table/Graph Set	up		? 🔀
General  Layout Period Columns Operator Program Job Targets Excel Exporting Switches Counters	Machines         Table / Graph:         Daily Machine Houtly Utilisation         Include machine information         No machine/group names on tables/graphs         Remove inactive machines/groups	Number of machines/groups per table/graph:	<ul> <li>✓</li> <li></li> </ul>
- Timers	Machine column header:		

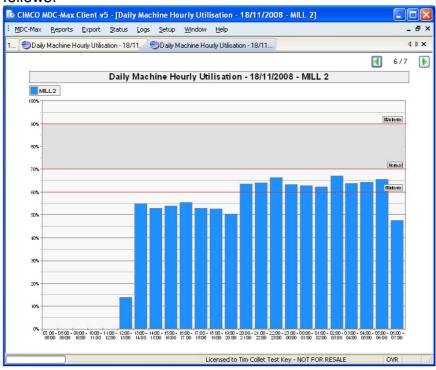
The system will then produce a single graph for each machine similar to the one below.



To make it more obvious which machine the graph is for, go to the General menu, and edit \$REPORTMACHINE into the title.

System and Table/Grap	1 Setup	? 🔀
General Layout	General Settings	
Period Columns	Table / Graph:	
Machines Operator	Daily Machine Hourly Utilisation	~
Program Job	Description: Daily Machine Hourly Utilisation	
Targets Excel Exporting	Title:	
- Switches Counters	Daily Machine Hourly Utilisation - \$REPORTSTARTDATE - \$REPORTMACHINE	$\mathbf{P}$

This will put the machine name onto the graph header for each machine as follows:-



### 9.8 Adding downtime totals to machine graphs

There is often a requirement to put more than one column of data on a graph, for example machine stoppage reason codes. To do this copy the Hourly utilisation graph we just created and edit the description and title to reflect that this is to be a downtime graph.

System and Table/Graph Se	etup	? 🛛
Client Settings Client Settings Client Settings Client Settings Client Settings Client Setting Client Setting Client Setting S	General General General Settings Table / Graph: Daily Machine Downtime Description: Daily Machine Downtime Title: Daily Machine Downtime! \$REPORTSTARTDATE - \$REPORTMACHINE	
Switches Counters Times OEE Operator Setup Odo Setup Schedule Setup Event Setup	Type: Graph ✓ ✓ Compact headers ✓	•

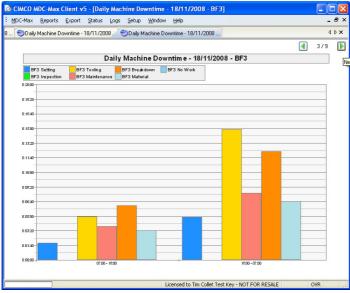
Go to the columns menu and for each machine downtime reason timer add a column, put in the relevant title and use the HMS format.

stem and Table/Graph S	etup					
Client Settings	Columns					
🖃 Tables/Graphs 👘	Column Settings					
- General	Table / Graph:					
Layout						
Period	Daily Machine Downtime					1
- Columns						
- Machines	Remove empty columns		Number of colur		and (Outerline)	n.
- Operator	Tremove empty columns			is per table/g	jraph (U=uniimited	
- Program	No column titles on tabels/graph	s	0			3
Job						
- Targets	Column 1 value:	Column 1 title:		Format 1:	Color 1:	
Excel Exporting	TIMER[SETTING]	Setting		HMS	Default	~
- Switches	Leave 0 fields empty Stack			-		
- Counters	Leave o neids empty Stack					
- Timers		0.1 0.W				
- OEE	Column 2 value:	Column 2 title:		Format 2:	Color 2:	
<ul> <li>Operator Setup</li> </ul>	TIMER[INSPECTION]	Inspection	2	HMS	✓ Default	~
- Program Setup	Leave O fields empty Stack	: 🗖				
-Job Setup						
- Schedule Setup	Column 3 value:	Column 3 title:		Format 3:	Color 3:	
Event Setup	TIMER[TOOLING]	Tooling	$\mathbf{P}$	HMS	V Default	~
Status Screens	Leave 0 fields empty Stack		· · · ·			
- Real-time Values	Leave Uneros empty Stack					
States	<u></u>	Column 4 title:			<u> </u>	
- Lights / Indicators	Column 4 value:			Format 4:	Color 4:	_
- Machines / Groups	TIMER[MAINTENANCE]	P Maintenance	2	HMS	✓ Default	~
Operator Screens	Leave O fields empty Stack					
- Buttons						
- Show Values						
- Input Values					Colum	nl·4
Show State						
CIMCO				Help	Cancel	OK

The arrow buttons by the Column 1-4 marker let you add more colums of data. On the layout menu change the Y-Axis format to HMS and delete the Y-Axis maximum value

- Schedule Setup				
- Event Setup	C Graph Layout			
Status Screens	X-Axis Title:	Y-Axis Title:	Y-Axis minimum value:	Y-Axis major:
- Real-time Values				· · · · · · · · · · · · · · · · · · ·
States				
<ul> <li>Lights / Indicators</li> </ul>	Legends position:	Y-Axis format:	Y-Axis maximum value:	Y-Axis minor:
Machines / Groups	Above graph 🗸 🗸	HMS	*	
Operator Screens				
- Buttons				
- Show Values				
Input Values				
Show State	<b>M</b>			
<b>CIMCO</b> Integration			Help	Cancel OK

On the Targets menu disable the targets, and the result should resemble the following



The Y axis is set automatically to the largest value on any of the graphs in the group.

#### 9.9 Displaying total downtime by reason on a graph

It is often useful to display the total downtime for all the machines in the shop on a single graph. This would give a good indication of shop wide problems. To do this copy the last graph and name the copy as follows.

System and Table/Graph Set	iup.	? 🛽
Client Settings General Layout Period Columns Machines Operator Program Job Targets	General           General Settings           Table / Graph:           Daily shop Downtime           Description:           Daily shop Downtime           Title:           Daily Shop Downtime - \$REPORTSTARTDATE	<ul> <li>✓</li> <li>✓</li> </ul>
Excel Exporting Switches Counters Ote Operator Setup Operator Setup Job Setup Schedule Setup Sup	Type: Graph Compact headers Compact headers	

Go to the machines menu and uncheck the 'Include machine information' box, this will put all the downtime for all the machines on one graph. In the example below it is then very clear that the shop concerned needs more setters

🔯 CIMCO MDC-Max	Client v5 - [Daily Sho	p Downtime - 18/	11/2008]				
MDC-Max Reports	Export Status Logs	≦etup <u>W</u> indow	Help				- 8 ×
Real Time stopp	ed reason 😌 Daily Shop	Downtime - 18/11/20	38				∢⊳×
		Dail	y Shop Dov	wntime - 19	2/11/2008		
Setting	Inspection	Tooling	Maintenance	Breakdown	Material	No Work	
27:46:40							
25:00:00							
22:13:20							
-							
19:26:40-							
16:40:00				_			
13:53:20-				_			
11:06:40							
8:20:00-				_			
6.20.00							
5:33:20							
2:46:40				_			
0:00:00		07:00 - 18:00				18:00 - 07:00	
					Licensed to Tim Ci	ollet Test Key - NOT FOR	RESALE OVR

### Chapter 10 Setting up an Event Log Report

A log Report displays an event or multiple events from the MDC-Max system in time order by Operator, Machine and Job.

For our first Log we will create a simple machine activity Log. On the main MDC-Max screen click Setup, System Setup then click on the 'Tables/Graphs' link on the left.

- Client Settings 🛛 🔥	Tables/Graphs		
Tables/Graphs	Tabel / Graph setup		
General			
Layout	Title	Type	Period 1
- Period	Weekly Machine Utilisation	Table	Selected Day
- Columns	Daily report: Cycle Times	Table	Selected Day
Machines	Daily report: Min/Max Cycle Times	Graph	Selected Day
- Operator	Monthly report: Machine Utilization	Table	Selected Month
- Program	Monthly report: Cycle Times	Table	Selected Month
Job	Monthly report: Min/Max Cycle Times	Graph	Selected Month
- Targets	Monthly report. Min/Max Cycle Tillies	craph	Selected Mohth
Excel Exporting			
Switches			
- Counters			
- Timers			
OEE			
- Operator Setup			
- Program Setup			
-Job Setup			
- Schedule Setup			
- Event Setup			
- Status Screens			
- Real-time Values			
- States			
Lights / Indicators			
- Machines / Groups			
Operator Screens			
- Buttons			
- Show Values			
- Input Values Show State		Delete	Copy Add

Click the Add button to see the screen below and type a description in the Description field – this is the name of the chart. Type a title in the Title field – this is what is displayed on the actual Log in this case the \$REPORTMACHINE will put the machine name and \$REPORTSTARTDATE will display the date on the top of the log.

System and Table/Grap	h Se	tup		? 🗙
Client Settings     Tables/Graphs/Logs     Geneta@     Legyout     Columns     Log Events     Machines     Operator     Job     Targets     Exact Exacting		General General Settings Table / Graph: Daily Machine Activity Log (Log) Description: Daily Machine Activity Log Title: Daily Machine Activity Log *	ARTDATE	
Excel Exporting Switches Counters DEE Deretor Setup Program Setup Schedule Setup Event Setup	THE SECOND SECOND	Compact headers	Order Machine Time Venk	1

The type must be set to Log – this produces a Log chart rather than a normal table or graph.

The tick box for 'Ignore Shedule' means that the shift pattern is ignored on the log chart. The 'Use 1 second resolution' box should normally be left un-ticked for most logs as it dramatically slows the generation of log charts. The 'Order' will determine how the data is displayed on the log. In this case we will be producing one page per machine so the Machine must be the first item in this list.

Click on the Layout menu on the left of the screen and the layout page will appear

Client Settings	Layout			
<ul> <li>Tables/Graphs/Logs</li> </ul>	- Lavout Settings			
- General	Table / Graph:			
Layout				
Period	Daily Machine Activity Log (L	ogj		~
- Columns				
Log Events	Disable color printing	Ber	iove empty rows / 'column groups'	
- Machines				
- Operator	C Table Layout			
- Program		Average	e lifle:	
Job	Print composite header	Averag		
- Targets	Show undefined values as "	222		
Excel Exporting		Total tit	e:	
Switches	Show Average	Total		
- Counters	Show Total			
- Timers - OEE				
- Operator Setup	Table column header / Graph le	egend fleave blank	for auto):	
			,	
- Program Setup - Job Setup				<u> </u>
-Job Setup -Schedule Setup				
-Event Setup	Graph Layout			
- Status Screens	X-Axis Title:	Y-Axis Title:	Y-Axis minimum value:	Y-Axis major:
- Real-time Values				
States	Legends position:	Y-Axis format:	Y-Axis maximum value:	
- Lights / Indicators	Auto			
Machines / Groups	Auto			
Operator Screens				
Buttons				
- Show Values				
- Input Values				

The layout determines how the data will be laid out on log chart. For a Log chart this page does not normally need editing.

### 10.1 Setting the period of an event log

Click on the Period menu on the left to determine the timescale of the Log.

System and Table/Graph Se	tup	<u>? 🗙</u>
Layout	Period	
Period	Period / Interval	
Columns	Table / Graph:	
- Log Events	Daily Machine Activity Log (Log)	~
Machines	Pally Hacking Karry Edg (Edg)	-
- Operator		
Program	Remove empty intervals Number of intervals per table/graph (0=unlimited):	
Job	0	\$
Targets	No time/interval header on tables/graphs	
Excel Exporting		
Switches	Start time: Day start: Interval length:	
Counters	Selected Day VIME[DAYSTART] VIDay	~
Timers OEE	Duration: Day end: Interval title:	
Operator Setup	1 Day V TIME[DAYEND] V Time	~
Program Setup		
- Job Setup		
- Schedule Setup	Interval title:	
Event Setup	\$INTERVALSTARTTIMEHM	$\mathbf{P}$
- Status Screens		

"Start Time" and "Duration" determine the total period of the Log. Selected Day means that when we run the Log the user will be able to select a day from a calendar. We want to report on a single day so the duration is 1 day.

The interval length for a log should normally always be set to the same value as the duration. The "Day Start" field is set to TIME[DAYSTART] – this means the Log will start at the beginning of the first shift.

