
# GE Fanuc Automation

*CIMPLICITY Monitoring and Control Products*

# CIMPLICITY HMI for CNC CNC Machining Interface Installation and Configuration Manual

*GFK-1566D* *November 1999*

**Warning**

Warning notices are used in this publication to emphasize that hazardous voltages, currents, temperatures, or other conditions that could cause personal injury exist in the equipment or may be associated with its use.

In situations where inattention could cause either personal injury or damage to equipment, a Warning notice is used.

**Caution**

Caution notices are used where equipment might be damaged if care is not taken.

**Note**

Notes merely call attention to information that is especially significant to understanding and operating the equipment.

This document is based on information available at the time of publication. While efforts have been made to be accurate, the information contained herein does not purport to cover all details or variations in hardware or software, nor to provide for every possible contingency in connection with installation, operation, or maintenance. Features may be described herein which are not present in all hardware and software systems. GE Fanuc Automation assumes no obligation of notice to holders of this document with respect to changes subsequently made.

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# Contents

# 1 Introduction

This document is supplied to the Original Equipment Manufacturer and End User to document the installation and configuration of the following software:

- Microsoft Windows NT ® Workstation
- CIMPLICITY ® HMI Base System
- CIMPLICITY ® HMI for CNC
- CIMPLICITY ® CNC Machining Interface
- GE Fanuc Ladder Edit and Display

**Note**

This assumes that the supplied hardware is a Display Station–Series 2000 with the CNC Machining Interface Install hard disk.

Please review this document before installing your system. Installation should be performed using a temporary keyboard and pointing device.

# Reference Manuals

For more information, please refer to the following manuals:

| Publication Number | Description |
|---|---|
| GFK-1542 | CIMPLICITY HMI for CNC – CNC Machining Interface Operations Manual |
| GFK-1180 | CIMPLICITY HMI for Windows NT/95 - Base System |
| GFK-1283 | CIMPLICITY HMI for Windows NT/95 - Basic Control Engine |
| GFZ-62994EN/01 | Basic Operation Package (BOP) 1 for Windows NT/95 Operator's Manual |
| GFK-1422 | Open Systems User's Manual (Type II High Speed Serial Bus Setup for Windows NT/95) |
| GFZ-62884EN/01 | Open Systems Operator's Manual ( Ladder Editing Package) |
| — | GE Fanuc OI Display Station (Series 2000 User Manual) |
| — | GE Fanuc OI Display Station (PC Mother Board User Manual) |
| — | GE Fanuc OI Display Station (PC Ethernet User Manual) |

# 2 Installation

## Installation Overview

1. Unpack the unit.
2. Connect the power cord and HSSB cable to the Operator Interface (OI) system.
3. Set the CNC parameters for Open Systems operations.
4. Check on the licenses for the Ladder Editing package.

## Installing Licensed Windows NT

**Note**

You must have a temporarily installed keyboard.

5. Read the on-screen licensing agreement, and tab down to "**[I AGREE]**".
6. Press **ENTER** or tab to "**Next**" to continue.
7. Enter your **Name** and **Organization** in the specified fields.

**Note**

Use **TAB** to move between fields. Hold down the **FN** key to access alphabetic characters.

8. Press **ENTER** or tab to "**Next**" to continue.
9. Get the license number for the Windows NT registration. It should be on the book that came packaged with the CD. Press **ENTER** or tab to "**Next**" to continue.
10. Enter your computer name, and press **ENTER** or tab to "**Next**" to continue.

11. Enter the administrator password (**ge**) twice to confirm, and press **ENTER** or tab to "**Next**" to continue. The password must be entered in lower case letters.

**Note**

This password is already defined and should not be changed.

## Installing the Ethernet System

12. Enter to start networking setup, and press **ENTER** or tab to "**Next**" to continue.
13. Specify your network configuration, and press **ENTER** or tab to "**Next**" to continue.

**Note**

If the window title bar turns gray and loses focus, hold **ALT** and press **TAB** to restore it.

14. Tab down to the "**To Select from List**" button to select the hardware.
15. Tab over to "**Have Disk…**".
16. Enter the path **c:\3com** when prompted.
17. Select **3C900** from the list. (This is usually not the first selection on the list.)
18. Press **ENTER** or tab to "**OK**" to continue.
19. Press **ENTER** to accept the TCPIP protocol, which should be selected by default.
20. Press **ENTER** or tab to "**Next**" to continue.
21. Press **OK** to close the success window.
22. Close "**3 Comm NIC Diagnostic VI.0**".
23. Select **NOT** to use DHCP.
24. Tab to the IP address field and enter your IP address. Use the left and right arrows to move between decimal points. Press **OK**.
25. Press **ENTER** or tab to "**Next**" to continue.
26. Enter your workgroup or domain name, and press **ENTER** or tab to "**Next**" to continue.
27. Restart you computer.

# Registration of CIMPLICITY HMI and CIMPLICITY HMI for CNC

**Note**

Proceed to Step 35 if you have already registered your CIMPLICITY product.

28. After your computer starts up, go to Registration, which can be found using this path:

    **Start → Programs → CIMPLICITY → HMI → Registration**

29. Select **New Registration**. Read and accept the license agreement.
30. To proceed, enter your personal information.
31. Enter the Base System registration, and click the button to add licenses.
32. Enter **CIMPLICITY** for the CNC license number.
33. Press **ENTER** or tab to "**Next**" to continue.
34. Call the telephone number displayed on the screen to obtain your registration number. Enter this number on the next screen.

**Note**

If you are unable to register CIMPLICITY software immediately, you may run the system for up to 4 days without having a registration number entered.

# Setup of CNC Machining Interface Auto-Boot on Power-Up

35. Configure Auto-boot, which is covered in Appendix A, *Automatic Launch of CNC Machining Interface Project at Display Station Boot-Up*.

# Setup of Ladder Edit and Display

**Note**

Disregard steps below if you have already setup Ladder edit and display.

36. Go to **Start → Run** and type **c:\temp\lepsetup.bat**. After it runs, reboot the system.
37. Reference section 2.5 of the *"Ladder Editing Package Operator's Manual"*, GFZ-62884 for additional information.

# 3 Configuration

## Overview

The CNC Machining Interface contains a set of standard screens. Many of the screens, such as the Program Check or Axes screens, are application independent. Several screens, such as the Autostart sequence, can be customized for a specific application.

In order to customize your CNC Machining Interface project, you must perform the following steps:

1. Back up the CNC Machining Interface project.
2. Configure CNC data points (i.e. input and output tags).
3. Run the Configuration Editor to:
   A. Enter machine characteristics
   B. Configure an auto-start sequence
   C. Generate I/O lists for maintenance screens
4. Configure manual sequences.

# Configuring CNC Data Points

The procedure for defining data points is described in detail in GFK-1180, *CIMPLICITY HMI for Windows NT and Windows 95 Base System User's Manual*. Information specific to configuring CNC data points is described in GFK-1341, *HMI for CNC Operation Manual.*

This section describes the absolute minimum information that must be specified in order to configure a point. Refer to GFK-1180 and GFK-1341 for detailed information about each step.

