



# SuiteFactory Enterprise Machine Monitoring Option

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**SuiteFactory Technote  
Machine Monitoring Option**

**Machine Monitoring**

## **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/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.

**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. The end user can create other types.

**Identifier** 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 default for the built-in RUN item is "DNC file Id".

**Value** 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, END or MARK. The end user can configure other session lists to use.

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

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 RRC.

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

EVT RUN/1045/START/Operation 234

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

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### 2 Automatic Insertion of START/STOP 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.)

```
(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 T and the R results in a space character being output the RS-232 port when the line is executed on a 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.

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## 2.1 Setting up SuiteFactory for Automatic Insertion of Stop/Start 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 finally the Insert Event RRC tab.

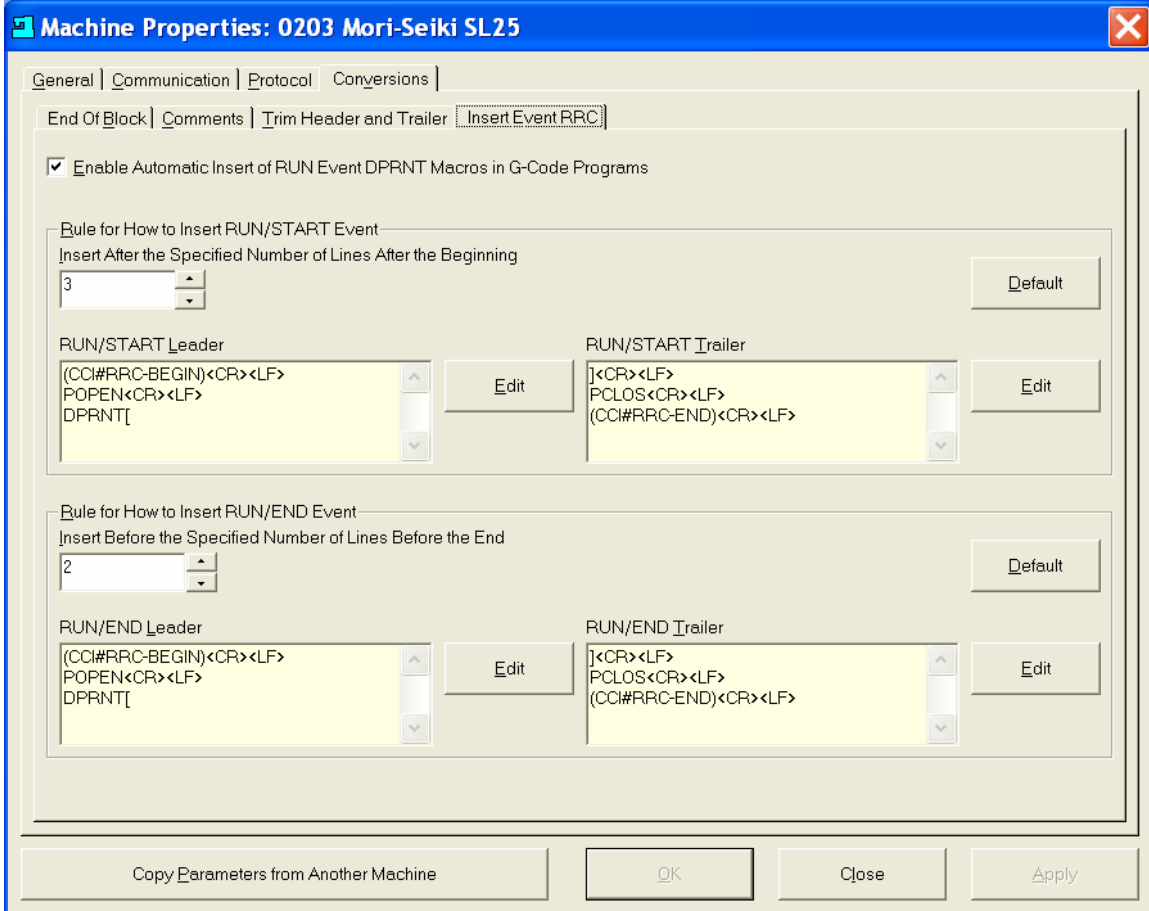


Figure 1 - Configuring DPRNT Macro Insertion Utility

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.

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## 2.2 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.

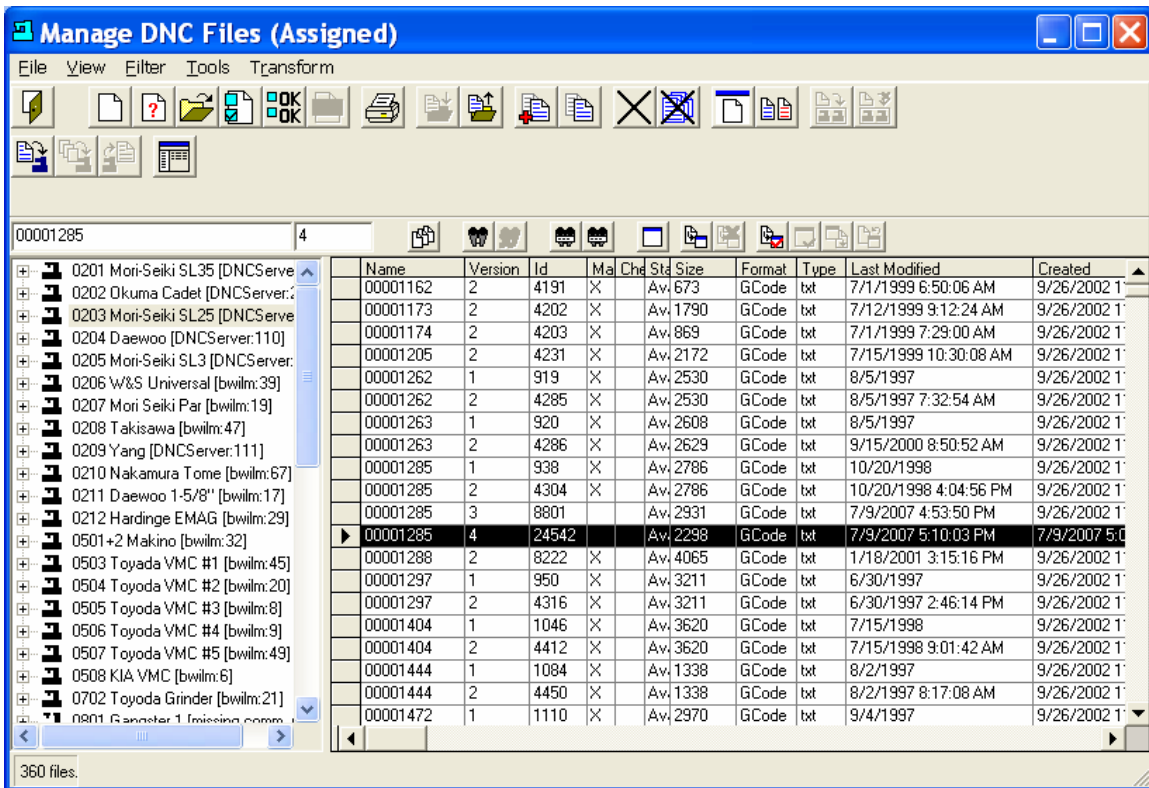
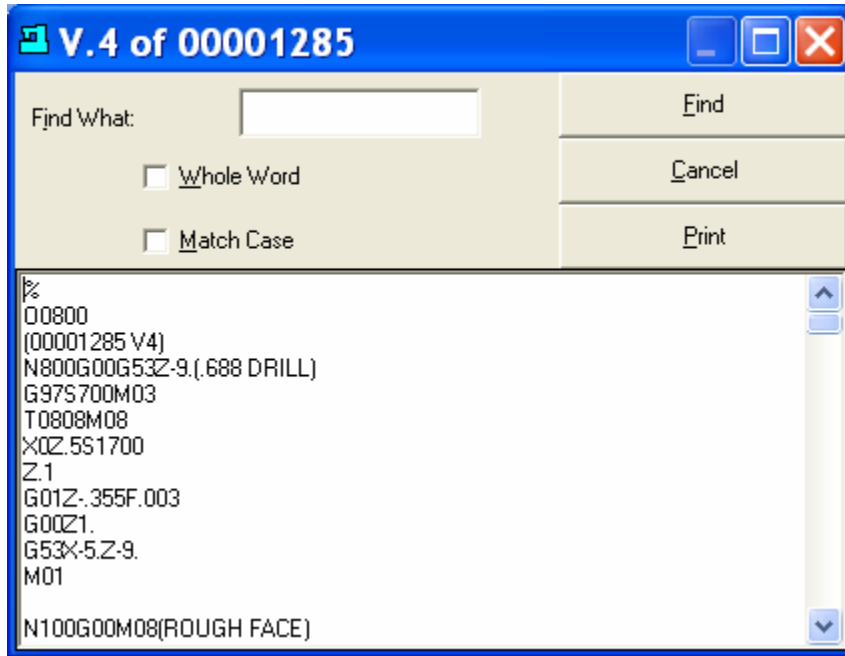


Figure 3 - Manage DNC Files

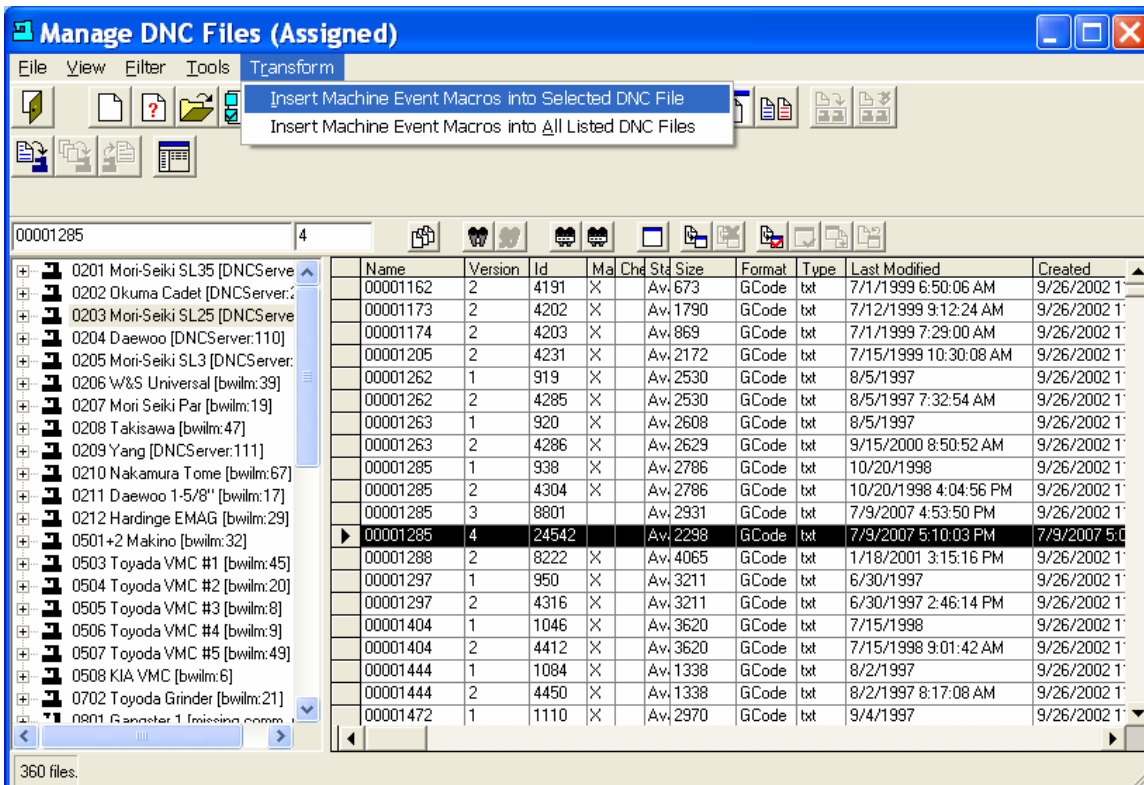
Highlight the appropriate machine. 0203 Mori-Seiki SL25 is selected here. See Figure 1, above to see how this machine was configured. Select a file or use the Search feature to filter to a set of files to which you want to add the macro statements. File 00001285 V4 is selected above.