The "Day End" is set to TIME[DAYEND] so the Log ends at the end of the final shift.

If your first shift starts at 6 am and you run three shifts ending at 6 the next morning, the graph above will run from 6 to 6, not from Midnight to Midnight.

### 10.2 Selecting which events to include in an event log

Click on the Columns menu on the left to determine what values are displayed

<ul> <li>Client Settings</li> </ul>	Columns		
Tables/Graphs/Logs	Columns		
General	Table / Graph:		
- Layout			
Period	Daily Machine Activity Log (Log)		*
Columns			
<ul> <li>Log Events</li> </ul>	Remove empty columns	Number of colums per table/graph (0=unlin	en it melle
- Machines			
Operator	No column titles on tabels/graphs	0	:
Program			
Job	Value	Title Format	Add
- Targets	TIMERICYCLE1	In Cycle time HMS	
Excel Exporting	TIMER[SCANNED]	Scanned HMS	Сору
- Switches	TIMERONT[CYCLE]	Part Count I	
- Counters			Delete
- Timers			
- OEE			<b>Ŷ</b>
<ul> <li>Operator Setup</li> </ul>			
<ul> <li>Program Setup</li> </ul>			
- Job Setup			
- Schedule Setup			
- Event Setup			
Status Screens			
- Real-time Values	Title:	Format	
- States			
<ul> <li>Lights / Indicators</li> </ul>	TIMERCNT[CYCLE]		`
Machines / Groups	Title:	Color:	
Derator Screens	Part Count	Default	🗸 Se
Buttons			
<ul> <li>Show Values</li> <li>Input Values</li> </ul>	Leave 0 fields empty		

Each Log can display multiple columns of data per machine but in this example we initially only want to see how long the machine has been running, and how long it has been stopped for a scanned reason and how many parts it has produced

The Format determines how the data is to be displayed (the drop down menu icon gives a series of valid formats) in this case we use HMS to display the time as Hours, Minutes and seconds for the two timers. And the value TIMERCNT[CYCLE] to give a part count (format I for integer)

Click on the events menu to set up which events will be displayed on the Log chart

System and Table/Graph Se	up	? 🛛	
Client Settings  Tables/Graphs/Logs  General Layout Period Columns	Log Events Log Event Settings Table / Graph: Daily Machine Activity Log [Log]	<u>~</u>	
Log Events     Machines     Operator     Program     Job     Targets     Excel Exporting     Switches	Eveni Trigger MSG[CYCLESTART]	Title Add cycle start Copy Delete	Color ? X Basic colors:
<ul> <li>Counters</li> <li>Timers</li> <li>OPE</li> <li>Operator Setup</li> <li>Program Setup</li> <li>Job Setup</li> <li>Schedule Setup</li> </ul>	Event trigger: MSG[CYCLESTART] Set Job/Program/Operator after this event	Title: Color Cycle start P Selected V Selected	
Correctuse exclupion     Event Setup     Status Screens     Real-trime Values     States     Lights / Indicators     Machines / Circups     Operator Screens     Buttons	Column Value In Cycle time Default Scamed Default Part Count Default	Overwrite default column value Column Value: Format: Leave 0 fields empty	
- Show Values - Input Values CIMCO Integration		Help Cancel OK	Define Custom Colors >>           OK         Cancel

Click on Add and choose the first event you wish to log. In this example we wish to record the actual time that each Cycle start occurs. Use the search

icon to edit the Event trigger value and then scroll to find the event (MSG[CYCLESTART] in this case). Type in the title you wish to occur on the log, then determine the colour you wish to use on the log for that event.

Repeat this procedure for all the other events you wish to appear on the log.

- Layout	Log Events	
- Period	- Log Event Settings	
Columns		
- Log Events	Table / Graph:	
Machines	Daily Machine Activity Log (Log)	
- Operator		
Program		
Job	Event Trigger	Title 🔼 Add
Targets	MSG[CYCLESTART]	Cycle Start
Excel Exporting	MSG[CYCLESTOP]	Cycle Stop Copy
Switches	MSG[JOBSTART]	Job Start
- Counters	MSG[SETTING] MSG[NORMALRUN]	Setting Delete
- Timers	MSG[TOOLING]	Tooling
OEE	MSG[MAINTENANCE]	Maintenance
- Operator Setup	MSG[BREAKDOWN]	Breakdown 🔽 🏌 🤳
- Program Setup		
Job Setup	Event trigger:	Title: Color
- Schedule Setup	MSGISCRAPPEDPART1	Scrapped Part P Selected V
- Event Setup	Modjocharrebrarrij	Scrapped rait 🕑 Selected 🖌 🗖
Status Screens	Set Job/Program/Operator after this eve	ent
Real-time Values		
States	Column Value	Overwrite default column value
- Lights / Indicators	In Cycle time Default	
Machines / Groups	Scanned Default	column value.
Operator Screens	Part Count Default	
Buttons		Format:
- Show Values		
Input Values		
Show State		Leave 0 fields empty
Machines / Groups		
Machines / Groups		

### 10.3 Adding Machine Information to the event log

Finally click the Machines menu on the left to edit machine info. This page determines how the data is displayed by machine and what machines to include.

tem and Table/Grap	h Set	up				?
Layout	~	Machines				
- Period		Machines				
Columns		Table / Graph:				
Log Events		Daily Machine Activity Log ( Log )				*
Machines		Daily Machine Activity Log (Log)				~
- Operator						
- Program		Include machine information		Number of machines/groups	ner table/graph:	
Job				1	per table/ graph.	\$
- Targets		No machine/group names on table	s/graphsi	1		¥
Excel Exporting		Remove inactive machines/groups				
- Switches		,				
- Counters		Machine column header				
- Timers		\$BEPOBTMACHINE				$\mathbf{P}$
- OEE						
- Operator Setup		Machines / Groups				
Program Setup		Generate information for each machin	ie			~
-Job Setup						
- Schedule Setup		Selected machines/groups only				
Event Setup		Science indefinites/groups only				
Beal-time Values		Machines / Groups To Include	NC-Base Group	DNC-Max Group	MDC-Max Group	~
States		✓ BF1	BF1	Cell a	A	
- Lights / Indicators		BF2	BF2	Cell a	A	
Machines / Groups		BF3	BF3	Cell a	С	
Operator Screens		✓ BF4	BF4	Cell a	D	
Buttons		Cincin Cincin		Mills	Mills	
- Show Values		CNC 1	CNC Control	Cella	Cell C	
Input Values		DF1	DF	Drip feed Cell	D	
- Show State		DF2	DE	Drip feed Cell	r	~
Machines / Groups		Select MDC Group Select DN		Base Group Select Nor	e Select /	
Machines / Groups	×	Select MDC aroup	C Group Select NC	base aloup Select Nor	e Select A	u

Ticking the "Include machine information" field and setting the "Number of machines/groups per graph/graph" to 1 will cause the log to display one page per machine.

Ticking "Remove inactive machines/groups" stops the log creating empty log pages for inactive machines.

IMCO MDC-Ma	ax Client v5 - [Daily Machine Ac	tivity Log - BF1 - 20/05/2009]			
C-Max Report	ts Export Status Logs Setup	Window Help			(-
🛄 Daily Machin	e Activity Log - BF1 - 20/				4
		Daily Machine Ac	ctivity Log - BF1 - 20/05/2009		4 1/7
achine	Time	Event	In Cycle time	Scanned	Part Cou
1	07:01	Cycle Start	14:55:42	0:50:31	6
1	07:05	Cycle Stop	14:59:31	0:50:31	
1	07.05	Cycle Stop	14.59.31	0.50.31	
1	07:07	Cycle Start	14:59:31	0:50:31	
1	07:11	Cycle Stop	15:03:22	0:50:31	
1	07:11	Cycle Stop	15.03.22	0.50.31	
1	07:12	Tooling	15.03.22	0.50.31	
1	07:14	Normal Run	15:03:22	0:52:26	
1	07:15	Cycle Start	15:03:22	0:52:26	
1	07:18	Cycle Stop	15:07:11	0.52.26	
1	07:18	Cycle Stop	15:07:11	0:52:26	
1	07:20	Cycle Start	15:07:11	0:52:26	
	07:24	Cycle Stop	15.11:02	0.52.26	
	07:24	Cycle Stop	15:11:02	0.52.26	
	07:27	Cycle Start	15:11:02	0:52:26	
1	07:30	Cycle Stop	15.14:53	0.52:26	
	07:30	Cycle Stop	15:14:53	0.52.26	
	07:32	Cycle Start	15:14:53	0:52:26	
	07:36	Cycle Stop	15:18:42	0:52:26	
	07:36	Cycle Stop	15.18.42	0.52.26	
	07:37	Maintenance	15:18:42	0:52:26	
	07:41	Normal Run	15:18:42	0:55:48	
	07:42	Job Start	15:18:42	0:55:48	
	07:43 07:44	Setting	15:18:42	0.55.48	
	07:44	Normal Run	15:18:42	0:56:46 0:56:46	
	07:48	Cycle Start	15:18:42		
	07:48	Cycle Stop	15/22/30 15/22/30	0.56.46	
	07:49	Cycle Stop Breakdown	15:22:30	0.56.46	
	07:53	Normal Bun	15:22:30	1:00:09	
	07:54	Cycle Start	15:22:30	1:00:09	
	07:57	Cycle Start	15:28:21	1:00:09	
	07:57	Cycle Stop	15/26/21	1:00:09	
	08:00	Cycle Stop	15:26:21	1:00:09	
	08:04	Cycle Start	15:26:21	1:00.09	
	08:04	Cycle Stop	15:30:10	1:00:09	
	08:06	Cycle Stop	15:30:10	1:00:09	
	08:10	Cycle Start	15:30:10	1:00.09	
1	0810	Cycle Stop	15:34:00	1:00:05	
1	08:10	Cycle Stop	15:34:00	1:00:09	
	Items: 388 / 422ms				

Here is the Log generated by the settings in our screen shots:

This produces a great deal of information about the running of the machine, additional columns can be added, for example the time of the last cycle and the Job Name can be added.

Click on the Columns menu and then add the variable 'TIMERLAST[CYCLE]'. This will display the time of the last cycle, its format is HMS and the title is Last Cycle. Once added, use the arrows to set the order of the values on the log.

System and Table/Graph S	etup	? 🛽				
Layout     Period     Columns     Log Events     Machines     Operator     Program     Job     Targets     Excel Exporting     Switches	Columns Columns Daily Machine Activity Log (Log) Remove empty columns No column titles on tabels/graphs	Columns Table / Graph: Daily Machine Activity Log (Log)  Remove empty columns Number of columns per table/graph (0=unlimited): No column titles on tabels/graphs				
<ul> <li>Ormiciles</li> <li>Counters</li> <li>Timers</li> <li>OEE</li> <li>Operator Setup</li> <li>Volo Setup</li> <li>Schedule Setup</li> <li>Schedule Setup</li> <li>Status Screens</li> <li>Reaktime Values</li> <li>States</li> </ul>	Value TIMERLAST[CYCLE] TIMER[CYCLE] TIMER[CANNED] TIMERCNT[CYCLE]	Tile     Formal     Add       Last Cycle     HMS     Copy       In Cycle time     HMS     Copy       Scanned     HMS     Delete       Part Count     I     Delete				
Machines / Groups Derator Screens Buttons Show Values Input Values Show State Machines / Groups Machines / Groups	Title: TIMERLAST[CYCLE] Title: Last Cycle Leave 0 fields empty	Format: HMS  Color: Default Set				
CIMCO Integration		Help Cancel OK				

Various other events can be added to the system to log error codes etc to build a complete log of the machines activity.

# 10.4 Adding Job Information to an Event Log

Click on the Job menu and click on the 'Include job information' tick box

System and Table/Graph	ı Set	tup	? 🗙
Layout Period Columns Log Events Machines Operator Program Job Targets Excel Exporting Switches		Job         Job Settings         Table / Graph:         Daily job Activity Log (Log)         ✓ Include job information         Number of jobs per table/graph (0=unlimited):         No job names on tables/graphs         Select job(s)	•
Counters Timers OEE Operator Setup		Job column header: \$REPORTJOB	
- Program Setup	-		

The resulting log will then have the job name and the last cycle time as below.