To create a new point:

1. Activate your project's **Configuration** cabinet.
2. If your project is not currently executing, you should start your project. You can do this by selecting the **Run** option from the **Project** menu.
3. After your project has started, select the **Dynamic** option from the **Tools** menu to enable dynamic configuration. The **CIMPLICITY login** dialog box opens. Enter **`administrator`**, and then press **`OK`**.
4. Select the **Points** icon to activate the **Point Configuration** window.
5. Press the **`NEW ITEM`** button on the **Point Configuration** window to add a new CIMPLICITY HMI point.
6. The **New Point** dialog box opens, prompting you to specify information about your new point.
7. Enter a unique Point ID for the point.
8. Press the **`DEVICE POINT`** button, and enter the name of the device associated with your CNC in the **Device ID** field. The device name is **CNC**.
9. Select **Analog** or **Digital** for the **Point Class**, as appropriate.
10. In the **Description** field, enter the I/O address of the point you are defining. The Description field will be displayed in the I/O address column of the Maintenance screen, and should be in the same format as the electrical print I/O address.
11. In the **Resource Id** field, enter the appropriate function group for the point. If the point is an input, select a function group that ends in **_I**. If the point is an output, select a function group that ends in **_O**.

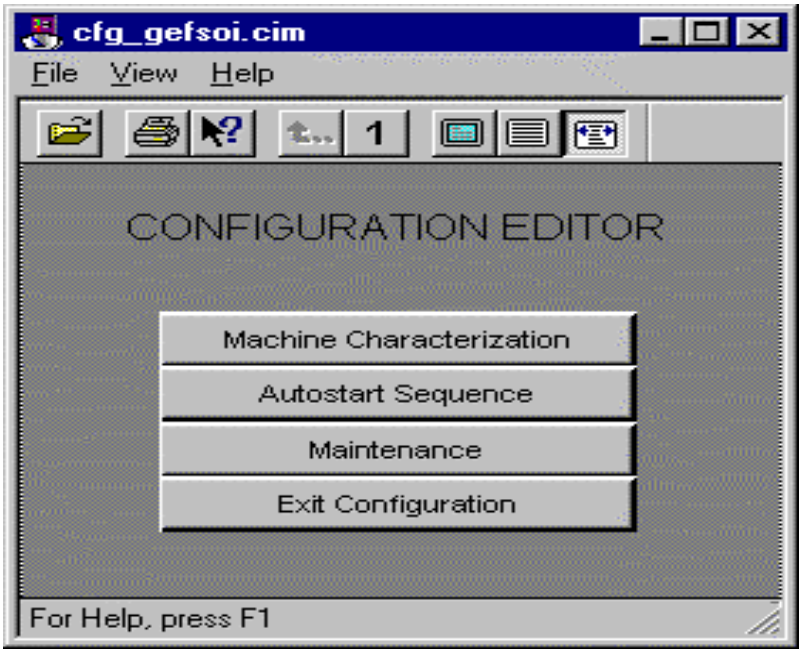
    You may create new resources to represent additional function groups or to describe the function group in another language by clicking on the resource icon in the project's **Configuration** cabinet. Each function group must have one resource that ends in **_I** for inputs and one resource that ends in **_O** for outputs. The resource name is displayed on the Maintenance screen when I/O is sorted by function group; however, the **_I** or **_O** suffix is not displayed.
12. Under the **Data Structure** field, set the **Type** field to an appropriate data type for the point you are defining.
13. Under the **Access** field, select **Read** or **Read/Write**, as appropriate, for the type of point you are defining.

14. In the **Logging** field, select **Log Alarm** to log alarms associated with this point to the CNC Machine Interface message log.
15. Select the **Device** property sheet to specify the address for your point.
16. In the **Address** field, enter a valid address for the point.
17. If you are defining a digital point, you may also be required to enter data in the **Address Offset** field to specify the particular bit of data you would like to reference.
18. Set the **Update Criteria** field to **On Change**.
19. Select the **Alarm** property sheet to define an alarm for this point.
20. Under the **Definition** field, enter an **Alarm Class** and **Alarm Message**.
21. Under the **Alarm Criteria** field, select **Absolute** to generate an alarm on transition to a fault state or **On Update** to generate an alarm each time the point changes value.
22. If **Absolute** was selected for an **Alarm Criteria**, select **Alarm Limits**.
23. Select the **Alarm Routing** property sheet to select the roles that can view any alarms generated by this point.
24. Add all the roles if you wish this alarm to be viewed by all users.
25. Select the **Alarm Options** property sheet to set alarm display options.
26. Under the **Deletion Requirements** field, select **Reset** if you wish the alarm to be removed from the active system messages when the point changes to a value that is not in a fault state.
27. Select **OK** to save the point configuration.

# Using the Configuration Editor

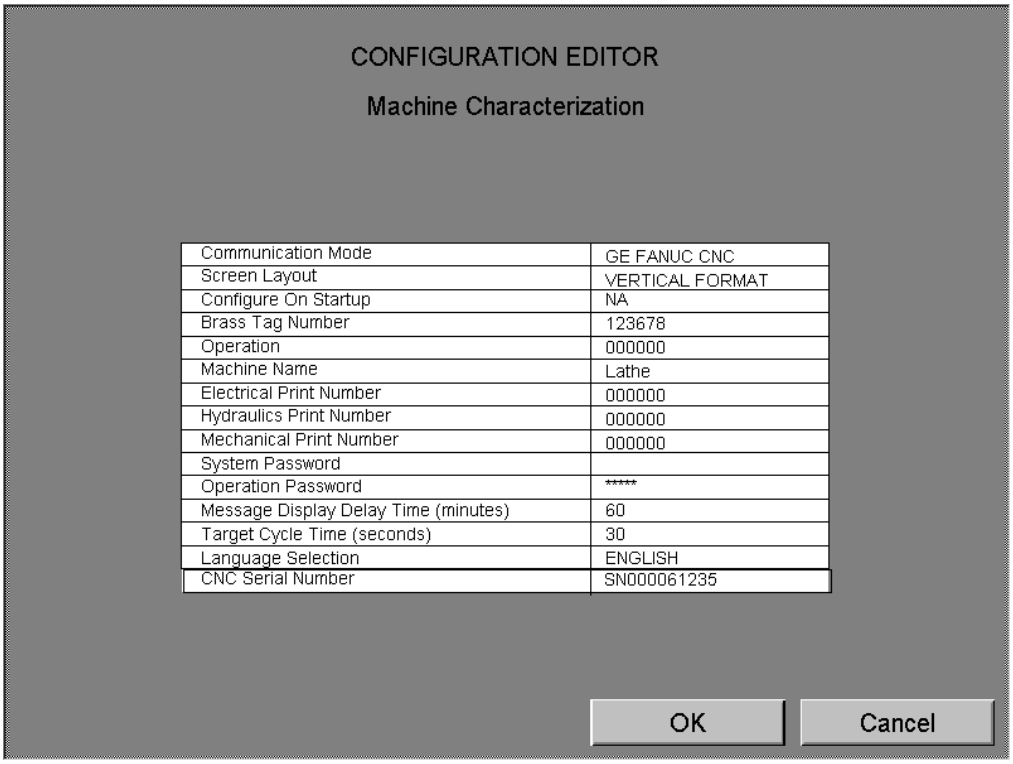
The Configuration Editor allows you to specify the Machine Characterization and Autostart Sequence information for the CNC Machining Interface project. To activate the Configuration Editor, double click on the **CFG_GEFSOI.CIM** file located in the **C:\GEFSOI\SCREENS** directory of the CNC Machining Interface project.

