GFK-0726

GE Fanuc Manual Series 90-30

State Logic Processor

GE Fanuc Automation

State Logic Products

State Logic® Processor For Series 90™-30 PLC

User's Guide

GFK-0726B March 1998

Warnings, Cautions, and Notes as Used in this Publication

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 this 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 its 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.

GE Fanuc Automation makes no representation or warranty, expressed, implied, or statutory with respect to, and assumes no responsibility for the accuracy, completeness, sufficiency, or usefulness of the information contained herein. No warranties of merchantability or fitness for purpose shall apply.

GE Fanuc Automation North America, Inc.
Software License Agreement

GFJ–317C

YOU SHOULD CAREFULLY READ THE FOLLOWING TERMS AND CONDITIONS BEFORE OPENING THIS PACKAGE. OPENING THIS PACKAGE SIGNIFIES YOUR ACCEPTANCE OF THESE TERMS AND CONDITIONS. IF YOU DO NOT AGREE WITH THEM, YOU SHOULD PROMPTLY RETURN THE PACKAGE UNOPENED ALONG WITH ANY OTHER ITEM THAT WAS INCLUDED IN THE SAME CATALOG NUMBER FOR FULL CREDIT.

You, as the Customer, agree as follows:

1. DEFINITIONS

"Application Software" shall mean those portions of the Licensed Software, in object code form only, created by GE Fanuc.

"Designated Computer" shall mean the one (1) computer upon which Customer shall run the Licensed Software.

"Licensed Software" shall mean the Application Software plus any other software, in object code form only, supplied by GE Fanuc pursuant to this Agreement. The Licensed Software may include third party software, including but not limited to operating systems, licensed to GE Fanuc. If no operating system software is included in the software provided under this Agreement, you must make provision for any required operating system software licenses.

2. LICENSE

2.1 Except as provided in section 2.2 below, you are granted only a personal, non–transferable, nonexclusive license to use the Licensed Software only on the Designated Computer. You may copy the Licensed Software into machine readable form for backup purposes in support of your use of the Licensed Software on the Designated Computer, limited to one copy. No other copies shall be made unless authorized in writing by GE Fanuc. You may not reverse compile or disassemble the software. The Licensed Software, comprising proprietary trade secret information of GE Fanuc and/or its licensors, shall be held in confidence by Customer and protected from disclosure to third parties. No title to the intellectual property is transferred. You must reproduce and include all applicable copyright notices on any copy.

2.2 If you are an authorized GE Fanuc distributor or an Original Equipment Manufacturer who incorporates the Licensed Software into your equipment for sale to an end user, you may transfer the Licensed Software to an end user provided that the end user agrees to be bound by the provisions of this Agreement.

2.3 GE Fanuc's licensors having a proprietary interest in the Licensed Software shall have the right to enforce such interests, including the right to terminate this Agreement in the event of a breach of its terms pertaining to such proprietary interests.

2.4 EXCEPT AS PROVIDED IN SECTION 2.2 ABOVE, IF YOU TRANSFER POSSESSION OF ANY COPY OF THE LICENSED SOFTWARE TO ANOTHER PARTY WITHOUT WRITTEN CONSENT OF GE FANUC, YOUR LICENSE IS AUTOMATICALLY TERMINATED. Any attempt otherwise to sublicense, assign or transfer any of the right, duties or obligations hereunder is void.

2.5 If the Licensed Software is being acquired on behalf of the U.S. Government, Department of Defense, the Licensed Software is subject to "Restricted Rights", including the legend to be affixed to the software as set forth in DOD Supplement to the Federal Acquisition Regulations (DFAR's) paragraph 252.227–7013(c)(1). If software is being acquired on behalf of any other U.S. Government entity, unit or agency, the Government's rights shall be as defined in paragraph 52.227–19(c)(2) of the Federal Acquisition Regulations (FAR's).

3. WARRANTY

3.1 GE Fanuc warrants that the Application Software will be in substantial conformance with the specifications in the manual pertaining thereto as of the date of shipment by GE Fanuc. If, within ninety (90) days of date of shipment, it is shown that the Application Software does not meet this warranty, GE Fanuc will, at its option, either correct the defect or error in the Application Software, free of charge, or make available to Customer satisfactory substitute software, or, as a last resort, return to Customer all payments made as license fees and terminate the license with respect to the Application Software affected. GE Fanuc does not warrant that operation of the Application Software will be uninterrupted or error free or that it will meet Customer's needs. All other portions of the Licensed Software are provided "as is" without warranty of any kind.

