

SuiteFactory Enterprise Machine Monitoring Option

Table of Contents

1	DPF	RNT Events/The EVT Remote Request Command	2
	1.1	Automatic Insertion of START/END lines	4
	1.2	Setting up SuiteFactory for Automatic Insertion of STOP/END Statements	5
	1.3	Inserting Machine Event Macro Statements into DNC Files via the Transfo	rm
	Utility	/ 6	
2	Mad	chine Event Status	9
	2.1	Machine Events - The Raw Data Report	10
	2.2	Session Report	13
	2.3	Collected Data by Machine and Data Item and Collected Data by Data Item	and
	Machi	ine	14
	2.4	Machine Utilization	15
3	Cor	nfiguring other types of events	17
	3.1	Data Items Tab	17
	3.1.	1 Column Descriptions	17
	3.1.	2 Modifying a Data Item	19
	3.2	Sessions Lists Tab	21
	3.2.	1 Column Descriptions – Session Lists	21
	3.2.	2 Column Descriptions – Session Values	22
	3.2.	3 Creating and Selecting a New Session List	23
	3.2.	4 Report Results using the new Program Run Session List	35
	3.3	State Lists Tab	37
	3.4	Using the Machine Status Data Item	41
	3.4.	1 Resulting Report	42
4	Apr	pendix A	45
	4.1	Editing the EVT Remote Request Command	45

1 DPRNT Events/The EVT Remote Request Command

This option takes advantage of the ability of many CNC's to send customized messages out its RS-232 port during part program execution. The most common example of this is the DPRNT statement included with FANUC's Macro B option. SuiteFactory "listens" for messages on this port as part of SuiteFactory's **Remote Request Command** (RRC) feature and records the events in its database and/or outputs the information in the form of XML files to a specified folder on the network for use by third party applications. For this purpose a new RRC command was created with the following general format:

EVT data item/identifier value/item data/value label/value data/timestamp/extra data

EVT is the default name of the remote command and is short for Event. The default argument separator is "/". The command, "EVT" and/or the argument separator can be changed by the end user for each machine via the Protocol/Remote Request Parameters/Customized Commands tab. See Appendix A.

Note! The first three arguments are configured via the "Edit Data Item" window of the Manage Machine Events section of General System Configuration.

Data item represents the type or class of data to be collected. A Data Item can either be a "session" type that has a start and end (open and close) or a "state type" that has multiple states like radio buttons. There is a third class called, "generic". This is used for stand alone events.

The Data item, "RUN", a "session" type, is built into SuiteFactory to be used for data gathered while running a part program on a CNC. It is used specifically to report on part program cycle time, idle time and part count. Furthermore, RUN data can be **displayed in real-time** on the SuiteFactory Runtime main screen. Also, a real-time bar chart report displays up to the minute cycle time/idle time for each machine being monitored.

The end user can create other types of Data Items.

Identifier value is optional. It can be any descriptive string such as a DNC file name, a DNC file Id, a user Id or a user name or something else. The built-in RUN item requires the "DNC file Id". This DNC file Id is validated against the SuiteFactory database Id. If the DNC file Id is specified but it is left out in the EVT command, as it could be if data is coming from a PLC rather than the CNC RS-232 port, SuiteFactory assumes that the last file downloaded to the CNC is the file running. In this case, two argument separators must be used to indicate the missing Identifier (// for example.)

Item data is optional. Whether or not it is used is pre-configured in the Machine Event setup. The default data item, "RUN" has no item data.

Note! The next four arguments are configured via the "Edit Session Value" and/or "Edit State Value" window of the Manage Machine Events section of General System Configuration.

Value label represents actual session list values or state list values for which SuiteFactory will listen on the RS-232 port. For the built-in RUN class it is configured to use the default session list: START and END. The end user can configure other session lists to use.

Value data is optional. Whether or not it is used is pre-configured in the Machine Event setup. The default data item, "RUN" has no item data.

Timestamp is optional and must be enabled for each machine via the machine properties' "Edit Remote Request Command Text" screen (the default state is disabled). This argument can be used if the CNC has date and time variables that can be output via DPRNT or equivalent statements in the form YYYYMMDD and HHMMSS. If the CNC is incapable of supplying this information then SuiteFactory will timestamp the data received with the computer clock as soon as it is able to.

Extra data can be anything extra to be collected and stored in the database.

NOTE! For purposes of Machine Event Reports the arguments: Data item, Identifier value, Value label, and Timestamp are "key" values used for sorting and filtering. The other arguments, Item data, Value data and Extra data are simply saved.

This EVT Remote Request Command can be embedded in DPRNT statements in part programs or output manually in Edit mode of the CNC like any other Remote Request Command.

Using the built-in RUN item, here is an example of an EVT RRC embedded in a DPRNT statement:

DPRNT[EVT RUN/1045/START]

RUN is the Data item. 1045 is the Identifier Value, a DNC file Id which will be validated when processed by SuiteFactory. No Item data is configured for the built-in RUN item, so START is a Value label. There is no Value data, Timestamp or Extra data. The computer running the Communication Engine will provide the date and time.

How to re-configure the RUN data item or to configure new kinds of items is described later in this document.

1.1 Automatic Insertion of START/END lines

The simplest and most common application of this option is to record when a part program has begun and when the part has been completed. In order to facilitate use of the machine monitoring option, SuiteFactory includes the feature in which the necessary program "DPRNT" lines are automatically added, to selected files in the SuiteFactory database. This is done via the Transform menu of SuiteFactory's Manage DNC Files screen. See paragraph 2.2, below.

With SuiteFactory's default "FANUC" implementation of this, the following lines are embedded at the beginning of each selected part program: (*Idnumber* represents the SuiteFactory database unique file Id number for the DNC file into which the DPRNT lines are embedded. When you run a report, the actual DNC file name will be included.

NOTE! We use the DNC file's *Idnumber* rather than the name because the name can be changed anytime but the underlying *idnumber* is unique and does not change.)

(CCI#RRC BEGIN) POPEN DPRNT[EVT*RUN/*idnumber*/START] PCLOS (CCI#RRC END)

And the following lines are embedded at the end of each part program:

(CCI#RRC BEGIN) POPEN DPRNT [EVT*RUN/*idnumber*/END] PCLOS (CCI#RRC END)

(Note! The * between the EVT and the RUN results in a space character being output the RS-232 port when the line is executed on a HAAS or FANUC CNC. The CCI# comments surrounding the other lines are for identifying to SuiteFactory those lines which it automatically inserted so that they can be automatically removed if required.)

These strings are customer configurable. Every machine can be configured uniquely as well as the location of these lines at the beginning and end of the file. (Number of lines from the top or bottom)

For example, for a FADAL CNC, the following lines at the beginning:

(CCI#RRC BEGIN) # SPRINT "EVT RUN/idnumber/START" (CCI#RRC END)

And the following lines at the end:

(CCI#RRC BEGIN) # SPRINT "EVT RUN/*idnumber*/END" (CCI#RRC END)

provide the same message as the FANUC lines do on a FANUC CNC.

For example, if file ID 1045 is being executed on the CNC, both result in the same strings output via the RS-232 port namely EVT RUN/1045/START and EVT RUN/1045/END respectively.

1.2 Setting up SuiteFactory for Automatic Insertion of STOP/END Statements

Each machine is configured individually. Click on Configure/Machines. Select the machine to be configured and click on Properties. Select the Conversions tab and then the Insert Event RRC tab.

Machine Properties: 0203 Mori-Seiki SL25	×									
General Communication Protocol Conversions										
End Of Block Comments Trim Header and Trailer Insert Event RRC										
Enable Automatic Insert of RUN Event DPRNT Macros in G-Code Programs										
Bule for How to Insert RUN/START Event Insert After the Specified Number of Lines After the Beginning										
RUN/START Leader RUN/START Irailer (CCI#RRC-BEGIN) CR> <lf> POPEN CR><lf> DPRNT[CCI#RRC-END)</lf></lf>	Edit									
Bule for How to Insert RUN/END Event Insert Before the Specified Number of Lines Before the End	Default									
RUN/END Leader RUN/END Trailer [CCI#RRC-BEGIN) [CCR> <lf> POPEN<</lf>	Edit									
Copy Parameters from Another Machine	Apply									

Figure 1 - Configuring DPRNT Macro Insertion Utility

You must first checkmark the Enable Automatic Insert ... option. Establish where the inserted lines will go and edit the text of the leader and trailer segments of the line. SuiteFactory will fill in the appropriate EVT Remote Request line between the leader and trailer for the RUN/START event and RUN/END, respectively as shown in the examples in section 2, above. The format of the EVT line is established as part of the Remote Request, Customized Commands settings. See Appendix A.

1.3 Inserting Machine Event Macro Statements into DNC Files via the Transform Utility

Start at the SuiteFactory main toolbar.