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



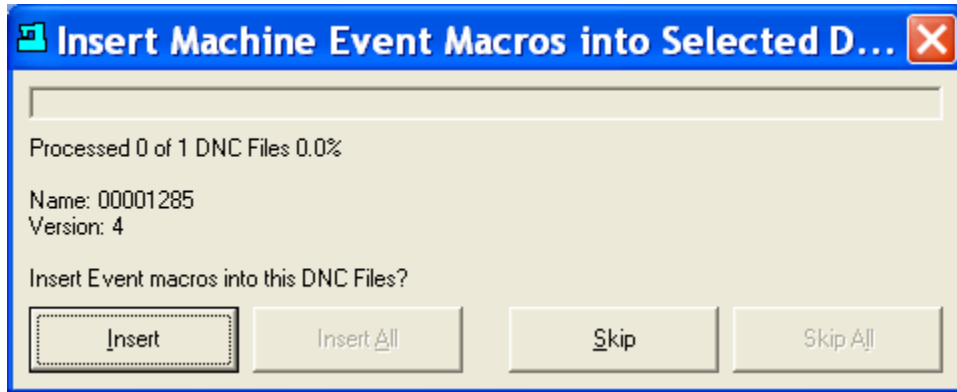
**Figure 4 - Top of a DNC File before adding Macro Statements**



**Figure 5 - Click on Transform**

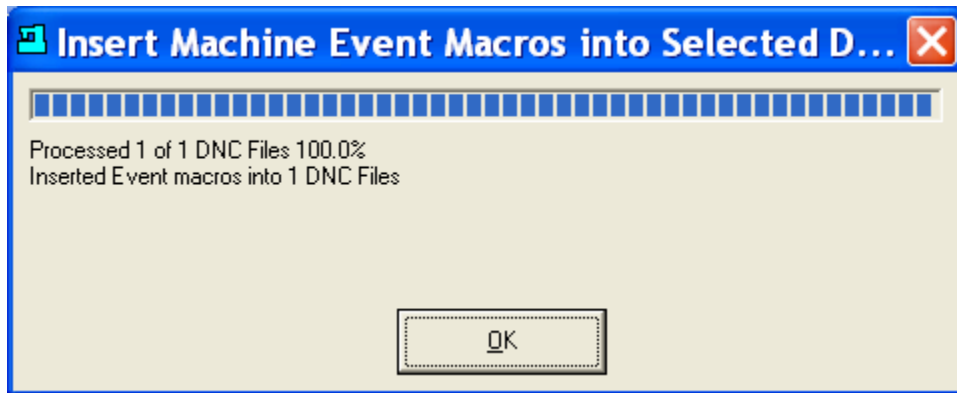
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Click on Transform. Select "Insert Machine Event Macros into Selected DNC File".



**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.

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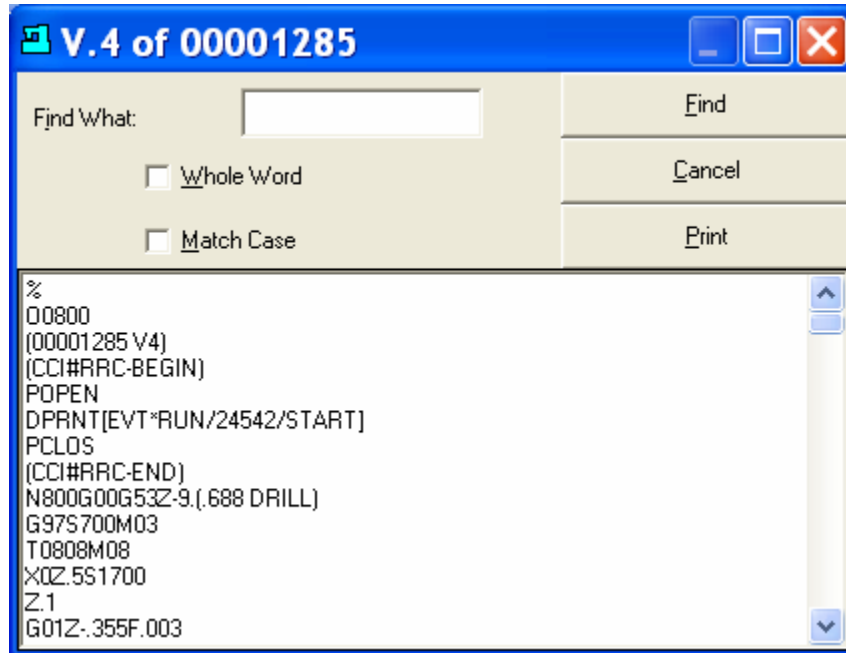


Figure 8 - Macro Lines Added



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### 2.3 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:

DateTimeStamp, Data Item, Identifier, Value, Type, Role, Status, Serial Number  
Identifier Object Type, Status, Id, Name, Version  
Raw Data, Elapsed time

For example – a Start/End pair of records:

#### 0201 Mori-Seiki SL35

2007/06/27 12:30:45 Run NC Program 1045 Start Session Open 11-6A-53D454454-000000  
Identifier Object Type: Dnc File Status: Valid Id: 1045 Name: PN2333-0009 Version: 1  
Raw Data: RUN/1045/START

2007/06/27 12:35:54 Run NC Program 1045 End Session Close 11-6A-53D454454-00000E  
Identifier Object Type: Dnc File Status: Valid Id: 1045 Name: PN2333-0009 Version: 1  
Raw Data: RUN/1045/END  
Start: 11-6A-53D454454-000000 2007/06/27 12:30:45 Elapsed: 0 days 00:05:09

What this says 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” was received at that time in the captured RS-232 string, “EVT RUN/1045/START”.

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 was received that that time in the captured RS-232 string, “EVT RUN/1045/END”..

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

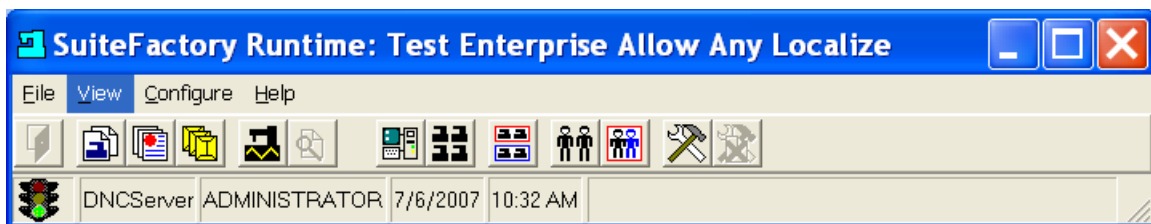
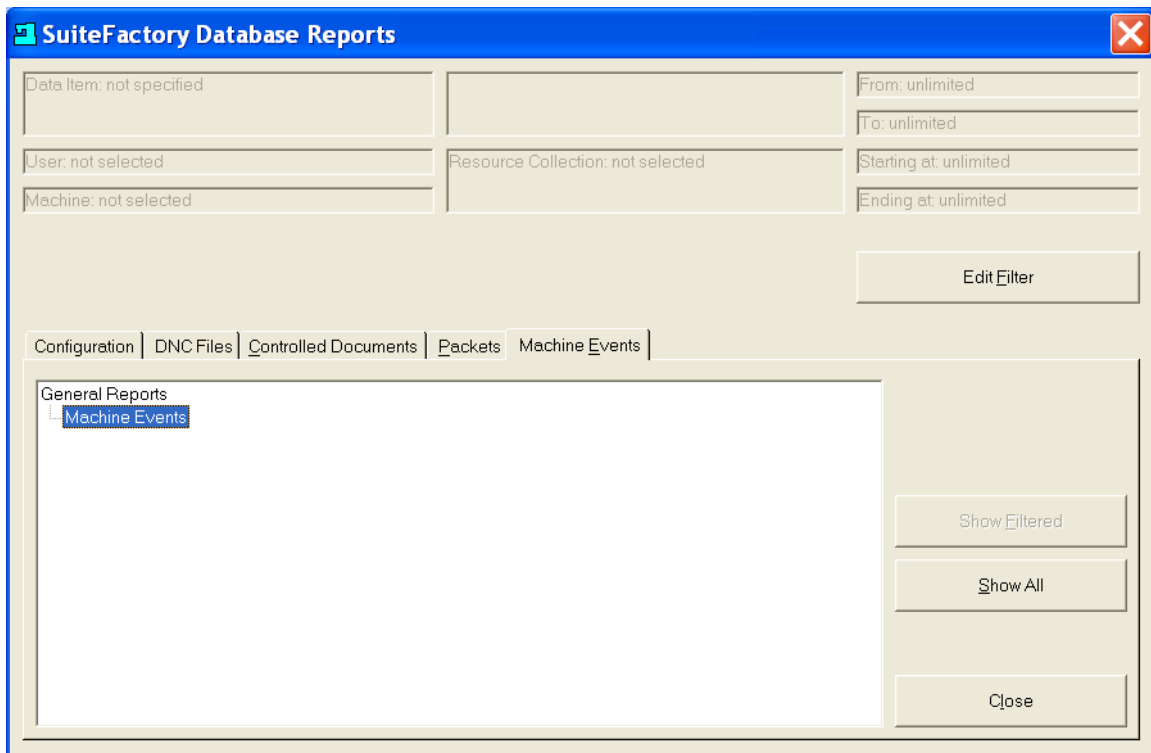


Figure 9 - SuiteFactory Runtime Main Toolbar

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

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**Figure 10 - 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:

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**Edit Report Filter**

Filter by Selected File or Document

Filter by Event Data Item

Filter by Event Identifier NC Program

Filter By Event Value

Filter by Selected Resource Collection

Filter by Selected Machine

Filter by Selected User

Filter by Starting Date

Filter by Ending Date

Filter by Starting Time Each Day

Filter by Ending Time Each Day

Buttons: Browse..., Browse..., OK, Cancel

**Figure 11 - Report Filtering**

There are more examples of reports below.