A window, similar to the one shown below, will appear. In addition, four MS-DOS command prompt windows will briefly appear on your screen. After these four windows are no longer displayed, you can begin the configuration process.



# Machine Characterization

Pressing the **MACHINE CHARACTERIZATION** button from the Configuration Editor after activating **CFG_GEFSOI.CIM** displays the following window:




To change a value on this screen, click on the value or tab to the value, and press the **ENTER** key. Enter a new value, and then press **ENTER** again to make the change.

The Machine Characterization screen allows you to specify the following information:

**Table 3 - 1. Machine Characterization Screen**

| Item | Description |
|---|---|
| Communication Mode | Not currently used. |
| Screen Layout | Contains one of two screen layout designations:<br>• VERITCAL DISPLAY formats the screen with five keys, positioned vertically on either side of the screen. This screen layout resembles the Flo Pro screen layout.<br>• HORIZONTAL DISPLAY formats the screen with ten function keys across the bottom.<br>The functionality remains exactly the same with either display type. |
| Configure on Startup | Not currently used. |
| Brass Tag Number | Contains the brass tag number of the machine. It is displayed, along with other machine specific identification information, on the main screen. |
| Operation | Contains the operation number of the machine. It is displayed, along with other machine specific identification information, on the main screen. |
| Machine Name | Contains the name of the machine. It is displayed, along with other machine specific identification information, on the main screen. |
| Electrical Print Number | Contains the reference number of the electrical prints for the machine. It is displayed, along with other machine specific identification information, on the main screen. |
| Hydraulics Print Number | Contains the reference number of the hydraulic prints for the machine. It is displayed, along with other machine specific identification information, on the main screen. |
| Mechanical Print Number | This field contains the reference number of the mechanical prints for the machine. It is displayed along with other machine specific identification information on the main screen. |
| System Password | Contains the system level password, which provides access to these functions:<br>• Purge Error Log<br>• Set Message Display Delay Time<br>• Set Target Cycle Time<br>• Backup History Log<br>• Change Passwords<br>• Reset Machine Cycle Counter<br>• Setup Machine Cycle Target Count and Shift Start and End Times<br>• Select Part Program |
| Operation Password | Contains the operator level password. The operator password provides access to the following functions:<br>• Purge Error Log<br>• Select Part Program |

| Item | Description |
|---|---|
| Message Display Delay Time (minutes) | Contains a value in minutes for the error message display window delay time. This determines the time delay for displaying the system error message screen if there are active system messages that have not been cleared.<br>If there is an active system message indicating a machine condition that is in a fault state or a warning state, the error message window will pop up at the frequency defined in this field in the machine characterization file. Each time the user exits the screen, the timer will be reset and begin timing from zero to the message display delay time. |
| Target Cycle Time | This field contains the value in seconds of the target cycle time for the machine. This value is used on the cycle time display screen to display a comparison between a running average cycle time and the target cycle time for the machine. |
| Language Selection | This field allows you to toggle the user interface between ENGLISH and SPANISH modes. |
| CNC Serial Number | This field allows you to enter the serial number of the CNC. |

Press **OK** after you have specified all of the above items.

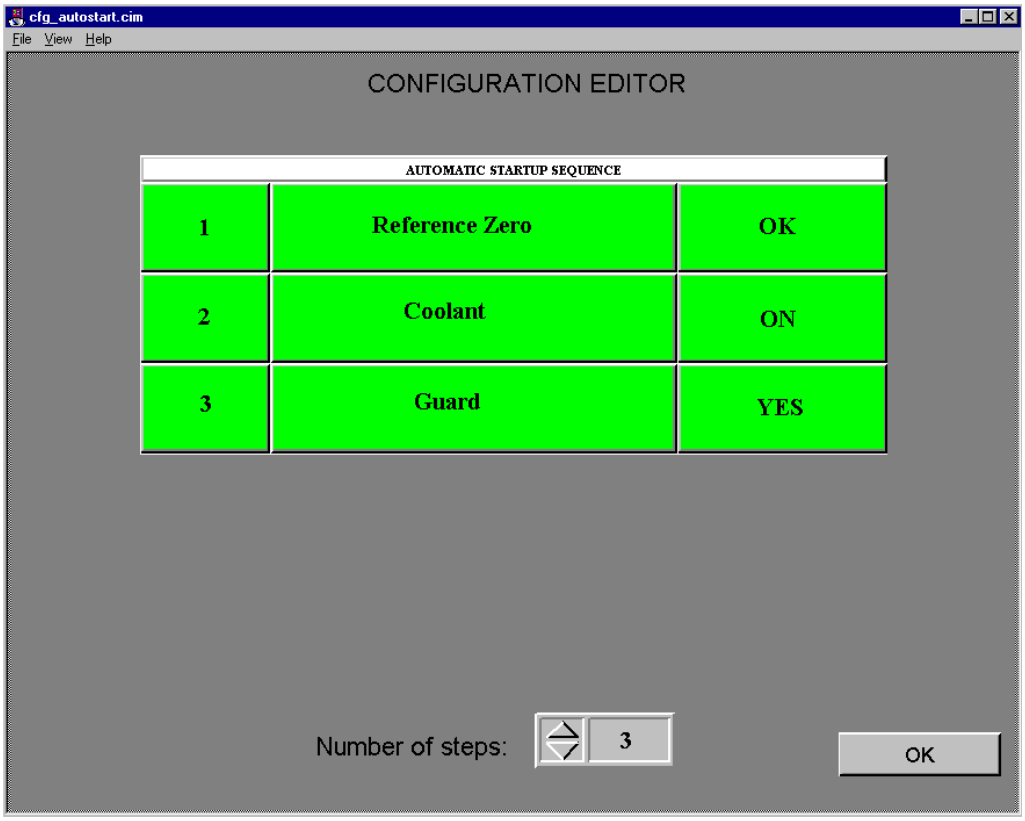
# AutoStart Sequence Configuration

Pressing the **AUTOSTART SEQUENCE** button from the Configuration Editor after activating **CFG_GEFSOI.CIM** allows you to configure the Autostart sequence steps.

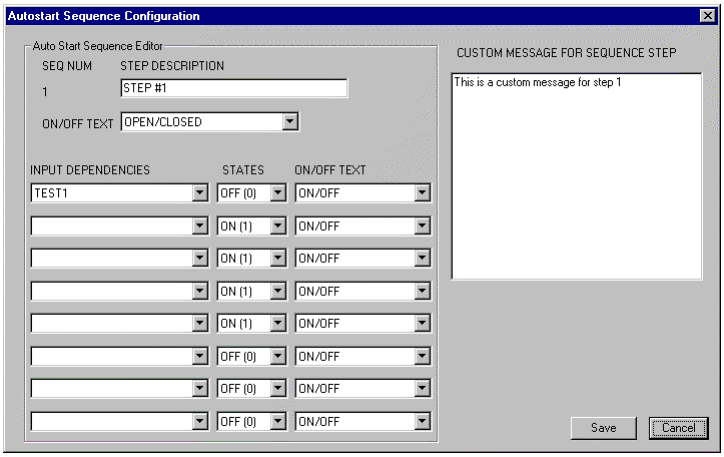
### Note

The Equipment Supplier must interlock the ability to enter Automatic mode and activate a part program with the completion of the configuration of all the Autostart sequence steps. In other words, the ladder logic must inhibit Automatic mode and part program cycle start until all the steps are completed.