🖴 SuiteFactory Runtime: Test Enterprise with Machine Eve 🔳 🗖 🔀								
<u>Eile View Configure Machine Event Window H</u> elp								
🗴 🛠 🖬 🖬 🗄 🗄 📲 🛃 📰 🛃 🖉 🖉								
Manage DNC Files INISTRATOR 8/12/2008 3:54 PM								
Figure 2 Main Tool Par								

Figure 2 – Main Tool Bar

Click on Manage DNC Files to get a screen similar to the following. View is set to Machines → Resource Collections \rightarrow Files. File Cabinets are shut off.

🖬 Manage DNC Files (Assigned)											
Eile <u>V</u> iew Eilter <u>T</u> ools T <u>r</u> ansform											
00001285 4	۲ B	1				5	다고				
🖅 🍱 0201 Mori-Seiki SL35 [DNCServe 🔨	Name	Version	ld	Ma	Che Sta Size	Format	Туре	Last Modified	Created 🔺		
🗄 🖪 0202 Okuma Cadet [DNCServer:2	00001162	2	4191	Х	Av. 673	GCode	txt	7/1/1999 6:50:06 AM	9/26/2002 1		
🗄 🖪 0203 Mori-Seiki SL25 [DNCServe	00001173	2	4202	Х	Av. 1790	GCode	txt	7/12/1999 9:12:24 AM	9/26/2002 1		
🗄 🛄 0204 Daewoo [DNCServer:110]	00001174	2	4203	Х	Av. 869	GCode	txt	7/1/1999 7:29:00 AM	9/26/2002 1		
🗄 🛄 0205 Mori-Seiki SL3 [DNCServer:	00001205	2	4231	Х	Av. 2172	GCode	txt	7/15/1999 10:30:08 AM	9/26/2002 1		
🗄 🎩 0206 W&S Universal [bwilm:39] 👘	00001262	1	919	Х	Av. 2530	GCode	txt	8/5/1997	9/26/2002 1		
🗄 🖪 0207 Mori Seiki Par [bwilm:19]	00001262	2	4285	Х	Av. 2530	GCode	txt	8/5/1997 7:32:54 AM	9/26/2002 1		
🗄 🖪 0208 Takisawa [bwilm:47]	00001263	1	920	Х	Av. 2608	GCode	txt	8/5/1997	9/26/2002 1		
🛨 🍱 0209 Yang [DNCServer:111]	00001263	2	4286	Х	Av. 2629	GCode	txt	9/15/2000 8:50:52 AM	9/26/2002 1		
🖶 🎞 0210 Nakamura Tome (bwilm:67)	00001285	1	938	Х	Av. 2786	GCode	txt	10/20/1998	9/26/2002 1		
+ 1 0211 Daewoo 1-5/8" [bwilm:17]	00001285	2	4304	Х	Av. 2786	GCode	txt	10/20/1998 4:04:56 PM	9/26/2002 1		
⊕	00001285	3	8801		Av. 2931	GCode	txt	7/9/2007 4:53:50 PM	9/26/2002 1		
⊕ ⊐ 0501+2 Makino (bwilm:32)	00001285	4	24542		Av. 2298	GCode	txt	7/9/2007 5:10:03 PM	7/9/2007 5:0		
1	00001288	2	8222	Х	Av. 4065	GCode	txt	1/18/2001 3:15:16 PM	9/26/2002 1		
1	00001297	1	950	Х	Av. 3211	GCode	txt	6/30/1997	9/26/2002 1		
1 0505 Touged VMC #3 [bwilm:8]	00001297	2	4316	Х	Av. 3211	GCode	txt	6/30/1997 2:46:14 PM	9/26/2002 1		
1 0506 Toyoda VMC #4 [bwilm:9]	00001404	1	1046	Х	Av. 3620	GCode	txt	7/15/1998	9/26/2002 1		
1 0507 Touged VMC #5 [bwilm:49]	00001404	2	4412	Х	Av. 3620	GCode	tst	7/15/1998 9:01:42 AM	9/26/2002 1		
	00001444	1	1084	Х	Av. 1338	GCode	txt	8/2/1997	9/26/2002 1		
1 0702 Touoda Grinder [bwilm:21]	00001444	2	4450	Х	Av. 1338	GCode	txt	8/2/1997 8:17:08 AM	9/26/2002 1		
1 0801 Gangeter 1 [missing comm	00001472	1	1110	Х	Av. 2970	GCode	txt	9/4/1997	9/26/2002 1		
<									•		
360 files.									1.		

Figure 3 - Manage DNC Files

Highlight the appropriate machine. 0203 Mori-Seiki SL25 is selected here. See Figure 1, above to see how this machine was configured. Select a file or use the Search feature to filter to a set of files to which you want to add the macro statements. File 00001285 V4 is selected above.

Here is a view of the beginning of the file before adding the macro statements.

[≝] V.4 of 00001285	
Find What:	Find
☐ <u>W</u> hole Word	<u>C</u> ancel
☐ <u>M</u> atch Case	Print
N100G00M08(ROUGH FACE)	~

Figure 4 - Top of a DNC File before adding Macro Statements

🖴 Manage DNC Files (Assigned)												
File	Eile <u>V</u> iew Eilter <u>T</u> ools <u>Transform</u>											
9	Insert Machine Event Macros into Selected DNC File Insert Machine Event Macros into All Istad DNC File Insert Machine Event Macros into All Istad DNC File											
00001	285 4		۲ B	1				B		고문		
···· ·	0201 Mori-Seiki SL35 [DNCServe 👗		Name	Version	Id	Ma	Che Sta S	Size	Format	Туре	Last Modified	Created 🔺
÷ 3	0202 Okuma Cadet (DNCServer:200	10 - C	00001162	2	4191	X	Av. 6	573	GCode	txt	7/1/1999 6:50:06 AM	9/26/2002 1 💳
÷	0203 Mori-Seiki SL25 [DNCServe	1	00001173	2	4202	X	Av. 1	790	GCode	txt	7/12/1999 9:12:24 AM	9/26/2002 1
÷	0204 Daewoo (DNCServer:110)	· · · · ·	00001174	2	4203	X	Av. 8	369	GCode	txt	7/1/1999 7:29:00 AM	9/26/2002 1
÷	0205 Mori-Seiki SL3 IDNCServer:	1	00001205	2	4231	X	Av. 2	2172	GCode	txt	7/15/1999 10:30:08 AM	9/26/2002 1
÷	0206 W&S Universal (bwilm: 39)	1.00	00001262	1	919	X	Av. 2	2530	GCode	txt	8/5/1997	9/26/2002 1
÷	0207 Mori Seiki Par [bwilm:19]	1999 - P	00001262	2	4285	X	Av. 2	2530	GCode	txt	8/5/1997 7:32:54 AM	9/26/2002 1
÷	0208 Takisawa (bwilm: 47)	1	00001263	1	920	X	Av. 2	2608	GCode	txt	8/5/1997	9/26/2002 1
	0209 Yang [DNCServer 111]	1	00001263	2	4286	X	Av. 2	2629	GCode	txt	9/15/2000 8:50:52 AM	9/26/2002 1
÷	0210 Nakamura Tome (bwilm:67)		00001285	1	938	X	Av. 2	2786	GCode	txt	10/20/1998	9/26/2002 1
÷	0211 Daewoo 1-5/8" [bwilm:17]	1	00001285	2	4304	X	Av. 2	2786	GCode	txt	10/20/1998 4:04:56 PM	9/26/2002 1
÷	0212 Hardinge EMAG [biwilm:29]	12-2	00001285	3	8801		Av. 2	2931	GCode	txt	7/9/2007 4:53:50 PM	9/26/2002 1
ä. –	0501+2 Makino (bwilm: 32)		00001285	4	24542		Av 2	298	GCode	txt	7/9/2007 5:10:03 PM	7/9/2007 5:0
÷	0503 Touada VMC #1 [bwilm:45]		00001288	2	8222	Х	Av. 4	1065	GCode	txt	1/18/2001 3:15:16 PM	9/26/2002 1
ä. –	0504 Toyoda VMC #2 [bwilm: 40]	19 - P	00001297	1	950	X	Av. 3	3211	GCode	txt	6/30/1997	9/26/2002 1
<u> </u>	0505 Tougda VMC #3 [bwilm:8]		00001297	2	4316	X	Av. 3	3211	GCode	txt	6/30/1997 2:46:14 PM	9/26/2002 1
H	0505 Toyoda VMC #3 [bwilm:9]		00001404	1	1046	X	Av. 3	3620	GCode	txt	7/15/1998	9/26/2002 1
	0500 Toyoda VMC #4 [bwilm:3]	10 - D	00001404	2	4412	X	Av. 3	3620	GCode	txt	7/15/1998 9:01:42 AM	9/26/2002 1
÷.	0509 KIA VMC [bwilm:6]	10-10	00001444	1	1084	X	Av. 1	338	GCode	txt	8/2/1997	9/26/2002 1
	0300 KiX VMC [Dwillin:0]	10.00	00001444	2	4450	X	Av. 1	338	GCode	txt	8/2/1997 8:17:08 AM	9/26/2002 1
	0801 Gangster 1 [missing comm		00001472	1	1110	X	Av. 2	2970	GCode	txt	9/4/1997	9/26/2002 1
<									-			•
360 fi	les.											1

Figure 5 - Click on Transform

Click on Transform. Select "Insert Machine Event Macros into Selected DNC File".