3.2 WITH RESPECT TO THE SOFTWARE WHICH IS THE SUBJECT OF THIS AGREEMENT, THE FOREGOING WARRANTIES ARE EXCLUSIVE AND ARE IN LIEU OF ALL OTHER WARRANTIES WHETHER WRITTEN, ORAL, IMPLIED OR STATUTORY. NO IMPLIED OR STATUTORY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE SHALL APPLY.

4. LIMITATION OF LIABILITY

4.1 IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT, BREACH OF WARRANTY, TORT (INCLUDING NEGLIGENCE) OR OTHERWISE SHALL GE FANUC OR ITS SUPPLIERS BE LIABLE FOR ANY SPECIAL, CONSEQUENTIAL, INCIDENTAL OR PENAL DAMAGES INCLUDING, BUT NOT LIMITED TO, LOSS OF PROFIT OR REVENUES, LOSS OF USE OF THE LICENSED SOFTWARE OR ANY PART THEREOF, OR ANY ASSOCIATED EQUIPMENT, DAMAGE TO ASSOCIATED EQUIPMENT, COST OF CAPITAL, COST OF SUBSTITUTE PRODUCTS, FACILITIES, SERVICES OR REPLACEMENT POWER, DOWN TIME COSTS, OR CLAIMS OF CUSTOMER'S CUSTOMERS AND TRANSFEREES FOR SUCH DAMAGES EVEN IF GE FANUC HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

4.2 EXCEPT AS PROVIDED IN SECTION 5, INDEMNITY, IN NO EVENT, WHETHER AS A RESULT OF BREACH OF CONTRACT OR WARRANTY, TORT (INCLUDING NEGLIGENCE) OR OTHERWISE, SHALL GE FANUC'S LIABILITY TO CUSTOMER FOR ANY LOSS OR DAMAGE ARISING OUT OF, OR RESULTING FROM THIS AGREEMENT, OR FROM ITS PERFORMANCE OR BREACH, OR FROM THE LICENSED SOFTWARE OR ANY PART THEREFORE, OR FROM ANY SERVICE FURNISHED HEREUNDER EXCEED THE QUOTED CHARGES FOR THE LICENSED SOFTWARE. ANY SUCH LIABILITY SHALL TERMINATE UPON THE TERMINATION OF THE WARRANTY PERIOD AS SET FORTH IN SECTION 4.

4.3 If GE Fanuc furnishes Customer with advice or other assistance which concerns Licensed Software or any portion thereof supplied hereunder or any system or equipment on which any such software may be installed and which is not required pursuant to this Agreement, the furnishing of such advice or assistance will not subject GE Fanuc to any liability, whether in contract, warranty, tort, (including negligence) or otherwise.

4.4 The products to be licensed or sold hereunder are not intended for use in any nuclear, chemical or weapons production facility or activity, or other activity where failure of the products could lead directly to death, personal injury or severe physical or environmental damage. If so used, GE Fanuc disclaims all liability for any damages arising as a result of the hazardous nature of the business in question, including but not limited to nuclear, chemical or environmental damage, injury or contamination, and Customer shall indemnify, hold harmless and defend GE Fanuc, its officers, directors, employees and agents against all such liability, whether based on contract, warranty, tort (including negligence), or any other legal theory, regardless of whether GE Fanuc had knowledge of the possibility of such damages.

5. INDEMNITY

5.1 GE Fanuc warrants that the Application Software shall be delivered free of any rightful claim for infringement of any United States patent or copyright. If notified promptly in writing and given authority, information and assistance, GE Fanuc shall defend, or may settle, at its expense, any suit or proceeding against Customer so far as based on a claimed infringement which would result in a breach of this warranty and GE Fanuc shall pay all damages and costs awarded therein against Customer due to such breach. In case the Application Software is in such suit held to constitute such an infringement and its use is enjoined, GE Fanuc shall, at its expense and option, either procure for Customer the right to continued use, or replace same with a non–infringing product or part, or modify the Application Software so that it becomes non–infringing, or remove the software and refund the license charge pertaining thereto (less reasonable depreciation for any period of use) and any transportation costs separately paid by Customer. The foregoing states the entire liability of GE Fanuc for patent and copyright infringement by the Licensed Software or any part thereof.