CIMCO MDC-Ma	ix Client v5 - [Daily job A	ctivity Log - BF1 - 19/10/20	09]				
DC-Max Report	ts Export Status Logs	Setup Window Help					- 8
<b>a</b>							4 0
P Event Log	Daily job Activity Log - BF2	19/10/2009 Daily job Activity L	og • MILL 2 • 19/10/ Daily job A	ctivity Log - Fanuc UM - 197 Daily job	Activity Log · BF1 · 19/10/200*	Daily job Activity Log • BF1 • 19/10/2009	4 1
			Daily job Activity L	og - BF1 - 19/10/200	9		
	1			<u> </u>			
lachine	Time	Event	Job	Last Cycle	In Cycle time		art Count
F1	07:04	Scrapped Part	2311223	0:03:51	4:35:43	2:43:47	68
F1	07:47	Toping	2311223	0:03:50	5:02:32	2:43:47	75
F1	07:49	Normal Run	2311223	0:03:50	5:02:32	2:45:42	75
F1 F1	08:12 08:16	Maintenance	2311223 2311223	0:03:49 0:03:49	5:17:53 5:17:53	2:45:42 2:49:04	79
		Normal Run			5:17:53	2:49:04	79
F1 F1	08:16 08:17	JOBSTOP Job Start	2311223 544664	0.03:49 0:03:49	5:17:53	2:43:04	79 79
F1	08:18	Setting	544664	0:03:49	5:17:53	2:43:04	79
F1	08.19	Normal Run	544664	0:03:49	5:17:53	2:43:04	75
F1	08.25	Breakdown	544664	0.03:48	5.21.41	250.02	90
F1	08:28	Normal Run	544664	0:03:48	5:21:41	2:53:24	80
F1	09.04	Scrapped Part	544664	0:03:50	5:44:39	25324	
F1	09.04	Scrapped Part	544664	0:03:50	5:44:39	2.53.24	86
F1	09.57	Scrapped Part	544664	0.03:51	6:19:08	25324	9
F1	10:00	Normal Bun	544664	0:03:51	6:19:08	2:56:45	9
F2	07:17	Scrapped Part	544666	0.03:50	7:14:23	5.50.25	9
F2	07:27	Tooling	544666	0:03:51	7:22:05	5.50.25	93
F2	07:28	Normal Run	544666	0:03:51	7:22:05	5:51:22	93
F2	07:35	Normal Run	544666	0:03:49	7:25:54	5:51:22	94
F2	07:40	Scrapped Part	544666	0:03:39	7:29:33	5.51:22	9
F2	07:40	Tooling	544666	0:03:39	7:29:33	5:51:22	9
2	07:44	Normal Run	544666	0:03:39	7:29:33	5:54:33	9
2	07:56	Tooing	544666	0:03:39	7:40:36	5.54:33	9
F2	07:57	Normal Run	544666	0:03:39	7:40:36	5:55:31	9
F2	08:01	Scrapped Part	544666	0:03:39	7:44:15	5:55:31	9
-2	08:35	Tooing	544666	0:03:40	8:17:07	5:55:31	10
-2	08:37	Normal Run	544666	0:03:40	8:17:07	5:57:24	10
F2	08:42	Scrapped Part	544666	0:03:39	8:20:46	5:57:24	10
F2	08:47	JOBSTOP	544666	0:03:41	8:24:27	5:57:24	110
F2	08:49	JOBSTOP	544666	0:03:41	8:24:27	5:57:24	110
F2	08:51	Job Start	5446432	0:03:41	8:24:27	5:57:24	110
F2	08:52	Setting	5446432	0:03:41	8:24:27	5:57:24	110
2	08:53	Normal Run	5446432	0:03:41	8:24:27	5:58:22	110
F2	09.30	Tooing	5446432	0.03:48	8:57:46	5.58.22	119
F2	09:32	Scrapped Part	5446432	0:03:48	8:57:46	6:00:39	11:
F2	09:33	Normal Run	5446432	0:03:48	8:57:46	6:01:08	119
F2	10.13	Scrapped Part	5446432	0.03:51	9:35:36	6.01:06	125
F2 F2	10.29 10:34	Scrapped Part	5446432 5446432	0.03:50 0:03:49	9.50.58 9.54:47	6.01:08	13.
F2 F2	10:34	Tooing Normal Run	5446432	0:03:49	9:54:47	6:01:08 6:02:34	134
-	10.30	Ronild Furi	0440402	0.03.45	3.34.47	0.02.04	104

This will display all the jobs and machines on a single log on a machine by machine basis. These can be separated into separate logs depending on the settings in the system.

For example if a time line log is required for each machine this can be achieved by setting the time as the first item in the general settings page as below

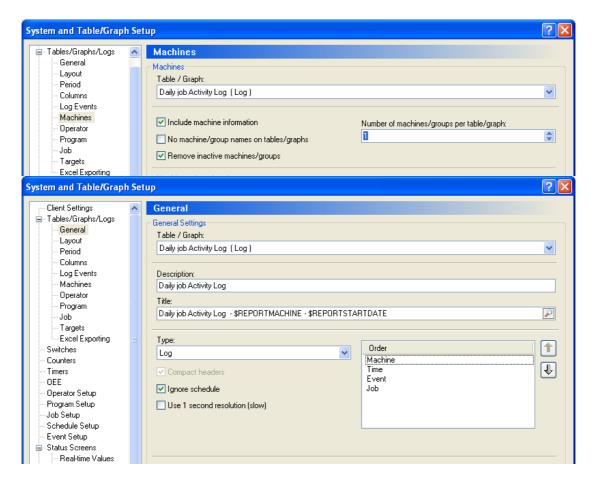
System and Table/Graph	h Setup	? 🗙
- General - Layout - Period - Columns - Log Events	General           General Settings           Table / Graph:           Daily job Activity Log ( Log )	~
Machines Operator Program Job Targets Excel Exporting Switches	Description: Daily job Activity Log Title: Daily job Activity Log - \$REPORTMACHINE - \$REPORTSTARTDATE	
Counters Counters − Der − Operator Setup − Program Setup − Job Setup − Schedule Setup E vent Setup ■ Status Screens ↓ Beattime Values	Type:     Drder       Log     Time       Compact headers     Machine       Ignore schedule     Use 1 second resolution (slow)	

This makes the time the first column. So the timeline for all the machines will be displayed as follows.

CIMCO MDC-Ma	ax Client v5 - [Daily job Act	ivity Log - BF4 - 19/10/20	09]				
DC-Max Repor	ts Export Status Logs Si	etup <u>W</u> indow <u>H</u> elp					_ 5
Daily job Acti	ivity Log - Fanuc OM - 19/ 🔲 D	aily job Activity Log • BF1 • 19/10/	2009 Daily job Activity Log - BF1 - 19	1/10/2009 🔲 Daily job Activity Log - Fa	anuc 0M - 19/ 💭 Daily job Activ	ity Log - BF4 - 19/10/2009	4 Þ
			Daily job Activity Lo	g - BF4 - 19/10/200	9		
lime	Machine	Event	Job	Last Cycle	In Cycle time	Scanned	Part Count
7:06	MILL 2	Scrapped Part	5446-543	0:02:46	8:51:03	1:02:06	76
)7:06	MILL 1	Scrapped Part	544-542464	0.02.17	8:44:02	1:45:19	52
7:11	BF3	Tooling	5444434	0.03:49	7:07:10	9.37.25	84
7:12	BF3	Normal Run	5444434	0:03:49	7:07:10	9.38.23	84
7:17	BF2	Scrapped Part	544666	0:03:50	7:14:23	5.50.25	91
7:24	BF3	JOBSTOP	5444434	0.03:49	7.18.37	9.38.23	87
7:27	BF2	Tooling	544666	0.03:51	7.22.05	5.50.25	93
7:27	BF3	JOBSTOP	544434	0:03:49	7:18:37	9:38:23	87
7:28	BE2	Normal Bun	544666	0.03.45	7:22:05	5.51-22	90
7:30	BF3	Job Start	544443	0:03:49	7.18:37	9.38.23	87
7:31	MILL 3	Scrapped Part	5446-5574	0.03.45	10.10.37	0.24:57	
7:31	BF3	Setting	544443	0:03:49	7:18:37	9:38:23	87
7:31	BF4	Breakdown	544-55344	0:03:56	8.07:08	9.54.03	07
7:32	BF3	Normal Run	544443	0:03:49	7:18:37	9.39.20	87
1:32 1:32	MILL 1	Scrapped Part	544-542484	0:03:45	9.05:51	1:45:19	55
7:33	MILL 1	Maintenance	544-542464	0.07.16	9:05:51	1:45:19	55
7:33 7:35	BF2	Normal Run	544666	0:03:49	7:25:54	5:51:22	9
7:35	MILL 1	Normal Run	544-542464	0:07:16	9:05:51	1:48:41	55
7:38	MILL 1	JOBSTOP	544-542464	0:07:16	9:05:51	1:48:41	58
1:38 7:40	MILL I BE2		544666	0.03.39	3:00:01		
040 7:40	BF4	Scrapped Part Normal Bun	544-55344	0:03:56	2:23:33	5.51.22 10:02:48	
:40 :40	BF4 BF2		544666	0:03:56	7:29:33	5:51:22	8
		Tooing					5
:43	MILL 1	Job Start	544-542135-4	0:07:16	9:05:51	1:48:41	
44	BF2	Normal Run	544666	0:03:39	7:29:33	5.54:33	9
:44	MILL 1	Setting	544-542135-4	0:07:16	9:05:51	1:48:41	5
:46	MILL 1	Normal Run	544-542135-4	0:07:16	9:05:51	1:51:06	5
:47	BF1	Tooling	2311223	0:03:50	5:02:32	2:43:47	7
:49	BF1	Normal Run	2311223	0:03:50	5:02:32	2:45:42	7
:49	BF4	Scrapped Part	544-55344	0:03:58	8:15:01	10:02:48	8
:56	BF3	Scrapped Part	544443	0:03:49	7:41:35	9.39.20	9
7:56	BF2	Tooling	544666	0:03:39	7:40:36	5.54:33	9
:57	BF2	Normal Run	544666	0:03:39	7:40:36	5:55:31	9
:59	MILL 1	Scrapped Part	544-542135-4	0:05:02	9:15:55	1:51:06	5
:00	BF3	Scrapped Part	544443	0.03:49	7:45:24	9.39.20	9
3:01	BF2	Scrapped Part	544666	0:03:39	7:44:15	5:55:31	3
:02	BF4	Scrapped Part	544-55344	0:03:57	8:26:53	10:02:48	8
:04	BF3	Scrapped Part	544443	0:03:50	7:49:14	9.39.20	9
3:07	BF4	Scrapped Part	544-55344	0:03:57	8:30:50	10.02.48	8
3:07	BF4	Maintenance	544-55344	0:03:57	8:30:50	10:02:48	8
:09	BF3	Tooling	544443	0:03:49	7:53:03	9:39:20	9

#### 10.5 Creating one Log per Machine

The log can be modified to produce one log per machine by editing the machine options to display 1 machine per table as follows, and making the machine the first item on the general settings page.



The resulting log will produce one page for each machine which will show the activity for whatever jobs are run on that machine.

MDC-Max Report	s <u>E</u> xport <u>S</u> tatus Logs	Setup Window Help					- 8
9 🔲 Daily job Activ	ity Log · BF1 · 19/10/2009	Daily job Activity Log - Fanuc OM -	19/ Daily job Activity Log • BF4 • 1	9/10/2009 🔲 Daily job Activity Log - BF2 -	19/10/200° Daily job Activity	Log - BF1 - 19/10/2009	4 Þ
		Daily	job Activity Log - E	3F1 - 19/10/2009			1/7
Machine	Time	Event	Job	Last Cycle	In Cycle time	Scanned	Part Cou
BF1	07:04	Scrapped Part	2311223	0:03:51	4:35:43	2:43:47	
BF1	07:47	Tooling	2311223	0:03:50	5:02:32	2:43:47	
BF1	07:49	Normal Run	2311223	0:03:50	5:02:32	2:45:42	
BF1	08:12	Maintenance .	2311223	0:03:49	5:17:53	2:45:42	
BF1	08:16	Normal Run	2311223	0:03:49	5:17:53	2:49:04	
BF1	08:16	JOBSTOP	2311223	0:03:49	5:17:53	2:49:04	
BF1	08:17	Job Start	544664	0:03:49	5:17:53	2:49:04	
BF1	08:18	Setting	544664	0:03:49	5:17:53	2:49:04	
BF1	08:19	Normal Run	544664	0:03:49	5:17:53	2:50:02	
BF1	08.25	Breakdown	544664	0:03:48	5:21:41	2:50.02	
BF1	08:28	Normal Run	544664	0:03:48	5:21:41	2:53:24	
BF1	09:04	Scrapped Part	544664	0:03:50	5:44:39	2:53:24	
BF1	09.04	Scrapped Part	544664	0:03:50	5:44:39	2:53:24	
BF1	09.57	Scrapped Part	544664	0:03:51	6:19:08	2:53:24	
BF1	10:00	Normal Run	544664	0:03:51	6:19:08	2:56:45	

#### 10.6 Creating one page per Job

In a similar way if the option to display 1 job per table in the job section of the setup is configured as below each job will be displayed on a separate page.