🛎 Insert Machine Event Mac	ros into Sel	lected D 🔀
J		f
Processed 0 of 1 DNC Files 0.0%		
Name: 00001285 Version: 4		
Insert Event macros into this DNC Files?		
Insert All	<u>S</u> kip	Skip A <u>l</u> l

Figure 6 - Insert Macros

Click Insert.



Figure 7 – OK

Click OK to return to the Manage DNC Files Screen. File 00001285 V4 is still highlighted. Click on View to see the results of the transformation.



Figure 8 - Macro Lines Added

2 Machine Event Status

The Machine Event data collected via "RUN" data item EVT commands, output via a DPRNT macro statement, are displayed in real-time by the Suitefactory Runtime Application.

SuiteFactory Runtime: Test Enterprise with Machine Eve
<u>Eile View Configure Machine Event Window Help</u>
Show Machine Event Status DNCserver ADMINISTRATOR 8/12/2008 4:04 PM

Figure 9 - Main Tool Bar

Click on the Show Machine Event Status button or the Show Machine Event Status item in the Machine Events pull down menu.

The following shows the real time status of all the machines selected.

SuiteFact	ory Runtin	ne: Test Enterpri	ise wi	th M	achine	e Even	ts wi	th Status	- [Mac	hine Status]		
<u>E</u> ile ⊻iew <u>C</u> on	figure <u>M</u> achine	e Event <u>W</u> indow <u>H</u> elp										
	1				ññ 👬		a 🧏					
Machine	Last Event	DNC File Configure	Machine	Event	Processir	¹⁹ % Run	% Idle	Elapsed Time	Cycle	Start Time	Last Event Time	Excep
48VTL	Probe Variable	D49848-48VTL	1	260	Run	85.80	14.20	00:02:19	1	2008/02/08 10:48:28	2008/02/08 10:51:10	
Haas LC20-1	End Program	MACHINE EVENTS MAIN	1	368	Idle	55.35	44.65	03:08:16	33	2008/08/08 11:16:21	2008/08/08 14:24:37	
🐺 мС40	Probe Variable	B88743-M40	1	262	Run	60.79	39.21	00:05:13	10	2008/02/08 11:38:01	2008/02/08 11:43:30	
😻 ОКИ5000	End Program	A67587-72VTL	1	259	Idle	0.00	0.00	21:35:19	2	2008/02/20 12:19:08	2008/07/30 09:54:27	
Sipp	End Program	J86661-SIPP	1	263	Idle	22.98	77.02	00:02:41	4	2008/02/08 11:46:01	2008/02/08 11:48:42	
	erver ADMINISTR/	ATOR 8/12/2008 4:10 PM	Ш	1								>

Click on the "Configure Machine Event Processing" button to setup which machines to monitor in real time and which machines to display in the Machine Status Window.

Achine Status	
Enable <u>S</u> ave Event Data	Enable Display Machine Event 48VTL 72VTL Haas LC20-1 OKU5000 Sipp
	Reset Apply DK Close

Machine Event Reports

The usefulness of all this data collection is in the reporting. A powerful report generator is built into SuiteFactory. Without filtering it outputs the collected data sorted by machine. Each record includes the following:

Timestamp, Data Item, Identifier, Value, Type, Role, Status, Serial Number Identifier Object Type, Status, Id, Name, Version Raw Data, Elapsed time and where applicable, Extra Data, This Start and Last End

2.1 Machine Events - The Raw Data Report

For example – A Start/End pair of Machine Event records:

0201 Mori-Seiki SL35

2007/06/27 12:30:45 Run NC Program 1045 Start Session Open 11-6A-53D454454-000002 Date/Time Source: 4=Controller Clock Posted at: 2007/06/27 12:32:44 Identifier Object Type: Dnc File Status: Valid Id: 1045 Name: PN2333-0009 Version: 1 Raw Data: RUN/1045/START/20070627 12:045 Last End: 11-6A-53D454454-000001 2007/06/27 12:27:30 Idle: 0 days 00:03:15

2007/06/27 12:35:54 Run NC Program 1045 End Session Close 11-6A-53D454454-000003 Date/Time Source: 4=Controller Clock Posted at: 2007/06/27 12:37:03 Identifier Object Type: Dnc File Status: Valid Id: 1045 Name: PN2333-0009 Version: 1 Raw Data: RUN/1045/END/20070627 123554 This Start: 11-6A-53D454454-000002 2007/06/27 12:30:45 Elapsed: 0 days 00:05:09 Last End: 11-6A-53D454454-000001 2007/06/27 12:27:30 Idle: 0 days 00:03:15

What they show is that at 12:30:45 on June 27, 2007 program PN2333-0009 Version 1 started running on machine 0201 Mori-Seiki SL35. We know that because the raw data, "RUN/1045/START/20070627 123045" was received at that time in the captured RS-232 DPRNT string, "EVT RUN/1045/START/20070627 123045". The machine was idle for 3 minutes and 15 seconds since the last END event.

Furthermore, at 12:35:45 on the same day the program PN2333.0009 Version 1 finished running on the same machine. It took 5 minutes and 9 seconds to make the part. We know that because at 12:35:45 the raw data, "RUN/1045/END/20070627 123554" was received at that time in the captured RS-232 string, "EVT RUN/1045/END/20070627 123554". The Last End information is repeated in this END record for ease in implementing the Session Report.

Machine Event Reports are accessed from the SuiteFactory main tool bar by selecting View/Reports.



Figure 10 - SuiteFactory Runtime Main Toolbar

Select the Machine Events tab. Highlight the General Report, Machine Events.

SuiteFactory Database Reports	×										
Configuration DNC Files Controlled Documents Packets Machine Events											
General Reports Machine Events	<u>S</u> how All										
Session Activity Collected Data by Machine and Data Item Collected Data by Data Item and Machine	Show <u>F</u> iltered										
Machine Utilization											
⊢ How to filter this report											
Data Item: 'RUN' - Run NC Program: not specified From:	unlimited										
Το: υ	nlimited										
User: not selected Resource Collection: not selected Starti	ng at: unlimited										
Machine: 48VTL, 72VTL, Mazak, MC40, OKU5000,	ng at: unlimited										
	E dit <u>F</u> ilter										
Select <u>F</u> ilter Template <u>S</u> ave Filter Template	Cļose										

Figure 11 - View/Reports Screen

Clicking on Show All will generate a report containing all records for all machines over all time. To limit this you can set filters by click on Edit Filter. The following screen shot shows the filtering options: After you setup your filtering requirements you can save it as a template for future use. For example you could create templates to cover each of the daily shifts and use it again when required using the Select Filter Templates and Save Filter Template features as shown above.

If you click on the Edit Filter button, you get the following screen:

🖴 Edit Report Filter		X
Filter by <u>S</u> elected File or Document		<u>B</u> rowse
Filter by Selected Besource Collection	Filter by Selected User	-
Filter by Selected Machine ✓ Enabled 48VTL ○ 72VTL ✓ Haas LC20-1 Mazak MC40 OKU5000 Select All Deselect All	Filter by Selected Machine Event Filter by Event Data Item ✓ Enabled 'RUN' - Run Filter By Event Value ✓ Enabled 'END' - End Program Filter by Event Identifier NC Program ✓ Enabled	Erowse
Filter by Time <u>Span</u> Start <u>D</u> ay ✓ Enabled 7 / 7 /2008 ✓ Enabled ✓ Enabled ✓ Enabled	Filter by ⊥ime Shift or Time of Day Start ⊥ime Ime Ime Enabled 7:00:00 AM 1 End ⊥ime Ime Ime	
End Date End Lime on End Date Enabled 5:00:00 AM	☐ _Iime Includes Midnight	<u>O</u> K <u>C</u> ancel

Figure 12 - Report Filtering

There are more examples of reports below.

2.2 Session Report

Below is an example of a Session Report showing a half hour period on August 8, 2008. In that time frame 10 parts were made. Each part took about 3 minutes and 10 seconds. The idle time between parts was about 10 seconds. The second page of the report gives a summary pie chart view of the time period selected.