5.2 The indemnity under the preceding paragraph shall not apply to any use of Application Software in conjunction with any other product in a combination not furnished by GE Fanuc as a part of this transaction. As to any such use in such combination, GE Fanuc assumes no liability whatsoever for patent and copyright infringement and Customer will hold GE Fanuc harmless against any infringement claims arising therefrom.

6. TERM AND TERMINATION

6.1 You may terminate the license granted hereunder at any time by destroying the Licensed Software together with all copies thereof and notifying GE Fanuc in writing that all use of the Licensed Software has ceased and that same has been destroyed.

6.2 GE Fanuc, upon thirty (30) days notice, may terminate this Agreement or any license hereunder if Customer fails to perform any obligation or undertaking to be performed by it under this Agreement or if Customer attempts to assign this Agreement without the prior written consent of GE Fanuc. Within twenty (20) days after any such termination of this Agreement, Customer shall certify in writing to GE Fanuc that all use of the Licensed Software has ceased, and that same has been returned or destroyed, in accordance with GE Fanuc's instructions.

6.3 Sections 4, 6 and 7 of this Agreement shall survive any expiration or termination and remain in effect. Termination of this Agreement or any license hereunder shall not relieve Customer of its obligation to pay any and all outstanding charges hereunder nor entitle Customer to any refund of such charges previously paid.

7. EXPORT

7.1 If you intend to export (or reexport), directly or indirectly, the software products or technical information relating thereto supplied hereunder or any portion thereof, it is your responsibility to assure compliance with U.S. export control regulations and, if appropriate, to secure any required export licenses in your own name.

8. GENERAL

8.1 This Agreement shall be governed by the laws of the State of Virginia, without regard to its conflict of law provisions. The provisions of the United Nations Convention on the International Sale of Goods shall not apply to this Agreement.

Should you have any questions concerning this Agreement, you may contact GE Fanuc by writiing to:
GE Fanuc, P.O. Box 8106, Charlottesville, VA 22906.

YOU ACKNOWLEDGE THAT YOU HAVE READ THIS AGREEMENT, UNDERSTAND IT AND AGREE TO BE BOUND BY ITS TERMS AND CONDITIONS. YOU FURTHER AGREE THAT IT IS THE COMPLETE AND EXCLUSIVE STATEMENT OF THE AGREEMENT BETWEEN US AND SUPERSEDES ANY PROPOSAL OR PRIOR AGREEMENT, ORAL OR WRITTEN, AND ANY OTHER COMMUNICATIONS BETWEEN US RELATING TO THE SUBJECT MATTER OF THIS AGREEMENT. FURTHER, NO CHANGE OR AMENDMENT TO THIS AGREEMENT SHALL BE EFFECTIVE UNLESS AGREED TO BY WRITTEN INSTRUMENT SIGNED BY A DULY AUTHORIZED REPRESENTATIVE OF GE FANUC.

Preface

Content of this Manual

Chapter 1. State Logic® Processor Description

Chapter 2. Installation and Maintenance

Chapter 3. Troubleshooting

Chapter 4. Serial Communications

Chapter 5. Specifications

We Welcome Your Comments and Suggestions

At GE Fanuc automation, we strive to produce quality technical documentation. After you have used this manual, please take a few moments to complete and return the Reader's Comment Card located on the next page.

® State Logic is a registered trademark of Adatek, Inc.

Contents

Chapter 1 State Logic Processor Description 1-1

Physical Description 1-2
Operational Description 1-4

Chapter 2 Installation and Maintenance 2-1

Selecting the Right Slot 2-1
Inserting the SLP 2-1
Configuration 2-2
Battery 2-3

Chapter 3 Troubleshooting 3-1

Status LED is not ON Steady 3-1
Serial Communication Problems 3-1

Chapter 4 Serial Communications 4-1

Programming Serial Communications 4-2
Serial Port Setup 4-3
Serial Cable 4-5

Chapter 5 Specifications 5-1

Content of this Manual iii
We Welcome Your Comments and Suggestions v

Contents

Figure 1-1. SLP in Series 90-30 Chassis 1-2
Figure 1-2. Series 90-30 State Logic Processor 1-3
Figure 2-1. Sample Logicmaster Configuration Screen 2-2
Figure 4-1. IBM-PC-AT to SLP Cable 4-6
Figure 4-2. Workmaster II or PS/2 to SLP Cable 4-6
Figure 4-3. Serial Port Assignments for Series 90-30 SLP 4-7
Figure 4-4. WYE Cable Connections for Series 90-30 SLP 4-8

Table 4-1. Serial Port Parameters 4-4
Table 4-2. Mini Converter Kit Adapters 4-5
Table 5-1. Hardware Specifications 5-1
Table 5-2. Standards 5-1
Table 5-3. Firmware Specifications 5-2

Chapter 1 State Logic Processor Description

The State Logic Processor (SLP) is a module which inserts into a Series 90™-30 PLC chassis. This module has the State Engine operating system to execute State Logic control programs produced by the ECLiPS programming software package.