System and Table/Graph	Set	up	? 🛛
General Layout Period Columns Log Events Machines Operator Program Job Targets Excel Exporting Sucches		Job         Job Settings         Table / Graph:         Daily job Activity Log ( Log )         ✓ Include job information         Number of jobs per table/graph (0=unlimited):         1         Select job(s)	<ul> <li>▼</li> <li>◆</li> </ul>
Counters Timers DEE		Job column header: \$REPORTJOB	

MDC Mary Danad	ts Export Status Logs Setup	Ulle dam. Usla					- 8
WDC-max Report	is Export Scatus Logs Setup	Wurdow Deib					- 0
09 🔲 Daily job Activ	vity Log • Fanuc 0M • 19/ 🔲 Daily jo	b Activity Log · BF4 · 19/10/	/2009 🔲 Daily job Activity Log - BF2 - 19/	10/2009 🔲 Daily job Activity Log · BF1	- 19/10/200° Daily job Activity	Log - BF1 - 19/10/2009	4 Þ
		Daily	job Activity Log - Bl	1 - 19/10/2009			1/15
Machine	Time	Event	Job	Last Cycle	In Cycle time	Scanned	Part Cou
	07:04	Scrapped Part	2311223	0:03:51	4:35:43	2:43:47	
BF1		× r	2311223	0:03:50	5:02:32	2:43:47	
BF1 BF1	07:47	Tooling					
BF1 BF1 BF1	07:47 07:49	Normal Run	2311223	0:03:50	5:02:32	2:45:42	
BF1 BF1 BF1 BF1 BF1	07:49	Normal Run	2311223	0:03:50	5:02:32	2:45:42	7

If the cyclestart and cyclestop events are added to the 'Log Events' settings at this stage a verbose log of each cycle of the machine for each job will be produced.

		livity Log - BF1 - 19/10/2009]					_ 7
DC-Max <u>R</u> eports	Export Status Logs S	etup <u>W</u> indow <u>H</u> elp					- ć
Daily job Activit	y Log · BF4 · 19/10/2009 🛄 🛙	aily job Activity Log - BF2 - 19/10/2009	Daily job Activity Log - BF1 - 19/10/2009	Daily job Activity Log - BF1 - 19/10/2000	Daily job Activity Log - BF1 - 19/10/20	09	4 Þ
			Daily job Activity Log	- BF1 - 19/10/2009			1 / 15
achine	Time	Event	Job	Last Cycle	In Cycle time	Scanned	Part Count
F1	07:00	Cycle Start	2311223	0:00:00	4:31:52	2:43:47	67
F1	07:04	Cycle Stop	2311223	0.03.51	4:35:43	2:43:47	68
F1	07:04	Scrapped Part	2311223	0.03.51	4:35:43	2:43:47	68
F1	07:07	Cycle Start	2311223	0:00:00	4:35:43	2:43:47	68
F1	07:10	Cycle Stop	2311223	0.03.51	4:39:34	2.43.47	69
F1	07:13	Cycle Start	2311223	0:00:00	4:39:34	2:43:47	69
-	07:17	Cycle Stop	2311223	0.03.51	4:43:25	2:43:47	70
F1	07:19	Cycle Start	2311223	0:00:00	4:43:25	2:43:47	70
1	07:22	Cycle Stop	2311223	0.03.49	4:47:14	2:43:47	7
1	07:24	Cycle Start	2311223	0.00.00	4:47:14	2:43:47	7
1	07:28	Cycle Stop	2311223	0:03:51	4:51:05	2:43:47	7
1	07:30	Cycle Start	2311223	0:00:00	4:51:05	2:43:47	72
	07:34	Cycle Stop	2311223	0.03.49	4:54:54	2:43:47	73
1	07:36	Cycle Start	2311223	0:00:00	4:54:54	2:43:47	73
1	07:40	Cycle Stop	2311223	0.03.48	4.58:42	2.43.47	74
1	07:42	Cycle Start	2311223	0.00.00	4:58:42	2:43:47	74
1	07:46	Cycle Stop	2311223	0.03:50	5:02:32	2:43:47	73
1	07:47	Tooling	2311223	0:03:50	5:02:32	2:43:47	75
1	07:49	Normal Run	2311223	0.03.50	5:02:32	2:45:42	7
1	07:50	Cycle Start	2311223	0:00:00	5:02:32	2:45:42	73
1	07:54	Cycle Stop	2311223	0:03:51	5:06:23	2:45:42	78
1	07:56	Cycle Start	2311223	0.00.00	5:06:23	2:45:42	7
1	07:59	Cycle Stop	2311223	0.03-52	5:10:15	2:45:42	7.
1	08:02	Cycle Start	2311223	0:00:00	5:10:15	2:45:42	77
1	08.06	Cycle Stop	2311223	0.03.49	5:14:04	2:45:42	7
1	08:08	Cycle Start	2311223	0.00:00	5:14:04	2:45:42	71
1	08:11	Cycle Stop	2311223	0:03:49	5:17:53	2:45:42	73
1	08:12	Maintenance	2311223	0:03:49	5:17:53	2:45:42	75
1	08.16	Normal Run	2311223	0.03.49	5:17:53	2:49.04	75
1	08.16	JOBSTOP	2311223	0:03:49	5:17:53	2:49.04	7

This can be further configured by adding or removing log events and changing the period of the log to suit customer requirements, as per the screen below, which shows the activity on a particular job over a period of two days.

CIMCO MDC-Mai	x Client v5 - [Monthly job .	Activity Log - BF4 - 01/10/2009 -	19/10/2009]				
DC-Max Reports	s Export Status Logs Se	stup <u>W</u> indow <u>H</u> elp					- 1
📕 Real Time [	Monthly job Activity Log - BF4	- 01/10/					4 ا
		Monthly jo	b Activity Log - BF4	- 01/10/2009 - 19/10/200	9		2715
ob	Machine	Time	Event	Last Cycle	In Cycle time	Scanned	Part Count
44-5544	BF4	12:39 - 16/10/2009	Setting		0.00:00	389:39:09	(
44-5544	BF4	12:40 - 16/10/2009	Normal Run		0.00.00	389:40.07	
44-5544	8F4	12:44 - 16/10/2009	Scrapped Part	0.03.50	0.03:50	369:40.07	
14-5544	BF4	12:48 - 16/10/2009	Scrapped Part	0:03:50	0:07:40	389:40:07	
14-5544	BF4	12:51 - 16/10/2009	Scrapped Part	0.03.49	0.11:29	369:40.07	
14-5544	BF4	13.03 - 16/10/2009	Scrapped Part	0.03.51	0.23:01	389:40.07	
14-5544	BF4	13:16 - 16/10/2009	Tooling	0:03:49	0.34:31	389:40:07	
14-5544	BF4	13:17 - 16/10/2009	Normal Run	0:03:49	0:34:31	389:41:06	
14-5544	BF4	13.25 - 16/10/2009	Scrapped Part	0.03.50	0.42:12	389:41:06	1
44-5544	8F4	13.37 - 16/10/2009	Scrapped Part	0.03.51	0.53:42	389:41:06	1
4-5544	BF4	13:47 - 16/10/2009	Maintenance	0.03.51	1:01:24	389:41:06	1
14-5544	BF4	13:51 - 16/10/2009	Normal Run	0.03.51	1:01:24	389:45:53	1
14-5544	BF4	19:56 - 16/10/2009	Job Start	0.03.57	6:00:30	390:21:42	7
14-5544	BF4	19:58 - 16/10/2009	Setting	0:03:57	6:00:30	390:21:42	7
4-5544	BF4	20:00 - 16/10/2009	Normal Run	0:03:57	6:00:30	390:24:36	7
4-5544	BF4	20:06 - 16/10/2009	Tooling	0.05.26	6.05:56	390:24:36	7
4-5544	BF4	20:07 - 16/10/2009	Normal Run	0:05:26	6:05:56	390:25:35	
4-5544	BF4	20:20 - 16/10/2009	Scrapped Part	0:05:28	6:16:52	390:25:35	8
4-5544	RF4	20:31 - 16/10/2009	Scrapped Part	0.05.26	6 27 46	390-25-35	8
14-5544	BF4	20:48 - 16/10/2009	Tooling	0.05.28	6:44:09	390:25:35	6
4-5544	BF4	20:49 - 16/10/2009	Normal Run	0:05:28	6:44:09	390:26:35	6
4-5544	BF4	00:42 - 17/10/2009	Setting	0.05:28	10:27:59	390:26:35	12
4-5544	BF4	00:43 - 17/10/2009	Normal Run	0.05.28	10:27:59	390:27:35	12
4-5544	BF4	00:46 - 17/10/2009	Scrapped Part	0.03:49	10:31:48	390:27:35	12
4-5544	BF4	00:50 - 17/10/2009	Scrapped Part	0:03:51	10.35:39	390:27:35	12
4-5544	BF4	00:54 - 17/10/2009	Scrapped Part	0.03.50	10.39:29	390:27:35	1
4-5544	BF4	01:06 - 17/10/2009	Scrapped Part	0:03:50	10.50:57	390:27:35	1:
4-5544	BF4	01:19 - 17/10/2009	Tooling	0:03:51	11:02:25	390:27:35	1
4-5544	BF4	01:20 - 17/10/2009	Normal Run	0.03.51	11:02:25	390:28:32	10
4-5544	BF4	01:28 - 17/10/2009	Scrapped Part	0.03:49	11:10:04	390:28:32	13
4-5544	BF4	01:40 - 17/10/2009	Scrapped Part	0.03.50	11:21:34	390:28:32	14
4-5544	BF4	01:49 - 17/10/2009	Maintenance	0.03.49	11:29:14	390:28:32	14
4-5544	BF4	01:54 - 17/10/2009	Normal Run	0:03:49	11:29:14	390:33:19	14
4-5544	BF4	01:55 - 17/10/2009	JOBSTOP	0:03:49	11:29:14	390:33:19	14
4-5544	BF4	01:58 - 17/10/2009	JOBSTOP	0.03.49	11:29:14	390:33.19	14
4-5544	BF4	04:45 - 17/10/2009	Job Start	0:03:58	13:35:58	390:54:09	11
4-5544	BF4	04:46 - 17/10/2009	Setting	0.03.58	13:35:58	390:54:09	17
4-5544	BF4	04:49 - 17/10/2009	Normal Run	0.03.58	13:35:58	390:57:03	17
4-5544	BF4	04:55 - 17/10/2009	Tooling	0:05:26	13:41:24	390:57:03	17
4-5544	BF4	04:56 - 17/10/2009	Normal Run	0:05:26	13:41:24	390:58:02	17
4-5544	BF4	05.08 - 17/10/2009	Scrapped Part	0.05.28	13.52:20	390:58:02	11
4-5544	BF4	05:20 - 17/10/2009	Scrapped Part	0.05.26	14.03:15	390:58.02	17
4-5544	BF4	05:37 - 17/10/2009	Tooling	0:05:28	14:19:38	390:58:02	16
14-5544	BF4	05:38 - 17/10/2009	Normal Run	0:05:28	14:19:38	390:59:02	18

# 10.7 Selecting an individual Job Log

To save having to look through lots of pages of log files for a single job, it is possible to configure the system to select which jobs are to be displayed. The 'Select Jobs' option on the 'Job' setting page lets the operator decide which jobs to produce a log table for.