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## 3 Configuring other types of events

In order to configure other type of events you need “exclusive access” to the SuiteFactory database. This means that all SuiteFactory clients except one 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.

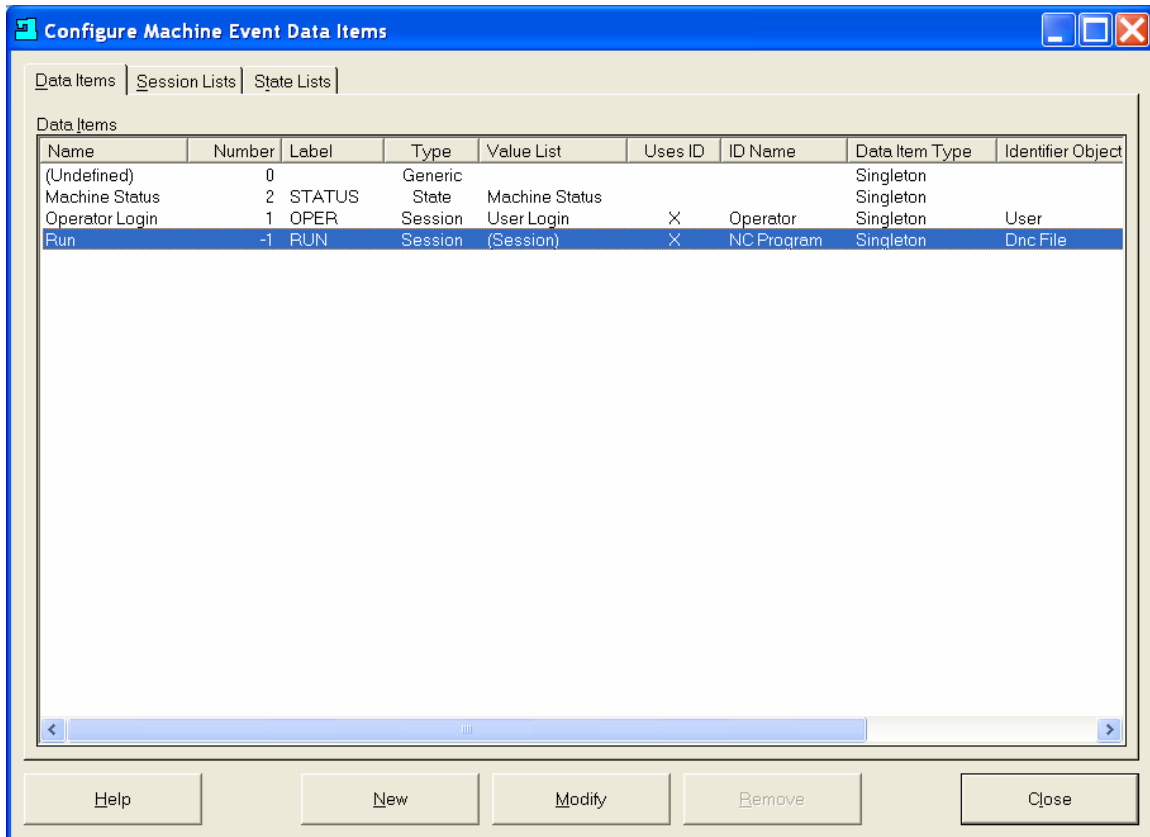


Figure 12 – Machine Events/Data Items Screen

### 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.

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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.

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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:

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Name: Run Remote Request Label: RUN Number: -1

Value Type: Session

Selected Session List

Name	Number	Open	Close	Mark	Data Items
[Session]	-1	Start	End	Mark	1
Program Run	2	Start	End	Unknown Value	0
User Login	1	Login	Logout	Comment	1

Requires an Identifier:

Identifier Title in Reports: NC Program Data Item Type: Singleton

Identifier Object Type for Validation: Dnc File How to Compare Identifier Value to Identifier Object: Identifier value equals DNC File Id

Buttons: Reset, Apply, OK, Close

**Figure 13 - 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.).

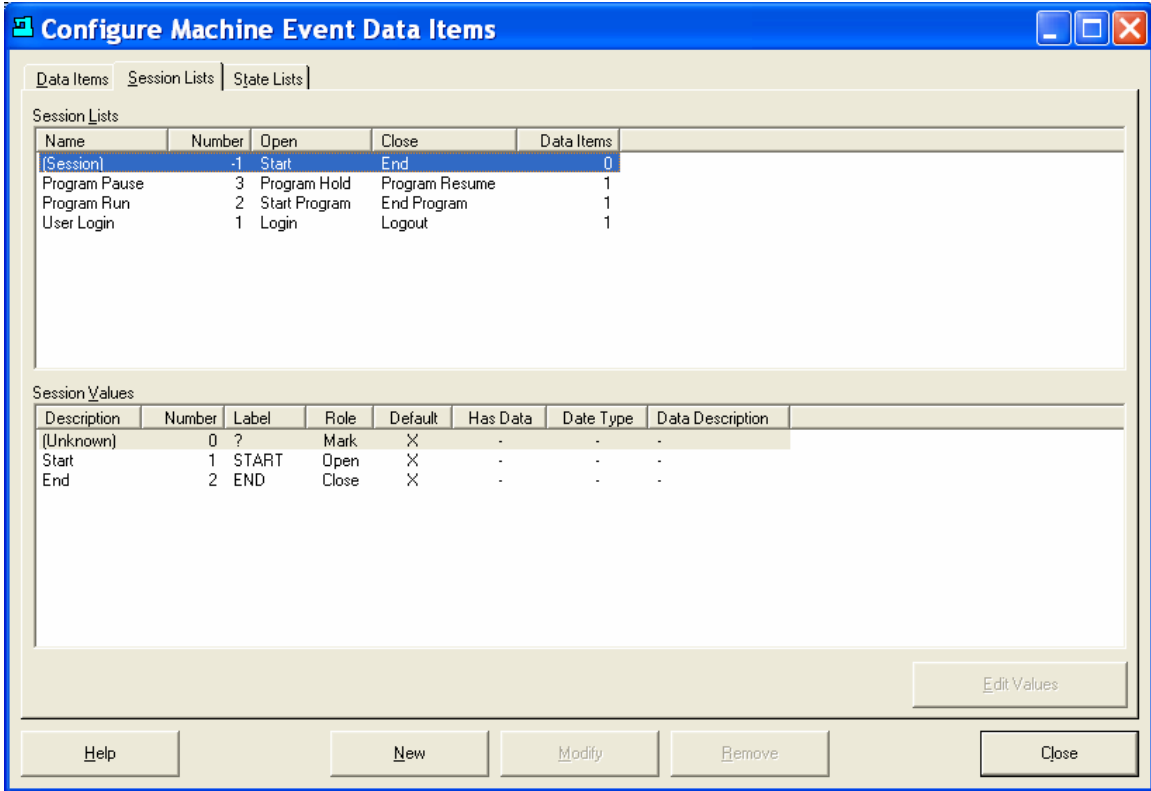
You can change the “Identifier Object Type for Validation” and its accompanying “How to Compare Identifier Value to Identifier Object”.

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:

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**Figure 14 - 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.



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### 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.

