SuiteFactory Technote

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

SuiteFactory Enterprise
Machine Monitoring Option

Table of Contents

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

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.

SuiteFactory Technote
Machine Monitoring Option

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.
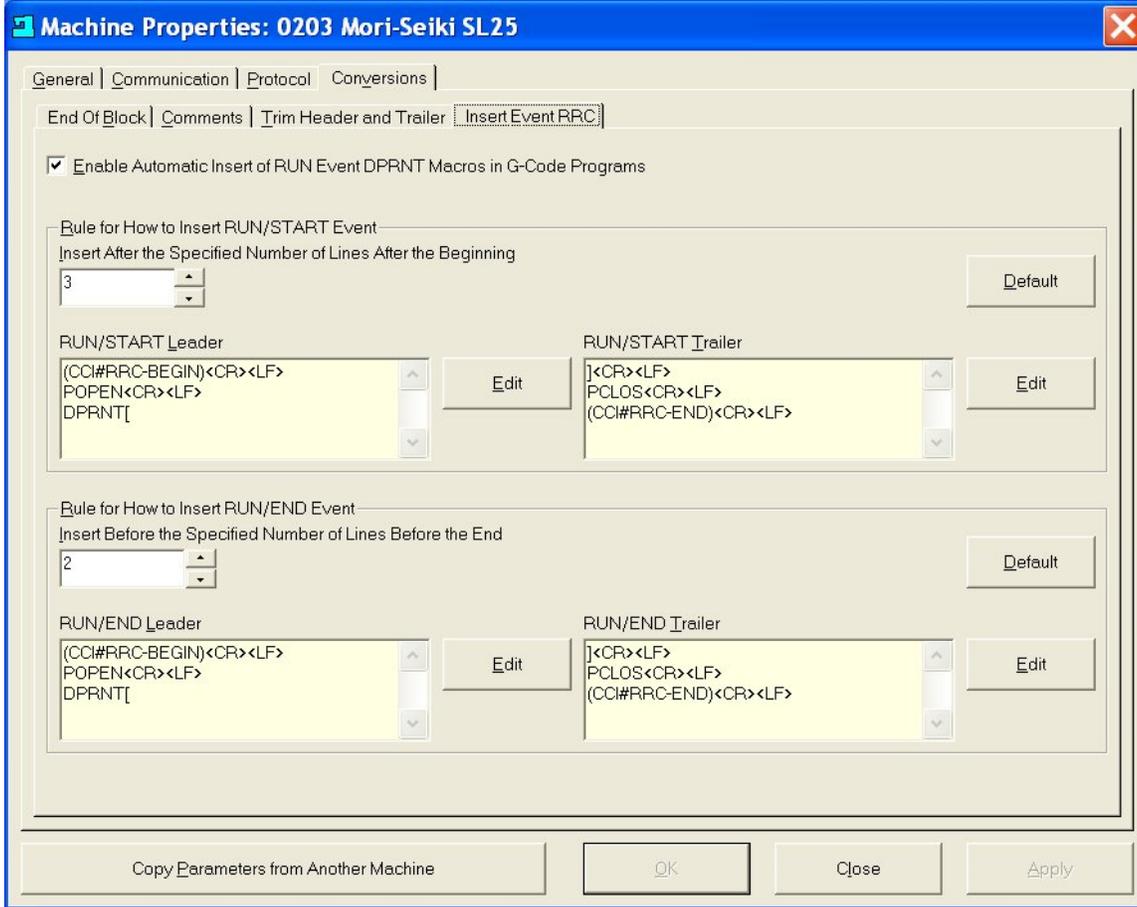
Figure 1 - Configuring DPRNT Macro Insertion Utility

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.

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 → Files. File Cabinets are shut off.
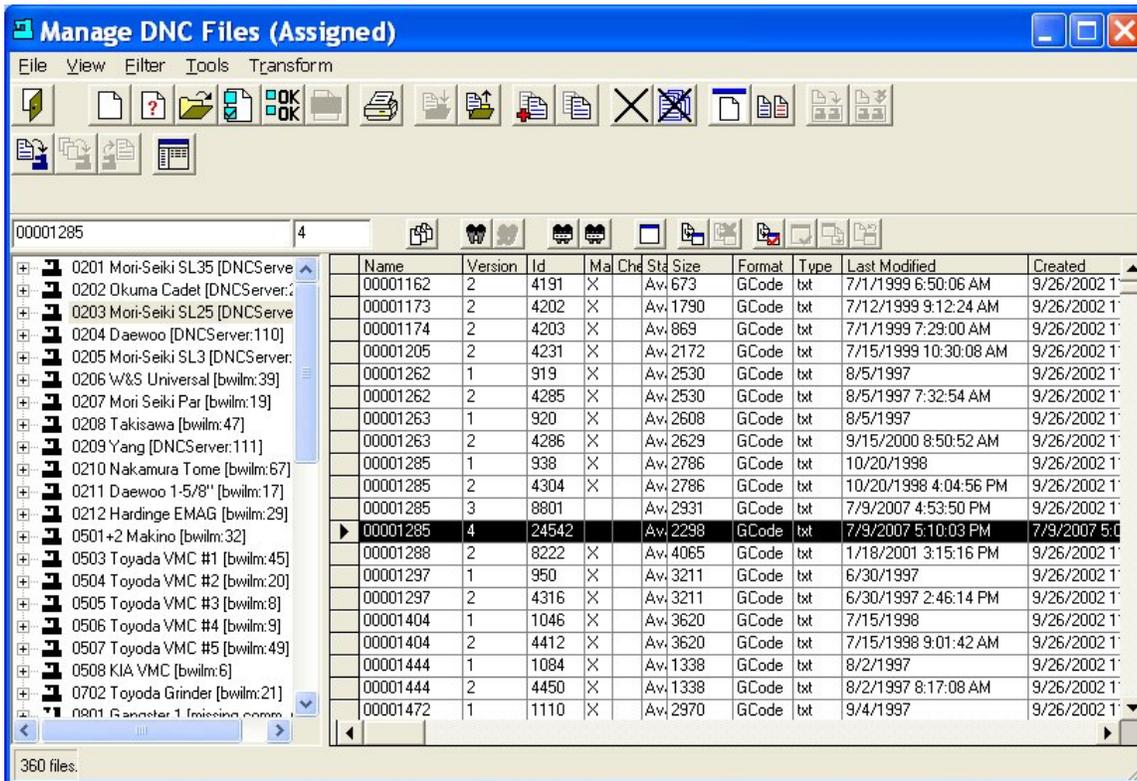
Figure 3 - Manage DNC Files

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.
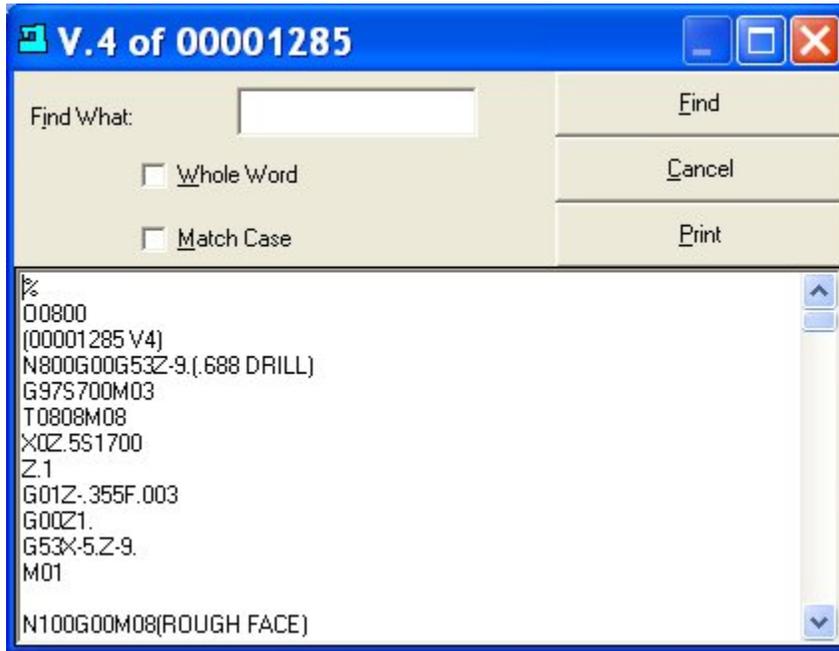
Figure 4 - Top of a DNC File before adding Macro Statements
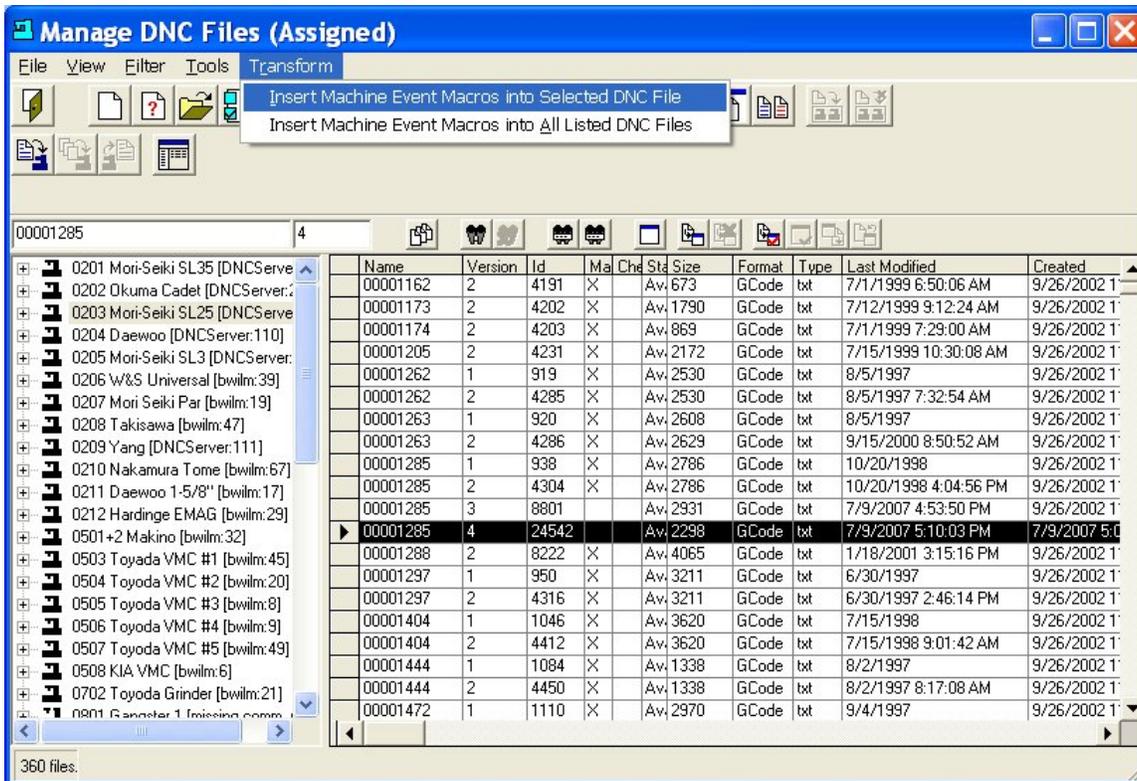
Figure 5 - Click on Transform

Click on Transform. Select "Insert Machine Event Macros into Selected DNC File".
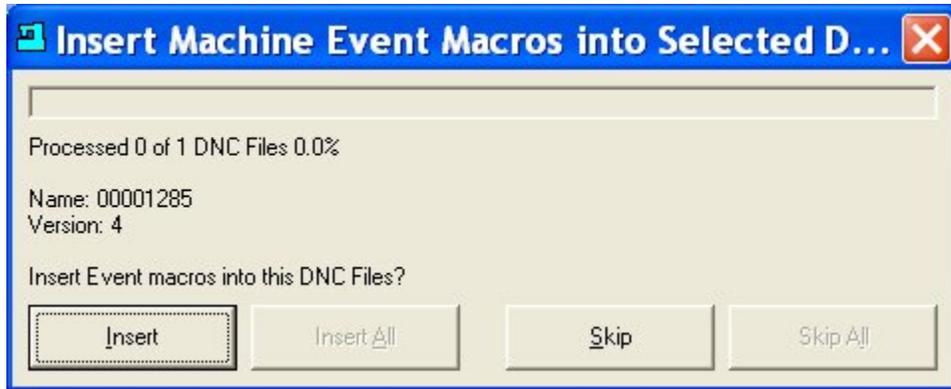
Figure 6 - Insert Macros