2.3 Collected Data by Machine and Data Item and Collected Data by Data Item and Machine

SuiteFactory provides two built-in reports to present data other than START/END cycle/idle data such as data collected from a probe: One of the reports sorts by machine and then the Data Item. The other report sorts by Data Item and then by machine. The following is an example of the former:

Collected Data b	y Machine an	d Data Item			
× I≪ ≪ 1 of 4	▶ N = 8 8	🛃 100% 💌	Total:89 1	100% 89 of 89	
Preview					
TICVICW			_		
					<u></u>
Collected Data by Mach	ine and Data Item		8/8/2008	1:54:37PM	
Machine	Data Iten	<u>n</u>			
Haas LC20-1	Measure	ments		Job Number = J885	0
8/8/2008 12:56:24PM	Dimension= =	ROUGH OD			
Probe Values	Probe Data =	X-9.0000 Z0.0000			
8/8/2008 12:56:32PM	Dimension= =	RADIUS BB			
Probe Values	Probe Data =	X-9.0000 Z0.0000			
8/8/2008 12:56:52PM	Dimension= =	NOTCH OD AA			
Probe Values	Probe Data =	X-10.8000 Z0.000	D		
8/8/2008 12:57:31PM	Dimension= =	TOP NOTCH OD (cc		
Probe Values	Probe Data =	X-10.8000 Z0.000	D		
8/8/2008 12:58:09PM	Dimension= =	HOLE DD			
Probe Values	Probe Data =	X-4.0000 Z0.0000			
8/8/2008 12:59:43PM	Dimension= =	ROUGH OD			
Probe Values	Probe Data =	X-9.0000 Z0.0000			
8/8/2008 12:59:51PM	Dimension= =	KADIUS BB			
Probe Values	Probe Data =	X-9.0000 20.0000			
S/S/2008 1.00.11FW	Dimension	X 10 2000 70 000	n		
	Dimension= =	TOP NOTCH OD (
Brobe Values	Probe Data =	Y_10 8000 70 000			
8/8/2008 1:01:28PM	Dimension= =	HOLEDD	5		
Prohe Values	Probe Data =	X-4 0000 Z0 0000			
8/8/2008 1:03:03PM	Dimension= =	ROUGHOD			
Probe Values	Probe Data =	X-9.0000 Z0.0000			
8/8/2008 1:03:11PM	Dimension= =	RADIUS BB			
Probe Values	Probe Data =	X-9.0000 Z0.0000			
8/8/2008 1:03:31PM	Dimension= =	NOTCH OD AA			
Probe Values	Probe Data =	X-10.8000 Z0.000	D		
8/8/2008 1:04:10PM	Dimension= =	TOP NOTCH OD (CC		STORE OF
Probe Values	Probe Data =	X-10.8000 Z0.000	D		~
<	- 110				> 4

The Data Item in this example is a Job Number. The DPRNT statement that provided the information for the first record, above, was as follows:

DPRNT[EVT*MDATA/J8850/ROUGH*OD/PROBE/X#5021[34]**Z#5023[34]/200#3011[80]*#3012[60]]

Referring to the format of the EVT statement which is:

EVT data item/identifier/item data/value label/value data/timestamp/extra data

MDATA is the Data item. J8850 is Identifier which was defined as a Job Number. ROUGH*OD is the Item data and was defined as a Dimension. PROBE is the Value label. X#5021[34]**Z#5023[34] are the value data. #5021 and #5023 are, in this example, CNC Macro variable where the probe data is stored. The rest is the

Timestamp. #3011 is the CNC variable where the date is stored. #3012 is the CNC variable where the current time is stored. (for FANUC and Haas CNC's). There is no Extra data.

2.4 Machine Utilization

The following two figures are examples of the built-in real-time Machine Utilization report.

The first figure shows the machine utilization of one particular machine for over a month and a half time span. The second figure shows several machine over a much longer time span.



This figure is an example of a 7 day utilization report.



3 Configuring other types of events

Note! In order to configure other types of events you need "exclusive access" to the SuiteFactory database. This means that all SuiteFactory clients except your's must be shutdown as well as the Maintenance Engine and all instances of the SuiteFactory Communications Engine. This is because adding new types of events change the database structure.

From the main tool bar select Configure/General System Configuration. Click OK at the warning box. Select the Machine Events tab and click on the Configure Machine Events button. Click OK at the warning box and finally click YES to shutdown the Communications Engine if it is running on your computer. A screen similar to the one below appears.

🛋 Config	gure Mach	ine Even	t Data II	tems				
Data Items	Session Lists	State Lists						
Data Items								
Name	Numbe	ar Label	Туре	Value List	Uses ID	Id. Type	ID Name	Id. Object
(Undefined	ł)	0	Generic					
Measurem	ents	3 MDATA	Session	Probedata	×	Singleton	Job Number	
Operator		2 MACHOPER	Session	Login El control Constant List	X	Collection	Operator	User
Hun	-		Session	Expanded Session List	×,	Singleton	NL Program	Dinc File
TOOLUSay	e	4 10015	2622000	1 001 Use Items	~	Singleton	Part Program	Dric File
					1			
	1	2.12		1		1		
<u>H</u> elp	,	N	ew	Modify	<u>R</u> emov	e		Close
		-			000000000			

Figure 13 – Machine Events/Data Items Screen

3.1 Data Items Tab

3.1.1 Column Descriptions

The figure above is a view of a typical Data Items screen. The (Undefined) and Run are built-in items. The others on the list were added by the end user.

The (Undefined) item is used if an EVT string is received that does not contain any of the defined items. It's a place holder and will show up in a report so that its origin can be investigated. It cannot be altered.

The Run item is intended for recording program start/end times. This item cannot be deleted but it can be modified.

Name is descriptive and is what the data item is called and listed as such in reports.

Number is an internally used ID number. If it is 0 or a negative number it is a built-in Data Item.

Label is what this data item will be called in the EVT Remote Request Command. (Always uppercase)

Type is either Generic, Session or State.

Generic type is one that stands alone. It has a name that is listed in reports; a label that is used in the EVT Remote Request Command; it can have an identifier; but it has no value list associated with it. For example, you might want to record when a tool or tool insert is replaced because of wear. This might happen after the program end and before the next start. The operator can output "EVT NEWTOOL/1045/T15" where perhaps a data item called New Tool with label, NEWTOOL, using the part program ID as an identifier. The T15, the tool number, will be recorded as received as part of the raw data field.

Session type is one in which the data item has a start and an end (open and close). However, you can also configure events that are simply "marked" as having happened after the session opens and before the session closes. For example, a part program starts, a tool change happens, another tool change happens the part program ends. A session type has a name, a label, an identifier and a Session List of values assigned to it.

State type is one that can be in one of several states (like radio buttons) when a new state begins the last one ends. For example, to track machine status the states might be Idle, Setting up, Running, Hold, Waiting for Material, Breaking Down... A state type has a name that is listed in reports, a label that is used in the EVT Remote Request Command, an identifier and a State List of values assigned to it.

Value List has the names of lists of events to associate with the data item. These lists are configured in the Session Lists and State Lists tabs. For example, the built-in Run data item uses the built-in Value List called (Session) which contains START as the open value, END as the close value and MARK for events that just happen – like a tool change, for example. The end user can create a different list to associate with run if he or she wishes.

Uses ID indicates whether or not an ID is required for this data item. For example, the Run item is for gathering data about the time it takes to execute a particular part program. So, an ID is required. What that ID is referred to in reports is the ID Name.

ID Name - When a data item ID is required, the ID Name is the identifier title for reports.

Data Item Type is either Singleton or Collection.

A **Singleton** type is where there must be an end for every start, a close for every open. If one part of a pair is found to be missing (for example, if two starts in a row are encountered in a Run session), a "dummy" end is inserted automatically but marked as an exception. Its DateTimeStamp will be the same as the second repeated value.

A **Collection** type allows multiple opens without a close necessarily for each open. "Dummy" closes are not inserted when a second open is encountered. An example of use of the Collection type is if you want to track operators running jobs and two or more operators are allowed to login to the same job at the same time.

Identifier Object/Identifier Mode is for validation (lookup) of the ID name. You can choose "(none)", "DNC File" or "User" as Identifier Objects. The choice of Identifier Modes is described below.

If you select "(none)" then only the *identifier* argument, as exactly as collected from the EVT string, will be recorded in the database to be displayed in reports.

If you select "DNC File" for validation of the *identifier* argument of the EVT string, the **Identifier Mode** defaults to DNC File ID (that is, the identifier argument of the EVT string is interpreted as a DNC File ID). It, as well as the actual DNC File Name, will be recorded in the database to be displayed in reports. If a valid DNC File Name cannot be found for the given ID then the item is marked *invalid*. *DNC File ID is* used because it is much more predictable than the DNC File Name which could be longer than the CNC's "DPRNT" allows or it might contain characters that the "DPRNT" does not allow. Furthermore, the DNC File Name can have multiple versions but each version has its own DNC File ID. The DNC File ID is guaranteed unique. The ID is listed along with the DNC File Name in SuiteFactory Runtime's files listing views.

If you select "User" as the **Identifier Object**, you then have a choice of making the Identifier Mode either User Name or User ID. This means that the *identifier* argument of the EVT string will be interpreted either as User Name or User ID as selected. The User ID is shown on the SuiteFactory User Properties screen.