If all conditions are met, a part program is activated, and if one of the conditions fails, that does not mean the cycle will stop immediately and exit Automatic mode, unless that is part of the Equipment Supplier's standard procedure.



You may configure up to 16 steps. First, select the number of steps in the Automatic startup sequence. Then, configure each step by clicking on the step. Selecting a step will display the following dialog that allows you to specify the information specific to that step:




The following information may be specified for each step:

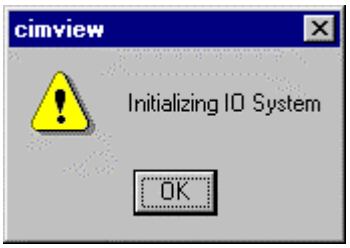
**Table 3 – 2. Step Configuration Information**

| Item | Description |
|---|---|
| Step Description | Specifies a description for the step. The step description is displayed in the center column of the Automatic Startup sequence. |
| ON/OFF Text | Specifies the text to be incorporated into the operator message when the step is either ON or OFF. Available options include:<br>• ON/OFF<br>• OFF/ON<br>• OPEN/CLOSED<br>• CLOSED/OPEN<br>• ADVANCED/RETRACTED<br>• RETRACTED/ADVANCED<br>• LOCKED/UNLOCKED<br>• UNLOCKED/LOCKED<br>• OK/NOT OK<br>• NOT OK/OK<br>• UP/DOWN<br>• DOWN/UP<br>• ESTOP/NO ESTOP<br>• NO ESTOP/ESTOP<br>• FAULT/NO FAULT<br>• NO FAULT/FAULT<br>• HOMED/NOT HOMENOT HOMED/HOMED<br>• LOADED/NOT LOADED<br>• NOT LOADED/LOADED<br>• READY/NOT READY<br>• NOT READY/READY |

| | |
|---|---|
| | • RUNNING/NOT RUNNING<br>• NOT RUNNING/RUNNING<br>• STARTED/IDLE<br>• IDLE/STARTED<br><br>**Note:** These values have been pre-configured. You may change this list if additional values are required or if you wish the labels to be in another language. To modify the list, use an editor such as Notepad to edit the file **ON_OFF_LABELS.CFG** located in the **C:\GEFSOI\SCRIPTS** directory. On each line of the file is an On/Off pair separated by the character "/". |
| Input Dependencies | Specifies up to eight CIMPLICITY points whose values will be used in determining whether or not this step is complete. |
| States | For each CIMPLICITY point, specifies whether that point should have a value of **1** (ON) for the condition to be true, or **0** (OFF). |
| ON/OFF Text | For each CIMPLICITY point, specifies the ON/OFF text to be associated with this point. This label will be used to construct informational messages about input dependencies for the Check Status function (F1) on the Auto Startup screen. |
| Custom Message for Sequence Step | Specifies a custom message for the step. This message is displayed when the user selects the Check Status function (F1) on the Auto Startup screen. After this message is displayed, the user is asked if they wish to see additional information about each input dependency. |

# Maintenance

After specifying the Machine Characterization and Autostart Sequence information, press the **MAINTENANCE** button from the Configuration Editor after activating **CFG_GEFSOI.CIM** to update the system. The following dialog will be displayed:




Selecting this option builds the I/O lists used by the maintenance screen. Whenever you add more points to your system, you must reselect this option before your new points can be displayed on the Maintanance screen.

You may then select **Exit Configuration** to exit from the Configuration Editor.

# Manual Sequence Configuration

The Manual Sequence Configuration screen allows maintenance personnel to debug machine electrical and mechanical sequences of machine operation. For example, if the operator is experiencing tool changer problems, he could configure the Manual Sequence Configuration screen to allow him to single step through a complete tool change, monitoring all outputs (solenoids) and inputs (limit switches). Correct operation could be documented and published for future troubleshooting.

The Manual Sequence screens contain eight rows and three columns of boxes. The boxes in the left and right columns represent operations that can be performed. The boxes in the center column can be used as either a label for the current step or as a transfer mechanism to another screen.

There are nine screens configured for use. The main Manual Sequence screen is **GEFSOI_MANUAL_OP.CIM**. Each row may be configured to transfer to an additional Manual Operations screen. These screens are **GEFSOI_MANUAL_OP1.CIM** through **GEFSOI_MANUAL_OP8.CIM**. For example, if you configure the center column in the third row as a transfer point, then, when the user selects the activate button while on that box, the screen **GEFSOI_MANUAL_OP3.CIM** will be displayed.

To configure the Manual Sequence screens, you must open the appropriate screen in **Cimedit**. For more information on the operation of **CimEdit**, please refer to GFK-1396, *CIMPLICITY HMI for Windows NT and Windows 95 CimEdit Operation Manual*.

## Configuring a Gray Box in the Center Column

To configure a gray box in the center column:

1. Double click on the **CimEdit** icon in the **Projects Configuration** cabinet.
2. Open the file named **GEFSOI_MANUAL_OP.CIM** from the **Projects Screens** directory. Eight rows of gray boxes will be displayed.
3. To configure a row as step in a manual sequence, double click on the gray box in the center column.
4. Select the **Variables** property page.
5. Click on the variable **label**. The variable **label** will appear in the **Name** field at the bottom of dialog box.
6. Enter the name of the step in the **Value** field. The name must be enclosed in double quotes.
7. Click on **APPLY**.
8. Click on the variable **new_sequence**.
9. Enter **0** in the **Value** field. A value of **0** indicates that this center box is a sequence label and performs no action.
10. Click on **APPLY**.
11. Click on **OK**.

## Configuring a Gray Box to the Left of the Center Column

To configure a gray box to the left of the center column:

1. Double click on the gray box to the left of the center box you just configured.
2. Click on the variable **activation_condition**. The activation condition is an expression which represents a condition that must be true before the step can be activated.

   A. If the step can always be activated, enter **1** in the **Value** field.

   B. If the step requires an activation condition, use the expression editor to enter an expression. For more information on entering expressions, refer to the CimEdit Manual.

   For example, if the step can only be activated if POINT1 has a value of 1 and POINT2 has a value of 0, enter (POINT1 EQ 1) AND (POINT2 EQ 0). You may include up to eight points in your equation.
3. Click on the variable **input_for_completion**.
4. Enter the name of the point that must be checked to determine if the step has been completed in the **Value** field. You may use the browser button to browse for the appropriate point.
5. Click on **APPLY**.
6. Click on the variable **completed_state**.
7. Enter the value that the point entered for **input_for_completion** must have for the step to be completed in the **Value** field.
8. Click on **APPLY**.
9. Click on the variable **trigger_output**.
10. Enter the name of the point in the **Value** field that will be activated when the button is selected. You may use the browser button to browse for the appropriate point name.
11. Click on **APPLY**.
12. Click on the variable **trigger_type**.
13. Enter one of the following values in the **Value** field:

| | | |
|---|---|---|
| 1 | Momentary OFF | Point is set to 0 and then to 1. |
| 2 | Momentary ON | Point is set to 1 and then to 0. |
| 3 | OFF | Point is set to 0. |
| 4 | ON | Point is set to 1. |

This type value indicates the action that will be taken on the point entered for the variable **trigger_output**, when the step is activated.