Click Insert.
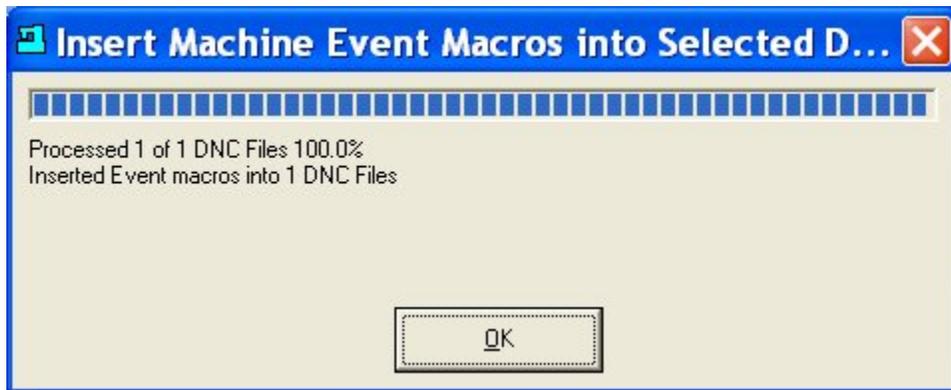
Figure 7 – OK

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.
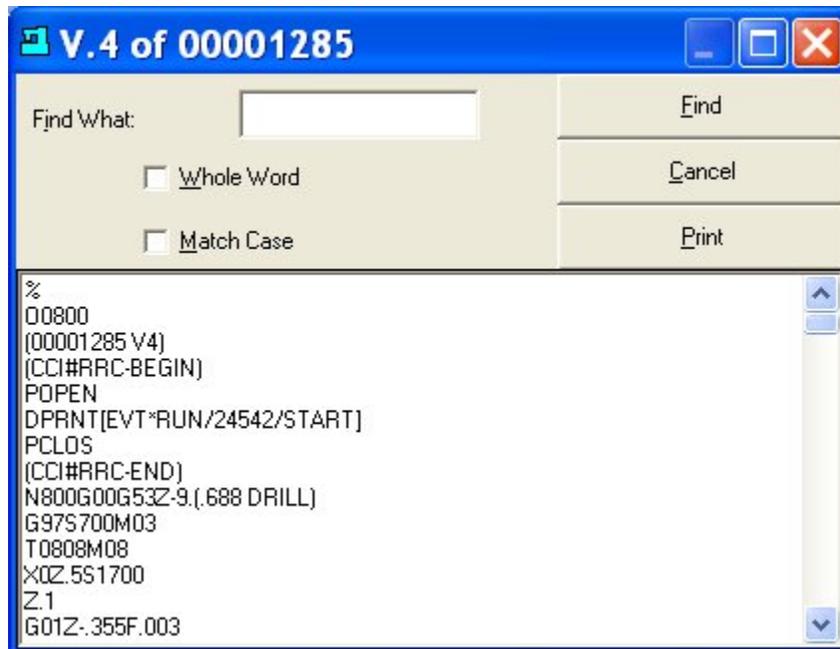
Figure 8 - Macro Lines Added

8

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.

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.

Machine	Last Event	DNC File	Version	Id	Status	% 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	
MC40	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	
OKU5000	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	

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.
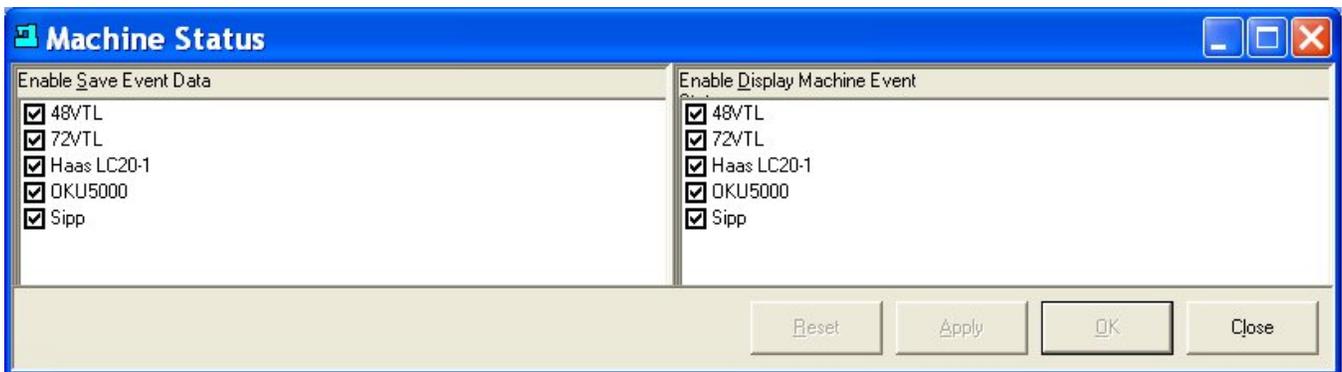
Machine Event Reports

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 123045
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

SuiteFactory Technote
Machine Monitoring Option

Select the Machine Events tab. Highlight the General Report, Machine Events.
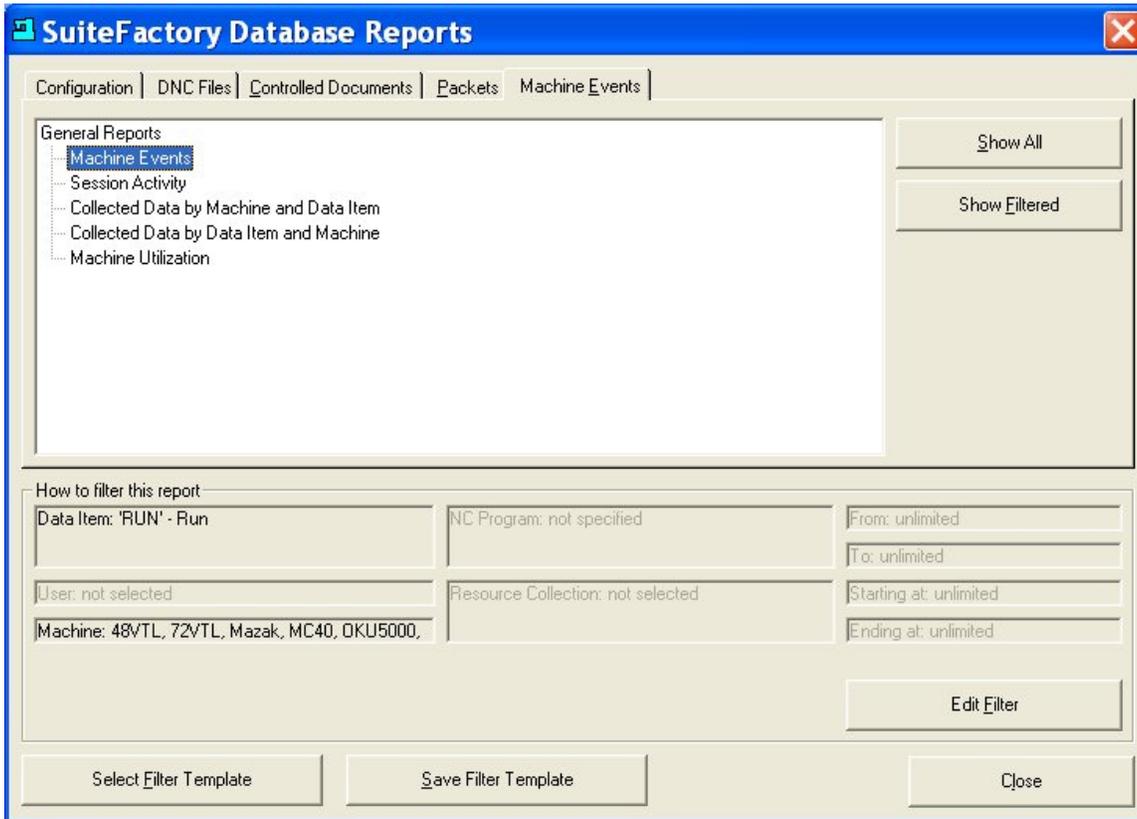
Figure 11 - View/Reports Screen

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:

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.

Session Activity

× |◄ ◄   1 of 2   ► ►| ■ | 🖨 🖨 ⚙ | 100% ▼ | Total:10   100%   10 of 10

Preview

chine Event Sessions Report   8/7/2008   11:49:21AM   Page 1 of 2

Machine Name	Data Item				Idle Start	Cycle Start	Cycle Time		Idle Time	
Record	Id Name	Id Value	Id Object Type	Status		Cycle End	Days:	Fraction	Days	Fraction
Haas LC20-1	**Run**									
19711	NC Program	368	Dnc File	Valid	2008/08/05 12:05:37	2008/08/05 12:40:19	0	00:03:09	0	00:34:42
	Id:368	Name: TOOLING DEMO MAIN-	Version:1			2008/08/05 12:43:28				
19750	NC Program	368	Dnc File	Valid	2008/08/05 12:43:28	2008/08/05 12:43:38	0	00:03:10	0	00:00:10
	Id:368	Name: TOOLING DEMO MAIN-	Version:1			2008/08/05 12:46:48				
19789	NC Program	368	Dnc File	Valid	2008/08/05 12:46:48	2008/08/05 12:46:58	0	00:03:09	0	00:00:10
	Id:368	Name: TOOLING DEMO MAIN-	Version:1			2008/08/05 12:50:07				
19828	NC Program	368	Dnc File	Valid	2008/08/05 12:50:07	2008/08/05 12:50:17	0	00:03:10	0	00:00:10
	Id:368	Name: TOOLING DEMO MAIN-	Version:1			2008/08/05 12:53:27				
19867	NC Program	368	Dnc File	Valid	2008/08/05 12:53:27	2008/08/05 12:53:37	0	00:03:09	0	00:00:10
	Id:368	Name: TOOLING DEMO MAIN-	Version:1			2008/08/05 12:56:46				
19906	NC Program	368	Dnc File	Valid	2008/08/05 12:56:46	2008/08/05 12:56:56	0	00:03:10	0	00:00:10
	Id:368	Name: TOOLING DEMO MAIN-	Version:1			2008/08/05 13:00:06				
19945	NC Program	368	Dnc File	Valid	2008/08/05 13:00:06	2008/08/05 13:00:16	0	00:03:09	0	00:00:10
	Id:368	Name: TOOLING DEMO MAIN-	Version:1			2008/08/05 13:03:25				
19984	NC Program	368	Dnc File	Valid	2008/08/05 13:03:25	2008/08/05 13:03:35	0	00:03:10	0	00:00:10
	Id:368	Name: TOOLING DEMO MAIN-	Version:1			2008/08/05 13:06:45				
20023	NC Program	368	Dnc File	Valid	2008/08/05 13:06:45	2008/08/05 13:06:55	0	00:03:09	0	00:00:10
	Id:368	Name: TOOLING DEMO MAIN-	Version:1			2008/08/05 13:10:04				
20062	NC Program	368	Dnc File	Valid	2008/08/05 13:10:04	2008/08/05 13:10:14	0	00:03:10	0	00:00:10
	Id:368	Name: TOOLING DEMO MAIN-	Version:1			2008/08/05 13:13:24				

Subtract Leading Idle Time: (0   00:34:42   )

Haas LC20-1	Run		Time Span Start and End:	**2008/08/05 12:40:19**	**2008/08/05 13:13:24**	**0**	**00:31:35**	**0**	**00:01:30**
	Count = 10				Total time span:	0	00:33:05		

	Machin	% Active	% Idle
	Haas L	95.47	4.53

Session Activity

× |◄ ◄   2 of 2   ► ►| ■ | 🖨 🖨 ⚙ | 100% ▼ | Total:10   100%   10 of 10

Preview

chine Event Sessions Report   8/7/2008   11:49:22AM   Page 2 of 2

Machine Name	Data Item				Idle Start	Cycle Start	Cycle Time		Idle Time	
Record	Id Name	Id Value	Id Object Type	Status		Cycle End	Days:	Fraction	Days	Fraction