3.1.2 Modifying a Data Item

To modify an existing Data Item listed on the Data Item tab, highlight that item and click on the Modify button. Selecting the built-in item Run and clicking Modify results in the following screen:

2	Edit Data Iten	n					X
	<u>N</u> ame Run				Remote Request Label	Number -1	
	Value <u>T</u> ype Session Selected Session List						
1	Name	Number	Open	Close	DataItems		
3	(Session)	-1	Start	End			
	Expanded Session List	1	Begin Program	End Program	1		
	Login	2	Login	Logout	1		
	Probedata	3	START	END	1		
	Tool Use Items	4	START	END	1		
	Requires an Identifier				Identifier Type Singleton		_
	Identifier Title in Reports						
	NC Program						
	Identifier <u>O</u> bject Type for	Validation			How to Compare Identifier	Value to Identifier Object	
	Dnc File			-	= DNC File Id		•
	Does not require Item Data				Item Data <u>T</u> ype		
] Text:		<u> </u>
					Item Data <u>D</u> escription		
	<u>R</u> eset					<u>D</u> K	Close

Figure 14 - Modify the Run Data Item

Note that you can change any of the fields that have a white background. You can change the name and label. You can select a different list of values from the Session List. (Since this is the built-in Data Item for use in the automatic insertion of "DPRNT" macro statements into selected DNC Files, the type must be Session so it cannot be changed and an Identifier is always required.) You can change the Identifier Title, whether it is a Singleton (Must have start and end pairs. System forces missing starts and end and marks them as exceptions) or Collection (Can have multiple starts without matching ends. The system does not force missing ends or starts.).

You can change the "Identifier Object Type for Validation" and its accompanying "How to Compare Identifier Value to Identifier Object".

The Session List selected in this example is the highlighted one, "(Session)." You can select any other one the list or create a new one. This is explained in the "Session List Tab" section, below.

3.2 Sessions Lists Tab

Clicking on the Sessions Lists tab one the Configure Machine Event Data Items screen results in the following screen:

51	Configure	Machine E	vent Da	ita Items			
	Consign Lists	on den 1 ogen ann	1				
	Name	Number Open		lose	Data Items		
	(Session)	-1 Start	En	nd	0		
	Program Pause Program Run User Login	3 Progra 2 Start F 1 Login	am Hold Pr Program Er Lo	rogram Resume nd Program ogout	1 1 1		
	Session Values	Number Label	Role [Default Has [X)ata Date Type	Data Description	
	End	1 START 2 END	Open Close	:x - x -			
							<u>E</u> dit Values
	<u>H</u> elp			New	<u>M</u> odify	<u>R</u> emove	Close

Figure 15 - Sessions Lists

The top portion of the screen shows the configured "Session Lists". The bottom portion shows the "Session Values" configured for the highlighted Session List name. In this example the built-in name, "(Session)" has values of (Unknown), Start and End. Start's role is "Open", End's role is "Close" and "(Unknown)" is the built-in default for the role "Mark." The other two values are defaults also. In a "session" type data item, the collected data must have open/close pairs. If, for example, two starts (opens) in a row show up then the system automatically inserts a "dummy" end (close) between the two starts. This "dummy" close is marked as an *exception* and has a datetimestamp equal to the second start.

As far as the default "(Unknown)" is concerned, this is to be able to save values that might be captured that are not configured. For example, the string, "EVT RUN/1045/TOOL" is captured from the RS-232 port of a CNC. The value, "TOOL" is not a configured value. So, what the system does is to save and display the information as received, record its status as "No Match" and give it the role, "Unknown". So, later when you get a report you can filter against event value "unknown" to find any unmatched values.

3.2.1 Column Descriptions – Session Lists

Name is the given name of the Session List.

Number is an internally used ID number. If it is 0 or a negative number it is a built-in Session List.

Open, Close and Mark are the default values for those three roles in the selected Session List..

Data Items shows the number of Data Items to which the Session Lists is assigned.

3.2.2 Column Descriptions – Session Values

Description is the description of the session value as shown in reports.

Number is an internally used ID number.

Label is what is entered in the EVT string value argument (Always uppercase).

Remember the events string format: EVT data item, identifier, value, extra data

Role can be either open, close or mark. In a session item, there must be a start (open) and end (close). Other values that are one time events (a tool change, for example) are configured to have the role, "mark".

Default values are required so that if there is a missing value of a paired open/close set then the system can add a "dummy" record, marked as an exception, to enforce the session pair rule. Session lists have a predefined, non-modifiable value, "(Unknown)" defined as the Mark role's default. If an unknown value is captured it will be saved and assigned the default role so that it can be viewed in reports.

Has Data is a flag that indicates that a value can include extra data which will be saved in the database and can be viewed in reports. For example, if you configure a "mark" role value, "programmed hold", you could add an extra data field that could contain the reason for the hold.

Another example is to include a measurement done by a probe. Define a value called Diameter A with a floating point data field.

Data Type indicates whether the extra data as described in the paragraph, above, is text, integer or floating point data.

Data Description describes what the extra data field is for.

3.2.3 Creating and Selecting a New Session List

Let's say we want to expand the capability of the data item, Run, beyond START, MARK, END. On the Sessions List screen click on New and a screen similar to the following results:

Define New Session List	
Name Number Session List 3 3	
Configure the set of Session ⊻alues	
Description Number Label Role Default Has Data Date Type Data Description	<u>R</u> eset
	New
	Edit
	Delete
I Diagon define default values for the Session Dalas (Open). (Clease) and Marki	
	Cancel

Figure 16 - New Session List

Let's call the new list Program Run and add several new values by clicking on New and putting in there names, labels and roles.

F	Edit Session	List D	efinition	le.						
N	lame				N <u>u</u>	umber				
F	^P rogram Run				2					
Ľ,										
	Configure the set of Ses	sion <u>V</u> alues	-							1
	Description	Number	Label	Role	Default	Has Data	Date Type	Data Description		<u>R</u> eset
	Unknown)	0	?	Mark	×	20	12			
	Start Program	1	START	Upen	×	13	10	5		
		2	TUUL	Mark		•	27	÷.		New
		4	END	Llose	X	1	1.5			
		5	PRUGHULD	Mark		• 3.				Edit
	Program Resume	6	RESUME	Mark	-	-1	2.5	-		
										1
										Delete
	1									
										0
									<u>0</u> K	Cancel
							_			

Figure 17 - Creating a new session list

In addition to START with role open and END with role close we've added Programmed Hold, Program Resume, Tool Change and Unknown all with role mark.

The Edit Session Value screen looks similar to this:

Edit Session Value	×
Session List Name: Program Run Number: 2	
Description	
Start Program	Session <u>R</u> ole
Remote Request Command Label <u>N</u> umber	Mark Open Close
Default Value for Selected Session Role Has Value Data	
Value Data <u>Type</u>	Value Data <u>D</u> escription
	Help
	<u>Q</u> K <u>Cancel</u>

Figure 18 – New or Edit Session Value Start Program

The value, "Start Program" is given the label, "START" and Session Role of Open. It is also selected as the default value for the selected Session Role, Open. Here is where, in addition to configuring the label, role and default, you can configure the extra data field if required.

To complete the process, save your changes by clicking OK, returning to the Edit Session List Definitions screen.

5	Edit Session	List De	efinition						
N	ame				N <u>u</u>	imber	N.5		
F	rogram Run				2		-		
1									
F	Configure the set of Sess	ion <u>∨</u> alues							
	Description	Number	Label	Role	Default	Has Data	Date Type	Data Description	Reset
	End Program	4	END	Close	X	-	-	-	
	Program Resume	6	RESUME	Mark	×	-	-	-	
	Programmed Hold	5	PROGHOLD	Mark	800	15		5	Neu
	Start Program	1	START	Open	Х	-	12	-	<u>IZ</u> EW
	Tool Change	2	TOOL	Mark	-	-	-	-	[]
	Unknown Value	3	UNKNOWN	Mark	×	-	5	5	<u>E</u> dit
									Delete
	5							>	
							A	OK	
							Арру	<u>U</u> K	

Figure 19 - Edit Session List Definition Screen

Click OK to return to the Session List tab of the Edit Machine Event Data Items screen.

5	Configure	Mach	ine Ev	ent D	ata Ite	ems						
	ata Items <u>S</u> essic	on Lists S	tate Lists									
9	- Session Lists											
ſ	Name	Number	Open		Jose	Mark		Data Items				
	(Session)	-1	Start	F	nd	Mark		0				
	Program Bun	2	Start Prog	ram E	nd Program	Unknow	/n Value	ĭ				
	User Login	1	Login	L	ogout	Comme	ent	1				
1												
9	Session <u>V</u> alues											
[Description	Nur	nber Labe	əl	Role	Default	Has Data	Date Type	Data D	escription		
	End Program		4 END)	Close	Х	10		-			
	Program Resume		6 RES	UME	Mark	-	1.0	-	. .			
	Programmed Hold		5 PRO	GHOLD	Mark	-	-	-	.			
	Start Program		1 STA	RT	Open	×	-	-	-			
	Tool Change		2 TOO	θL	Mark	-	-	-	-			
	Unknown Value		3 UNK	NOWN	Mark	X	-	-	-			
												1
											<u>E</u> dit Values	
		1			[?***				1			1
	<u>H</u> elp			<u>N</u> ew		<u>M</u> odify	/	<u>R</u> emove			Clos	e
_												

Figure 20 - Configure Machine Event Data Items Screen

Now you must assign the new Value List to the Data Item, Run. Click on the Data Items tab.