14. Click on **APPLY**.
15. Click on the variable **operation_label**.
16. Enter the label for the step in the **Value** field enclosed in quotes.
17. Click on **APPLY**.
18. If the activation condition configured in step 2 contains points to complete the activation, then you must assign values to the following variables:

    - **tag1** through **tag8**.
    - **val1** through **val8**.
    - on_text1 through on_text8.

    The information assigned to these variables is used to construct the status message that is displayed when the user selects **Check Status** on a step that is not ready to be activated.

    For example, if the activation condition is:

    ```
    (MYPOINT1 EQ 1) AND (MYPOINT2 EQ 2)
    ```

    The following variable assignments should be made:

    - Tag1 should be assigned the value MYPOINT1.
    - Tag2 should be assigned the value MYPOINT2.
    - Val1 should be assigned the value 1.
    - Val2 should be assigned the value 2.

    On_text1 and on_text2 should be assigned a label that represents the on value of the tag, such as ON.

    To assign a value to each variable, perform the following:

    1. Click on the appropriate variable from the **Variables** property page.
    2. Enter a value.
    3. Click on **APPLY**.

## Configuring a Gray Box to the Right of the Center Column

To configure a gray box to the right of the center column, repeat steps 1 – 18, as already described for “Configuring a Gray Box to the Left of the Center Column”.

### Note

It is intended that the left and right columns perform opposing actions. If the left action was SLIDE ADVANCE, the right action should be SLIDE RETRACT.

## Configuring a Step as a Transfer Point

To configure a step as a transfer point to another Manual Sequence screen:

1. Double click on a gray box in the center column to configure a row as a step in a manual sequence.
2. Select the **Variables** property page.
3. Click on the variable **label**. The variable **label** will appear in the **Name** field at the bottom of dialog box.
4. Enter the name of the new manual sequence in the **Value** field. The name must be enclosed in double quotes.
5. Click on **APPLY**.
6. Click on the variable **new_sequence**.
7. Enter **1** in the **Value** field.

   Entering a value of **1** on the main screen **GEFSOI_MANUAL_OP.CIM** will cause a transfer point to one of the eight secondary screens **GEFSOI_MANUAL_OP1.CIM** through **GEFSOI_MANUAL_OP8.CIM**, depending upon whether it is the first center button or the eighth center button.

   Entering a value of **1** on a secondary screen **GEFSOI_MANUAL_OP1.CIM** through **GEFSOI_MANUAL_OP8.CIM** will cause a transfer point back to the main manual operations screen **GEFSOI_MANUAL_OP.CIM**. In this case, the label variable should be set to “**Main Menu**”.
8. Click on **APPLY.**
9. Press **OK**.
10. Now, you must configure the screen that this is a transfer point to. For example, if you just configured the center box in the second column on the main screen, then you must configure the screen **GEFSOI_MANUAL_OP2.CIM**.

### Note

Unused steps should have the activation_condition variable set to 0, input_for_completion varaible set to 0, and completed_state set to 1. All steps are initially set to these values.

The following table summarizes each of the variables that must be configured for a left or right step.

**Table 3 – 3. Variables for a Left or Right Step**

| Item | Description |
|---|---|
| activation_condition | Enter an expression that must be true before the selected operation can be initiated. If the step can always be selected, enter **1**. |
| Cell_num | Do not change this value. Each gray rectangle has a cell number associated with it. Cells are numbered left to right, top to bottom. |
| Conpleted_state | Enter the On/Off state for the point entered in the input_for_completion field. |
| Input_for_completion | Enter the input point that is checked to indicate whether or not a given operation or action has been completed. |
| On_text1-on_text8 | Enter the text that indicates the ON state for each of the points entered in tag1-tag8. |
| Operation _label | Enter the label you wish to appear on the step enclosed in quotes. For example, “SLIDE ADVANCE”. |
| Tag1-tag8 | Enter the names of the points that are contained in activation_condition. |
| Trigger_output | Tag name for the output that triggers the operation. You may browse for point Ids by selecting the browser button. |
| Trigger_point | Do not change this value. |
| Trigger_type | Enter **1** for Momentary OFF.<br>Enter **2** for Momentary ON.<br>Enter **3** for Turn OFF.<br>Enter **4** for Turn ON. |
| Val1-val8 | Enter the value each of the points entered in tag1-tag2 must have in order to be considered ON. |

# Safety Features Associated with the Manual Operations Screen

The Manual Operations Display screen is not designed to directly replace any hardware pushbuttons. This screen is designed as an alternate to using hardware pushbuttons. The Equipment Supplier must determine all machine functionality and if the machine functionality is to be operated from hardware pushbuttons or the software pushbuttons in this screen.

It is recommended that all machine functionality required to run a machine in automatic mode or to continue machine operation in automatic mode be programmed using hardware pushbuttons. Since the Manual Operations Display screen runs on the PC, the machine functionality programmed with software pushbuttons may be temporarily lost if communication failure between the PC and the CNC occurs.

To allow for greater safety when using the CMI, the following features exist:

- A “Heart Beat” or “Watch Dog” signal has been implemented. The CMI application will set **R1109.0** to logic ‘1’ every 250 msec. The Equipment Supplier can monitor this signal and set this signal back to a logic ‘0’. If the signal is not set back to logic ‘1’ within 250msec., the equipment supplier can determine that communications between the PC and the PMC Ladder Logic has failed. The equipment supplier can use this failure condition to clear all necessary manual function interface bits and create a FAULT condition if necessary.
- A “Manual Operations Display Screen” ACTIVE signal has been implemented. The CMI application will set **R1109.1** to logic ‘1’ whenever the Manual Operations Display screen is active. The CMI application will set this bit to logic ‘0’ whenever the Manual Operations Display Screen is not active. The equipment supplier can monitor this signal to validate manual function activation. Also, if the equipment supplier creates an additional application which is activated or another application within the CMI is activated, the communications between the PC and the PMC Ladder Logic may “slow down”. This is dependent upon the configuration or programming of this additional application. If the equipment supplier’s additional application does “slow down” the communications, the equipment supplier can use this signal along with the “Heart Beat” signal to verify proper Manual Operations Display operation.
- Each of the cells on the Manual Operations Display Screen has been assigned a unique number. There is a total of 24 cells on each Manual Operations Display Screen, and a total of 9 possible Manual Operations Display screens that can be configured. The cell number increases as the cells move from right to left and top to bottom of the screen. The selection of a given cell is accomplished by using the cursor keys. As the operator selects a different cell using the cursor keys, registers **R1110** and **R1111** will be updated to contain the value of the cell number for the selected cell on the Manual Operations Display screen. The equipment supplier can monitor these registers to determine if the cursor keys have been used to select another cell. The equipment supplier can then either clear or reset the desired machine functions not associated with the selected cell.
- As the operator uses the cursor keys to select different cells in the Manual Operations Display screen, the border around the currently selected cell will always be highlighted with a “flashing yellow” border. When a particular cell has been activated using the “F4 – Activate Selection” button, the highlight will be a **solid yellow** border *after* the operator moves off of that cell using the cursor keys. The solid yellow border will remain until the opposite action associated with that step is activated.