For Haas LC20-1

■ @CycleTime_Percent
■ @IdleTime_Percent
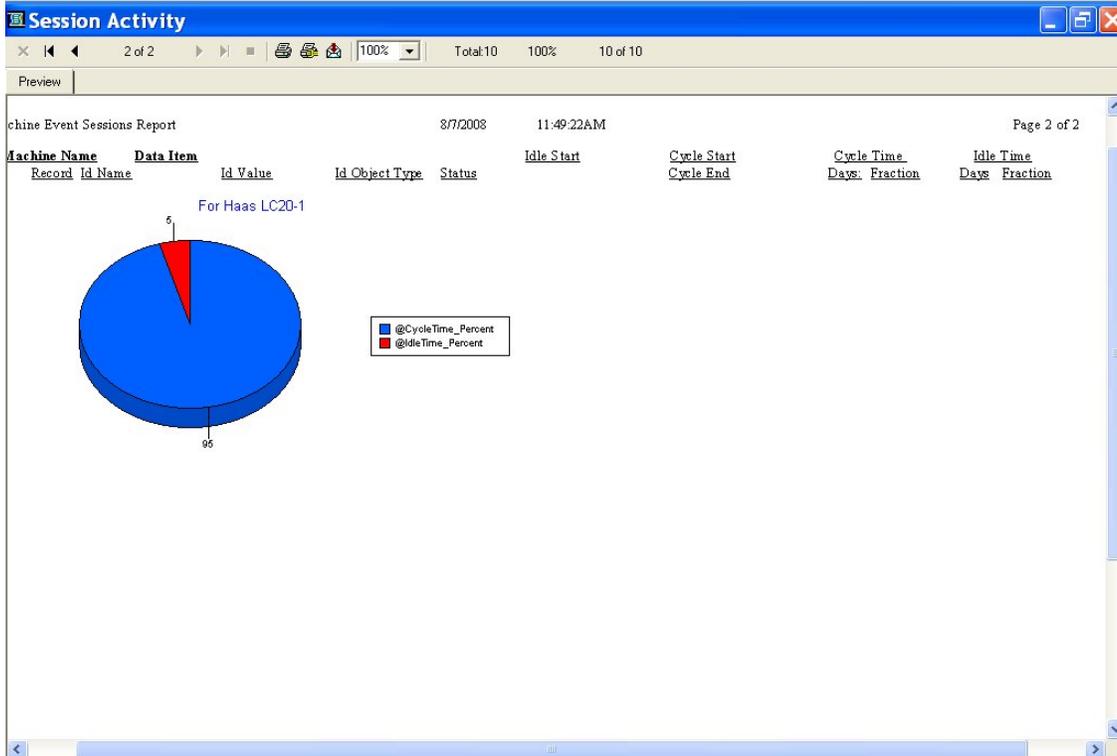
2.3 Collected Data by Machine and Data Item and Collected Data by Data Item and Machine

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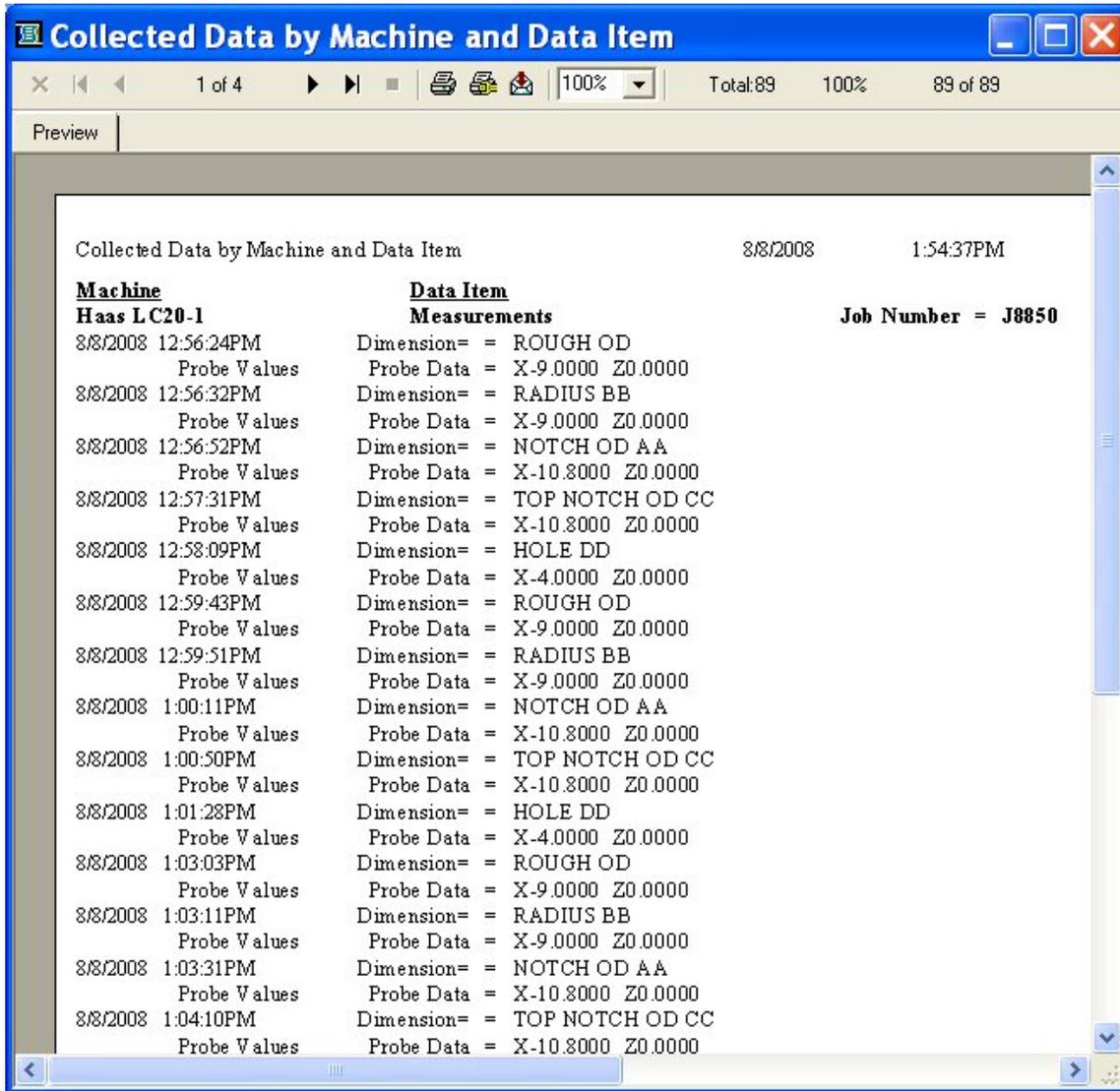
The Data Item in this example is a Job Number. The DPRNT statement that provided the information for the first record, above, was as follows:

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.
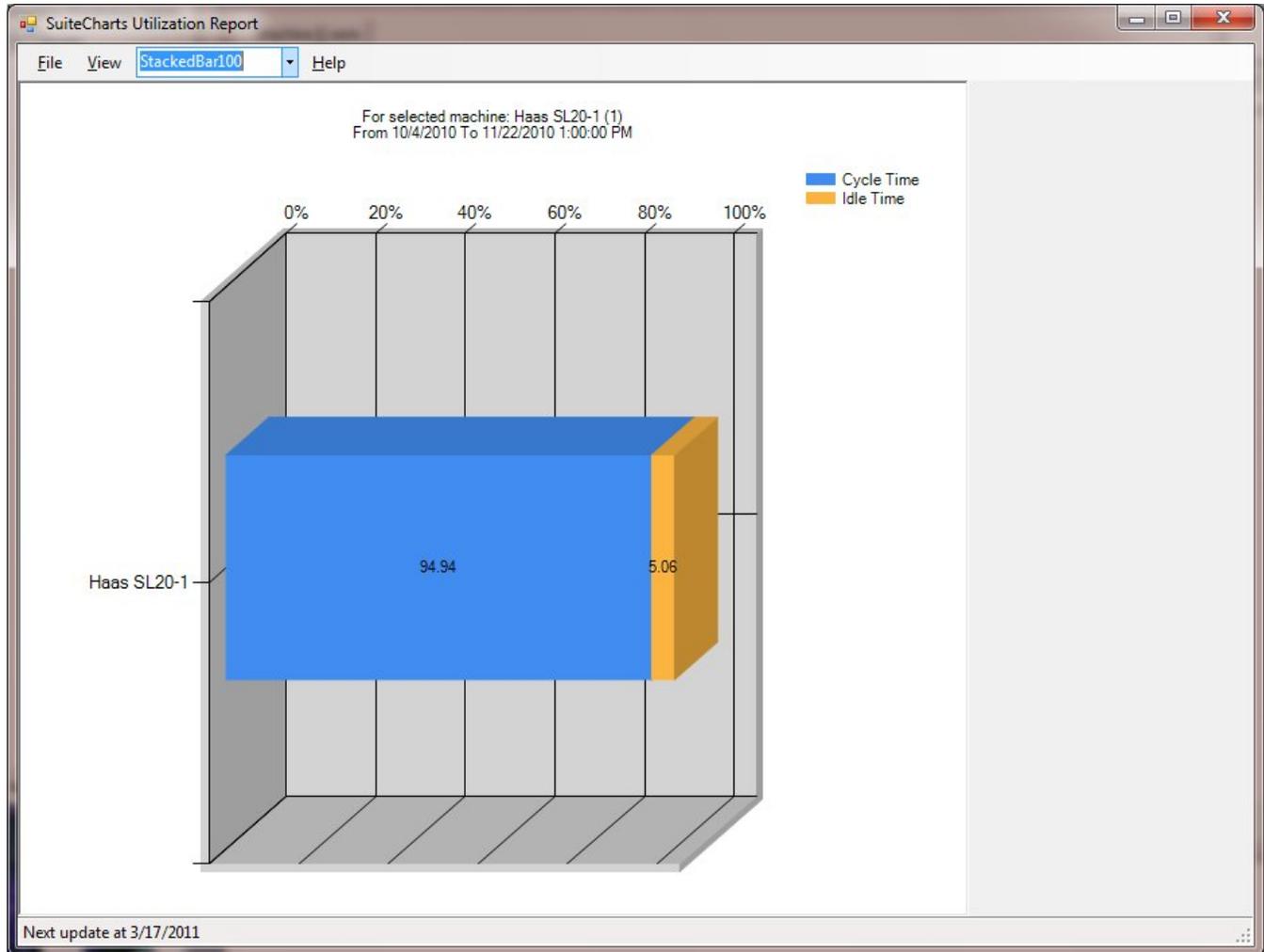
SuiteFactory Technote
Machine Monitoring Option