System and Table/Graph S	ietup	? 🗙
General Layout Period Columns Log Events Machines Operator Program Job Targets Excel Exporting Switches	Job       Job Settings       Table / Graph:       Monthly Activity Log (Log)       Include job information       No job names on tables/graphs       Select job(s)	>
- Counters Timers DEE	Job column header: \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$ \$	

If this option is ticked MDC max will display a 'Select Job(s)' screen to allow the operator to decide which job to produce a log for.

Select Job(s)	X
54-312364         544-5544         544-55344         544-542135-4         544-542464         5446-543         5446-5574         ✓         544664         544666         544674         2311223         5446432	
Select None Select All Se	earch

The system will then just produce a log for the selected job.

C-Max Report	ts Export Status Logs S	etup Window Help					_ 5
Beal Time	Monthlu job áctivitu Log - REA	- 01/10/ Monthle job Activity Los - B	F1 - 01/10/	v Log - 544443 - 01/. Monthly job Activity Log - 544	443-01/		4.0
				1 - 544443 - 01/10/2009 - 19			
b	Machine	Time	Event	Last Cycle	In Cycle time	Scanned	Part Count
4443	BF3	13:47 - 16/10/2009	Job Start	0.03.49	1:01:11	389.41:17	16
4443	BF3	13:49 - 16/10/2009	Setting	0.03.49	1:01:11	399.41:17	16
4443	BF3	13.49 - 16/10/2009	Normal Bun	0.03.49	1.01.11	389.42.15	16
4443	863	1413 - 16/10/2009	Scrapped Part	0/0349	124.08	389.42.15	27
4443	BF3	14:27 - 16/10/2009	Normal Bun	01411	1:39:19	389.42.15	22
4443	BF3	14:31 - 16/10/2009	Scrapped Part	0.18.32	1:42:40	389.42.15	23
4443	BE3	14:32 - 16/10/2009	Tooling	0.18.32	1:42:40	389.42.15	2
4443	BF3	14:32 - 16/10/2009	Normal Run	0.18.32	1:42:40	389.43.12	23
4443	BF3	14:37 - 16/10/2009	Scrapped Part	0.03.49	1:46:29	389 43 12	24
1443	BF3	15:53 - 16/10/2009	Normal Run	0.36.45	3.01:28	389.43.12	34
443	BF3	15:58 - 16/10/2009	Scrapped Part	0.41:04	3.05.47	389.43.12	3
1443	BF3	15:58 - 16/10/2009	Tooling	0.41:04	3.05.47	389.43.12	3
1443	BF3	15:59 - 16/10/2009	Normal Run	0.41:04	3.05:47	389.44:11	35
1443	BF3	16:03 - 16/10/2009	Scrapped Part	0.03.49	3.09.36	389.44.11	3
1443	BF3	16:47 - 16/10/2009	Tooling	0.03.49	3.51:42	389.44.11	4
443	BF3	16:48 - 16/10/2009	Normal Run	0.03.49	3:51:42	389.45.09	4
443	BF3	17:01 - 16/10/2009	JOBSTOP	0.03.50	4.03.11	389.45.09	9
443	BF3	17:04 - 16/10/2009	JOBSTOP	0.03.50	40311	389.45.09	9
1443	RE3	17-07 - 16/10/2009	Job Stat	0.0350	4/07/11	389.45.09	9
1443	BF3	17:07 - 16/10/2009	Setting	0.03.50	4.03.11	389.45.09	9
443	BF3	17:08 - 16/10/2009	Normal Run	0.0350	4.03.11	389.46.09	50
1443	BF3	17:33 - 16/10/2009	Scrapped Part	0.03.50	4:26:10	389.46.09	50
1443	8F3	17:37 - 16/10/2009	Scrapped Part	0.03.49	4.29.59	389.46.09	5
1443	8F3	17:40 - 16/10/2009	Scrapped Part	0.03.51	4:33:50	389.46.09	56
443	BF3	17:45 - 16/10/2009	Tooling	0.03.51	4:37:41	389.46.09	5
1443	BF3	17:46 - 16/10/2009	Normal Bun	0.03.51	4:37:41	389.47.06	5
443	8F3	18:10 - 16/10/2009	Scrapped Part	0.03.48	5.00.39	389.47.06	6
443	BF3	18:41 - 16/10/2009	Tooling	0.03.49	5.27.26	389.47.06	7.
443	BF3	18:42 - 16/10/2009	Normal Run	0.03.49	5.27:26	389.48.09	7.
443	BF3	19:24 - 16/10/2009	Maintenance	0.0350	6:05:46	389.48.09	8
1443	BF3	19.27 - 16/10/2009	Normal Run	0.03.50	6.05.46	389.51:56	8
1443	BF3	19:28 - 16/10/2009	JOBSTOP	0.0350	6.05.46	389.51:56	8
443	BF3	22:47 · 16/10/2009	Job Start	0.03.50	8.43.50	390.06.19	11
1443	BF3	22:48 - 16/10/2009	Setting	0.03.50	8.43.50	390.06.19	11
1443	BF3	22:49 - 16/10/2009	Normal Run	0.03.50	8.43.50	390.07:18	11
443	BF3	23:13 - 16/10/2009	Scrapped Part	0.0351	3.06.50	390.07:18	12
1443	BF3	23:17 - 16/10/2009	Scrapped Part	0.03.49	9 10 39	390.07.18	12
443	BF3	23:21 - 16/10/2009	Scrapped Part	0.0351	9.14:30	390.07:18	12
443	BF3	23:26 - 16/10/2009	Tooling	0.03.51	9.18.21	390.07:18	124
1443	BF3	23:27 - 16/10/2009	Normal Run	0.03.51	9.18.21	390.08.15	124
443	BF3	23:50 - 16/10/2009	Scrapped Part	0.03.50	9.41:22	390.08.15	13
443	BF3	00.21 - 17/10/2009	Tooling	0.03.49	10.08.08	390.08.15	13
1443	BF3	00:22 - 17/10/2009	Normal Run	0.03.49	10.08.08	390.09.18	13
1443	BF3	01:04 - 17/10/2009	Maintenance	0.03.49	10.46:25	390.09.18	147

# Chapter 11 – Creating a Realtime Timeline or Gant Graph

MDC-Max can create a bar graph for each machine where the bar section colour changes according to the machine state as below:-

						Da	ily N	Лас	hin	e D	owi	ntim	ıe -	14/1	2/2	009	
BF1 14/12/2009	07:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0
BF2 14/12/2009	07:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0(
BF3 14/12/2009	07:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0(
BF4 14/12/2009	07:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0(
MILL 1 14/12/2009	07:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0(
MILL 2 14/12/2009	07:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	0(
MILL 3 14/12/2009	07:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	00

The user can then zoom in on a section of the chart and hover the mouse over a section to get popup statistics such as part count. This is much faster than generating a report and scrolling through it to find the right section.

These timeline graphs can be generated for any date and if you create one for today and leave it on the screen it will be updated automatically with the current machine status. This realtime timeline is the preferred method of finding cycle times for many customers.

#### 11.1 – Setting up a Timeline or Gant Graph

To produce a time-line for a single day we need to create a new graph as follows

stem and Table/Graph S	etup	?
- Client Settings 🧖	General	
🗐 Tables/Graphs/Logs 👘	/ General Settings	
General	Table / Graph:	
Layout		
- Period	Daily machine TIMELINE	~
Columns		
- Log / Timeline	Description:	6
- Machines	Daily machine TIMELINE	
- Operator	Title:	
- Program	Daily Machine Downtime - \$REPORTSTARTDATE	
Job	Daily Machine Downtime - \$REPORTSTARTDATE	
- Targets		
Excel Exporting	Туре:	
- Switches	Timeline Order	
Counters	Time	
- Timers	Compact headers Machine	Ð
OEE	Ignore schedule	
- Operator Setup		
- Program Setup	Use 1 second resolution (slow)	
-Job Setup		
Schedule Setup		
- Event Setup		
Status Screens		
- Real-time Values		
- States		
<ul> <li>Lights / Indicators</li> </ul>		
Machines / Groups		
Operator Screens		
- Buttons		
- Show Values		
Indut values		
CIMCO Integration	Help Cancel	OK

The type must be set to Timeline and the order set to 'Time' 'Machine' then 'Column'. Once you have created the graph click on the Layout menu on the left of the screen and the layout page will appear

- Client Settings	Layout					
Tables/Graphs/Logs						
General	- Layout Settings					
Layout	Table / Graph:					
Period	Daily machine TIMELINE (Ti	meline )				~
- Columns						
- Log / Timeline	Disable color printing		Demous emoti	rows / 'column groups'		
Machines	Disable color printing		Hemove empty	rows / column groups		
Operator						
Program	Table Layout					
Job	Print composite header		Average title:			
- Targets			Average			
Excel Exporting	Show undefined values as '		Total title:			
Switches	Show Average		Total			
Counters	Show Total		- oran			
- Timers	Show Lotal					
- OEE						
- Operator Setup	Table column header / Graph I	egend (le	ave blank for autoj:			_
- Program Setup						$\mathbf{P}$
-Job Setup						
- Schedule Setup	C Graph Layout					
- Event Setup	X-Axis Title:	Y-Axis T	itle:	Y-Axis minimum value:	Y-Axis major:	
- Status Screens						
- Real-time Values						
- States	Legends position:	Y-Axis fo		Y-Axis maximum value:	Y-Axis minor:	
<ul> <li>Lights / Indicators</li> </ul>	Above graph 🛛 👻	HMS	*			_
Machines / Groups						
Operator Screens						
- Buttons						
- Show Values						
- Input Values						

Set the y axis format to HMS (Hours Minutes Seconds) – this will display the time across the page.

# 11.2 Choosing the period for the Timeline

Click on the Period menu on the left to determine the timescale of the Timeline.

System and Table/Graph	Set	tup				?×			
Client Settings I⊒ Tables/Graphs/Logs IIII General	^	Period Period / Interval Table / Graph:							
Layout <mark>Period</mark> Columns		Daily machine TIMELINE (Timeline)							
Log / Timeline Machines		Remove empty intervals							
Operator Program Job		No time/interval header on tables/grap Start time:	Day start:		Interval length:				
- Targets Excel Exporting		Selected Day	TIME[DAYSTART	] 💌	1 Day	~			
Switches Counters		Duration: 1 Day	Day end: TIME[DAYEND]	~	Interval title:	~			
Timers OEE Operator Setup		Interval title:							
- Program Setup Job Setup		\$INTERVALSTARTTIMEHM				<u></u>			
- Schedule Setup Event Setup									

"Start Time" and "Duration" determine the total period of the timeline. Selected Day means that when we run the graph the user will be able to select a day from a calendar. We want to report on a single day so the duration is 1 day.

A timeline would usually be set up for a whole day so the interval length should be set to 1 day, this will display a whole day on one page. The "Day Start" field is set to TIME[DAYSTART] – this means the graph will start at the beginning of the first shift.

The "Day End" is set to TIME[DAYEND] so the graph ends at the end of the final shift.

If your first shift starts at 6 am and you run three shifts ending at 6 the next morning, the graph above will run from 6 to 6, not from Midnight to Midnight.

## 11.3 Choosing the Popup Information for the Timeline

Click on the Columns menu on the left to determine what is displayed in the Popup window for each period of the timeline.

System and Table/Graph	etup					? 🛛
Layout     Period     Columns     Log / Timeline     Machines     Operator     Program     Job     Targets     Excel Exporting     Switches     Counters     Timers     OEE     Operator Setup     Program Setup     Job Setup     Schedule Setup     Status Screens     Real-time Values     States	Columns Columns Table / Grag Daily machi Remove No colun Value TEXTUDE TIMER[CN TIMER[CN TIMER[CN TIMER[CN TIMER[CN TIMER[CN TIMER[CN TIMER[CN TIMER[CN]	ne TIMELINE (Timeline) empty columns an titles on tabels/graphs (LEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB) (CLEJOB)		Number of colums D Title Job Cycle time Parts this Job In Cycle Today Setting Inspection Tooling Maintenance Breakdown Material No Work	per table/graph (0 Format TEXT HMS HMS HMS HMS HMS HMS HMS HMS HMS HMS	unimited):
<ul> <li>Lights / Indicators</li> <li>Machines / Groups</li> <li>Operator Screens</li> <li>Buttons</li> </ul>	Value: TEXTIJOB1			Format: TEXT		
- Show Values -	Title:		<u>~</u>	Color:		×
- Input Values	Job			Default		V Set
- Show State	000		<u> </u>	Derduit		
Machines / Groups	Leave 0	fields empty				
CIMCO Integration					Help Ca	ancel OK

We are going to display the job the machine is working on, how long the machine has been in cycle on that job and how many parts have been produced for that job so far (see below for new timer required). We will also display the total cycle today and the amount of time the machine has been stopped for setting, inspection etc.