# Machine Cycle Count Screen

The following functions can be activated from the Machine Cycle Count screen:

| Button | Description | Function | Password |
|---|---|---|---|
| F1 | | | |
| F2 | Machine Cycle Times | Activates Machine Cycle Times screen | N/A |
| F3 | Machine Cycle Count Log | Activates Machine Cycle Count Log screen | N/A |
| F4 | | | |
| F5 | | | |
| F6 | Setup | Activates Shift Setup screen | System |
| F7 | | | |
| F8 | Cycle Diagnostics | Activates Cycle Diagnostics screen | System |
| F9 | Reset Cycle Count | Resets Actual Machine Cycle Count value only | System |
| F10 | Previous Screen | Returns to CNC Machining Interface Main menu | N/A |

The following data values are displayed on the Machine Cycle Count screen:

| Data Title | Origin | Definition |
|---|---|---|
| Actual Machine Cycle Count | D1170-D1171 | Value represents the cycle count for the current shift. The internal cycle counter must be made available through ladder logic. The point **GMOI_MCYCCNT** must be configured for this address. By default, it is set to D1170, but it may be changed. Value is incremented when a part has been produced at end of a cycle. |
| Target Cycle Count | CIMPLICITY point | Value is set by calculation based on time elapsed from current shift and Target Part Count for current shift (set on the Shift Setup screen). Value is a pro-rated count over the total shift time. |
| Difference (Actual – Target) | CIMPLICITY point | Value is set by subtracting Target Cycle Count from Actual Machine Cycle Count.<br>If value is positive, it appears with white lettering and green background. This indicates Cycle Count is ahead of schedule.<br>If value is negative, it appears with white lettering and red background. This indicates Cycle Count is behind schedule. |
| Total Target for *current shift* | CIMPLICITY point | Total Actual Machine Cycle Count Target for current shift. Value shown here is entered in Target Part Count on Shift Setup screen. Description for *current shift* comes from Shift Setup screen TIME BLOCK DESCRIPTION. |
| Last *Shift 1* Cycle count | CIMPLICITY point | Actual Machine Cycle Count at end of the Last *Shift 1* time schedule. (Note: *Shift 1* defined in Shift Setup screen) |

| | | |
|---|---|---|
| Last *Shift 1 OT* Cycle Count | CIMPLICITY point | Actual Machine Cycle Count at end of the Last *Shift 1 OT* time schedule. (Note*: Shift 1 OT* defined in Shift Setup screen) |
| Last *Shift 2* Cycle count | CIMPLICITY point | Actual Machine Cycle Count at end of the Last *Shift 2* time schedule. (Note: *Shift 2* defined in Shift Setup screen) |
| Last *Shift 2 OT* Cycle Count | CIMPLICITY point | Actual Machine Cycle Count at end of the Last *Shift 2 OT* time schedule. (Note: *Shift 2 OT* defined in Shift Setup screen) |

# Machine Cycle Time Screen

The following buttons are displayed on the Machine Cycle Time screen:

| Button | Description | Function | Password |
|---|---|---|---|
| F1 | Set Target Cycle Time | Allows entry to change Target Cycle Time. | System |
| F3 | Machine Cycle Time Log | Activates Machine Cycle Time Log Screen | N/A |
| F10 | Previous Screen | Returns to Machine Cycle Count screen. | N/A |

The following data values are displayed on the Machine Cycle Time screen:

| Data Title | Origin | Definition |
|---|---|---|
| Last Cycle Time | D1114-D1115 | The Last Cycle completed for the current shift must be made available through ladder logic. The point **MACHINE_CYCLE_TIME** must be configured for this address. By default, it is set to D1114, but it may be changed. Value is determined by interface bits from Cycle Begin to Cycle End. Value displayed is the Last completed Cycle Time. Value is shown in 0.1 second increments. |
| Target Cycle Time | CIMPLICITY point | Value is set via entry from F1 Set Target Cycle Time button. Value represents desired target cycle time of machine. Value to be entered in 0.1 second increments. |
| Average Cycle Time | CIMPLICITY point | This value contains the running average cycle time. |
| Difference (Target - Average) | CIMPLICITY point | Value is determined by subtracting the Average Cycle Time from the Target Cycle Time.<br>If value is positive, it appears with black lettering and green background. This indicates the Average Cycle Time is faster than the Target Cycle Time.<br>If value is negative, it appears with black lettering and red background. This indicates the Average Cycle Time is slower than the Target Cycle Time. |

| | | |
|---|---|---|
| | | Value to be displayed in 0.1 second increments. |
| Accumulated Cycle Time | D1118-D1121 | Value represents total Accumulated Cycle Time for current shift. D1118-D1121 are CNC addresses set through ladder logic. Value is determined by adding every cycle time for the current shift together. Value is shown in 0.1 second increments. |

# Machine Cycle Time Log Screen

The following buttons are displayed on the Machine Cycle Time Log screen:

| Button | Description | Function | Password |
|---|---|---|---|
| F4 | Next | Pages the Machine Cycle Time Log screen forward. | System |
| F5 | Previous | Pages the Machine Cycle Time Log screen backward. | System |
| F6 | Backup to File | Activates a popup window which provides the ability to backup data contained on this screen to a comma-separated file. | System |
| F10 | Previous Screen | Returns to MACHINE CYCLE Time screen | N/A |

The following data values are displayed on the Machine Cycle Time Log Screen:

| Data Title | Definition |
|---|---|
| Date | Date of Shift the data within the row represents. |
| Shift | Shift Description the data within the row represents. |
| Last Cycle Time | Last Cycle Time Value. Cycle Time at completion of last Cycle. |
| Target Time | Target Cycle Time. |

# Machine Cycle Count Log Screen

The following buttons are displayed on the Machine Cycle Count Log screen:

| Button | Description | Function | Password |
|---|---|---|---|
| F4 | Next | Pages the Machine Cycle Log screen forward | System |
| F5 | Previous | Pages the Machine Cycle Log screen backward | System |
| F6 | Backup to File | Activates a popup window which provides the ability to backup data contained on this screen to a comma-separated file. | System |
| F10 | Previous Screen | Returns to MACHINE CYCLE COUNT screen | N/A |

The following data fields are displayed on the Machine Cycle Log screen:

| Data Title | Description |
|---|---|
| Date | Date of Shift the data within the row represents. |
| Shift End Time | Time set for End of Shift time the data within the row represents. Same time as Time Block x setting time for End Time as shown in Section IV. |
| Shift | Shift Description the data within the row represents. Same Description as Time Block x setting for Time Block Definition as shown in Section IV. |
| Part Count | Final Machine Cycle Count of the Shift the data within the row represents. |

At the end of every shift, this data must be set into consecutive rows in the table on the Machine Log screen. When the data is set, the table on the Machine Log screen must increment one row and be available for end of next shift data setting values.

If (F9) RESET CYCLE COUNT is activated from the Machine Cycle Count screen, the point **RESET_CYCLE_COUNT** is set to 0. Ladder logic must be written to reset the cycle count when this point is set to 0. The default address for this point is D1112.5, but it may be changed.