ø	Configure Ma	chine Ev	vent Data	ltems					
	Data Items Sessio	n Lists S <u>t</u> at	e Lists						
	Data <u>I</u> tems								
	Name	Number	Label	Туре	Value List	Uses ID	ID Name	Data Item Typ	e Identifier Object
	(Undefined)	0	OTATUO	Generic	Mashina Status			Singleton	
	Operator Login	2	OPER	Session	User Login	×	Operator	Singleton	User
	Run	-1	RUN	Session	(Session)	X	NC Program	Singleton	Dnc File
	1								×
		1			1.1	1		1	
	Help		1	lew	Modify		<u>R</u> emove		Close
-		_							

Figure 21 - Configure Machine Event Data Item Screen

Highlight Run and click Modify

.

🖪 Edit Dat	a Item							×
<u>N</u> ame					Remote Rec	quest <u>L</u> abel	Number	
Hun					RUN			
Value <u>T</u> ype								
Session								
Selected Session	<u>L</u> ist							
Name	Number	Open	Close	Mark		Data Items		
(Session)	-1	Start	End	Mark		1		
Program Run	2	Start Program	End Program	Unkno	own Value	0		
OserLogin		Login	LUGUUI	Comm	ient			
Requires an Ident	ifier							
Identifier Title in	n Reports				Data Item	Гуре		
NC Program					Singleton			•
					, -			
Identifier Obiec	t Type for Va	alidation			How to Cor	mpare Identifier \	√alue to Identifier Obiect	
Dnc File				•	Identifier	alue equals DNI	C File Id	T
15.161.110					Justitutor	ciae equilite priv		
	1					. [01	
<u>R</u> eset					A	ppiy	UK	Cancel

Figure 22 - Edit Data Item Run

You should find that the built-in Value List, "(session)" is highlighted. Choose Program Run instead and click OK.

5	Configure	Machine	Even	t Data	Items				
	Data Items Sessio	n Lists S <u>t</u> ate L	_ists]						
	Data <u>I</u> tems							-24	
	Name	Number La	abel	Туре	Value List	Uses ID	ID Name	Data Item Type	Identifier Object
	(Undefined)	0		Generic	11.10.20.			Singleton	
	Machine Status	2 5		State	Machine Status	0	Oranatan	Singleton	Lines
	Operator Login	-1 BI		Session	Oser Login Program Bun	×	NC Program	Singleton	Dnc File
	i tuit			00001011	riogramman	^	Ronogian	ongleton	
	<			1111					>
F	11-1-	1	NI		1		Deserve	1	0
	Нер		<u>N</u> e	3W	Modify		Remove		Liose
						the second s			

Figure 23 - Data Item Screen showing new Value List Assignment

Note that now the Value List assignment has been changed from "(session)" to the new list, called "Program Run".

The Session Lists screen with the new Program Run entry highlighted looks like this:

5	Edit Session	List D	efinition							
N	ame				N	<u>u</u> mber				
F	Program Run				2					
-	Configure the set of Ses	sion Values								
	Description	Number	Label	Role	Default	Has Data	Date Type	Data Description		Baset
	Unknown)	0	?	Mark	X					<u></u>
	Start Program	1	START	Open	X	-		.		
	Tool Change	2	TOOL	Mark	•	-		•		N
	End Program	4	END	Close	X	.	5 .	5 2		New
	Programmed Hold	5	PROGHOLD	Mark		÷				·
	Program Resume	6	RESUME	Mark	1 0	÷1	14	¥1		<u>E</u> dit
										Delete
]									
								Applu	ПK	Cancel
							_	OPPy -		

Figure 24 - Session list showing Program Run Values

Say you want to get more specific regarding the Tool Change value to output what tool was changed. To do this you have to add a data field to Tool Change. In the Session List tab view, click Modify.

E	Edit Session	List D	efinition							
Ν	lame				Nu	umber				
ſ	Program Run				2					
1										
F	Configure the set of Ses	sion <u>V</u> alues								
	Description	Number	Label	Role	Default	Has Data	Date Type	Data Description		<u>R</u> eset
	Unknown)	0	?	Mark	×	20	12			
	Start Program	1	START	Open	X	-	•	-		
	Tool Change	2	TOOL	Mark			•	•		New
	End Program	4	END	Close	X	-		5		
		5	PROGHOLD	Mark	-	-	15	-		E D
	Program Resume	6	RESUME	Mark	-	-		20		Edit
										<u>D</u> elete
	,									
									<u>0</u> K	<u>C</u> ancel
							_			

Figure 25 - Editing Tool Change

Highlight the Tool Change item and then click Edit.

Edit Session Value		×
Session List Name: Program Run Number: 2		
Description		
Tool Change	Session <u>R</u> ole	
Remote Request Command Label Number	Mark Open Close	
Default Value for Selected Session Role		
Has Value Data		
Value Data <u>T</u> ype	Value Data Description	
Text		
	Help	
	<u>O</u> K <u>C</u> ancel	

Figure 26 - Tool Change Edit Screen

Checkmark "Has Value Data", select Integer as the "Value Data Type" and type Tool Number in the "Value Data Description" field.

Edit Session Value		×
Session List Name: Program Run Number: 2		
Description		
Tool Change	Session <u>B</u> ole	
Remote Request Command Label Number	Mark Open Close	
Default Value for Selected Session Role		
🔽 Has Value <u>D</u> ata		
Value Data <u>T</u> ype	Value Data Description	
Integer 👤	Tool Number	
		1
	_	Help
		1
	<u>K</u>	<u>C</u> ancel

Figure 27 - Edited Tool Change Value

Click OK to finish and return to the previous screen.

5	Edit Session	List D	efinition							
Na	ime				N,	umber				
Pr	ogram Run				2	3				
	Configure the set of Ses	sion <u>V</u> alues								
	Description	Number	Label	Role	Default	Has Data	Date Type	Data Description		Beset
	🗌 (Unknown)	0	?	Mark	X	20	1	-		
	Start Program	1	START	Open	×	10	÷	1		
	Tool Change	2	TOOL	Mark		X	Integer	Tool Number		Nou
	End Program	4	END	Close	X	52	1.	58		<u>I4</u> 600
	Programmed Hold	5	PROGHOLD	Mark		-	15	51		[[[]]]
	Program Resume	6	RESUME	Mark	-	- 1	-	÷1		<u>E</u> dit
										<u>D</u> elete
								Annly	ПК	Cancel
								CPPS	<u> </u>	

Figure 28 - Edit Session List Definition Screen showing the extra data added for Tool Change

Click OK to return to last screen. Click Close on subsequent screens until you return to the Machine Events tab of the General System Configuration screen. Wait until the Communications Engine re-starts and then click on the Close (the door) icon to return to the main tool bar of SuiteFactory Runtime.



Figure 29 - Main Tool Bar

3.2.4 Report Results using the new Program Run Session List

For example, the part program with ID number 1045 being executed on a FANUC CNC includes the following DPRNT statements in the appropriate places in that program:

(Shown here are the DPRNT lines by themselves. The actual program will have all the lines similar to that shown in the first section of this Technote.)

DPRNT[EVT*RUN/1045/START]

DPRNT[EVT*RUN/1045/TOOL/12]

DPRNT[EVT*RUN/1045/HOLD

DPRNT[EVT*RUN/1045/RESUME]

DPRNT[EVT*RUN/1045/TOOL/23]

DPRNT[EVT*RUN/1045/END]

.The following page shows the six records in the Machine Events Report resulting from these six DPRNT statements being executed on a CNC.

The report shows that the data was received from machine 0203 Mori-Seiki SL25. Note the Role column. The first record is an "open". The last record is a "close". The elapsed time is recorded as the difference between the open time and close time. The rest of the records are "marks". They just happen when they happen. The elapsed time shown is the difference between the "open" record and the "mark" record. For example, the Programmed Hold record took place 7 minutes and 3 seconds after the Program Start record was received.