Add each item in turn using the Add button and the drop down menu as with a normal graph. The format must always be correct for the value you are adding. For example the job name will be TEXT, the parts count will be an integer (a real number) and any times will be HMS.

In order to display the amount of time spent on a particular job (provided we have a means of logging the start of each job), we will need to create a new timer called TIMERJOB which clears itself at the start of each new job. Here is setup for the timer (refer to section 5.1 on how to setup a new timer) :-

Layout	Timer	Description		Machine	^	Add
Period	CYCLE	Total Cycle Time		All		Сору
Columns	CYCLEJOB	Job Cycle Time		All		Copy
- Log / Timeline	CYCLEDAY	Total Cycle Time		All		Delete
Machines	SCRAPPED	Timer SCRAPPED		All		
Operator	SCANNED	Timer SCANNED		All	~	11
Program						
Job	Description:			Machine / Group:		
- Targets	Job Cycle Time			All		~
Excel Exporting	Start condition:		_	Minimum value:		
Switches				Minimum value.		
Counters	MSG[CYCLESTART]		$\mathbf{P}$			*
Timers	Stop condition:			Maximum value:		
OEE	MSG[CYCLESTOP]		$\mathbf{P}$			~
Operator Setup		L				
- Program Setup	Restart condition:	F		Action if greater than maximum:		
Job Setup	MSG[PARTCOMPLETE]		$\mathbf{P}$	Stop and set to average		×
Schedule Setup	Clear condition:			Signal event when timer reaches:		
Event Setup	MSG[JOBSTART]		$\mathbf{P}$			*
Real-time Values	Use 'Clear Condition' on ta	able/graphs		Event:		

Notice the only difference to the Cycle timer we setup in the earlier sections of the manual is the Clear Condition – MSG[JOBSTART]

# 11.4 Choosing the timeline state and colour

Click on the Log/Timeline settings

System and Table/Graph Se	etup	$\mathbf{X}$							
- Layout	Log / Timeline								
Period	Cog Event / Timeline Settings								
Columns									
- Log / Timeline	Table / Graph:								
Machines	Daily machine TIMELINE (Timeline)								
- Operator									
- Program									
Job	Event/Timeline Trigger Title Add								
- Targets	TIMERRUNS[CYCLE] In Cycle								
Excel Exporting	TIMERRUNS[TOOLING] Tooling Copy								
- Switches	TIMERRUNS(SETTING) Setting								
- Counters	TIMERRUNS[INSPECTION] Inspection Delete								
- Timers	TIMERRUNS[NOWORK] No Work								
OEE	TIMERRUNS(STOPPED) stopped								
- Operator Setup									
- Program Setup									
Job Setup	Event/Timeline trigger: Title: Color								
- Schedule Setup	TIMERRUNS[CYCLE]								
- Event Setup									
Status Screens	Set Job/Program/Operator after this event/state								
Real-time Values	Ceture Veture Overwrite default column value								
- States	Column Value								
- Lights / Indicators	Job Default Column Value:								
- Machines / Groups	Job Cycle time Default								
Operator Screens	In Cycle Today Default								
Buttons	Setting Default								
- Show Values -	Inspection Default								
- Input Values	Tooling Default								
- Show State	Maintenance Derault								
— Machines / Groups — Machines / Groups	Breakdown Default								
		2							
<b>CIMCO</b> Integration	Help Cancel OK								

The machine can only be in one state at a time (ie it is running, stopped for inspection, stopped for maintenance or just stopped for no reason). It is these states that will be displayed as colours on the timeline in exactly the same way as we displayed them on the live screen in section 6.3. Use the same colour for each state on the timeline as you used on the livescreen for consistency.

Each machine state will be indicated by a TIMERRUNS(timername) variable. For example TIMERRUNS[CYCLE] is always turned on whenever the timer CYCLE is running and this will be our first state.

Add each of the states you want to display on the timeline by clicking the add button near the Event/Timeline trigger. Use the search icon to select

TIMERRUNS[CYCLE]. This would give us the actual run time in hours minutes and seconds since the timer was reset. Then type in a title for the trigger and select a colour for that state. Repeat for each machine state as above.

## 11.5 Choosing the machines for the timeline

Finally click the Machines menu on the left to edit machine info. This page determines how the data is displayed by machine and what machines to include.

System and Table/Graph	l Set	ир				? 🗙						
- Layout Period	^	Machines										
Columns		Table / Graph:										
- Log / Timeline												
Machines		Daily machine TIMELINE [Timeline	Daily machine TIMELINE (Timeline)									
- Operator												
- Program - Job		Include machine information		Number of machines/groups p	er table/graph:							
Targets		No machine/group names on tab	oles/graphs	0		*						
Excel Exporting												
Switches		Remove inactive machines/group	<u>DS</u>									
- Counters												
Timers		Machine column header:										
- OEE		\$REPORTMACHINE	\$REPORTMACHINE									
- Operator Setup		Machines / Groups										
- Program Setup		Generate information for each mach	hine			~						
- Job Setup			into									
- Schedule Setup												
- Event Setup		Selected machines/groups only										
Status Screens		Machines / Groups To Include	NC-Base Group	DNC-Max Group	MDC-Max Group	~						
- States		✓ BF1	BF1	Cell a	А							
Lights / Indicators		BF2	BF2	Cell a	A							
Machines / Groups		BF3	BF3	Cell a	С							
Operator Screens		BF4	BF4	Cell a	D							
Buttons		DF1	DF	Drip feed Cell	D							
- Show Values		DF2	DF	Drip feed Cell	С							
- Input Values		DF3	DF	Drip feed Cell	D							
Show State		DF4	DF	Drin feed Cell	Δ	~						
Machines / Groups		Select MDC Group Select D	NC Group Select NC	Base Group Select None	Select All	_						
- Machines / Groups	~	Select MDC Group Select D	The aroup [Belect NC	Select None								
CIMCO Integration				Help	Cancel	ОК						

Make sure the "Include machine information" field is ticked (so a timeline is produced for each machine)

The "Number of machines/groups per table/graph" field determines how many machines will be displayed on each page. If you have a large number of machines, set this to 8 and you will only get 8 machines per page.

The 'Machine column header' determines the name of each machine on each timeline.

Finally it is possible to select which machines you wish to display by ticking the 'Selected machines/groups only' field and selecting the machines in the list below it. Click OK to save you changes.

#### 11.6 Viewing the timeline for any day.

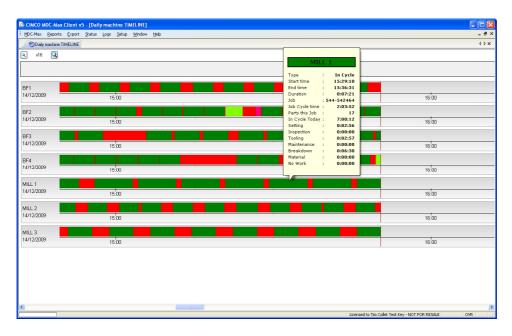
Click Report, Generate Graph and choose the Daily Machine Timeline report. You are then prompted for a date. If you choose a date before today you will get a complete timeline for the whole day. If you choose today you will get a partial timeline upto the current time which will then update in realtime as the machine states change. Click Today and you will see:-

CIMCO MDC-		5 - [Daily	machine	TIMELI	NE]																		
MDC-Max Rep		Status į	ogs Se	tup <u>W</u> in	dow ⊞∈	de de																	- 6
	hine TIMELINE																						4 Þ
🔍 ×1 🤇	4																						
						Da	ily N	/lac	hin	e D	ow	ntim	ne -	14/ <sup>·</sup>	12/2	009	1						
BF1																							
14/12/2009	07:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	00:00	01:00	02:00	03:00	04:00	05:00	06:00
BF2																							
4/12/2009	07:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	00:00	01:00	02:00	03:00	04:00	05:00	06:00
BF3																							
14/12/2009	07:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	00:00	01:00	02:00	03:00	04:00	05:00	06:00
BF4 14/12/2009																						· · · · ·	
140 1202000	07:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	00:00	01:00	02:00	03:00	04:00	05:00	06:00
MILL 1 14/12/2009	07:00	09:00	10:00	11:00	12,00	12.00	14:00	15.00	10.00	17:00	19:00	10.00		21-00	22.00	22.00	00.00	01-00	02.00	02:00	04.00	05:00	00.00
	07.00	09.00	10.00	11.00	12.00	13.00	14.00	15.00	10.00	17.00	10.00	19.00	20.00	21.00	22.00	23.00	00.00	01.00	02.00	03.00	04.00	05.00	00.00
MILL 2 14/12/2009	07:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	00:00	01:00	02:00	03:00	04:00	05:00	00:00
MILL 3																							
14/12/2009	07:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	00:00	01:00	02:00	03:00	04:00	05:00	06:00
2																Li	censed to	Tim Collet	Test Kev	- NOT FOR	RESALE		OVR

This shows activity from the start of the current day until the current time. You can zoom in on any event on the graph by pointing the mouse at a particular event and using the mouse scroll button to zoom in and out.

## 11.7 Viewing Popup information on a timeline.

By letting the mouse hover over an event block the popup window for that event will be displayed as per below.



Here we can easily see the machine name, the type of event (i.e. in cycle) the start and end time of the event and its duration, along with the Job name, the time in cycle on that job, the number of parts produced, the time the machine has been in cycle during the current day and the timings for all the other stoppage reasons.

### Chapter 12 – Grouping tables and graphs into a single report

A Report is simply a collection of graphs and tables collected together into a report. This can then be printed or exported to a PDF file.

From the MDC-Max client click Setup then Report Setup then click on the Add button.

Report Setup							
Description			Star		Duration		Ŷ
Veekly report				cted Week	1 Week		
Daily Report			Sele	cted Day	1 Day		
Hide tables/graphs with different duratio	n		De	lete	Сору	Add	
	-						
Title	Туре	Period	^	Order			T
Daily report: Machine Utilization	Table	One day					
Daily report: Cycle Times	Table	One day					
Daily Machine Downtime	Graph	One day					1
Daily Machine utilisation	Graph	One day					
Daily report: Machine Utilization by	Table	One day					
Daily report: Machine Utilization by		One day					
Daily report: Machine Utilization by		One day					
Daily report: Machine Utilization by	Graph	One day	~				
Description:							
Daily Report							
Title:							
Daily Report							$\mathbf{P}$
Start time:	Duration:						
Selected Day 🗸 🗸	1 Day			*			
					Cancel	ОК	

Type in a description and title for the report then select the start time and period. For a daily report this is normally set to 'Selected Day' and Duration 1 Day.

Next select the tables and graphs you require in the report, as they are selected they will appear in the Order window to the right of the screen. Always make sure that the period of the tables and graphs you are selecting for a report matches the duration of the report you are building.

Title	Туре	Period	^	Order
Daily report: Machine Utilization	Table	One day		Daily report: Machine Utilization
Daily report: Cycle Times	Table	One day		Daily report: Cycle Times
🗹 Daily Machine Downtime	Graph	One day		Daily Machine Downtime Daily Machine utilisation
Daily Machine utilisation	Graph	One day		Daily Machine utilisation
Daily report: Machine Utilization by	Table	One day		
Daily report: Machine Utilization by	Graph	One day		
Daily report: Machine Utilization by	Graph	One day		
Daily report: Machine Utilization by	Graph	One day	~	

Next set the order you with the tables and graphs to appear in on the report. To do this highlight the table or graph in the 'Order' box and use the Up and Down arrows to change its position in the list.

Order Daily report: Machine Utilization Daily Machine Downtime Daily report: Cycle Times Daily Machine utilisation	
--------------------------------------------------------------------------------------------------------------------------------	--

The result here is that the Daily Machine Downtime will now appear below the machine utilization table and above the Daily Report Cycle Times. Click the OK button to confirm the report is finished. By going to the Reports drop down menu on the MDC page and selecting Generate reports it should now be possible to select the new daily report, it should create the series of graphs and tables selected, where the graphs or tables had multiple sheets these will all be displayed, they can be printed by clicking the right mouse button and selecting print. The example shown would produce a series of pages similar to the screen shots below.