The SLP exists together with a CPU module in the Series 90 -30 PLCs. The CPU must be a model 331, Revision 3.03 or higher. The CPU may execute a Relay Ladder Logic Program at the same time the State Logic Processor is executing a State Logic Program. The SLP manipulates the CPU memory space and the CPU controls the I/O during its normal cycle of operations. More than one SLP can be installed in one Series 90-30 PLC system, although the SLP must be installed in the main rack with the CPU.

The software products, ECLiPS and OnTOP, are the user interfaces to the SLP. ECLiPS is a program development and on-line monitoring software product which runs on an IBM-PC® compatible computer. OnTOP, the On-Line Troubleshooting Operator Program, also runs on an IBM-PC compatible computer. For questions about programming or on-line functions, see the ECLiPS or OnTOP User's Manuals.

® IBM-PC is a registered trademark of International Business Machines Corporation.

Physical Description

The SLP occupies a single slot in the Series 90-30 rack, communicating with the PLC CPU over the backplane to perform its many control functions. The SLP controls and accesses CPUI/O, register, and system data.

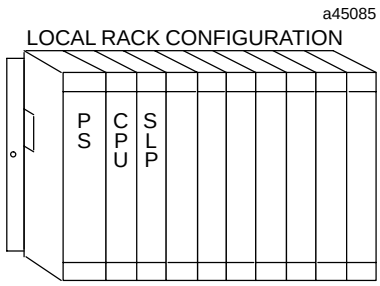

Figure 1-1. SLP in Series 90-30 Chassis

The 90-30 SLP uses an 8 mHz 80C188 microprocessor and has two serial ports, port 1 is and RS-232 port and port 2 is an RS-422/485 port. One port is designated the programming port, to be used to communicate with ECLiPS or OnTOP. The other port may be configured to be a CCM port, communicating to a host computer using the CCM protocol. See the section on Serial Communications for more information on using the serial ports.

There are three LED indicators located at the top front edge of the SLP. The top LED is the status indicator for the SLP. During power-up this LED flashes while the SLP is running its diagnostic checks. If this LED is off, either the power is off, there is some hardware malfunction of the SLP, or there is no CPU present in the Series 90-30 PLC system. When the LED is on, the SLP is functioning normally.

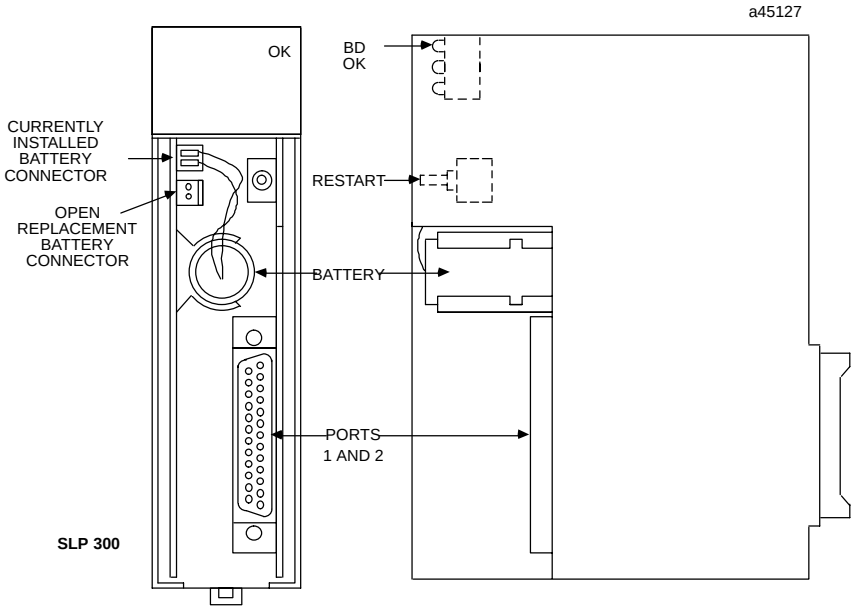

Figure 1-2. Series 90-30 State Logic Processor

The SLP comes with a battery to maintain memory when power is removed. This is a lithium battery which is installed as shown in the SLP drawings. When the battery reaches a low charge, this condition is reported to the PLC fault table.