This figure is an example of a 7 day utilization report.
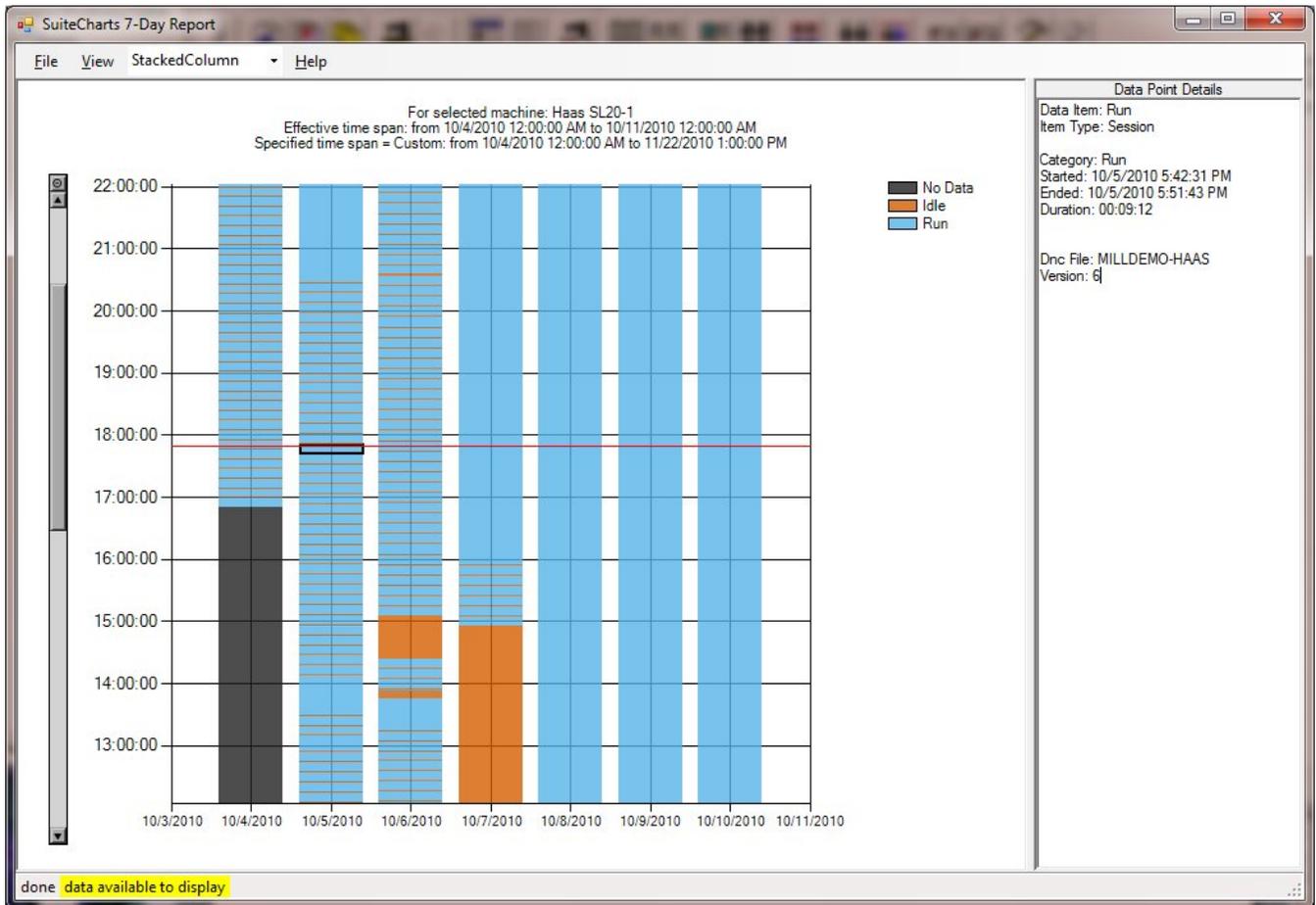
3   Configuring other types of events

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.
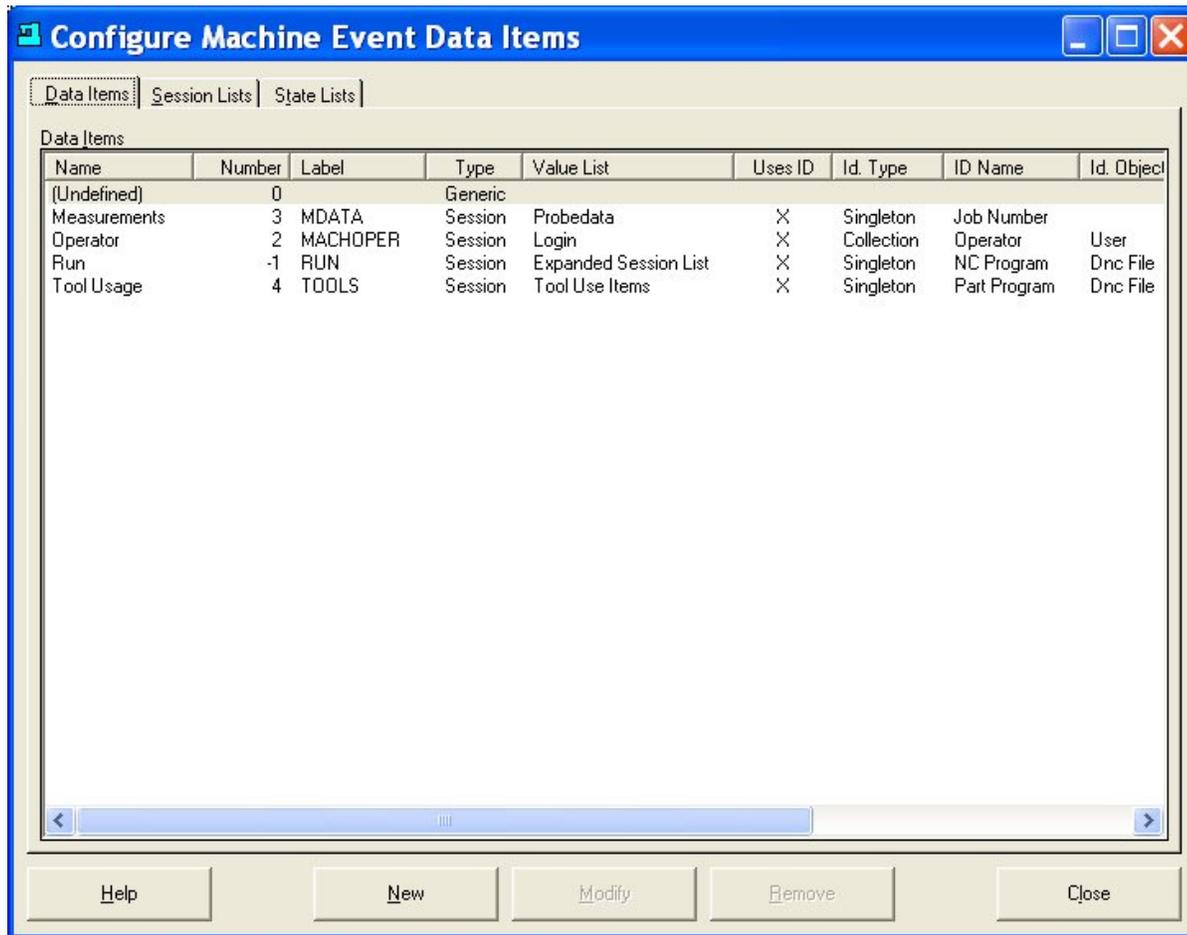
Figure 13 – Machine Events/Data Items Screen

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:

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:
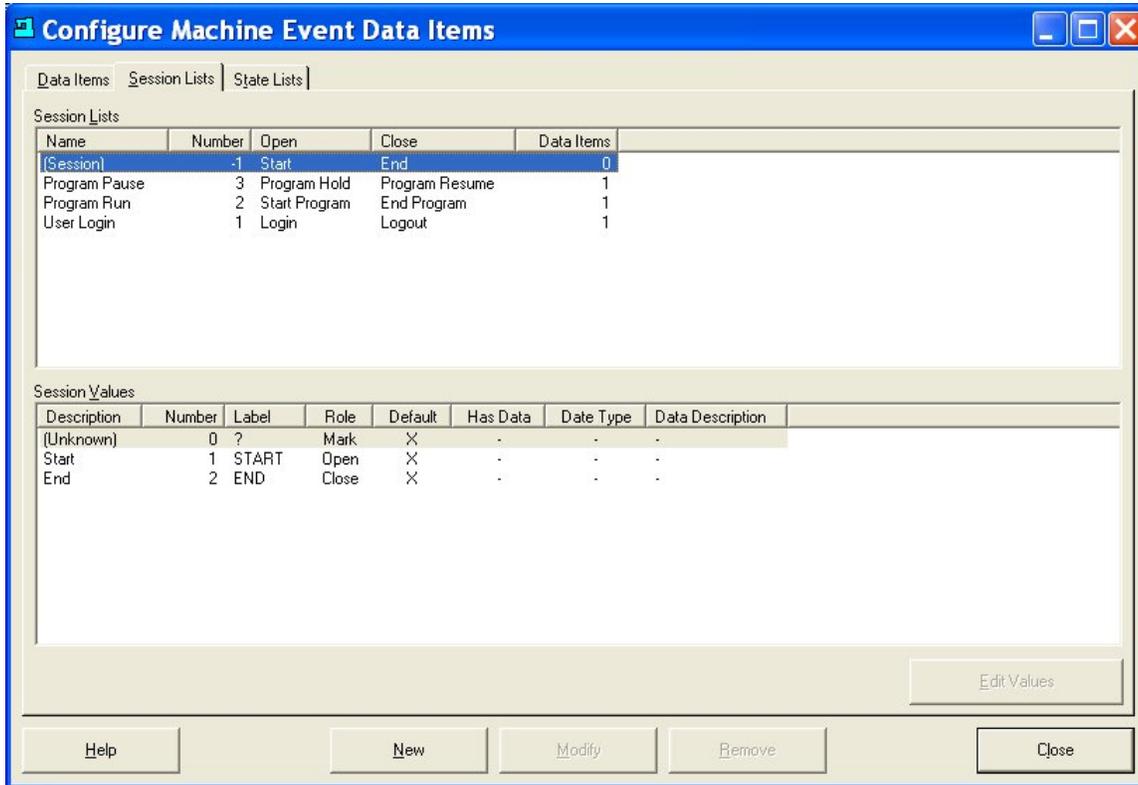
Figure 15 - Sessions Lists

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:

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.
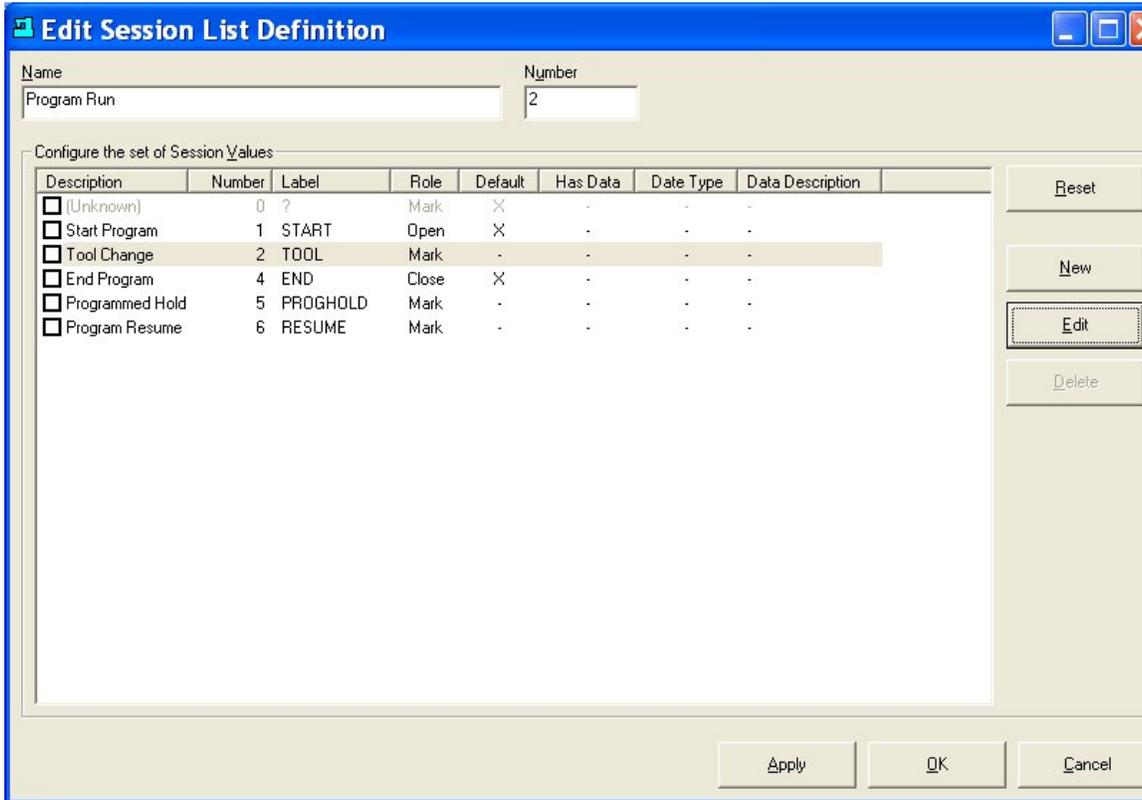
Figure 17 - Creating a new session list

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:

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.