### Chapter 13 Creating OEE Reports

The OEE figure for a machine can be calculated as the Availability multiplied by Productivity multiplied by Quality X 100%

The Availability is the total production time divided by the Planned production time.

The Productivity is the Planned cycle time divided by the actual cycle time The Quality is the quantity of good parts produced divided by the total quantity of parts produced this takes into account all scrapped parts).

The Actual production time is the time the machine is available to run, ie is not stopped for any breakdown or material or tooling issues etc.

The Planned production time is the total shift time for the machine less any planned stoppage. i.e for planned maintenance, warm up, clean down, lunch breaks etc.

The Planned cycle time is the projected time to produce one part. This normally would be the CNC machining time plus the loading and unloading time for each part.

The Actual cycle time is the time the machine was producing parts divided by the total number of parts produced (scrapped parts included).

The quantity of good parts is simply the number of parts produced that would pass inspection; this is the total number of parts produced minus the number of scrapped parts.

Each figure has to be available for each job on each machine for the OEE calculation to be carried out correctly.

The machine stoppages need to be entered into the database by the operators, normally using a bar code reader, to signal the reason each time the machine tool stops. And the planned cycle and handling times must be entered either into the Cimco database, or into an Excel spreadsheet.

# 13.1 OEE Reports - Cycle Times provided by NC-Base

Nc-Base must be set up to record the projected cycle time and handling time for each job, this means these fields must exist already in the database or we have to add them.

# 13.1.1 Adding Cycle Time and Handling fields to NC-Base

Open Cimco Edit, Click Database, Setup and highlight Database Settings on the left.

CIMCO NC-Base Config	uration - ADMIN			? 🗙
<ul> <li>Client Settings</li> <li>Server Settings</li> <li>Machines</li> <li>Directories</li> <li>Extensions</li> </ul>	Database Settings Base directory Base directory: \\DNCSERVER\NC-Data			
- Advanced - Program Format - Templates - User Groups	Custom fields Text field 1: DESC	Text field 4: Cycle Time	Text field 7: Job No	
<ul> <li>Database Settings</li> <li>Maintenance</li> <li>Backup</li> </ul>	Text field 2: Drawing number Text field 3:	Text field 5: Part No Text field 6:	Text field 8: Handling Time Text field 9:	
		Op No		

Most NC-Base databases already have a Cycle Time field so we have to add an extra Handling Time field. In the example above the Cycle Time was already an active field. The Handling Time field was added later. DO NOT change the field order on an existing database as this will leave all existing data fields with the incorrect data in them. Add an extra field at the end of the existing database fields to avoid corruption. Click OK to save the changes. Keep a note of which database field the Cycle time and Handling time are saved in – you will need them in the next stage.

#### 13.1.2 Configuring MDC-Max to use NC-Base fields

We now need to configure MDC-Max to look at these fields. Open the MDC-Max client, click Setup, System Setup and click Job Setup on the left.

stem and Table/Grap	h Set	ир		?
- Layout	^	Job Setup		
- Period		Extracting Job Name		
- Columns				
- Log Events		Condition	Field	Database Field Add
- Machines		MSG[JOBSTART]	Log Variable 1	Database Program name
- Operator		MSG[SENDSTART]	Log Filename	Database Program name Copy
- Program				
Job				Delete
- Targets				
Excel Exporting				
Switches				1 T
- Counters				
- Timers - OEE		When condition is true:		
Operator Setup		MSG[JOBSTART]		P
Program Setup				
Job Setup		Set job to field:		Set DBVAR[1] to:
Schedule Setup		Log Variable 1	~	Database Field 4 🛛 👻
Event Setup		Using:		Set DBVAR[2] to:
Status Screens		Entire Field	~	Database Field 8 🗸 🗸
- Real-time Values		Trigger:		Set DBVAR[3] to:
- States			9	Do not set variable
<ul> <li>Lights / Indicators</li> <li>Machines / Groups</li> </ul>		Lookup in NC-Base:		Set DBVAR[4] to:
Operator Screens		When job matched database program n	ame 🗸	Do not set variable
Buttons		Set job to:		
- Show Values		Database Program name	~	Set job name to 'NONE' when program empty
- Innut Values				

Click MSG[JOBSTART] in the list (this is the barcode start job message we setup previously). Now click into DBVAR section on the right – these variables will be used to read the correct database fields in NCBase. Set DBVAR(1) to be the Cycle Time (Database Field 4 in our example) and DBVAR(2) to the Handling time (Database Field 8 in our example). Note you can now use DBVAR(1) on any live screen to display the expected cycle time.

Click MSG[SENDSTART] and make the same changes to it. This ensures that the database variables are read whether using a barcode reader or sending a file from DNC-Max.

Tables/Graphs	Job Setup			
- General	Extracting Job Name			
- Layout	Extracting Job Name			
- Period	Condition	Field	Database Field	Add
- Columns	MSGIJOBSTARTI	Log Variable 1	Database Program name	
- Machines	MSG[SENDSTART]	Log Filename	Database Program name	Сору
- Operator				
- Program				Delete
- Job				
- Targets				
Excel Exporting				1 1 ↓
Switches				
- Counters Timers	When condition is true:			
- OEE	MSGISENDSTART1			
Operator Setup	Set job to field:	c	et DBVAR[1] to:	ليت
Program Setup	Log Filename		Database Field 4	~
Job Setup				×
- Schedule Setup	Using:		et DBVAR[2] to:	
Event Setup	Filename without path and ext	tension 🔽 [	Database Field 8	*
Status Screens	Trigger:	S	et DBVAR[3] to:	
<ul> <li>Real-time Values</li> <li>States</li> </ul>		<u>s</u>	Donot set variable	*
<ul> <li>Lights / Indicators</li> </ul>	Lookup in NC-Base:	S	et DBVAR[4] to:	
Machines / Groups	When job matched database	program name 🛛 🔽	Do not set variable	~
Operator Screens	Set job to:			
- Buttons	Database Program name	✓	Set job name to 'NONE' when program	n empty
- Show Values				
- Input Values	Test data:		ob:	
- Show State - Machines / Groups	C:\DATA\MOULD.NC		MOULD	8

# 13.1.3 Configuring a scrap counter timer for MDC-Max

OEE requires that we record the number of scrapped parts. This means we must setup a timer to count the number of times the operator scans a 'Scrapped part' bar code.

stem and Table/Grap	oh Set	tup				?
- Client Settings	~	Timers				
Tables/Graphs/Logs General		Timer configuration				
Layout		Timer	Description		Machine	Add
- Period		CYCLE	Total Cycle Time		All	
- Columns		CYCLEJOB	Total Cycle Time		All	Сору
- Log / Timeline		CYCLEDAY	Total Cycle Time		All	Delete
Machines		SCRAPPED	Timer SCRAPPED		All	
- Operator		SCANNED	Timer SCANNED		All	✓ ① ↓
- Program						
- Job		Description:			Machine / Group:	
- Targets		Timer SCRAPPED			All	~
Excel Exporting		0				
Switches		Start condition:			Minimum value:	
- Counters		MSG[SCRAPPEDPART]		$\mathbf{P}$		*
Timers		Stop condition:			Maximum value:	
OEE				$\mathbf{P}$	15	~
Operator Setup						
Program Setup		Restart condition:			Action if greater than maximum:	
Job Setup				$\mathbf{P}$	Stop Timer	*
- Schedule Setup		Clear condition:			Signal event when timer reaches:	

The start condition is the SCRAPPEDPART message (which you will need to setup in DNC-Max) and the maximum value is 1 Second (1 second). Note that this will only work if the operator scans scrapped parts while he is running the same job.

# 13.1.4 Adding Cycle time to MDC-Max OEE configuration

Next call up the OEE menu and enter the value for the expected part time. This is the sum of the two DBVAR values configured in the last section (i.e the sum of Cycle Time and Handling Time from the database.

System and Table/Graph Se	etup			? 🛛
Layout	OEE			
Period Columns	- Timer configuration			
- Log Events	OEE	Machine		Add
- Machines	OEE	All		C Casar
- Operator				Сору
Program				Delete
Job				
- Targets				
Excel Exporting				
Switches	Number of good parts p	oduced:	Machine / Group:	
Counters	TIMERCNT[CYCLE]		All	~
- Timers	Number of scrapped par	ts:	Unplanned downtime:	
Operator Setup	TIMERCNT[SCRAPPE	D] 🖉	TIMER[STOPPED]	
- Program Setup	Expected part time:		Planned downtime:	
Job Setup	DBVAR[1] + DBVAR[2]		TIMER[MAINTENANCE]	2
Schedule Setup Event Setup	✓ Ignore breaks			
Status Screens	Planned production time	c		
- States				

# 13.1.5 Adding Part/Scrap Count and Production time to OEE

The other field values then need to be entered to enable the calculations. The number of good parts is the total part count. The number of scrapped parts comes from the timer we just set up. In this case we are using the 'Stopped' timer to record the unplanned downtime and the 'Maintenance' timer to record planned downtime. If we leave the Planned Production Time blank it will use the shift pattern entered in the schedule setup to calculate this figure.

### 13.1.6 Creating the OEE Table

An OEE table can now be produced to display the daily OEE figure. First generate a new table called Daily OEE (click Tables/Graphs on the left and Add a new Table).

System and Table/Graph Se	etup	? 🛛
Client Settings Client Settings Client Settings Client Settings Client Settings Client Settings Client Setting Client Setting	General         General Settings         Table / Graph:         Daily OEE (Table )         Description:         Daily OEE         Title:         Daily Oee • \$REPORTSTARTDATE         Type:         Compact Table         Ignore schedule         V Use 1 second resolution (slow)	

Select Compact Table from the type and tick Compact headers, this will make the data clearly readable on the resultant chart. The machine and job information should also be included using the tick boxes in the two respective menus (see below) and set in the order shown above.

System and Table/Grap	h Se	tup		? 🗙
Period     Columns     Log Events     Machines     Operator     Program     Job     Targets     Excel Exporting     Switches     Counters		Machines         Machines         Table / Graph:         Daily OEE (Table )         Include machine information         No machine/group names on tables/graphs         Remove inactive machines/groups	Number of machines/groups per table/graph: 0	×
System and Table/Grap	h Set	lup Job		?×
Columns Log Events Machines Operator Program		Job Settings Table / Graph: Daily OEE (Table)		~
- Job - Targets - Excel Exporting - Switches - Counters		✓ Include job information No job names on tables/graphs	Number of jobs per table/graph [0=unlimited]: 0	٢
Timers OEE Operator Setup Program Setup		Job column header: \$REPORTJOB		

Make sure that the 'Number of jobs per table/graph' and 'Number of machines/groups per table/graph' boxes are both set to 0 and that the 'Remove inactive machines/groups' box on the machines menu it ticked.

# 13.1.7 Setting the OEE Table Period

<b>Click Period</b>	on the left and set it for one day as below:-	
ystem and Table/Graph	Setup	?
Client Settings Tables/Graphs/Logs General Layout Percol Columns Log Events Machines Operator	Period     Period     Period     Period     Period     Table / Graph:     Daily OEE (Table )     Bemove empty intervals     Number of intervals per table/graph (0=unlimited):     O	<ul> <li></li> <li></li> </ul>
Program     Job     Targets     Excel Exporting     Switches     Counters     Timers     OEE     Operator Setup     Program Setup	Start time:     Day start:     Interval length:       Selected Day     TIME[DAYSTART]     I Day       Duration:     Day end:     Interval title:       I Day     TIME[DAYEND]     Time	<ul><li>✓</li><li>✓</li></ul>

In this example we are producing a table for a whole day, so the interval length should also be set to one day. It is however possible to produce a table showing OEE on an hourly or shift by shift basis simply by changing the Interval Length to 1 hour or 1 shift accordingly.

#### 13.1.8 Adding the OEE data

Click Columns on the left, tick the 'Remove empty columns' box.

Add each of the following values in sequence using the search icon, the OEE values are near the bottom of the list of expressions just above the TIME options. The order of the columns determines the order they will be displayed in the resultant table. The order can be changed by highlighting a value in the central window and moving it up and down the list using the up and down arrows to the right of the window.