Operational Description

The State Logic Processor (SLP) uses areas in the CPU memory for I/O references and Register values. The SLP and the CPU communicate this information over the PLC backplane.

When a Ladder Logic control program and a State Logic control program are running at the same time, the State Logic and Ladder Logic programs should not be controlling the same outputs. The SLP cannot control an output that is being controlled by the CPU, since the 90-30 CPU always takes precedence when both processors are controlling the same outputs.

All of the outputs used in the State Logic program should be selected to be contiguous if system response time is important. Outputs being non-contiguous causes the scan rate to increase significantly.

When changing outputs the SLP writes to a byte of I/O bits at a time, so that any the SLP actually controls eight ouputs at a time. Therefore, if some outputs of a byte are not named in the SLP program, ECLiPS issuses a warning that the other outputs in that byte are changed when the program executes.

Chapter 2 Installation and Maintenance

This chapter describes how to install the SLP into a Series 90-30 PLC rack. There is also a section describing maintenance considerations.

Selecting the Right Slot

The SLP can be installed in any unused slot in the CPU rack of the Series 90-30 PLC if the following rules are followed:

1. Configuration created by Logicmaster must match the physical location of the modules. Configuration faults are logged in the PLC fault table.
2. For the 90-30 SLP all the slots between the SLP and CPU must be occupied. If any slots between are empty the SLP cannot communicate with the CPU. The SLP must be in the main rack with the CPU.

Inserting the SLP

Follow these steps to insert the SLP into the Series 90-30 rack:

1. Power down the Series 90-30 PLC system
2. Locate the desired rack and slot.
3. Slide the 90-30 SLP completely into the slot.
4. Press down firmly to lock the module in place, but do not use excessive force.
5. Power up the PLC rack. The Status LED flashes during power-up diagnostics. The LED comes on steady when the SLP is ready for operations.

Configuration

Use the Logicmaster™ 90-30 configuration software to add the SLP to the Series 90-30 I/O configuration. This software is used to describe the modules present in the PLC racks. Rack and slot location and other features for each module are entered by completing setup screens that describe the modules in a rack.

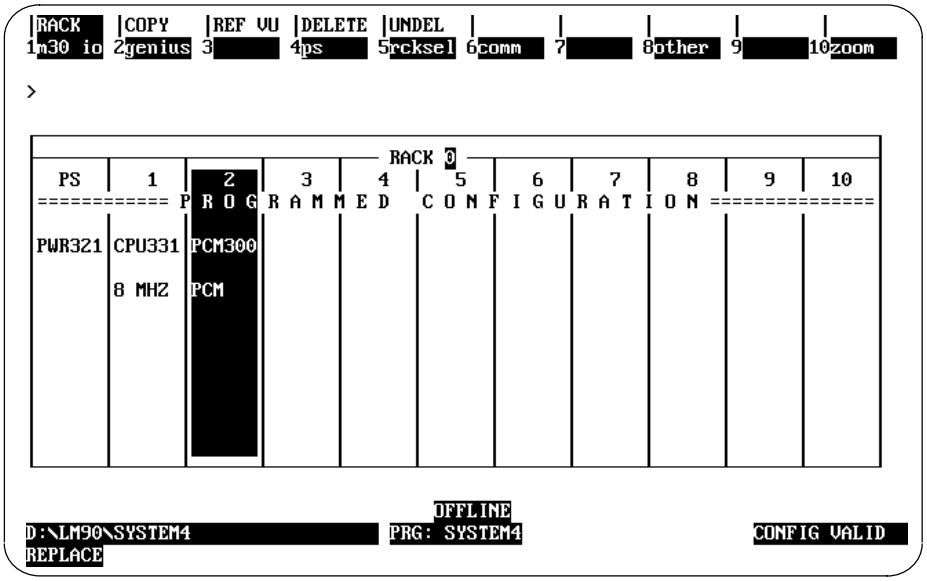

Figure 2-1. Sample Logicmaster Configuration Screen

From the main menu of the Logicmaster 90-30 configuration software, press I/O <F1>. The screen displays a representation of the modules in a rack. To add an SLP to the configuration, highlight the desired slot, then press Other <F8> and then PCM <F1>.