# Shift Setup Screen

The following buttons are displayed on the Machine Cycle Time screen:

| Button | Description | Function | Password |
|---|---|---|---|
| F7 | Input | Allows entry to change Start Time, End Time, Target Part Count, and Time Block Description | System |
| F10 | Previous Screen | Returns to MACHINE CYCLE COUNT screen | N/A |

The following data values are displayed on the Machine Cycle Time screen:

| Data Title | Variable | Origin | Definition |
|---|---|---|---|
| Time Block x (see NOTE 1) | Start Time | CIMPLICITY point | Value entered in this location is for start of Time Block x. (See Notes 2 and 3 below.) |
| | End Time | CIMPLICITY point | Value entered in this location is for end of Time block x. (See Notes 2, 3, and 4 below.) |
| | Target Part Count | CIMPLICITY point | Value entered in this location is for Target Cycle Count for Time Block x. The value entered here will also appear on MACHINE CYCLE COUNT screen when Time Block x is active. Click on register, enter value, and select (F7) INPUT. |
| | Time Block Definition | CIMPLICITY point | Description for Time Block x. This description appears on MACHINE CYCLE COUNT screen for TOTAL TARGET FOR *current shift.* Enter desired description and select (F7) INPUT. |

**Notes:**

**Note 1:** There are four time blocks: Time Block 1, Time Block 2, Time Block 3, and Time Block 4. The description provided in this table corresponds to each individual time block.

**Note 2:** For Start Time and End Time settings in this table, the following description explains how to set time.

Enter a value in the following format: **xx.yy zz**
where **xx** = hour (1 to 12)
**yy** = minute (00 – 59)
**zz** = AM or PM

Click on **xx.yy**, and enter the proper time. For example, for 2:30, enter 0 2 3 0 and press F7 (INPUT).

Click on **zz**, and use Tab to change between AM or PM. For example, for 2:30 PM, use Tab to select PM. Then, press F7 (INPUT).

**Note 3:** For Start Time, all calculations and data gathering which are based off of this

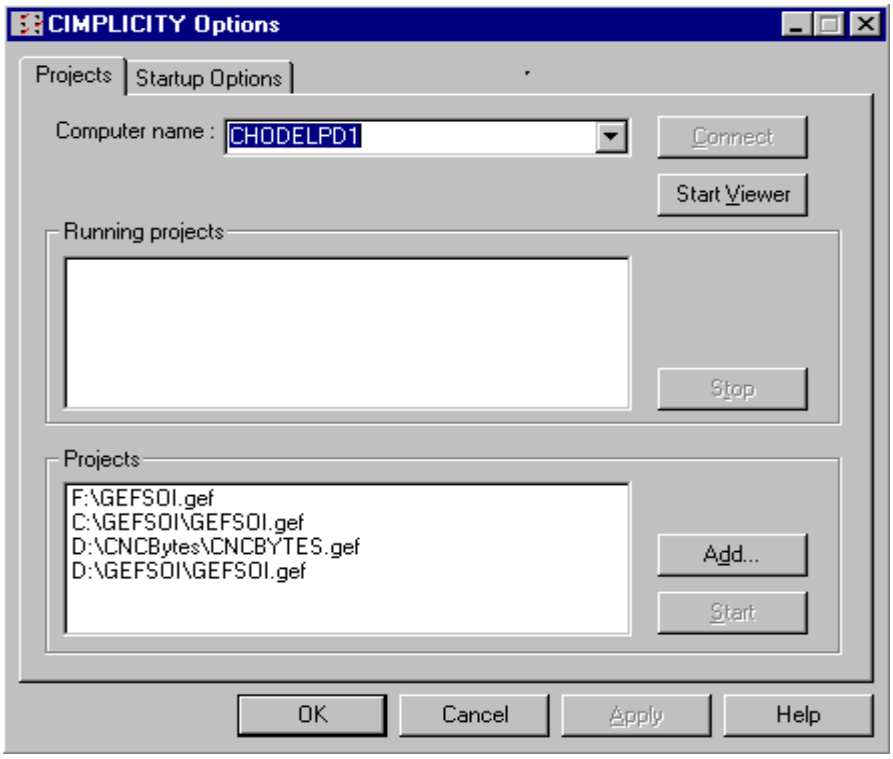
time will begin at this hour and minute AND 00 seconds. In other words, if the Start Time is set for 06:00AM, and calculations and data gathering will start at 06:00 AND 00 seconds AM. By using this specification, the End Time of the previous shift and the Start Time of the current shift can be set to the same time without having to consciously adjust the times one minute or one second apart from each other.

For End Time, all calculations and data gathering which are based off of this time will end 1 second before this time setting. In other words, if the End Time is set for 02:30PM, all calculations and data gathering will end at 02:29 and 59 seconds PM. By using this specification, the End Time of the previous shift and the Start Time of the current shift can be set to the same time without having to consciously adjust the times one minute or one second apart from each other.

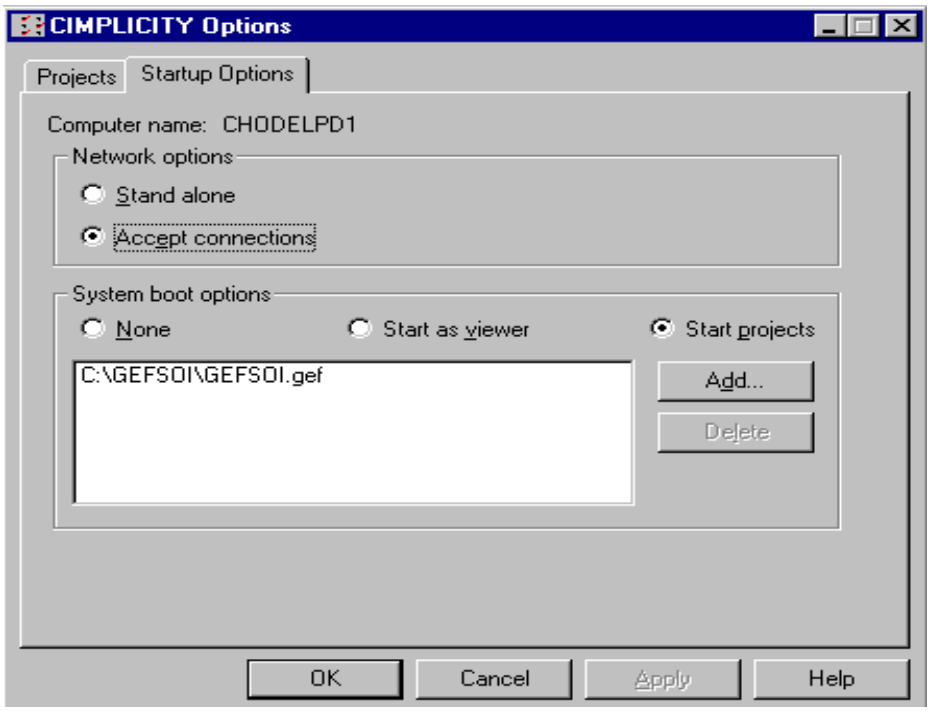
# A Automatic Launch of CNC Machining Interface Project at Display Station Boot-Up

This appendix explains how to set up an NT-based PC so that the CNC Machining Interface CIMPLICITY application will be launched at PC boot time. This will insure that, when the PC boot is complete, the main CNC Machining Interface screen will be displayed at FULLSCREEN mode. This appendix also suggests how to set up Windows NT so that the START KEY bar can be hidden without using a system password.