Figure 19 - Edit Session List Definition Screen

Click OK to return to the Session List tab of the Edit Machine Event Data Items screen.
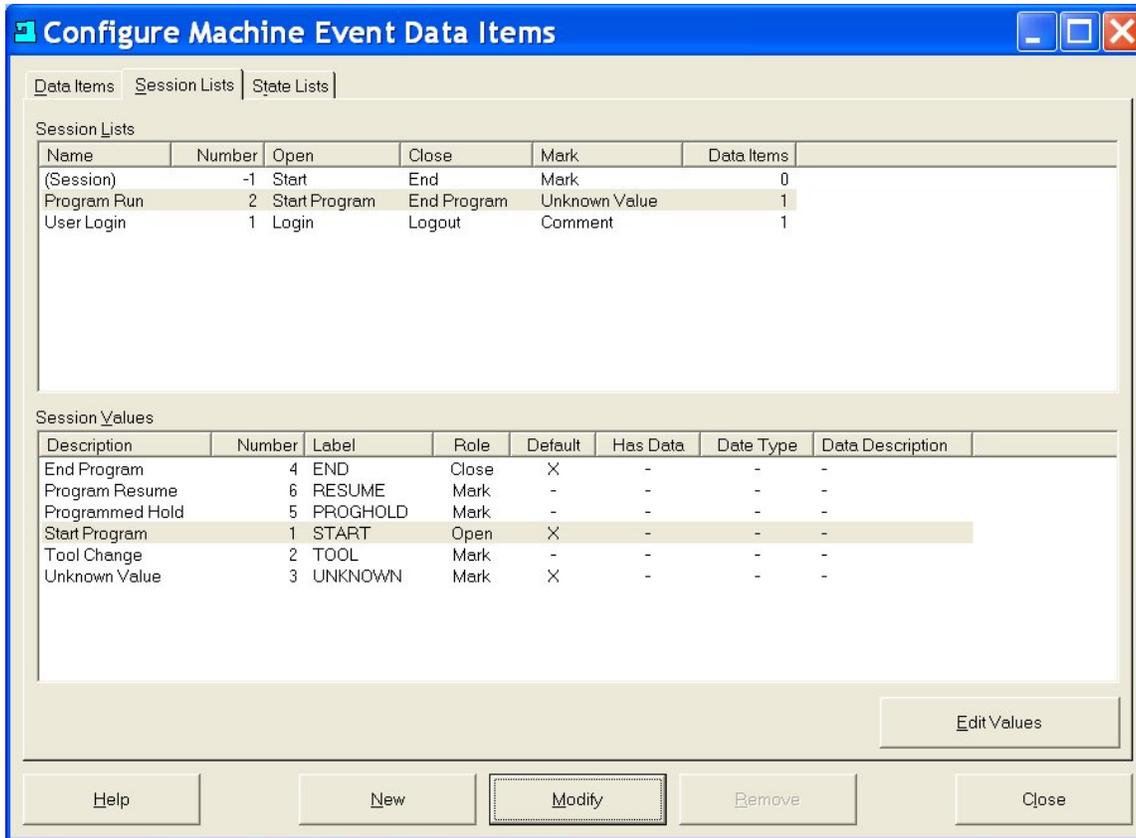
Figure 20 - Configure Machine Event Data Items Screen

Now you must assign the new Value List to the Data Item, Run. Click on the Data Items tab.
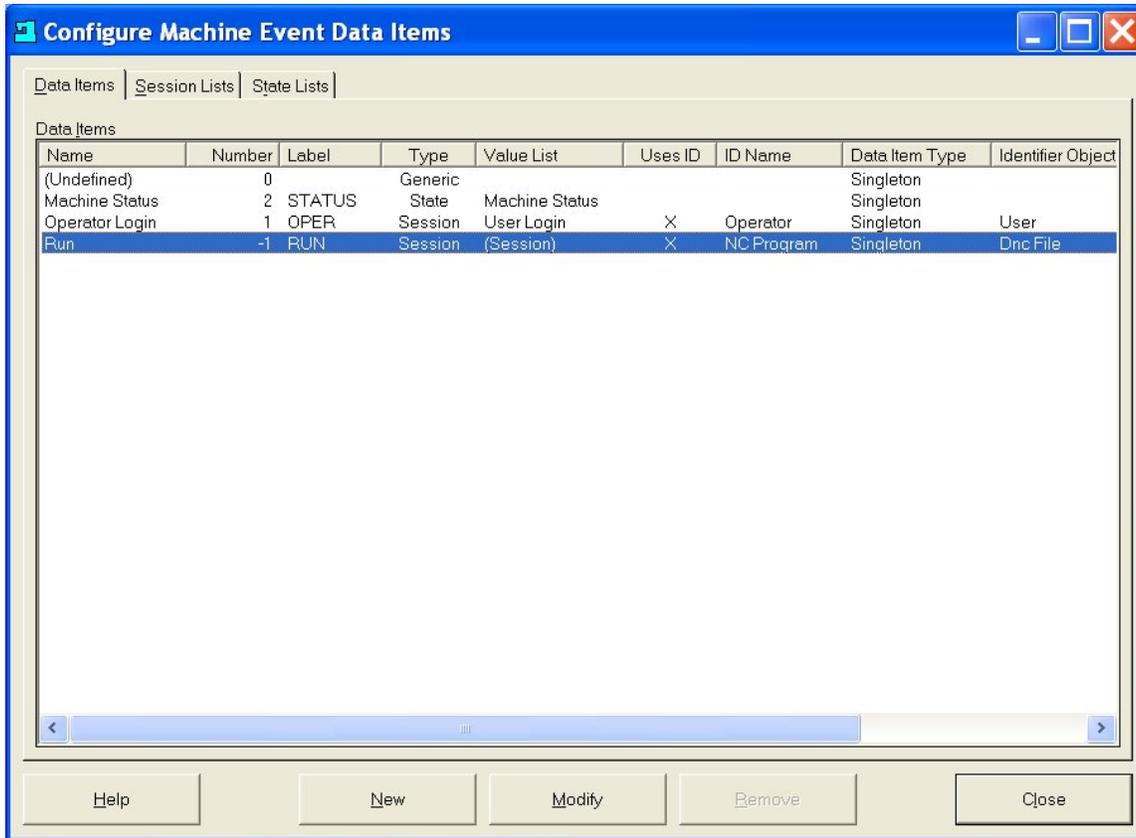
Figure 21 - Configure Machine Event Data Item Screen

Highlight Run and click Modify

.

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.
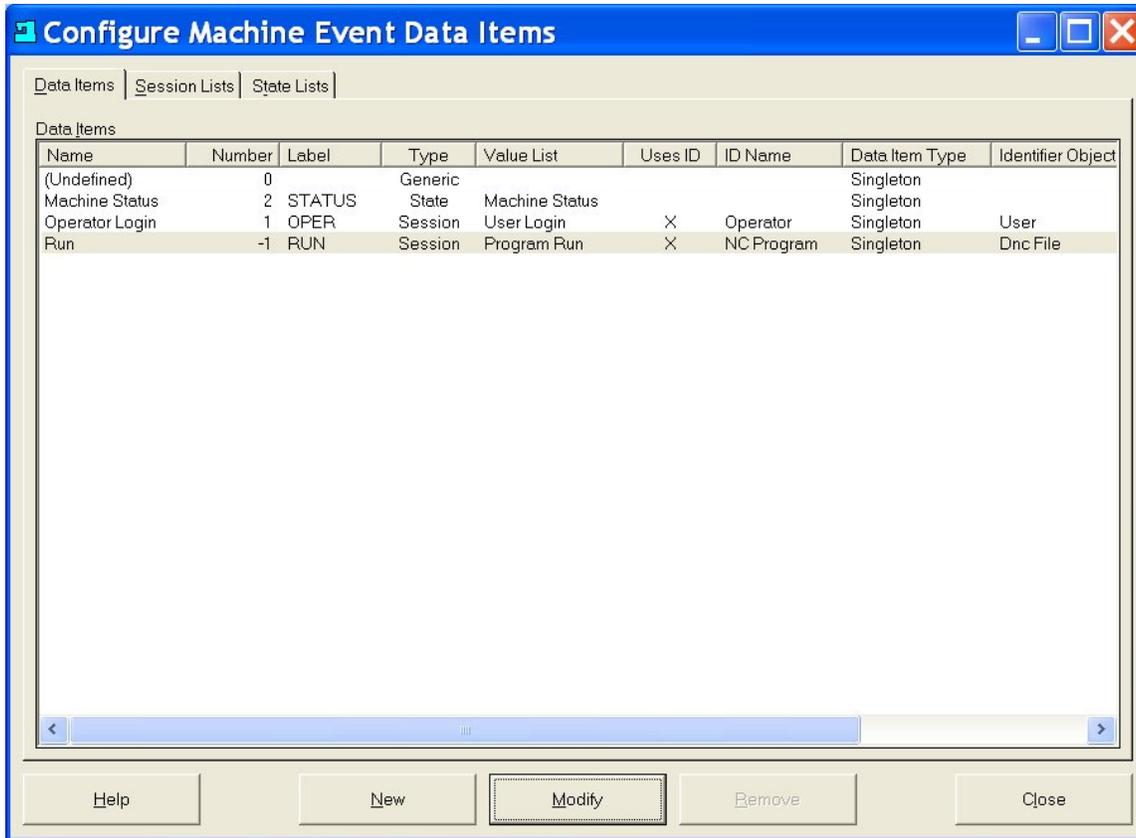
Figure 23 - Data Item Screen showing new Value List Assignment

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:
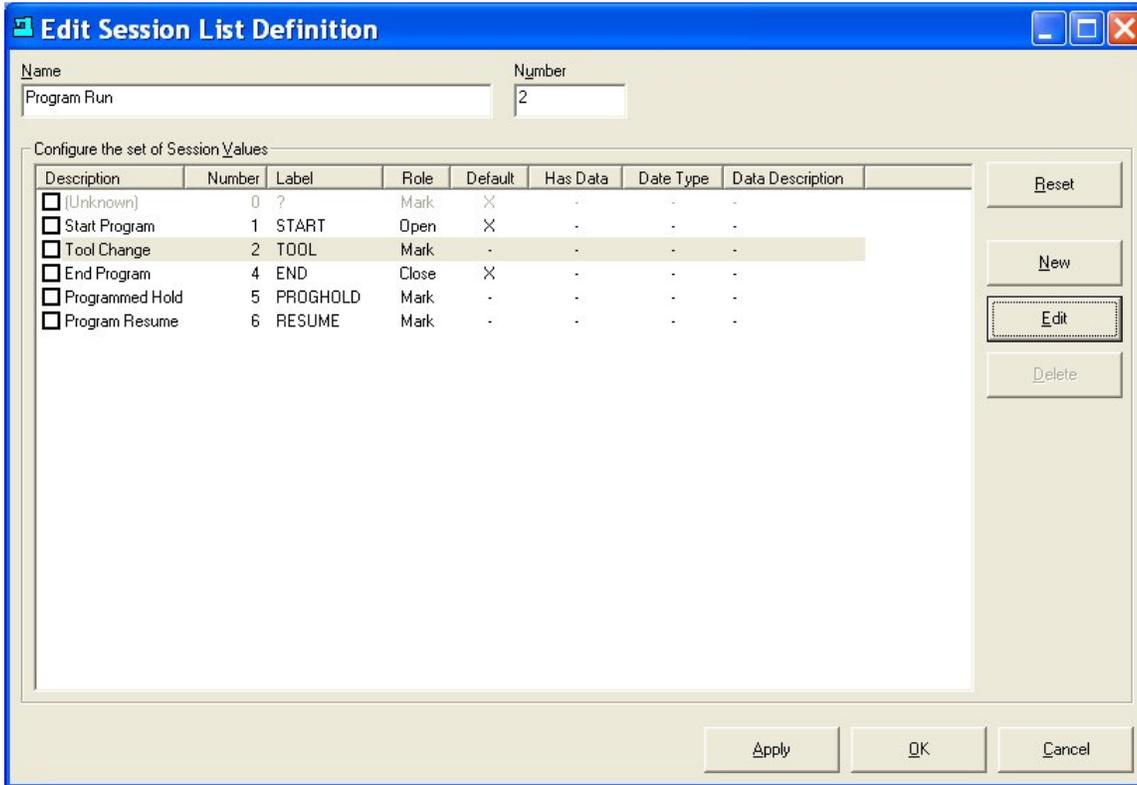
Figure 24 - Session list showing Program Run Values