Now press Zoom <F10> to view the current configuration. Press <Enter> to enter the highlighted catalog number and display the PCM detail screen.

Now set the Configuration Mode to PCM CFG for the 90-30 SLP. First highlight the Config Mode option and repeatedly press the <Tab> key until PCM CFG is displayed on the screen. The serial ports are under program control and the parameters are initialized by the State Logic Processor.

Now press the <Esc> key to save the configuration and return to the rack display. The display should now show a PCM in the correct slot. Send the configuration to the PLC CPU and the configuration is complete.

During program execution the CPU must be in run mode with the outputs enabled. Use LM90-30 to set the status of the CPU before executing the State Logic program.

™ Logicmaster is a trademark of GE Fanuc Automation North America, Inc.

Battery

The State Logic Processor comes with a 3 volt lithium battery (IC697ACC701) to maintain memory through a power cycle. If the battery charge becomes low, a fault is set in the fault table. These faults can be monitored by the State Logic program.

To replace the battery, connect the new battery to the extra set of battery connections then disconnect the old battery. A Product Safety Data Sheet for the battery is available. Order from GE Fanuc using number GFK-0633.

Chapter 3 Troubleshooting

This chapter provides procedures for diagnosing State Logic Processor (SLP) problems. If these procedures do not solve the problem, contact the GE Fanuc Hotline (1-800-828-5747) for assistance.

Status LED is not ON Steady

1. Check that power is supplied to the I/O rack housing the SLP. Try removing and reinstalling the SLP.
2. Cycle power to the SLP, then press the reset button for more than 5 seconds.
3. Turn the power OFF and disconnect the battery and short the SLP battery terminal connection points to clear the SLP. Reconnect the battery, turn ON power again, and reset the SLP.
4. Check that the CPU is functioning properly by checking its "OK" LED.
5. Check that there are no empty slots between the CPU and the SLP. If there are empty slots, the Status LED blinks continuously.
6. If the Status LED is still not ON, try to download a program from ECLiPS or OnTOP. If you can connect with the SLP and download a program, then the Status LED is faulty.
7. If you get a message that ECLiPS or OnTOP cannot connect to the controller, then check the fault table in the CPU using Logicmaster 90. If there is a fault "Bad or missing module", then the SLP is faulty and must be returned for repairs.
8. If there is no fault then contact the GE Fanuc Hotline for assistance.

Serial Communication Problems

This section is split into two parts, communication problems to ECLiPS or OnTOP and problems with other serial devices.

Communications Problems with ECLiPS or OnTOP

1. Check that the serial cable used conforms to one of the types specified for communications to the SLP ports. Check that the cable is firmly secured at both ends.
2. When there is a communications problem, a message indicating problems connecting to the controller is displayed together with some options. Select the "Change Host Comm Port Settings" option to check the computer port being used and the baud rate. The default SLP baud rate is 19.2K.
3. The SLP programming port may have been changed. ECLiPS and OnTOP must be connected to the designated programming port. The default programming port is Port 1 but can be changed by ECLiPS or OnTOP. Make sure the serial cable is connected to the current programming port.
4. The SLP serial port configuration may have been changed. These parameters can only be changed by Statements using the Set_Commport keyword in the State Logic program. Reset the SLP to return the SLP serial port parameters to their default state. If the program is setup to start running automatically and the program continues to change the serial port parameters after the reset switch is pressed, turn off the power to the SLP, remove the battery, and short the SLP battery leads to reset the SLP.
5. Port 2 of the 90-30 SLP is an RS-422/485 port and Port 1 is an RS-232 port. Make sure that the host computer serial port setup matches the SLP port for RS-232-RS-422/485 option.
6. If there is still no communication between the SLP and OnTOP or ECLiPS then call the GE Fanuc Hotline for assistance.

Communications Problems with Another Serial Device

1. Check that the serial cable used conforms to one of the types specified for communications to the SLP ports. Check that the cable is firmly secured at both ends.
2. Make sure that the serial port parameters of the serial device match the settings of the SLP. The default settings of the SLP are 19.2K baud rate, 8 data bits, 2 stop bits, and no parity.
3. Make sure the RS-422/485-RS-232 standards are the same for SLP and the serial device
4. When connecting some device to the programming port, make sure that you exit ECLiPS or OnTOP normally before disconnecting from the SLP.
5. If there are still problems contact the GE Fanuc Hotline for assistance.