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## 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:

Configure the set of Session Values

Description	Number	Label	Role	Default	Has Data	Date Type	Data Description
-------------	--------	-------	------	---------	----------	-----------	------------------

Buttons: Reset, New, Edit, Delete

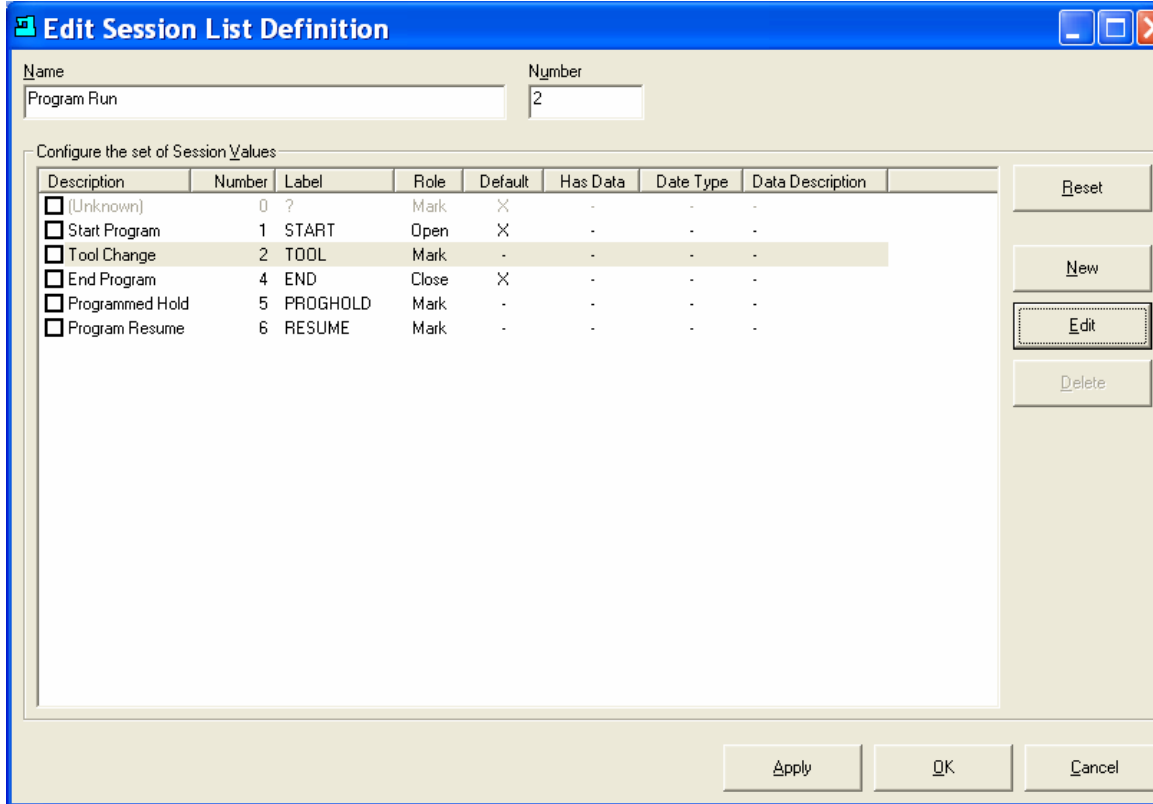
Please define default values for the Session Roles 'Open', 'Close', and 'Mark'

Buttons: Apply, OK, Cancel

**Figure 15 - New Session List**

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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 16 - 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.

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The Edit Session Value screen looks similar to this:

**Edit Session Value**

Session List  
Name: Program Run  
Number: 2

Description  
Start Program

Remote Request Command Label    Number  
START    1

Session Role  
Mark  
Open  
Close

Default Value for Selected Session Role

Has Value Data

Value Data Type    Value Data Description  
Text   

Help  
OK    Cancel

**Figure 17 – 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.

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

**Edit Session List Definition**

Name: Program Run      Number: 2

Configure the set of Session Values

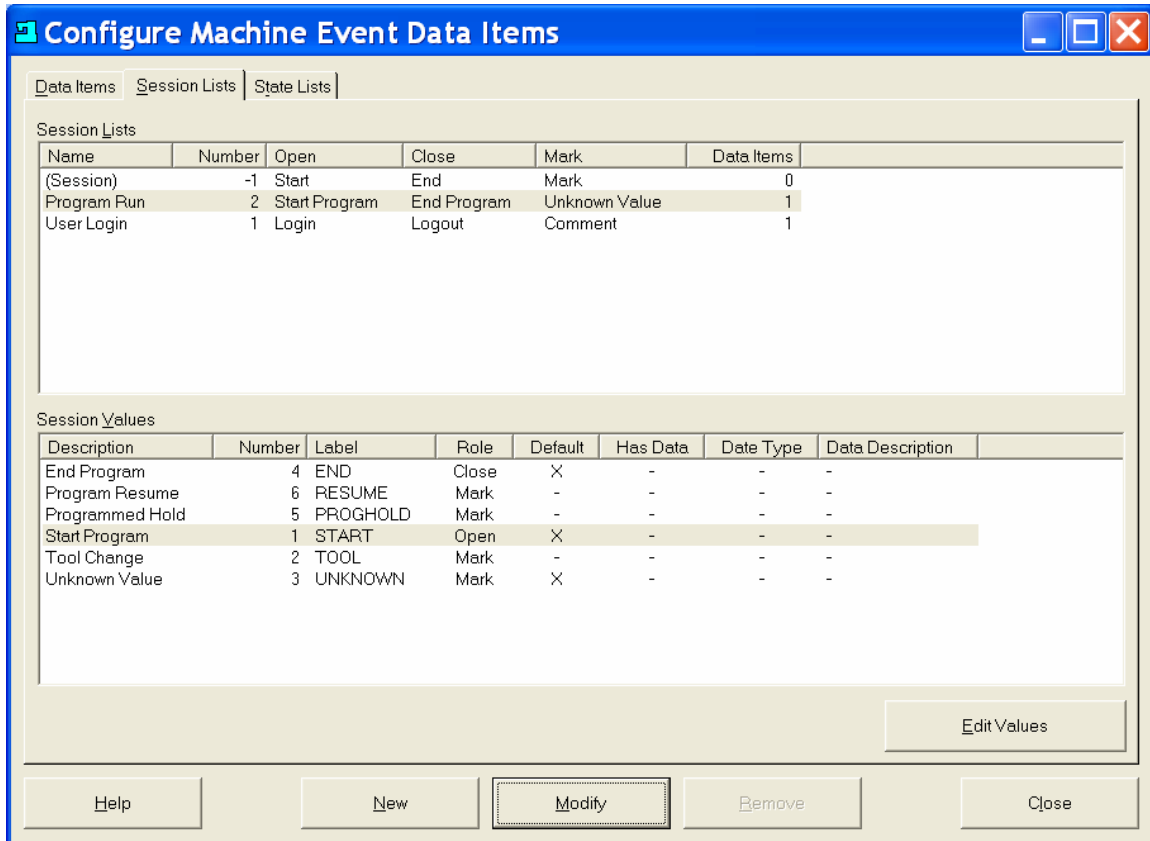
Description	Number	Label	Role	Default	Has Data	Date Type	Data Description
<input type="checkbox"/> End Program	4	END	Close	X	-	-	-
<input type="checkbox"/> Program Resume	6	RESUME	Mark	-	-	-	-
<input type="checkbox"/> Programmed Hold	5	PROGHOLD	Mark	-	-	-	-
<input type="checkbox"/> Start Program	1	START	Open	X	-	-	-
<input type="checkbox"/> Tool Change	2	TOOL	Mark	-	-	-	-
<input type="checkbox"/> Unknown Value	3	UNKNOWN	Mark	X	-	-	-

Buttons: Reset, New, Edit, Delete, Apply, OK, Cancel

**Figure 18 - Edit Session List Definition Screen**

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

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**Figure 19 - 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.