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.
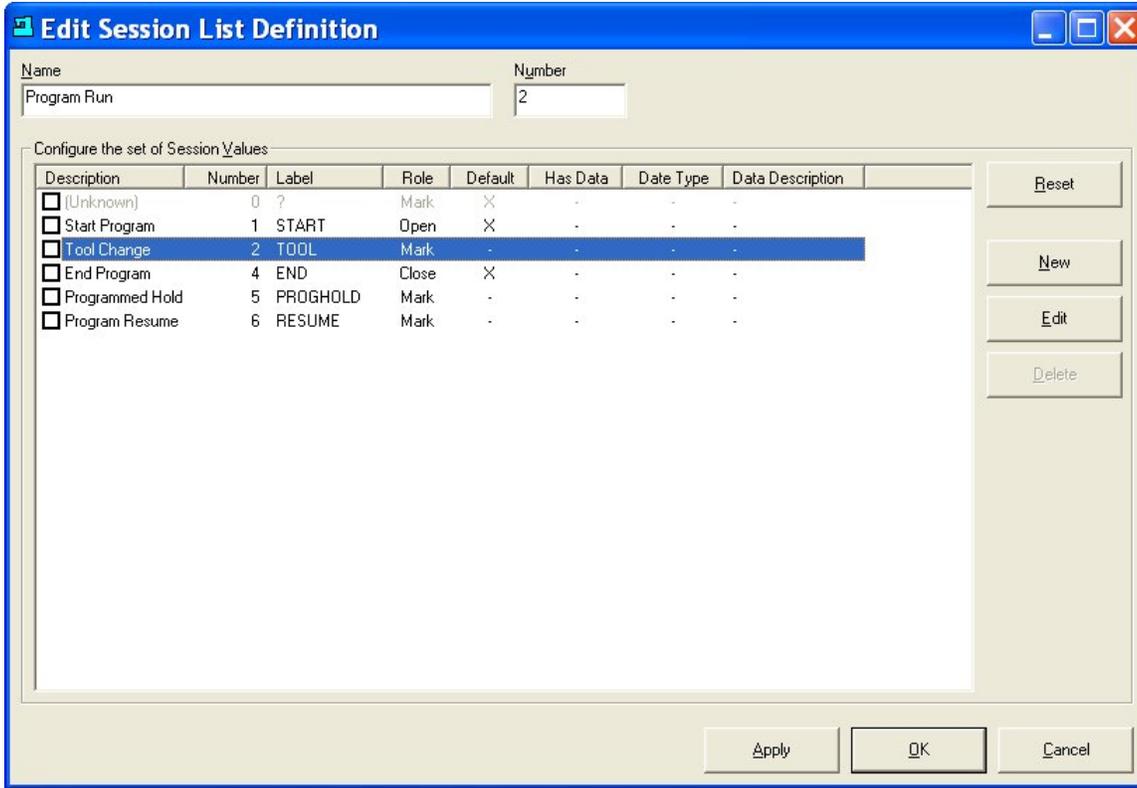
Figure 25 - Editing Tool Change

Highlight the Tool Change item and then click Edit.
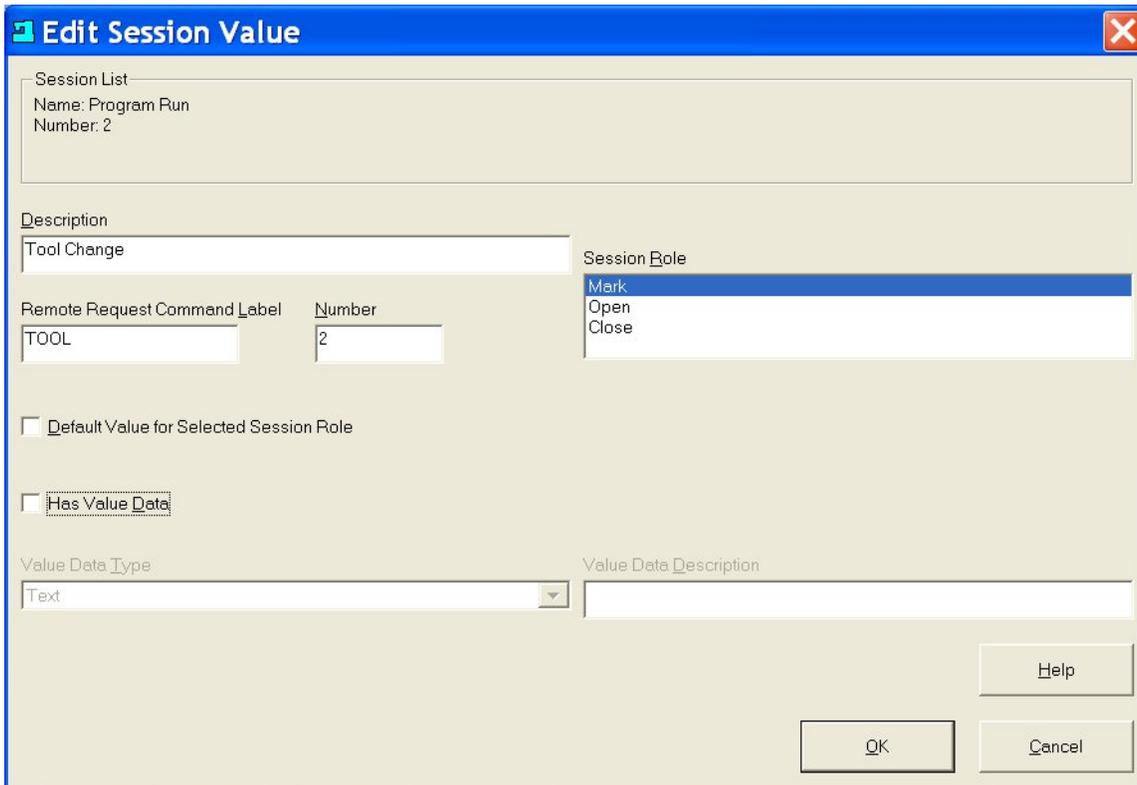
Figure 26 - Tool Change Edit Screen

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

Figure 27 - Edited Tool Change Value

Click OK to finish and return to the previous screen.
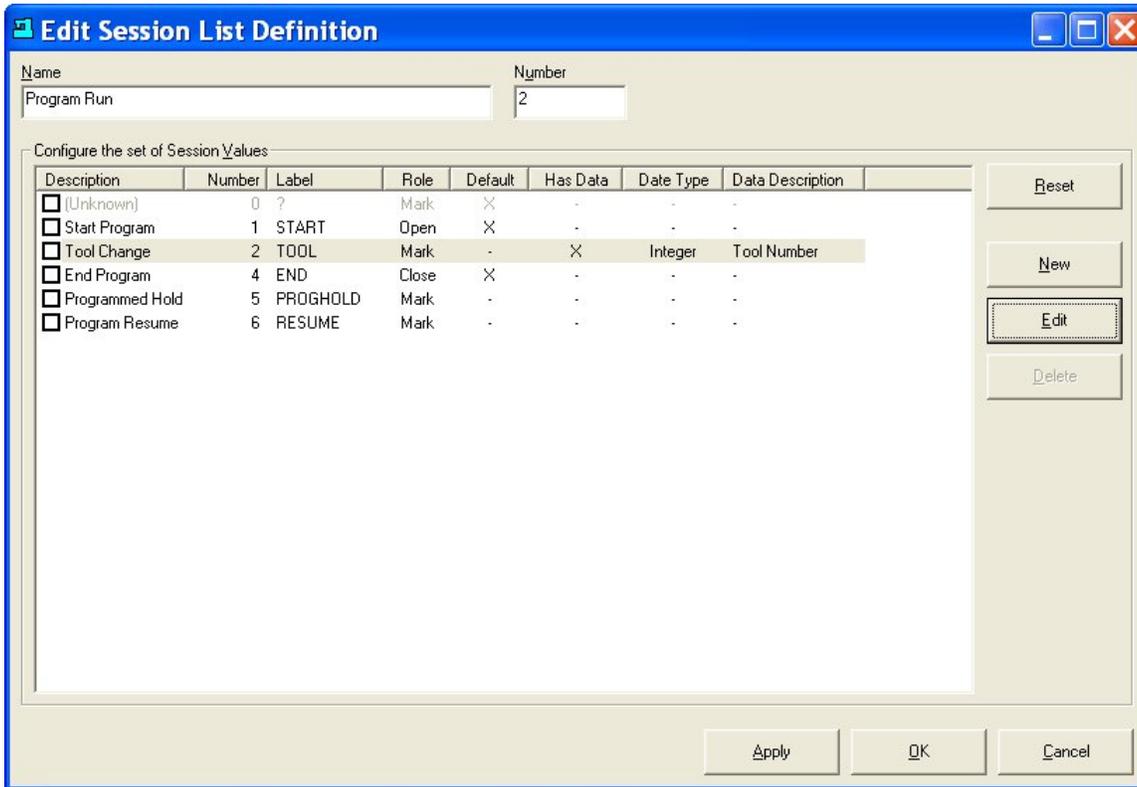
Figure 28 - Edit Session List Definition Screen showing the extra data added for Tool Change

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.

Machine Events

DateTimeStamp	Data Item	Identifier		Value	Type	Role	Status	Serial Number

0203 Mori-Seiki SL25

2007/07/06 12:33:16	Run	NC Program	1045	Start Program	Session	Open		11-6A-7D776C1B0-00000002
Identifier Object Type:	Dnc File	Status:	Valid	Id: 1045	Name: 00001403 Version: 1			
Raw Data: RUN/1045/START								

2007/07/06 12:35:13	Run	NC Program	1045	Tool Change	Session	Mark		11-6A-7D776C1B0-00000003
Identifier Object Type:	Dnc File	Status:	Valid	Id: 1045	Name: 00001403 Version: 1			
Data: Tool Number	, type =	Integer	, value =	12 Status: Valid				
Raw Data: RUN/1045/TOOL/12								
Start: 11-6A-7D776C1B0-00000002		2007/07/06 12:33:16	Elapsed:	0 days 00:01:57				

2007/07/06 12:40:19	Run	NC Program	1045	Programmed Hold	Session	Mark		11-6A-7D776C1B0-00000004
Identifier Object Type:	Dnc File	Status:	Valid	Id: 1045	Name: 00001403 Version: 1			
Raw Data: RUN/1045/PROGHOLD								
Start: 11-6A-7D776C1B0-00000002		2007/07/06 12:33:16	Elapsed:	0 days 00:07:03				

2007/07/06 12:42:30	Run	NC Program	1045	Program Resume	Session	Mark		11-6A-7D776C1B0-00000005
Identifier Object Type:	Dnc File	Status:	Valid	Id: 1045	Name: 00001403 Version: 1			
Raw Data: RUN/1045/RESUME								
Start: 11-6A-7D776C1B0-00000002		2007/07/06 12:33:16	Elapsed:	0 days 00:09:14				

2007/07/06 12:43:46	Run	NC Program	1045	Tool Change	Session	Mark		11-6A-7D776C1B0-00000006
Identifier Object Type:	Dnc File	Status:	Valid	Id: 1045	Name: 00001403 Version: 1			
Data: Tool Number	, type =	Integer	, value =	23 Status: Valid				
Raw Data: RUN/1045/TOOL/23								
Start: 11-6A-7D776C1B0-00000002		2007/07/06 12:33:16	Elapsed:	0 days 00:10:30				