Chapter 4 Serial Communications

Serial communications with the State Logic Processor (SLP) is provided through one of the two serial ports. Each of these ports can send and receive serial data independent from the other. Port 1 is an RS-232 port and port 2 is an RS-422/485 port. There is only one 25-pin connector on the SLP which provides access to the connections for both ports. The SLP comes with a WYE cable which provides one 25-pin connector for each port.

ECLiPS and OnTOP must communicate with the SLP through the programming port. Either port can be the programming port, but port 1 is the default programming port. When ECLiPS or OnTOP is not connected to the SLP, the programming port can be used to communicate with some other serial device. To properly set the programming port to communicate with another device, exit ECLiPS or OnTOP normally before disconnecting from the SLP.

Either of these ports may also be a CCM port. The CCM port uses the GE Fanuc CCM2 protocol for all communications. This protocol is used for connecting the SLP with a host computer which collects data and changes data in the SLP. Typical CCM uses are connecting to a graphical user interface program such as CIMPLICITY® or for custom host interaction with the SLP.

The SLP is always a slave to the host, i.e., all communications are initiated by the host computer. The SLP may be one of several devices on a CCM network. The CCM port is always the port that is not designated as the programming port. The CCM port is a normal RS-232 or RS-422/485 port when CCM communications are not enabled.

Programming Serial Communications

The program communicates through two ports using WRITE and READ terms. For example:

State: Get_Setpoint

Write “Enter New Setpoint” to Operator_Panel.

Read SetPoint1 from Operator_Panel, then go to Check_Setpoint State.

The Write Term sends the string of characters, Enter New Setpoint, to the port defined as the Operator_Panel. This same port is then monitored for input by the Read Term in the next Statement. The variable Setpoint1 is set to the value entered through the specified port.

In this example the WRITE and READ term information is directed to a particular port. Operator_Panel in this case is defined in ECLiPS as Port 1 or Port 2. Use the ECLiPS, DEFINE or LIST menus to make the port definitions. The default names are Port_1 and Port_2.

The Read and Write Terms may also be used without being directed to any particular channel, for example:

State: Choose_Recipe

Write “Enter Recipe Number”.

Read Recipe_Number, then go to StartBatch State.

Since no port is specified in this example, information is sent to the programming port. For a more detailed discussion of programming serial input and output, refer to the Reference Section of the ECLiPS User’s Manual.

Serial Port Setup

There are several serial port configuration options. Some of these options are set using ECLiPS or OnTOP, and others can only be set by an executing State Logic program.

ECLiPS or OnTOP Options

The options available in the ECLiPS or OnTOP menus to change the configuration of the SLP serial ports are displayed below.

The options available in the ECLiPS or OnTOP menus to change the configuration of the SLP serial ports are displayed below.

Change Programming Port
Enable/Disable CCM Port
Set CCM Station Number
Set the RS-422/485 Status of each Port

Serial Options Set by ECLiPS or OnTOP

Each of these options is set in the State Engine Configuration Menu selected from the Debug Mode Project Menu in ECLiPS or from the Controller Option in OnTOP.

Programmable Setup Options

On power up the serial port parameters are set to their default settings. These settings may be changed by using the Set_Commport programming keyword in the control program. The Set_Commport keyword and parameters must be executed by the control program to change the serial port settings. Just changing the parameters in the ECLiPS serial communications setup form does not automatically change these settings.

After the SLP serial port parameters are set, ECLiPS automatically enters the Set_Commport instruction into the program when the following selections are made. Select the LIST option from the program mode menu; then select the Communication Ports option. Highlight the appropriate port and press <Enter>. ECLiPS prompts whether to enter the port name only or enter reconfiguration data. After selecting Enter Reconfiguration Data, the Set_Commport keyword plus the instructions to change the serial port parameters are entered into the ECLiPS program.

These options affect the SLP serial port configuration only, not the ECLiPS or OnTOP serial port setup. The option to change the ECLiPS or OnTOP host computer serial port configuration is available only when there is some problem connecting ECLiPS or OnTOP to the SLP. The only options which can be changed on the ECLiPS or OnTOP serial port configuration are selecting COM1 or COM2 and changing the baud rate.