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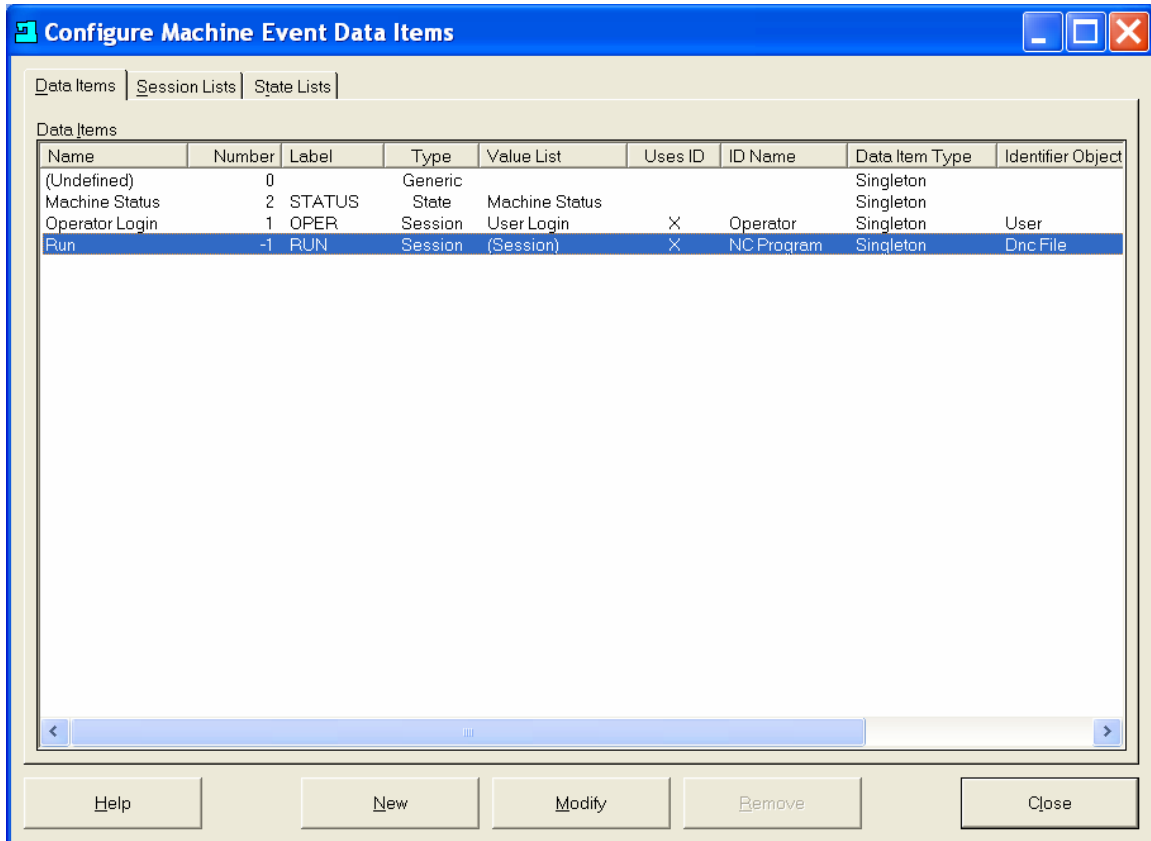


Figure 20 - Configure Machine Event Data Item Screen

Highlight Run and click Modify

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**Edit Data Item**

Name: Run Remote Request Label: RUN Number: -1

Value Type: Session

Selected Session List

Name	Number	Open	Close	Mark	Data Items
(Session)	-1	Start	End	Mark	1
Program Run	2	Start Program	End Program	Unknown Value	0
User Login	1	Login	Logout	Comment	1

Requires an Identifier:

Identifier Title in Reports: NC Program Data Item Type: Singleton

Identifier Object Type for Validation: Dnc File How to Compare Identifier Value to Identifier Object: Identifier value equals DNC File Id

Reset Apply OK Cancel

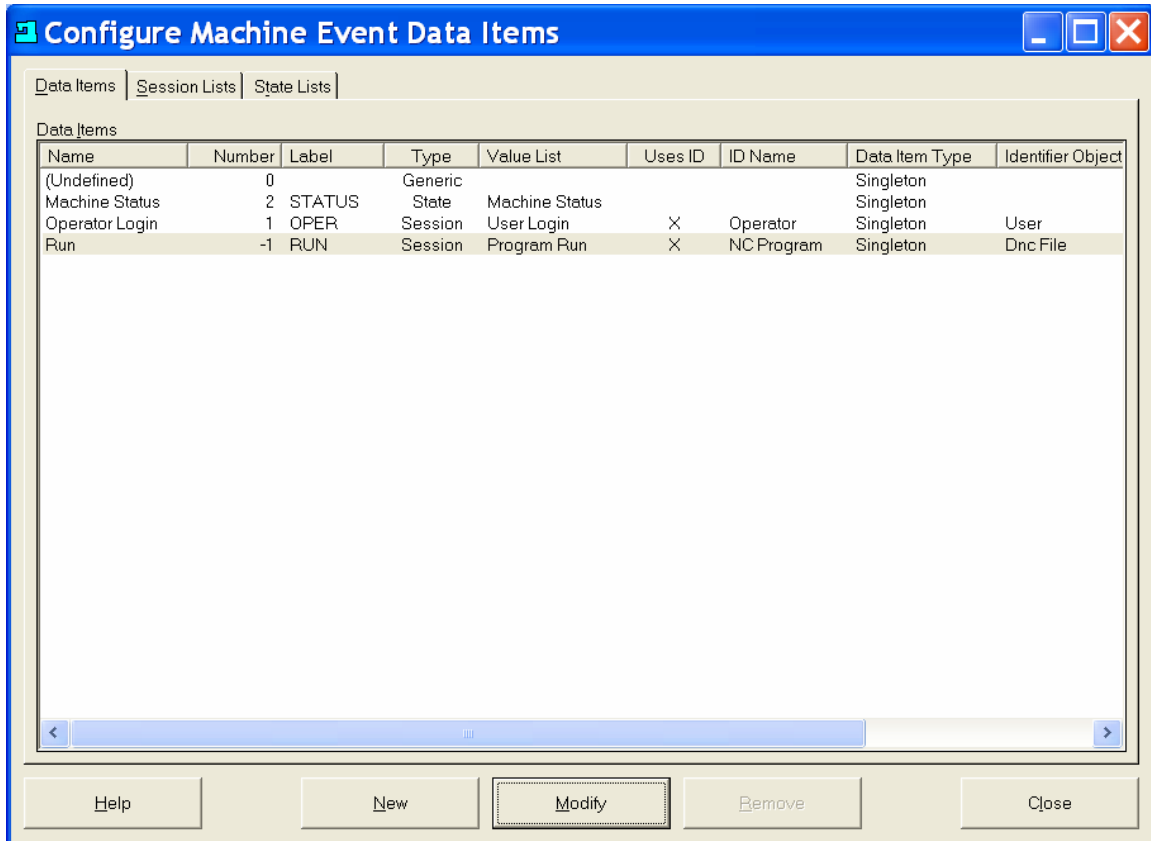
**Figure 21 - Edit Data Item Run**

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



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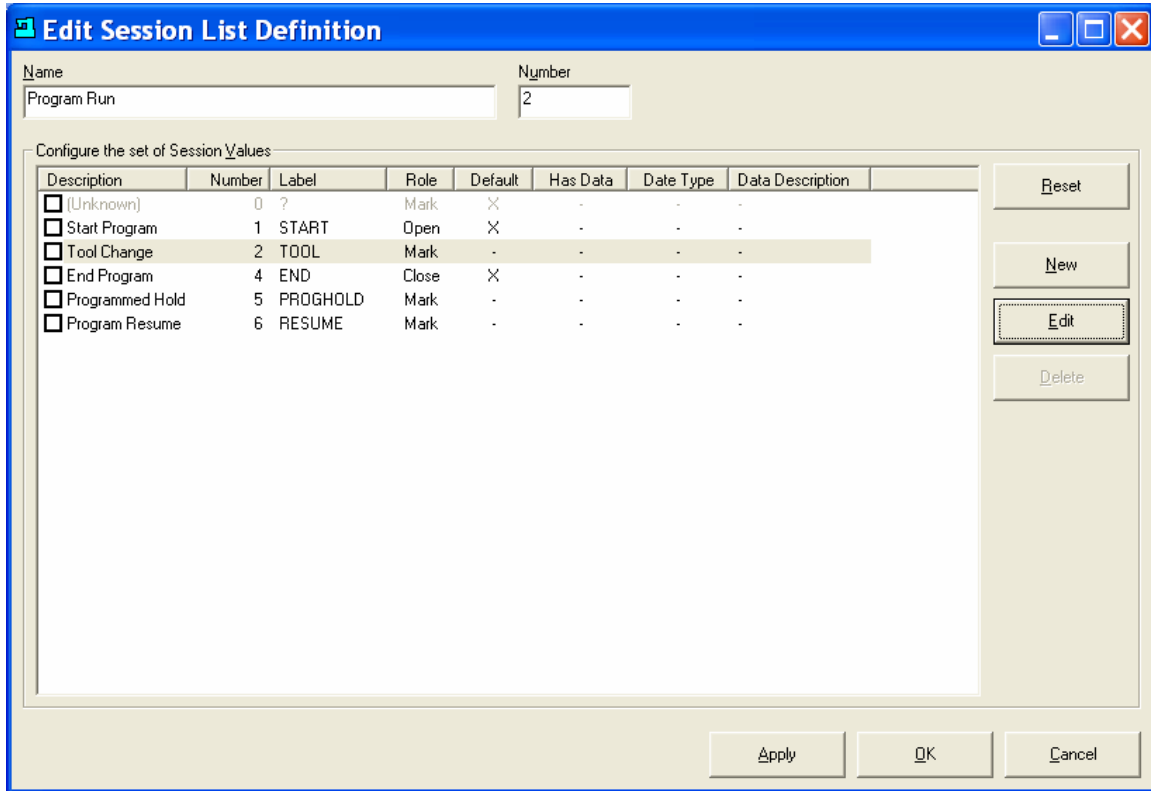
**Figure 22 - Data Item Screen showing new Value List Assignment**

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

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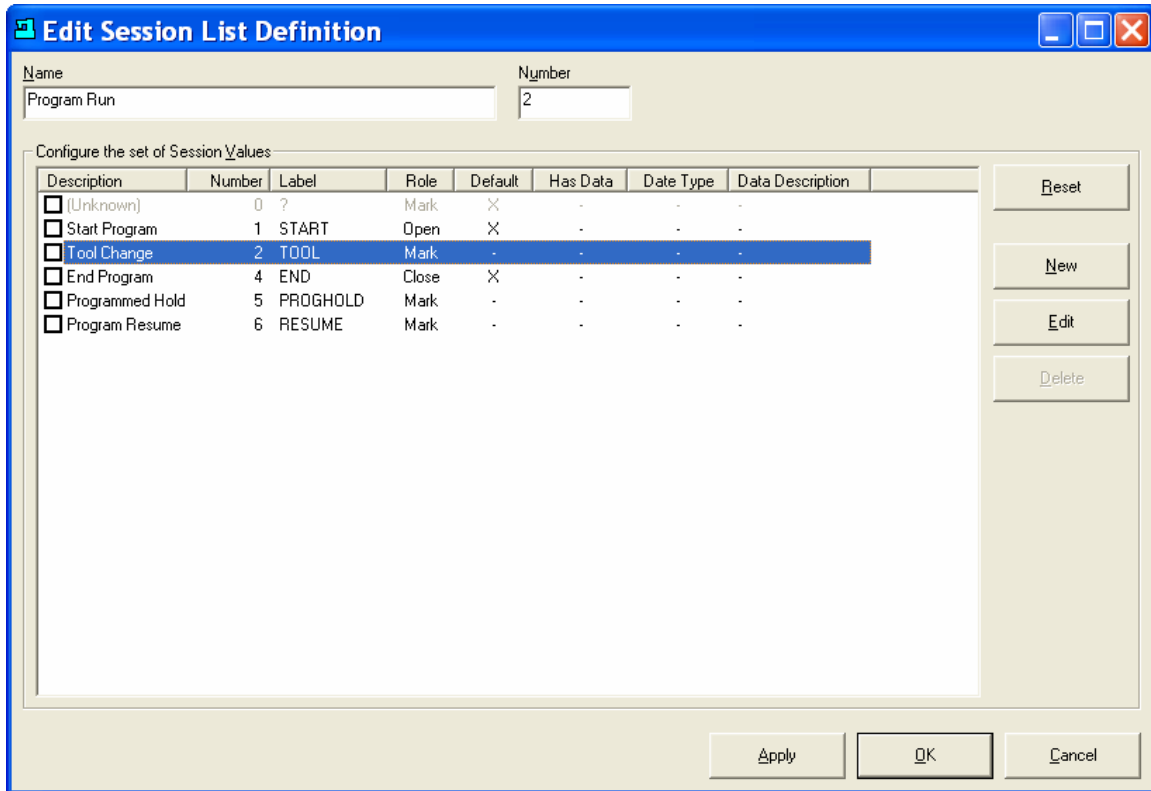
The Session Lists screen with the new Program Run entry highlighted looks like this:



**Figure 23 - 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.

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**Figure 24 - Editing Tool Change**

Highlight the Tool Change item and then click Edit.