2007/07/06 13:01:43	Run	NC Program	1045	End Program	Session	Close		11-6A-7D776C1B0-00000007
Identifier Object Type:	Dnc File	Status:	Valid	Id: 1045	Name: 00001403 Version: 1			
Raw Data: RUN/1045/END								
Start: 11-6A-7D776C1B0-00000002		2007/07/06 12:33:16	Elapsed:	0 days 00:28:27				

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

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.
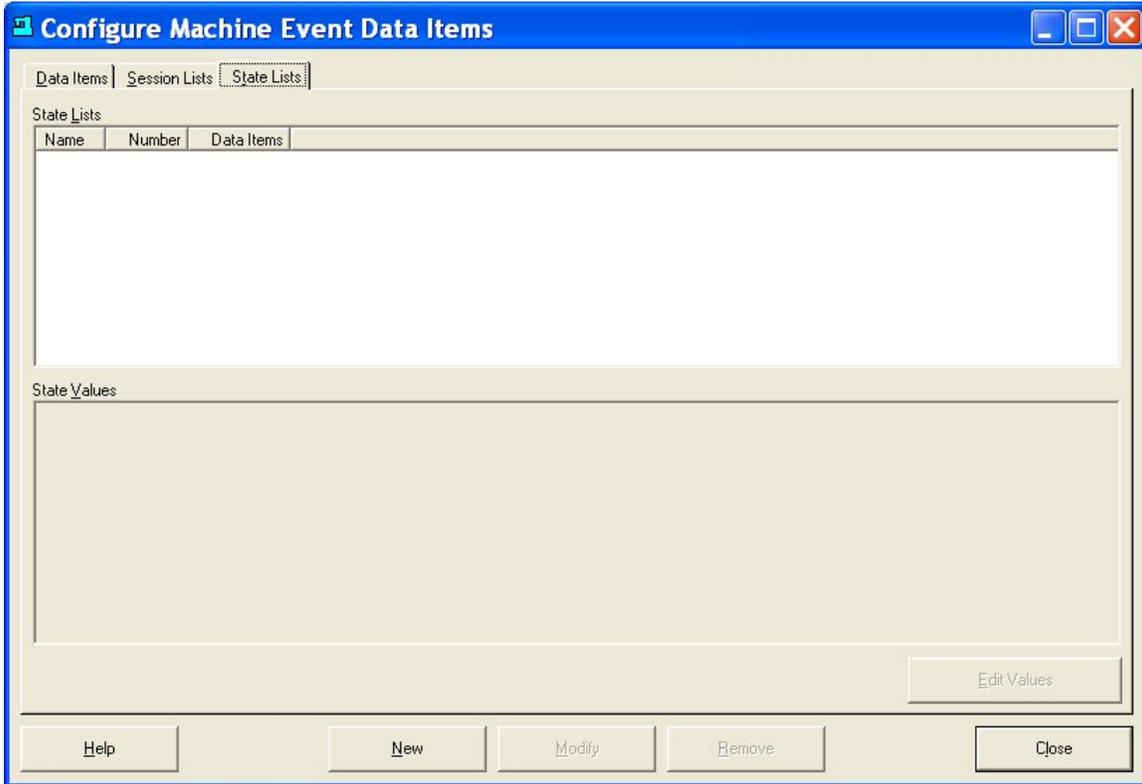
Figure 30 - State Lists Screen

Click on New.

Figure 31 - Define New State List

Click New.

Figure 32 - Define New State Value

Fill in the data you require for as many new states as you need.
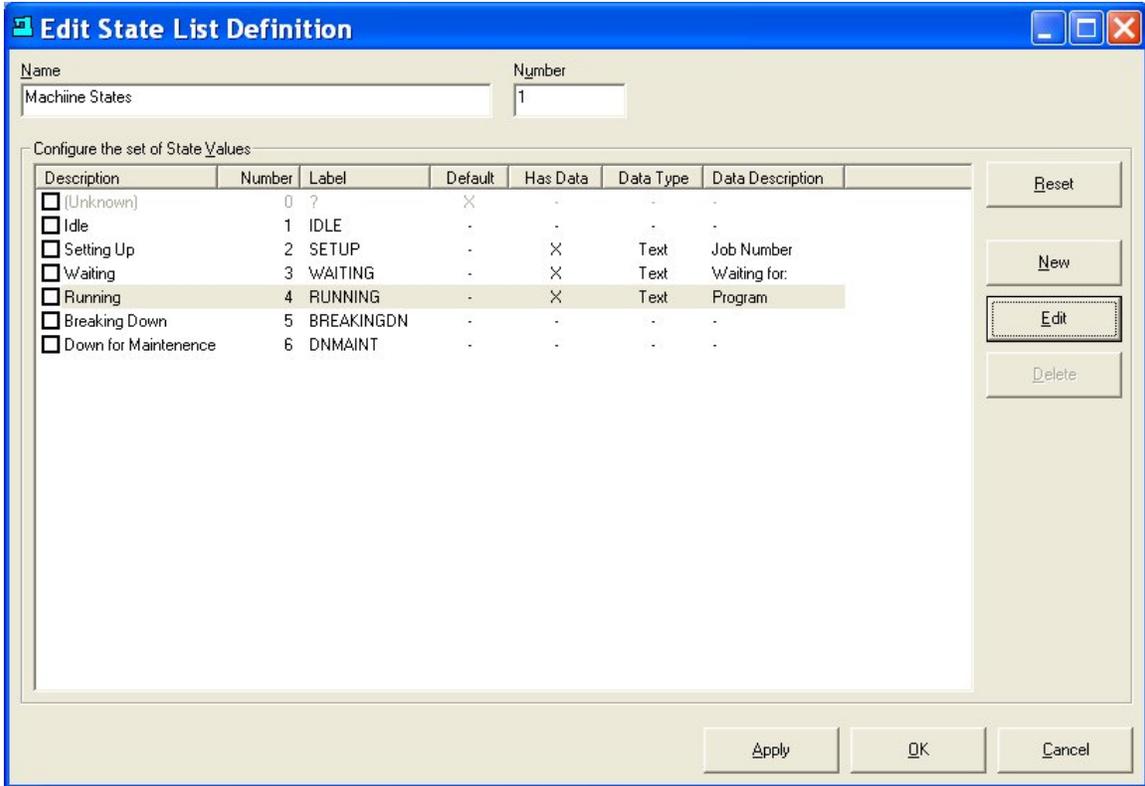
Figure 33 - Machine Status Values

Click OK.
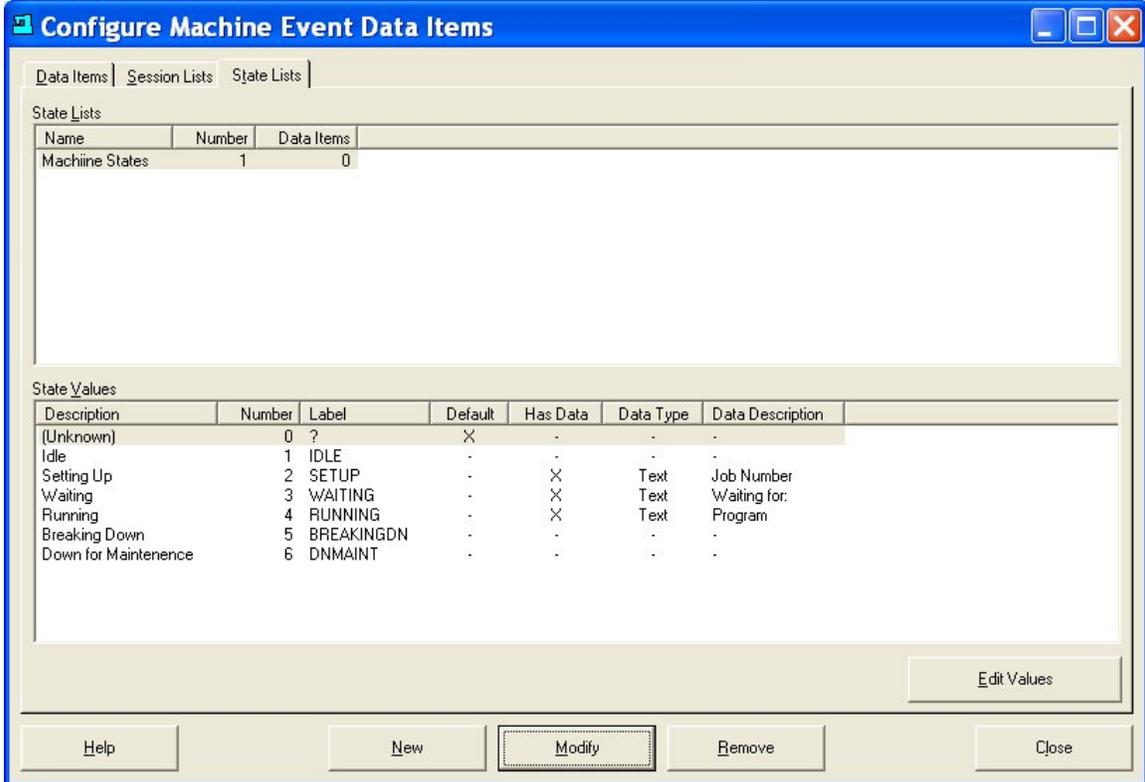
Figure 34 - State List Screen Showing the New List

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".

Figure 35 - Machine Status Data Item Defined

Click OK to return to the Data Items screen.
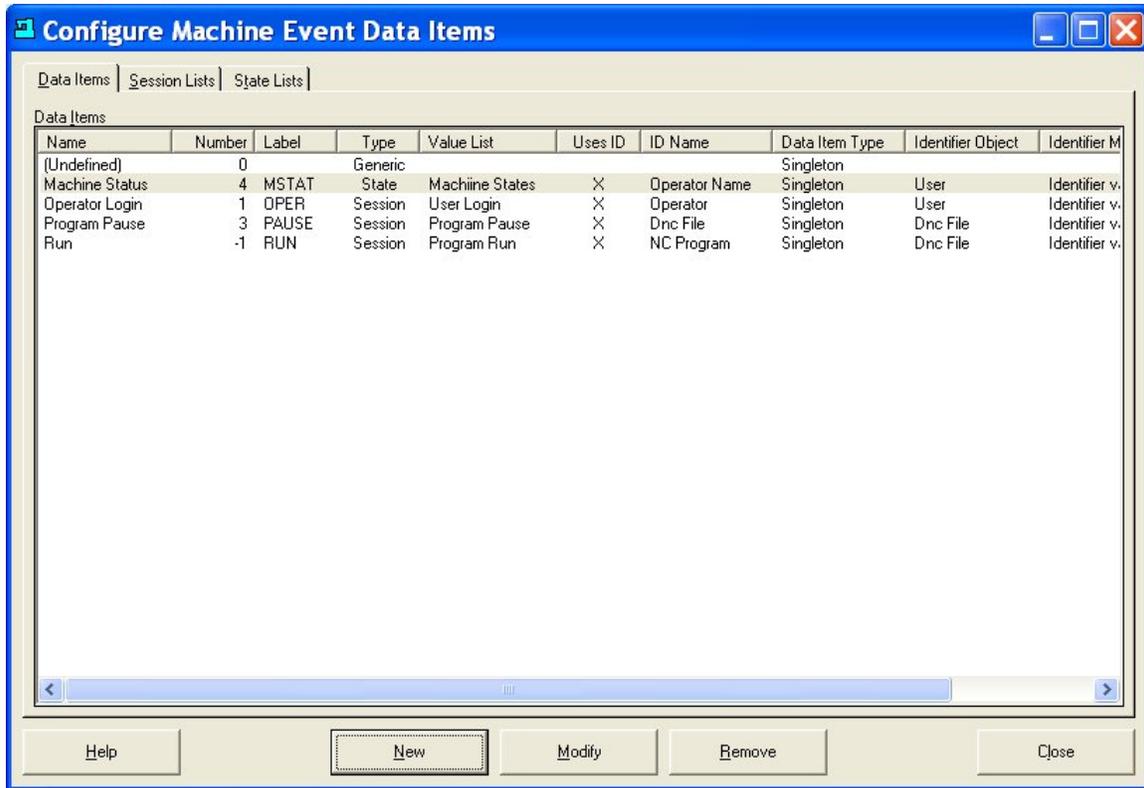
Figure 36 - Data Items Screen Showing the Machine Status Item