1. Select the **Start** Menu, then **Programs**, **CIMPLICITY**, **HMI**, and then **CIMPLICITY Options**. The following CIMPLICITY Options window will be displayed:



2. Select the **Startup Options** tab.

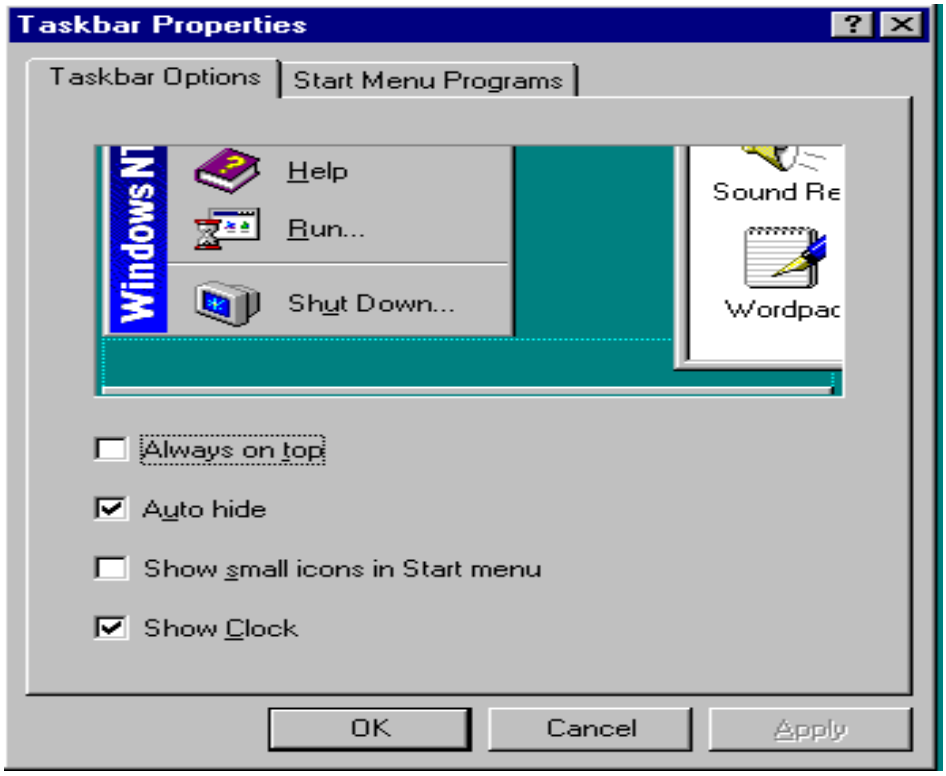



3. Verify that the Network Options are **ACCEPT CONNECTIONS**.
4. Select System Boot Options equal **START PROJECTS**.
5. Press the **ADD** pushbutton, and cursor down to **C:\GEFSOI\GEFSOI.GEF**.
6. Press **APPLY** and then **OK**.

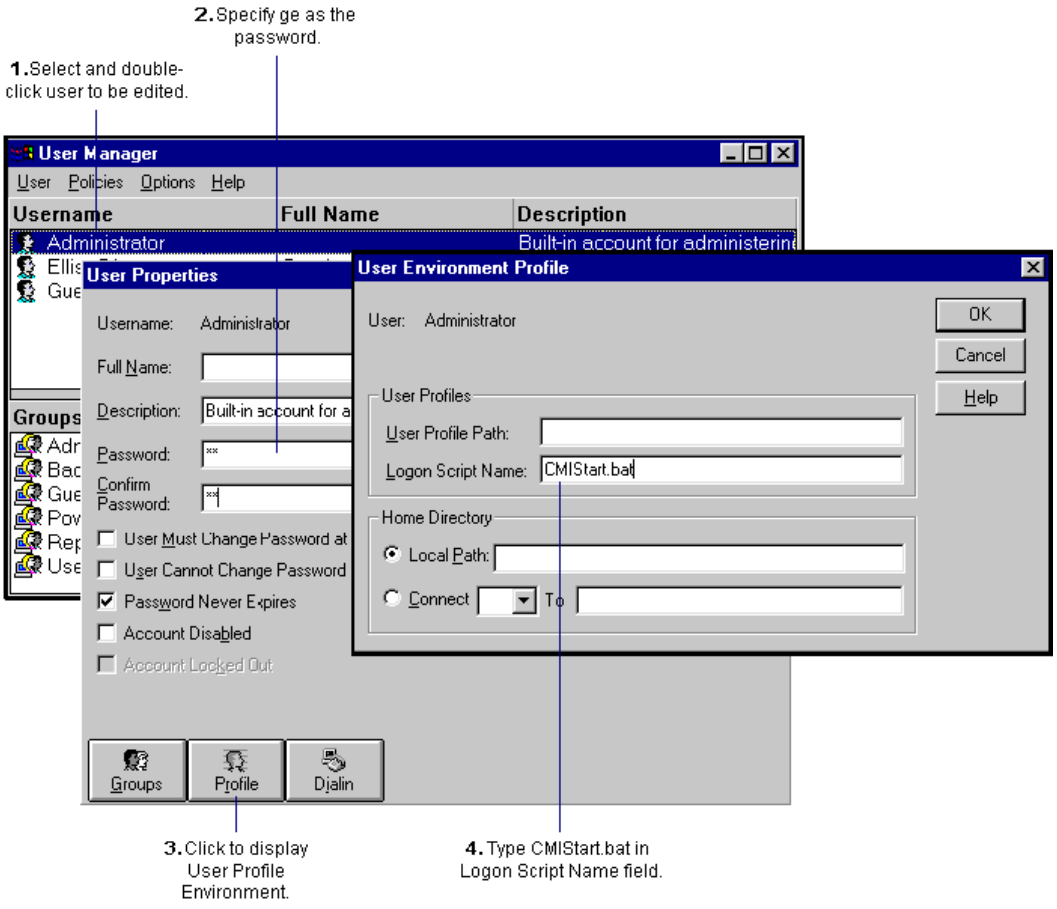
### Note

This completes the first of three setup functions.

7. Select **Start** menu, then **Settings**, and then the **Taskbar Properties** page. Verify that "**Always on top**" is not checked and "**Auto Hide**" is checked.



8. Select the **Start Menu>Programs>Administration Tools>User Manager**. Edit the Administrator account. Specify the password as 'ge'. Select the profile and enter "CMIStart.bat' for the Logon Script name.




9. Execute the cmi_setup.bat file in the c:\gefsoi\options\autocfg to setup the CMI environment.

## Disabling the Windows NT Task Manager

If you want to prevent your operator's from accessing the Windows NT Task manager and having the ability to shutdown system processes, please do the following:

1. Rename **taskmgr.exe** in your **Windows** directory to **taskmgr.save**.
2. Run **REGEDT32.EXE** and open

**HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\Winlogon**.

3. For the **AutoRestartShell** value, change the Data value to 0 (zero).

GE Fanuc Automation North America, Inc., Charlottesville Virginia