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**Edit Session Value**

Session List  
Name: Program Run  
Number: 2

Description  
Tool Change

Remote Request Command Label: TOOL      Number: 2

Session Role: Mark  
Open  
Close

Default Value for Selected Session Role

Has Value Data

Value Data Type: Text      Value Data Description:

Help      OK      Cancel

**Figure 25 - 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.

# SuiteFactory Technote Machine Monitoring Option

**Edit Session Value**

Session List  
Name: Program Run  
Number: 2

Description  
Tool Change

Remote Request Command Label: TOOL      Number: 2

Session Role: Mark  
Open  
Close

Default Value for Selected Session Role

Has Value Data

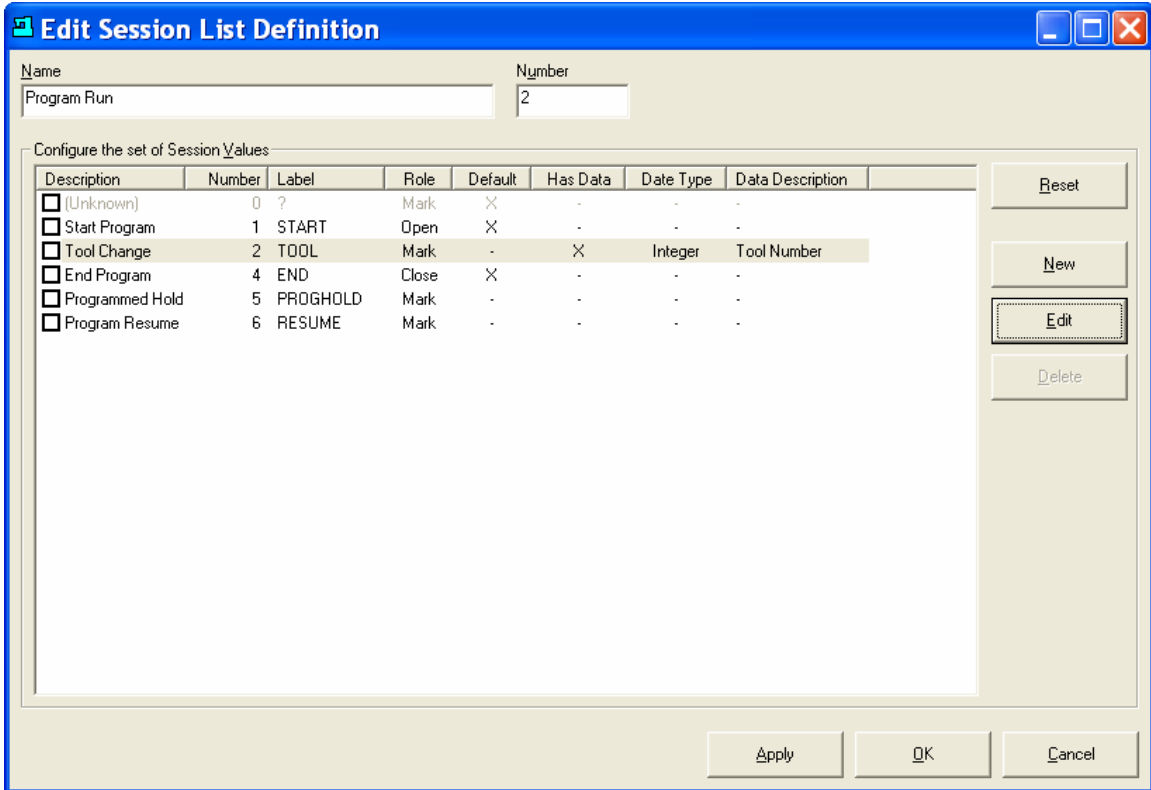
Value Data Type: Integer      Value Data Description: Tool Number

Help      OK      Cancel

**Figure 26 - Edited Tool Change Value**

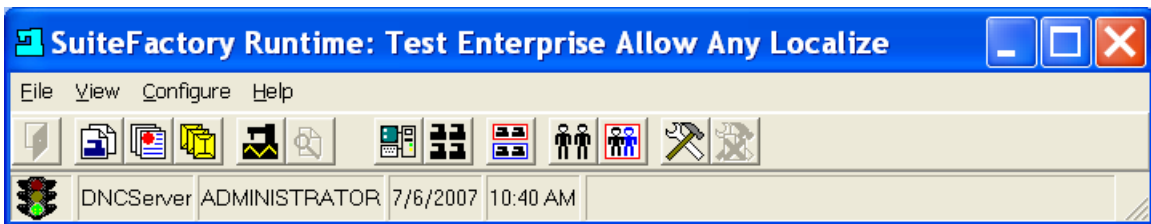
Click OK to finish and return to the previous screen.

# SuiteFactory Technote Machine Monitoring Option



**Figure 27 - 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 28 - Main Tool Bar**

## SuiteFactory Technote Machine Monitoring Option

### 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**

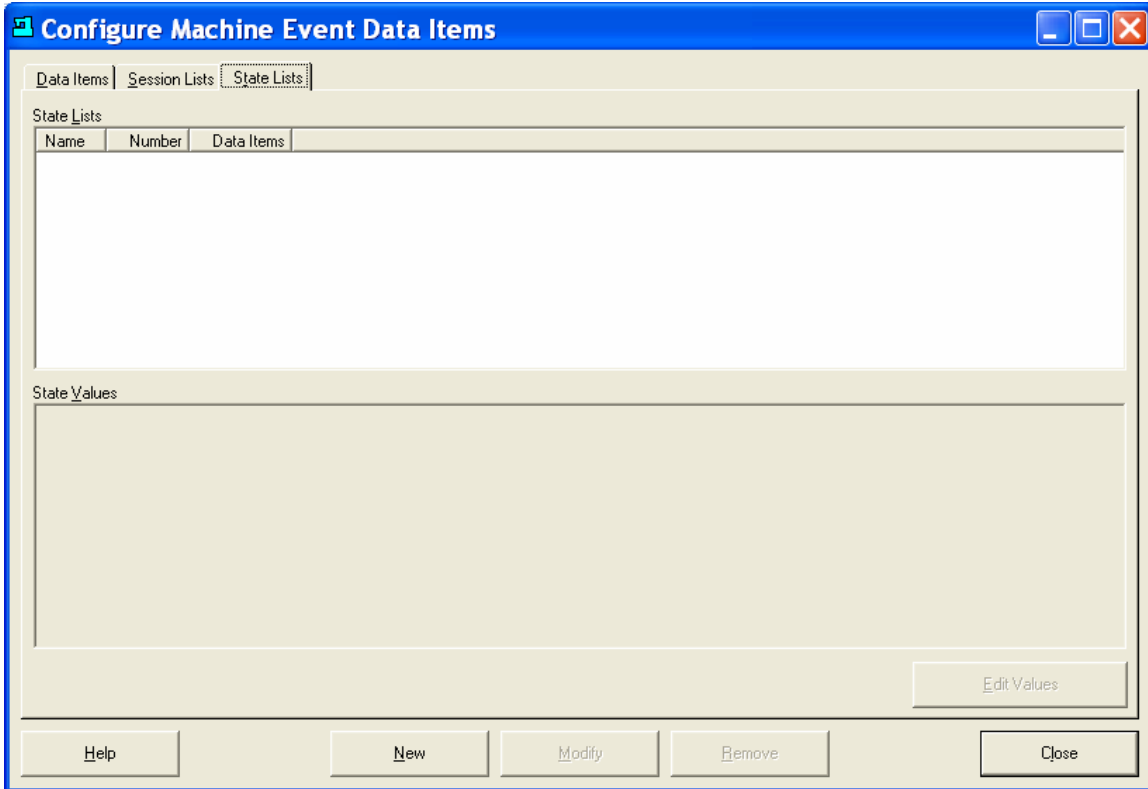
<u>DateTimeStamp</u>	<u>Data Item</u>	<u>Identifier</u>	<u>Value</u>	<u>Type</u>	<u>Role</u>	<u>Status</u>	<u>Serial Number</u>
2007/07/06 12:33:16	Run Identifier Object Type: Dnc File Raw Data: RUN/1045/START	NC Program Status: Valid	1045 Id: 1045	Start Program Name: 00001403	Session Version: 1	Open	11-6A-7D776C1B0-00000002
2007/07/06 12:35:13	Run Identifier Object Type: Dnc File Data: Tool Number Raw Data: RUN/1045/TOOL/12 Start: 11-6A-7D776C1B0-00000002	NC Program Status: Valid , type = Integer	1045 Id: 1045 , value = 12	Tool Change Name: 00001403 Status: Valid	Session Version: 1	Mark	11-6A-7D776C1B0-00000003
2007/07/06 12:40:19	Run Identifier Object Type: Dnc File Raw Data: RUN/1045/PROGHOLD Start: 11-6A-7D776C1B0-00000002	NC Program Status: Valid	1045 Id: 1045	Programmed Hold Name: 00001403	Session Version: 1	Mark	11-6A-7D776C1B0-00000004
2007/07/06 12:42:30	Run Identifier Object Type: Dnc File Raw Data: RUN/1045/RESUME Start: 11-6A-7D776C1B0-00000002	NC Program Status: Valid	1045 Id: 1045	Program Resume Name: 00001403	Session Version: 1	Mark	11-6A-7D776C1B0-00000005
2007/07/06 12:43:46	Run Identifier Object Type: Dnc File Data: Tool Number Raw Data: RUN/1045/TOOL/23 Start: 11-6A-7D776C1B0-00000002	NC Program Status: Valid , type = Integer	1045 Id: 1045 , value = 23	Tool Change Name: 00001403 Status: Valid	Session Version: 1	Mark	11-6A-7D776C1B0-00000006
2007/07/06 13:01:43	Run Identifier Object Type: Dnc File Raw Data: RUN/1045/END Start: 11-6A-7D776C1B0-00000002	NC Program Status: Valid	1045 Id: 1045	End Program Name: 00001403	Session Version: 1	Close	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.