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SuiteFactory Technote



Machine Events

DateTimeStamp	Data Item	Identifier		Value Type	Role S	tatus Serial Number
0203 Mori-Seiki SL2	25					
2007/07/06 12:33:16 Identifier Object Typ Raw Data: RUN/1	Run e: Dnc File 1045/START	NC Program Status: Valid	1045 Id: 1045	Start Program Sessio Name: 00001403 Vers	n Open sion: 1	11-6A-7D776C1B0-00000002
2007/07/06 12:35:13 Identifier Object Typ Data: Tool Number Raw Data: RUN/1 Start: 11-6A-7D7760	Run e: Dnc File 1045/TOOL/12 C1B0-00000002	NC Program Status: Valid , type = Integer 2007/07/06 12:33:16	1045 Id: 1045 , value = 12 Elapsed: 0	Tool Change Sessio Name: 00001403 Vers Status: Valid days 00:01:57	n Mark sion: 1	11-6A-7D776C1B0-000000003
2007/07/06 12:40:19 Identifier Object Typ Raw Data: RUN/1 Start: 11-6A-7D7760	Run e: Dnc File 045/PROGHOLD C1B0-00000002	NC Program Status: Valid 2007/07/06 12:33:16	1045 Id: 1045 Elapsed: 0	Programmed Hold Sessio Name: 00001403 Vers days 00:07:03	n Mark sion: 1	11-6A-7D776C1B0-00000004
2007/07/06 12:42:30 Identifier Object Typ Raw Data: RUN/1 Start: 11-6A-7D7760	Run e: Dnc File 1045/RESUME C1B0-00000002	NC Program Status: Valid 2007/07/06 12:33:16	1045 Id: 1045 Elapsed: 0	Program Resume Sessio Name: 00001403 Vers days 00:09:14	n Mark sion: 1	11-6A-7D776C1B0-00000005
2007/07/06 12:43:46 Identifier Object Typ Data: Tool Number Raw Data: RUN/1 Start: 11-6A-7D7760	Run e: Dnc File 1045/TOOL/23 C1B0-00000002	NC Program Status: Valid , type = Integer 2007/07/06 12:33:16	1045 Id: 1045 , value = 23 Elapsed: 0	Tool Change Sessio Name: 00001403 Vers Status: Valid days 00:10:30	n Mark sion: 1	11-6A-7D776C1B0-00000006
2007/07/06 13:01:43 Identifier Object Typ Raw Data: RUN/J Start: 11-6A-7D7760	Run e: Dnc File 045/END C1B0-00000002	NC Program Status: Valid 2007/07/06 12:33:16	1045 Id: 1045 Elapsed: 0	End Program Sessio Name: 00001403 Vers days 00:28:27	n Close sion: 1	11-6A-7D776C1B0-00000007



3.3 State Lists Tab

Let's say you want to be able to record the current state of a machine from idle to running a job to waiting for something to.... Select the State Lists tab on the Configure Machine Events Data Item screen.

Configure Machine Event Data Items	
Data Items Session Lists State Lists	
Name Number Data Items	
State <u>V</u> alues	
Edit	Values
Help New Modify Bemove	Cļose

Figure 30 - State Lists Screen

Click on New.

Define New State List	
Name Number	
Configure the set of State <u>V</u> alues Description Number Label Default Has Data Data Type Data Description ☐ (Unknown) 0 ? X · · · · · · · · · · · · · · · · · ·	<u>R</u> eset
	<u>N</u> ew Edit
Please define at least 2 state values Apply DK	Cancel

Figure 31 - Define New State List

Click New.	
Define New State Value	
State List Name: Machiine States Number: 1	
Description State Value 1	
Remote Request Command Label Number	
☐ Has <u>D</u> ata	
Data <u>T</u> ype	Data Description
	Help
	<u> </u>

Figure 32 - Define New State Value

Fill in the data you require for as many new states as you need.

E	Edit State List	Defini	ition						
N	ame				Number	-			
N	fachiine States				1				
1									
F	Configure the set of State Va	lues							
	Description	Number	Label	Default	Has Data	Data Type	Data Description		Reset
	🔲 (Unknown)	0	?	×		1020	÷		
	Idle Idle	1	IDLE	15					
	Setting Up	2	SETUP	57	X	Text	Job Number		New
	☐ Waiting	3	WAITING		X	Text	Waiting for:		<u>Idean</u>
	Running	4	RUNNING		Х	Text	Program		[[[[]]]]
	Breaking Down	5	BREAKINGDN		-				Edit
	Down for Maintenence	6	DNMAINT						
									Delete
	ļ								
							Analu	OK	Canad
							Apply	<u></u>	

Figure 33 - Machine Status Values

ck OK.								
Configure Machine Event Data Items								
2ata Items Session Lists tate Lists Name Nu Machiine States	State Lists mber Dat	a Items						
itate <u>V</u> alues	Number	Label	Default	Has Data	Data Tune	Data Description	[
(Unknown)	n number	2	Verduit	Tids Data	Data Type	- Data Description		
die Setting Up Waiting Running Sreaking Down Down for Maintenence	1 2 3 4 5 6	IDLE SETUP WAITING RUNNING BREAKINGDN DNMAINT		· × × × · ·	Text Text Text	Job Number Waiting for: Program		
								<u>E</u> dit Values
Help		<u>N</u> ew		<u>M</u> odify		<u>R</u> emove		Close

Figure 34 - State List Screen Showing the New List

Click on the Data Items tab and create an new item called Machine Status and fill in the fields required. The value type is State, therefore, any defined State Lists appear in the lower box. In this case the only State List that was just defined, Machine States is there. Requires an Identifier is selected with user name as the requirement. In reports the user field will be labeled "Operator".

🖬 Define New Data Item	
Name Machine Status	Remote Request Label Number
Value <u>Type</u> State]
Selected State List	
Machiine States 1 0	
✓ Reguires an Identifier	
Identifier Title in Reports Operator Name	Data Item Type Singleton
Identifier <u>O</u> bject Type for Validation User	How to Compare Identifier Value to Identifier Object Identifier value equals User Name
<u>R</u> eset	Apply <u>O</u> K <u>C</u> ancel

Figure 35 - Machine Status Data Item Defined

Click OK to return to the Data Items screen.

Configure I	Machin	e Eve	nt Data	Items					
Data Items Session	n Lists S <u>t</u> al	te Lists							
Data <u>I</u> tems									
Name	Number	Label	Туре	Value List	Uses ID	ID Name	Data Item Type	Identifier Object	Identifier M
(Undefined)	0		Generic				Singleton		
Machine Status	4	MSTAT	State	Machiine States	×	Operator Name	Singleton	User	Identifier v.
Operator Login	1	OPER	Session	User Login	×	Operator	Singleton	User	Identifier v
Program Pause	3	PAUSE	Session	Program Pause	×	Dnc File	Singleton	Dnc File	Identifier v
Run	-1	RUN	Session	Program Run	×	NC Program	Singleton	Dnc File	Identifier v
<				Ш					>
Help			<u>N</u> ev	v	<u>M</u> odify	<u>R</u> emo	ve		Close

Figure 36 - Data Items Screen Showing the Machine Status Item

Click Close, wait for the communications engine to restart and click on the Close (the door) icon to return to the main toolbar.

3.4 Using the Machine Status Data Item

Setup man Bob is going to set up a new job AD8890-52. So he creates program O1234 as shown here using the CNC editor.

```
%
O1234
(EVT MSTAT/BOB/SETUP/AD8890-52)
M02
```

Bob outputs this program via the RS-232 port to SuiteFactory.

A while later, Bob finishes setup and turns the job of running the machine to operator Guy. Guy changes O1234 to

% O1234 (EVT MSTAT/GUY/RUNNING/002348) M02

002348 is the name of the part program for job AD8890-5. Guy outputs O1234 via the RS-232 port to SuiteFactory.

Part way through the run, Guy runs out of material so he changes O1234 to

% O1234 (EVT MSTAT/GUY/WAITING/MATERIAL) M02

Guy outputs O1234 via the RS-232 port to SuiteFactory.

Material arrives and Guy outputs

% O1234 (EVT MSTAT/GUY/RUNNING/002348) M02

When Guy is done with the run he turns the machine back to setup man Bob who then outputs

% O1234 (EVT MSTAT/BOB/BREAKINGDOWN) M02

When Bob is finished breaking down the job he determines the machine is ready for scheduled maintenance and outputs

% O1234 (EVT MSTAT/BOB/DNMAINT) M02

Finally, when maintenance is complete and if there is no new job to set up, Bob outputs

```
%
O1234
(EVT MSTAT/BOB/IDLE)
M02
```

Or he outputs the setting up message with the new job number and starts the process again.