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
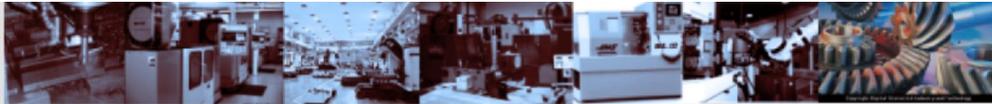
0203 Mori-Seiki SL25

```
    2007/07/11  12:21:22      Machine Status      Operator Name      BOB                  Idle                State      Begin                      11-6A-
7D77BCF1F-00000001
        Identifier Object Type:      User                    Status:    Valid              Id:   6              Name:    BOB
        Raw Data:      MSTAT/BOB/IDLE
    2007/07/11  12:22:43      Machine Status      Operator Name      BOB                  Idle                State      End                        11-6A-
7D77BCF1F-00000002
        Identifier Object Type:      User                    Status:    Valid              Id:   6              Name:    BOB
        Raw Data:      MSTAT/BOB/IDLE
        Start:  11-6A-7D77BCF1F-00000001        2007/07/11  12:21:22        Elapsed:        0  days        00:01:21
    2007/07/11  12:22:43      Machine Status      Operator Name      BOB                  Setting Up          State      Begin                      11-6A-
7D77BCF1F-00000003
        Identifier Object Type:      User                    Status:    Valid              Id:   6              Name:    BOB
        Data:  Job Number                  , Type =    Text          , Value      AD3215-098                          Status:    Valid
        Raw Data:      MSTAT/BOB/SETUP/AD3215-098
    2007/07/11  12:24:13      Machine Status      Operator Name      BOB                  Setting Up          State      End                        11-6A-
7D77BCF1F-00000004
        Identifier Object Type:      User                    Status:    Valid              Id:   6              Name:    BOB
        Data:  Job Number                  , Type =    Text          , Value      AD3215-098                          Status:    Valid
        Raw Data:      MSTAT/BOB/SETUP/AD3215-098
        Start:  11-6A-7D77BCF1F-00000003        2007/07/11  12:22:43        Elapsed:        0  days        00:01:30
    2007/07/11  12:24:13      Machine Status      Operator Name      GUY                  Running             State      Begin                      11-6A-
7D77BCF1F-00000005
        Identifier Object Type:      User                    Status:    Valid              Id:   5              Name:    GUY
        Data:  Program                     , Type =    Text          , Value      00001162                            Status:    Valid
        Raw Data:      MSTAT/GUY/RUNNING/00001162
    2007/07/11  12:25:17      Machine Status      Operator Name      GUY                  Running             State      End                        11-6A-
7D77BCF1F-00000006
        Identifier Object Type:      User                    Status:    Valid              Id:   5              Name:    GUY
        Data:  Program                     , Type =    Text          , Value      00001162                            Status:    Valid
        Raw Data:      MSTAT/GUY/RUNNING/00001162
        Start:  11-6A-7D77BCF1F-00000005        2007/07/11  12:24:13        Elapsed:        0  days        00:01:04
    2007/07/11  12:25:17      Machine Status      Operator Name      GUY                  Waiting             State      Begin                      11-6A-
7D77BCF1F-00000007
        Identifier Object Type:      User                    Status:    Valid              Id:   5              Name:    GUY
        Data:  Waiting for:                , Type =    Text          , Value      MATERIAL                            Status:    Valid
        Raw Data:      MSTAT/GUY/WAITING/MATERIAL
    2007/07/11  12:26:07      Machine Status      Operator Name      GUY                  Waiting             State      End                        11-6A-
7D77BCF1F-00000008
        Identifier Object Type:      User                    Status:    Valid              Id:   5              Name:    GUY
        Data:  Waiting for:                , Type =    Text          , Value      MATERIAL                            Status:    Valid
        Raw Data:      MSTAT/GUY/WAITING/MATERIAL
        Start:  11-6A-7D77BCF1F-00000007        2007/07/11  12:25:17        Elapsed:        0  days        00:00:50
```

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        Id:  5          Name:  GUY
   Data:  Program                       , Type =   Text         , Value    00001162                              Status:   Valid
   Raw Data:     MSTAT/GUY/RUNNING/00001162
2007/07/11  12:27:54      Machine Status      Operator Name    GUY              Running         State    End                11-6A-
7D77BCF1F-0000000A
   Identifier Object Type:    User              Status:  Valid        Id:  5          Name:  GUY
   Data:  Program                       , Type =   Text         , Value    00001162                              Status:   Valid
   Raw Data:     MSTAT/GUY/RUNNING/00001162
   Start:  11-6A-7D77BCF1F-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        Id:  6          Name:  BOB
   Raw Data:     MSTAT/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        Id:  6          Name:  BOB
   Raw Data:     MSTAT/BOB/BREAKINGDN
   Start:  11-6A-7D77BCF1F-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        Id:  6          Name:  BOB
   Raw Data:     MSTAT/BOB/DNMAINT
```

SuiteFactory Technote

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

CADCAM
INTEGRATION
Driving Manufacturing
Productivity for Over
Two Decades

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.
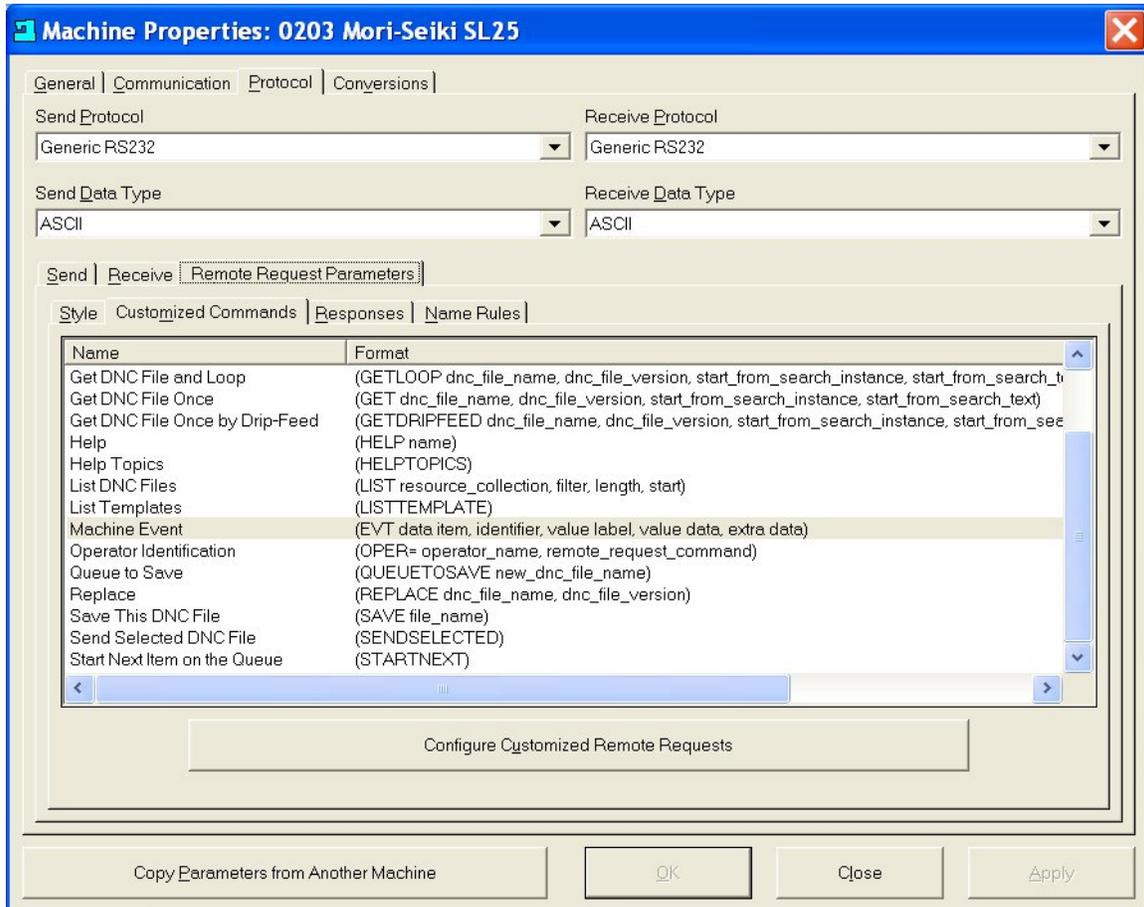
Figure 37 - Editing the Machine Event Remote Command

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

Created by Ron Lamkin 7/26/07
Edited 3/15/11
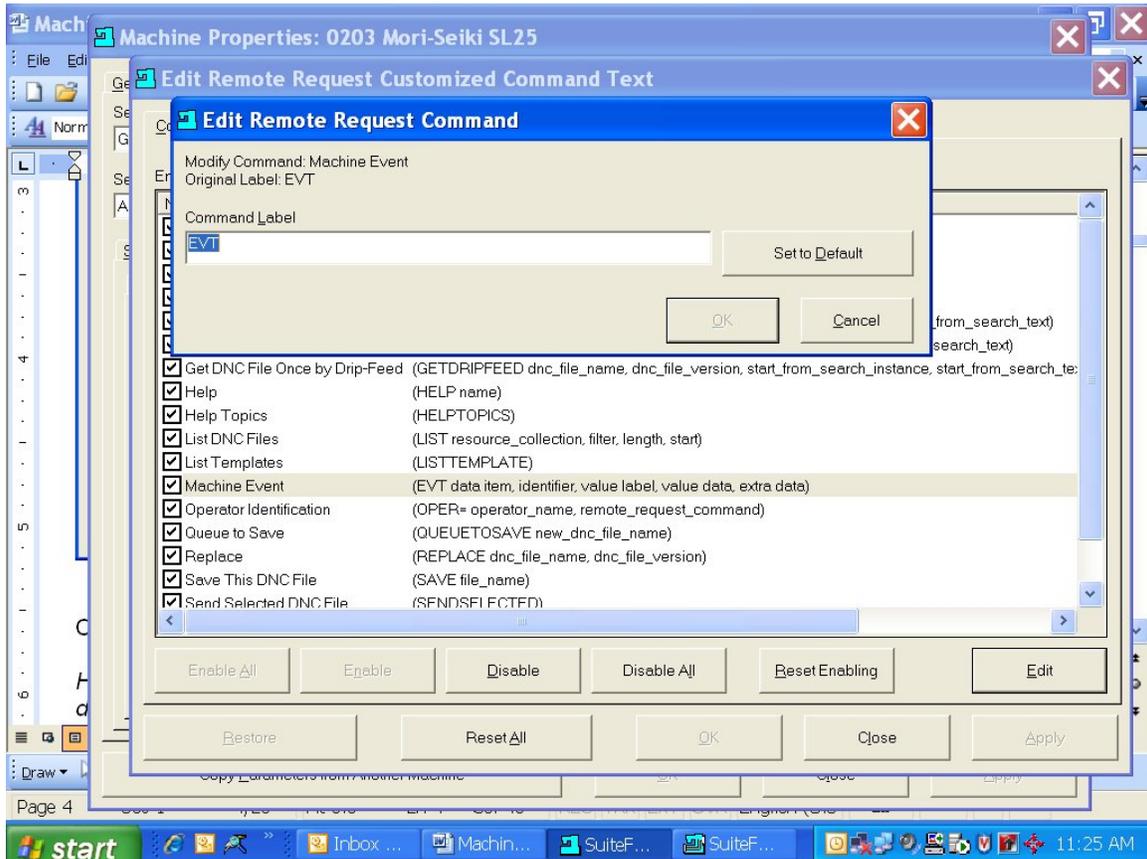
Figure 38 - Editing the EVT Command

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

Edit Remote Request Customized Command Text

Commands | Delimiters | LIST Parameters | CNC E-Mail Parameters | Machine Events

Machine Event Argument Separator

/

☑ Macros Require Representing 'Space' Characters With a Space Substitute Character

Machine Event Space 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   ☐ Post Machine Events for Pickup by a Third-Party Program

Target Path for Posting Machine Events

Browse...

| Restore | Reset All | OK | Cancel | Apply |