**Figure 29 - State Lists Screen**

Click on New.

## SuiteFactory Technote Machine Monitoring Option

The 'Define New State List' dialog box has a title bar with a blue background and standard window controls. It contains the following elements:

- Name:** A text field containing 'State List 1'.
- Number:** A text field containing '1'.
- Configure the set of State Values:** A table with the following columns: Description, Number, Label, Default, Has Data, Data Type, and Data Description. The table contains one row: 

Description	Number	Label	Default	Has Data	Data Type	Data Description
<input type="checkbox"/> (Unknown)	0	?	X	-	-	-
- Buttons:** 'Reset', 'New', 'Edit', and 'Delete' are located on the right side. 'Apply', 'OK', and 'Cancel' are at the bottom.
- Message:** A yellow box at the bottom left contains the text 'Please define at least 2 state values'.

Figure 30 - Define New State List

Click New.

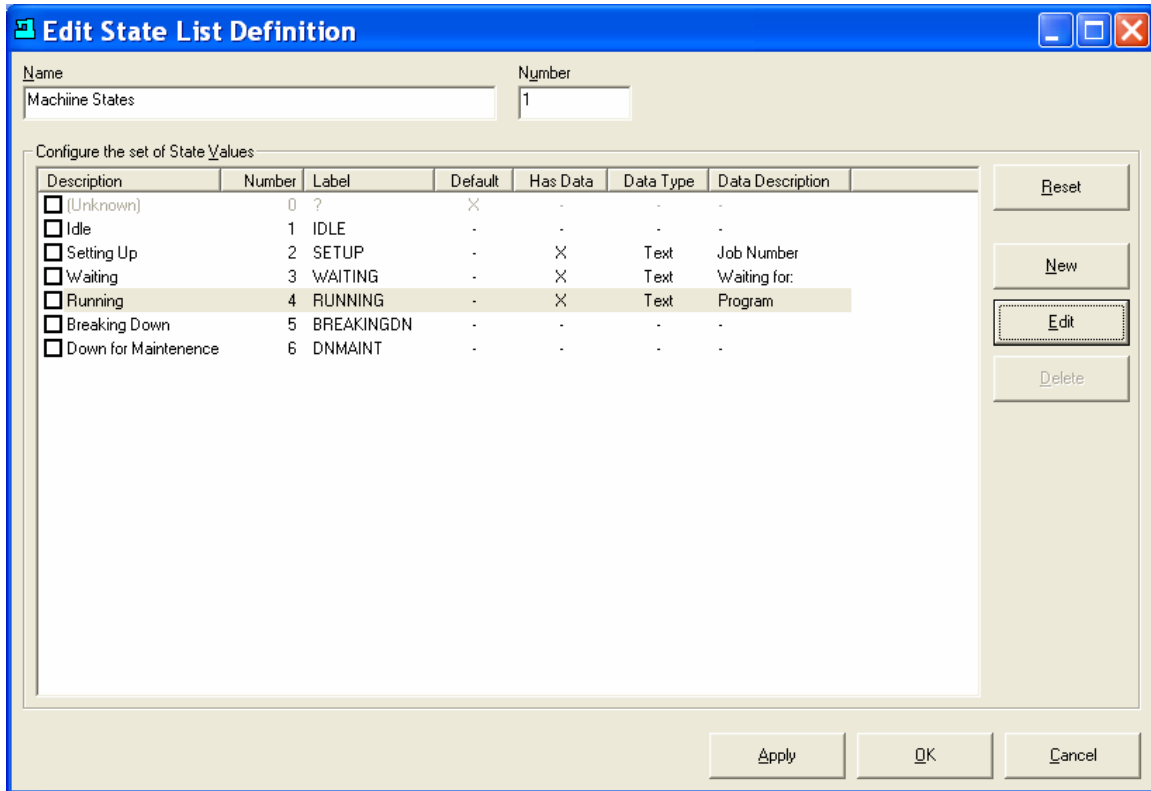
The 'Define New State Value' dialog box has a title bar with a blue background and a close button. It contains the following elements:

- State List:** A text area showing 'Name: Machine States' and 'Number: 1'.
- Description:** A text field containing 'State Value 1'.
- Remote Request Command Label:** A text field containing 'VALUE1'.
- Number:** A text field containing '1'.
- Has Data:** An unchecked checkbox.
- Data Type:** A dropdown menu set to 'Text'.
- Data Description:** An empty text field.
- Buttons:** 'Help', 'OK', and 'Cancel' are located at the bottom right.

Figure 31 - Define New State Value

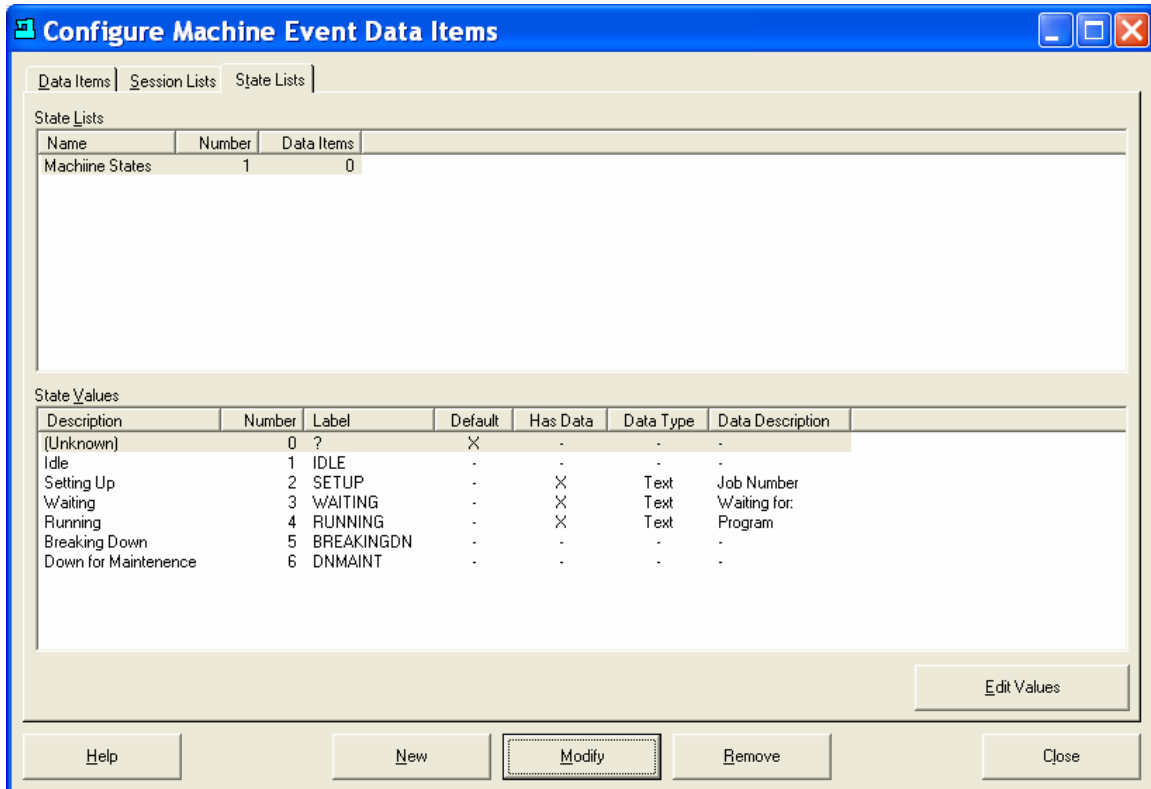
Fill in the data you require for as many new states as you need.

## SuiteFactory Technote Machine Monitoring Option



**Figure 32 - Machine Status Values**

Click OK.



**Figure 33 - State List Screen Showing the New List**

## SuiteFactory Technote Machine Monitoring Option

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: MSTAT      Number: 4

Value Type: State

Selected State List

Name	Number	Data Items
Machine States	1	0

Requires an Identifier

Identifier Title in Reports: Operator Name      Data Item Type: Singleton

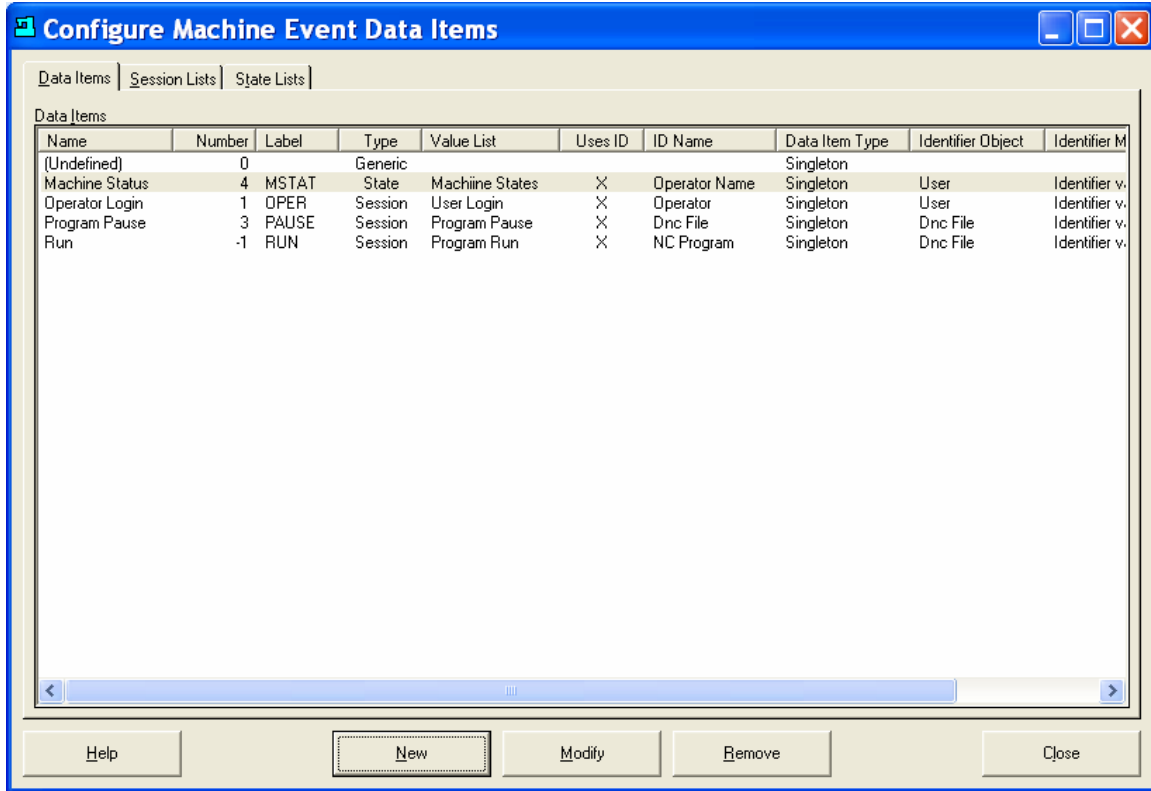
Identifier Object Type for Validation: User      How to Compare Identifier Value to Identifier Object: Identifier value equals User Name

Reset      Apply      OK      Cancel

**Figure 34 - Machine Status Data Item Defined**

Click OK to return to the Data Items screen.