System and Table/Graph Se	etup		? 🛛
Layout     Period     Columns     Log Vents     Machines     Operator     Program     Job     Targets     Excel Exporting     Switches     Counters     Timers     OEE     Operator Setup     Program Setup     Job Setup     Schedule Setup     Event Setup     Schedule Setup     Schedule Setup     Statu Screens     Real-time Values     Status / Indicators	Columns Columns Table / Graph: Daily OEE (Table )  Remove emply columns No column titles on tabels/graphs Value DEE(DEE) OEEAVAL(DEE) OEEAVAL(DEE) OEEAVAL(DEE) OEEBADPARTS(DEE) OEEBADPARTS(DEE)	Number of colums per table/graph (0 0 Title Format OEE % Quality % Performance % Total Parts I Good parts I Bad parts I	)=unlimited): Add Copy Delete T
Machines / Groups	Title:	Format:	
Buttons	OEE(OEE)	2 %	~
- Show Values	Title:	Color:	
- Input Values - Show State - Machines / Groups	OEE	Default	Set Set
Machines / Groups		Help C	ancel OK

The title for each value will appear at the top of the chart and needs to be manually entered for each value. The formats also need to be set correctly or the data will be displayed incorrectly, as a guide the OEE expressions are all in '%' format apart from the Part counts which are 'l' Integers and the time's are all 'HMS' format.

DEE Values:-		
itle		
(		
Expression:		
OEEBADPARTS[OEE]		
	/ % = 🗘	<= < >>= \$ ? : AND OR TIMER[] COUNTER[] ! U
Expression	Data	Help
OEE[OEE]	OEE	Overall Equipment Effciency (OEE) setup 'OEE'
OEEAVAIL[OEE]	OEE	Availability for OEE setup 'OEE'
OEEPERF[OEE] OEEQUALIOEE1	OEE OEE	Performance for OEE setup 'OEE' Quality for OEE setup 'OEE'
OEEPARTSIOEE1	OEE	Parts produced for OEE setup 'OEE'
OEEGOODPARTS[OEE]	OEE	Good parts produced for OEE setup 'OEE'
OEEBADPARTS[OEE]	OEE	Scrapped for OEE setup 'OEE'
OEETIME[OEE]	OEE	Operating time for OEE setup 'OEE' (Planned production - unplanned downtime)
OEEPLANTIME[OEE]	OEE	Planned production time for OEE setup 'OEE' (Shift - breaks and planned downtime)
OEEPLANDOWNTIME[OEE] OEEUNPLANDOWNTIME[OEE]	OEE OEE	Planned downtime for OEE setup 'OEE' Unplanned downtime for OEE setup 'OEE'
OEEPARTTIME[OEE]	DEE	Ideal part time OEE setup 'OEE'
OEEPARTTIMETOTALIOEE1	OEE	Total ideal part time DEE setup 'DEE'
CHANGED[OPERATOR]	OPERATOR	True when the operator is changed
CHANGED[JOB]	JOB	True when the job is changed
CHANGED[PROGRAM]	PROGRAM	True when the program is changed
TIME[NOW]	NOW	The current time
TIME[PERIODLEN] TIME[SHIFTSTART]	PERIODLEN SHIFTSTART	The length of the current period in table/graphs Start of current shift
TIME[SHIFTEND]	SHIFTEND	End of current shift
TIME[SHIFT1START]	SHIFT1START	Shift 1 start
TIME[SHIFT1END]	SHIFT1END	Shift 1 end
TIME[SHIFT2START]	SHIFT2START	Shift 2 start
TIME[SHIFT2END]	SHIFT2END	Shift 2 end
TIME[SHIFT3START] TIME[SHIFT3ENID]	SHIFT3START	Shift 3 start
		Insert <u>D</u> K <u>C</u> ancel

#### Once the columns are set up correctly the chart should look like this:-

🙆 CIMCO MDC-Max (	Client v5 - [Daily O	ee - 27/05/2009]							
MDC-Max Reports	Export Status Lo	gs <u>S</u> etup <u>W</u> indow	Help						_ 8
Daily Oee - 27/05	5/2009								4 Þ 🗙
			Daily	Oee - 27/0	5/2009				
Time	Machine	Job	OEE	Availability	Quality	Performance	Total Parts	Good parts	Bad parts
07:00:00 - 12:25:50	BF1	544664	41%	62%	100%	67%	19	19	0
		544674	63%	64%	100%	98%	14	14	(
		2311223	58%	67%	88%	99%	24	21	3
	BF2	5446432	71%	81%	89%	98%	38	34	4
		544666	84%	77%	97%	112%	35	34	1
	BF3	54443	88%	88%	91%	110%	53	48	5
		544434	93%	86%	100%	108%	25	25	0
	BF4	544-5544	80%	92%	89%	97%	57	51	E
		544-55344	71%	77%	82%	113%	11	9	2
	MILL 1	544-542135-4	71%	82%	81%	107%	21	17	4
		544-542464	69%	84%	96%	87%	23	22	1
	MILL 2	54-312364	64%	61%	93%	112%	61	57	4
	MILL 3	544-545464	66%	56%	96%	124%	48	46	2

Any performance figures greater than 100% show that the part is being produced in less time than the database expected time figures, less than 100% shows it is taking longer to produce than the expected time.

# 13.1.9 Entering Cycle and Handling Times in NC-Base

The performance figure will only be calculated if the relevant fields were filled in for the job in the database. Open Cimco Edit, click the database icon to see a list of files and double click a filename to display the Job stats:-

10000.	
Cycle Time:	3M 40S
Part No:	23457
Op No:	1
Job No:	548547
Handling Time:	30s

The Cycle Time and Handling Time fields should be entered either as a number of seconds or in the form 3M 40S for 3 minutes 40 seconds. The Data in these fields is read by MDC-Max as each new job starts, so retrospectively adding the Cycle Times will have no effect on the OEE figures until the job is run again.

## 13.2 OEE Reports - Cycle Times provided by Excel

An alternative to using the database is to use an excel spreadsheet to store the times for each job. The data should be stored in an excel spreadsheet similar to the one below.

JOB No	BF1_CYCLE TIME	BF1_HANDLING	BF2_CYCLE TIME	BF2_HANDLING
1111223	20	20		
2311223	132	20		
544666			230	65
5444434			300	20
544-5544			200	25
544-542135-4			176	30
54464	130	25		
544674	120	33		
2311223	123	55		
544664	220	75		
5446432	33	33		
544443			234	30
544-55344			330	25
54-312364			120	75
5446-543	145	120		
5446-5574	150	45		
544-545464			126	39

In this example the cycle time and handling time for different machines are entered in seconds (BF1 and BF2 are the names of the machines as entered in DNC-Max as port names). This format is flexible as it allows the same job to have different runtimes on different machines.

**NOTE:** For the excel interface to work the PC running the DNC-Max server must have the MS Excel library functions loaded – the simplest way to do this is to install a copy of Excel.

Open MDC-Max client, Click Setup, System Setup and Highlight Excel Variables on the left.

Machines 🔨	Excel Variables						
- Operator	- Excel Variables						
- Program		F 10 11 1					
Job	Extract variables from	Excel Spreadsheet					
- Targets Excel Exporting	F1						
Switches	Filename:	MCO\TEST Worksheet.xls					
Counters	\\cncacu1\GLoder\$\Lli	MUUNIEST Worksneet.xis					
Timers	When:	When:		When:		When:	
OEE	Job Name	<ul> <li>Job Name</li> </ul>	~	Not Used	~	Not Used	~
Operator Setup	Matches:	Matches:		Matches:		Matches:	
Program Setup	Column A	Column A	~	Column A	V	Column A	v
Job Setup	And	And:	_	And:		And	
Schedule Setup		Not Used	~	NotUsed	V	Not Used	~
Event Setup Status Screens							
- Beal-time Values	Matches:	Matches:		Matches:		Matches:	
- States	Column A	Column A	~	Column A	~	Column A	~
Lights / Indicators	And:	And:		And:		And:	
Machines / Groups	Not Used	V Not Used	~	Not Used	V	Not Used	V
Operator Screens	Matches:	Matches:		Matches:		Matches:	
- Buttons	Column A	Column A	~	Column A	~	Column A	~
- Show Values	Set EXCELVAR[1] =	Set EXCELVAR[2] =		Set EXCELVARI31 =		Set EXCELVABI41 =	
- Input Values Show State		Portname Column	*	Column A	~	Column A	~
Machines / Groups	Portname suffix:	Portname suffix:		Portname suffix:		Portname suffix:	
Machines / Groups	_CYCLE TIME	HANDLING					
Machine Variables	Default value:	Default value:		Default value:		Default value:	
Messages		~	~		~		~

Tick the "Extract Variables from Excel" box.

The filename must point to the name of the excel spreadsheet containing the data (always use a UNC name rather than a mapped drive as each MDC-Max client must be able to access the spreadsheet).

In the example above, in the first column on the menu, when the 'Job Name' changes for any machine, MDC-Max looks for a match in Column A of the spreadsheet.

If MDC-Max finds a match it then appends \_CYCLE TIME to the DNC-Max Portname and sets EXCELVAR(1) to the value in the same row whose column is called PortName\_CYCLE TIME.

MDC-Max then matches the second condition and sets EXCELVAR(2) to the value in the same row which matches PortName\_HANDLING.

For example if the jobname changes to 54464 on machine BF1 MDC-Max looks for 54464 in Column A and finds it. It then creates column reference BF1\_CYCLE TIME and finds the value 130 in the BF1\_CYCLE TIME column for the 54464 row. EXCELVAR(1) is set to 130 MDC-Max then checks the second condition (When Jobname matches) and finds 54464 in Column A It then creates column reference BF1\_HANDLING and finds the value 25 in the BF1\_HANDLING column of the 54464 row EXCELVAR(2) is set to 25

The best way to check the configuration once complete is to set up a simple operator screen with a jobname input field and to display the values of 'EXCELVAR (1)' and 'EXCELVAR (2)' on the same screen. Test the variables by entering different jobnames or numbers and checking the values displayed. You can also use EXCELVAR(1) on normal live screens to display the expected cycle time for a given job.

- Machines 🗛	OEE			
- Operator	<ul> <li>Timer configuration</li> </ul>			
Program				
Job	OEE	Machine		Add
Targets	OEE A	All .		Сору
- Excel Exporting	OEEEXCEL A	All .		Copy
- Switches				Delete
- Counters				
- Timers				
OEE				
- Operator Setup	Number of good parts produced:		Machine / Group:	
- Program Setup	TIMERCNT[CYCLE]		All	×
			Unplanned downtime:	
Job Setup				
-Job Setup Schedule Setup	Number of scrapped parts:			
	TIMERCNT[SCRAPPED]		TIMER[STOPPED]	P
- Schedule Setup - Event Setup - Status Screens				P
Schedule Setup Event Setup	TIMERCNT[SCRAPPED] Expected part time:		TIMER[STOPPED] Planned downtime:	
- Schedule Setup - Event Setup - Status Screens	TIMERCNT[SCRAPPED]		TIMER[STOPPED]	

Click OEE on the left menu and fill in the OEE values as follows :-

The system will now look at the Excel spreadsheet for its part cycle times. Create the chart in exactly the same way as for NC-Base (section 13.1.5 onwards).

Appendix A - LS2208 Barcode Setup Sheet



Standard RS-232<sup>1</sup>



Baud Rate 600



Baud Rate 1200



Baud Rate 2400



Baud Rate 4800



\*Baud Rate 9600



Baud Rate 19,200



Baud Rate 38,400

SCAN THIS CODE FIRST

# THEN SCAN ONE OF THE BAUDRATE SETTINGS



Odd



Even



\*None



\*1 Stop Bit



2 Stop Bits



7-Bit



\*8-Bit



Scan Options



<DATA> <SUFFIX>



Enter

SCAN ONE PARITY SETTING

SCAN EITHER 1 or 2 STOPBITS

SCAN EITHER 7 or 8 DATABITS

SCAN EACH

OF THESE

THREE BARCODES IN ORDER

(THIS ADDS A CRLF AFTER THE SCAN OUTPUT)

# Appendix B – Example Bar Code Sheet





















Sample Job Numbers For Testing Purposes