3.4.1 Resulting Report

The following pages show the resulting report for 0203 Mori-Seiki SL25



SuiteFactory Technote

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0203 Mori-Seiki SL25

2007/07/11 12:21:22	Machine Status	Operator N	ame	BOB		Idle		State	Begin		11-6A-
7D77BCF1F-00000001											
Identifier Object Type:	User	Status:	Valid		ld: 6	Name:	BOB				
Raw Data: MSTAT/E	BOB/IDLE										
2007/07/11 12:22:43	Machine Status	Operator N	ame	BOB		ldle		State	End		11-6A-
7D77BCF1F-00000002											
Identifier Object Type:	User	Status:	Valid		ld: 6	Name:	BOB				
Raw Data: MSTAT/E	BOB/IDLE										
Start: 11-6A-7D77BCF	TF-00000001	2007/07/11 12	:21:22	E	lapsed: 0	days 00:0	1:21				
2007/07/11 12:22:43	Machine Status	Operator N	ame	BOB	•	Setting Up		State	Begin		11-6A-
7D77BCF1F-00000003		•				0 1			0		
Identifier Object Type:	User	Status:	Valid		ld: 6	Name:	BOB				
Data: Job Number		, Type = Text		, Value	AD3215-098	8			Status:	Valid	
Raw Data: MSTAT/E	BOB/SETUP/AD3215	-098		,							
2007/07/11 12:24:13	Machine Status	Operator N	ame	BOB		Setting Up		State	End		11-6A-
7D77BCF1F-00000004						J					
Identifier Object Type:	User	Status:	Valid		ld: 6	Name:	BOB				
Data: Job Number		Type = Text	, and	Value	AD3215-098	8	202		Status:	Valid	
Raw Data: MSTAT/F	BOB/SETUP/AD3215	-098		,		-			e la la la la	, and	
Start: 11-6A-7D77BCF	TF-00000003	2007/07/11 12	.22.43	F	lapsed 0	days 00.0	1.30				
2007/07/11 12:24:13	Machine Status	Operator N	ame	GUY	apooa. o	Running		State	Begin		11-6A-
7D77BCF1F-00000005		oporator				. taning		01010	209		
Identifier Object Type	User	Status:	Valid		ld [.] 5	Name [.]	GUY				
Data: Program		Type = Text		Value	00001162				Status:	Valid	
Raw Data: MSTAT/	SUY/RUNNING/0000	1162		, value	00001102				olatao.	Valia	
2007/07/11 12:25:17	Machine Status	Operator N	ame	GUY		Running		State	End		11-64-
7D77BCE1E-00000006		operator n	unic	001		rtanning		Oldie	End		11 0/ (
Identifier Object Type	llser	Status	Valid		ld 5	Name [.]	GUY				
Data: Program	0001	Type = Text	vana	Value	00001162	Nume.	001		Status	Valid	
Raw Data: MSTAT/		1162		, value	00001102				Olalus.	valia	
Start: 11-64-7D77BCE	1E-00000005	2007/07/11 12	.24.13	F	lansed 0	dave 00.0	1.04				
2007/07/11 12:25:17	Machine Status	Operator N	ame	GUY	iapscu. 0	Waiting	1.04	State	Regin		11-64-
7D77BCE1E_0000007		operator N	unic	001		valung		Olaic	begin		11-0/1-
Identifier Object Type:	Lleor	Statue	Valid		ld 5	Namo:	CUV				
Data: Waiting for:	USEI	Type = Text	valiu	Value		Name.	001		Status	Valid	
Paw Data: MSTAT/				, value					Status.	valiu	
2007/07/11 12:26:07	Machino Status		200	CUV		W/aiting		State	End		11.64
Z007/07/11 12.20.07	Machine Status	Operator N	ame	901		waiting		Siale	LIIU		TT-UA-
Identifier Object Type:	Lleor	Status	Valid		ld 5	Name	CUV				
Dete: Waiting for:	USEI		valid	Value		iname:	GUY		Ctatura	Valid	
Data. Waiting IOF.		, iype = iext		, value	IVIATERIAL				Status:	valiu	
	30 1/WALLING/WALL	2007/07/14 40	.05.17	-		dava 00.0	0.50				

Start: 11-6A-7D77BCF1F-00000007 2007/07/11 12:25:17 Elapsed: 0 days 00:00:50

> 43 Created by Ron Lamkin 7/26/07 Edited 3/15/11

2007/07/11 12:26:07	Machine Status	Operator Name	GUY	Running	State	Begin	11-6A-
7D77BCF1F-00000009							
Identifier Object Type:	User	Status: Valid	ld: 5	Name: GUY			
Data: Program		, Type = Text	, Value 00001162			Status: Valid	
Raw Data: MSTAT/0	GUY/RUNNING/00001	162					
2007/07/11 12:27:54	Machine Status	Operator Name	GUY	Running	State	End	11-6A-
7D77BCF1F-0000000A							
Identifier Object Type:	User	Status: Valid	ld: 5	Name: GUY			
Data: Program		, Type = Text	, Value 00001162			Status: Valid	
Raw Data: MSTAT/C	GUY/RUNNING/00001	162					
Start: 11-6A-7D77BCF	1F-00000009	2007/07/11 12:26:07	Elapsed: 0	days 00:01:47			
2007/07/11 12:27:54	Machine Status	Operator Name	BOB	Breaking Down	State	Begin	11-6A-
7D77BCF1F-0000000B							
Identifier Object Type:	User	Status: Valid	ld: 6	Name: BOB			
Raw Data: MSTAT/E	BOB/BREAKINGDN						
2007/07/11 12:28:54	Machine Status	Operator Name	BOB	Breaking Down	State	End	11-6A-
7D77BCF1F-0000000C				-			
Identifier Object Type:	User	Status: Valid	ld: 6	Name: BOB			
Raw Data: MSTAT/E	BOB/BREAKINGDN						
Start: 11-6A-7D77BCF	1F-0000000B	2007/07/11 12:27:54	Elapsed: 0	days 00:01:00			
2007/07/11 12:28:54	Machine Status	Operator Name	BOB	Down for Maintenen	State	Begin	11-6A-
7D77BCF1F-0000000D						-	
Identifier Object Type:	User	Status: Valid	ld: 6	Name: BOB			
Raw Data: MSTAT/E	BOB/DNMAINT						



4 Appendix A

4.1 Editing the EVT Remote Request Command

From the SuiteFactory Runtime main toolbar, select Configure/Machine. Select the machine to be edited and click on Properties. Select the Protocol Tab then the Remote Request Parameters tab and then the Customized Commands tab.

Achine Properties: 0203	Mori-Seiki SL25			×			
General Communication Protocol	Conversions]						
Send Protocol		Receive <u>P</u> rotocol					
Generic RS232	•	Generic RS232		•			
Sand Data Tuna		Reseive Data Tura					
Ascu		Ascil					
1000		[ABOI					
Send Receive Remote Request F	'arameters						
Style Customized Commands Re	sponses Name Rules						
				1			
Get DNC File and Loop Get DNC File Once Get DNC File Once by Drip-Feed Help Help Topics List DNC Files List Templates Machine Event Operator Identification Queue to Save Replace Save This DNC File Send Selected DNC File Start Next Item on the Queue	Name Format Image: Control of the second secon						
Configure Customized Remote Requests							
Copy <u>P</u> arameters from And	other Machine	<u>O</u> K	Close	Apply			

Figure 37 - Editing the Machine Event Remote Command

Click on Configure Customized Remote Requests, highlight "Machine Event" and click Edit.

쾁 Mach	<mark>ы</mark> м	achine Properties: 0203 Mori-Seiki SL25	×
: Eile Edi	Ge	Edit Remote Request Customized Command Text	
4 Norm	Se	्र 🖬 Edit Remote Request Command	
L · .	Se A	Modify Command: Machine Event Original Label: EVT Command Label Set to Default	
с. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.		Get DNC File Once by Drip-Feed (GETDRIPFEED dnc_file_name, dnc_file_version, start_from_search_text) search_text) Get DNC File Once by Drip-Feed (GETDRIPFEED dnc_file_name, dnc_file_version, start_from_search_instance, start_from_search_text) Search_text) Help (HELP name) Help Topics (HELPTOPICS) List DNC Files (LIST resource_collection, filter, length, start) List Templates (LIST resource_collection, filter, length, start) List Templates (LIST removed) Machine Event (EVT data item, identifier, value label, value data, extra data) Operator Identification (OPER operator_name, remote_request_command) Oucue to Save (QUEUETOSAVE new dnc_file_name)	
· L		Replace (REPLACE dnc_file_name, dnc_file_version) Save This DNC File (SAVE file_name) Send Selected DNC File (SENDSELECTED)	
		Enable All Enable Disable All Reset Enabling Edit	* 2
	-	Reset All OK Close Apply	
Page 4			
	nrt	🖉 🕺 🗶 🧮 😫 Inbox 🔛 Machin 💶 SuiteF 😰 SuiteF 🛛 🥥 🕵 🔊 🕅 🏘 11:25	АМ

Figure 38 - Editing the EVT Command

Now you can change "EVT" to something else. Click OK ...

Edit Remote Request Customized Command Text							
Commands Delimiters UST Parameters CNC E-Mail Parameters Machine Events							
Machine Event Argument Separator							
✓ Macros Require Representing 'Space' Characters With a Space Substitute Character							
Machine Event <u>S</u> pace Substitute Character							
Macros Allow Only Alphabetic and Numeric Characters in Event Identifier Fields							
Machine Event Identifier Substitute Character							
Save Machine Event Data to SuiteFactory Database							
Target Path for Posting Machine Events							
Browse							
	1						
Reset All OK Cancel Apply							