## SuiteFactory Technote Machine Monitoring Option



**Figure 35 - 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

## SuiteFactory Technote Machine Monitoring Option

%  
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							

## SuiteFactory Technote Machine Monitoring Option

2007/07/11 12:26:07 7D77BCF1F-00000009	Machine Status	Operator Name	GUY	Running	State	Begin	11-6A-
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 7D77BCF1F-0000000A	Machine Status	Operator Name	GUY	Running	State	End	11-6A-
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 7D77BCF1F-0000000B	Machine Status	Operator Name	BOB	Breaking Down	State	Begin	11-6A-
Identifier Object Type: User		Status: Valid	Id: 6	Name: BOB			
Raw Data: MSTAT/BOB/BREAKINGDN							
2007/07/11 12:28:54 7D77BCF1F-0000000C	Machine Status	Operator Name	BOB	Breaking Down	State	End	11-6A-
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 7D77BCF1F-0000000D	Machine Status	Operator Name	BOB	Down for Maintenene	State	Begin	11-6A-
Identifier Object Type: User		Status: Valid	Id: 6	Name: BOB			
Raw Data: MSTAT/BOB/DNMAINT							

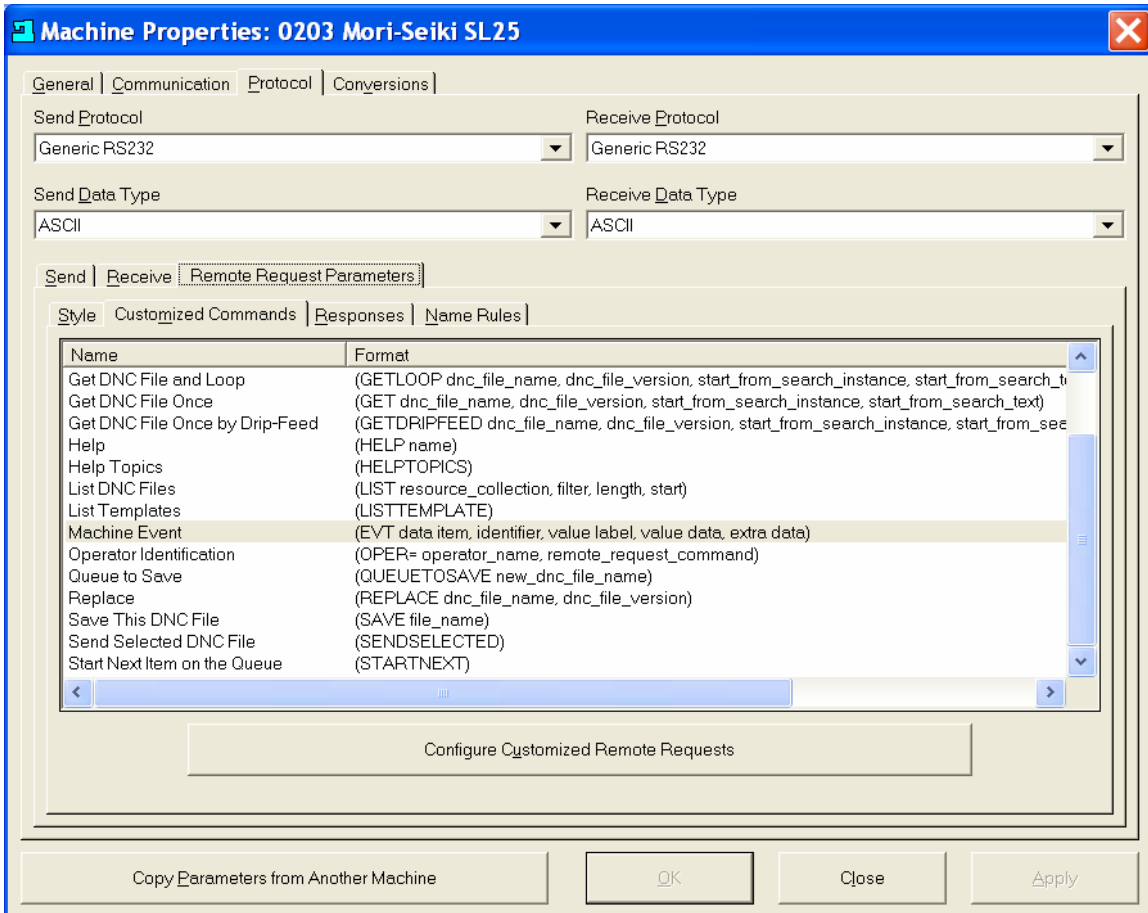




## 4 Appendix A

### 4.1 Editing the EVT Remote Request Command

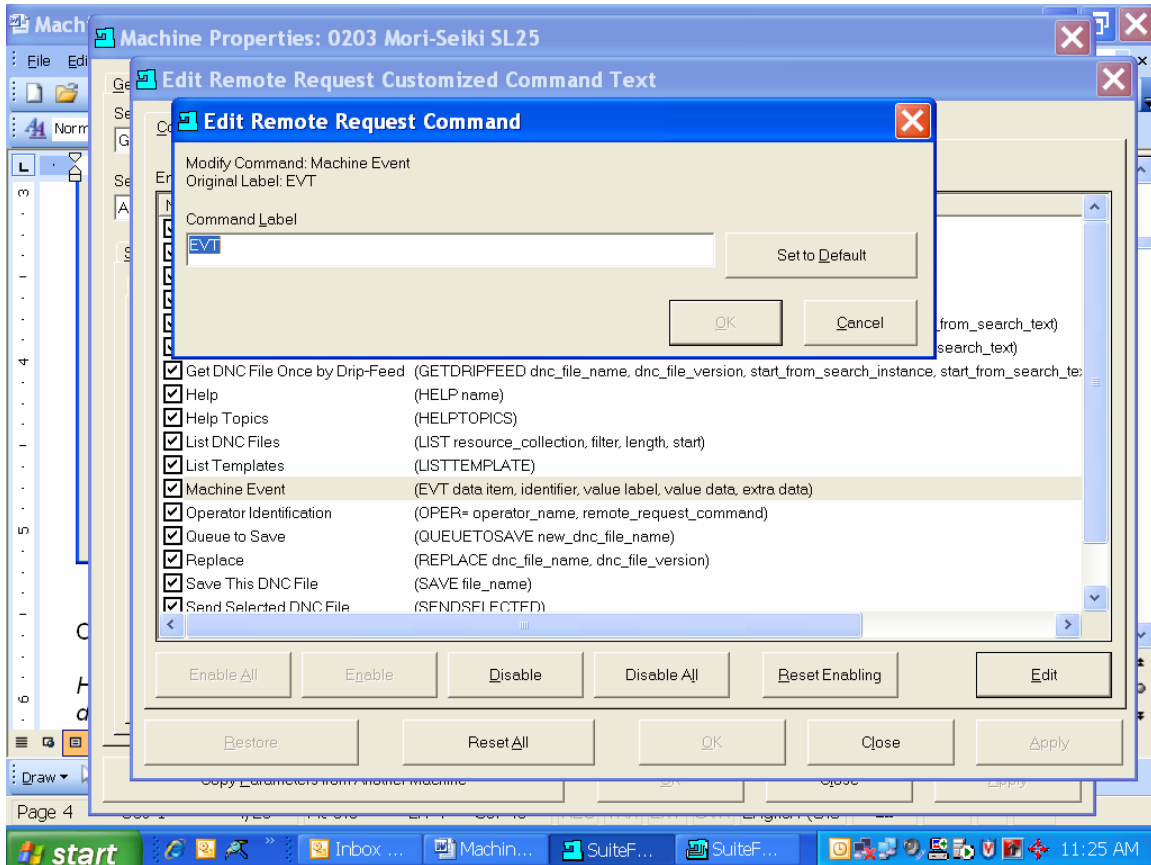
From the SuiteFactory Runtime main toolbar, select Configure/Machine. Select the machine to be edited and click on Properties. Select the Protocol Tab then the Remote Request Parameters tab and then the Customized Commands tab.



**Figure 36 - Editing the Machine Event Remote Command**

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

## SuiteFactory Technote Machine Monitoring Option



**Figure 37 - Editing the EVT Command**

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

# SuiteFactory Technote Machine Monitoring Option

The screenshot shows a dialog box titled "Edit Remote Request Customized Command Text" with a close button in the top right corner. The dialog has a tabbed interface with the following tabs: "Commands", "Delimiters", "LIST Parameters", "CNC E-Mail Parameters", and "Machine Events". The "Machine Events" tab is currently selected.

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

[Empty text box] [Browse...]

Buttons at the bottom: Restore, Reset All, OK, Cancel, Apply