Table 4-1. Serial Port Parameters

Parameter	Settings
Baud Rate	19.2K 1200 9600 300 4800 2400
Data Bits	8, 7 or 6
Parity	Even, Odd, None
Stop Bits	2, 1.5, or 1
Respond to Backspace	Enabled Disabled
Stop Transmit on Receive	Enabled Disabled
Receiver Always On	Enabled Disabled
Line Feed After Carriage Return	Enabled Disabled
Auto Echo	Enabled Disabled
XON / XOFF Protocol	Enabled Disabled
End of Message Character	Hex OD (Carriage Return

* Default Settings are Underlined

Serial Cable

The State Logic Processor (SLP) is designed to work with two GE Fanuc standard serial cables. One cable is the Mini Converter Kit that comes with the ECLiPS. The other is the PCM to IBM-PC cable. Use the RS-422 / 485 serial cables to connect to Port 2, if RS-422 / 485 communications are used.

Mini Converter Kit

ECLiPS comes with a serial cable kit that can be used to both connect the CPU with Logicmaster and to connect the SLP with ECLiPS or OnTOP running on an IBM PC. This cable kit comes with three adapters:

Table 4-2. Mini Converter Kit Adapters

9-pin Male to 15-pin Male	CPU Port	HE693SNP232
9-pin Male to 25-pin Male	SLP Ports 1 or 2	AD232 / 1-2
9-pin Male to 25-pin Female	IBM PC COM 2	HE693XTADP

The cable provided in the kit is terminated with two 9-pin connectors. One of the adapters connects the 9-pin serial cable to the 15-pin serial port on the CPU (HE693SNP232), another adapter connects the serial cable to the 25-pin female Port 1 on the SLP (AD232 / 1-2), and the third adapter can be used to connect to a 25-pin port on the IBM computer running Logicmaster 90, ECLiPS, or OnTOP (HE693XTADP).

Other Cable Options

Other cables that work with the SLP are the IBM-AT cable, IC697CBL702, and the Workmaster II or PS/2 cable, IC697CBL705. The connector on the SLP end can be made to be a right angle connector, so that the SLP front cover can be closed and the cable brought out the side of the SLP or through the bottom of the Series 90-30 chassis.

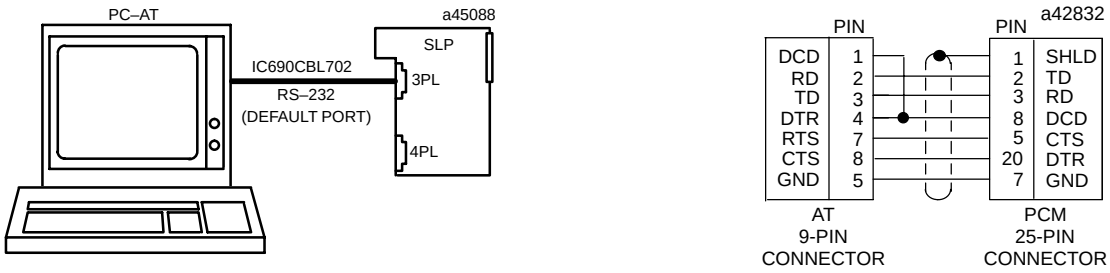

Figure 4-1. IBM-PC-AT to SLP Cable

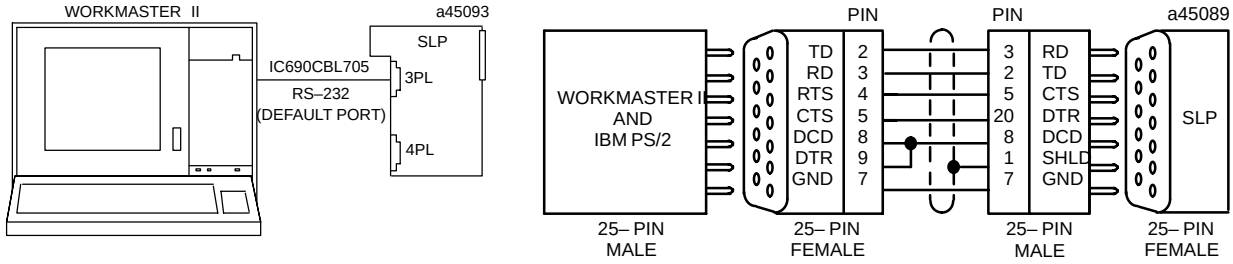

Figure 4-2. Workmaster II or PS/2 to SLP Cable

Custom Made Cables

If you want to make your own cable to connect to some serial device, use the drawing of the SLP pin assignments and the cable connection drawings in the previous section for the required connections. Hardware flow control lines must be used when communicating with the SLP using RS-232. The flow control lines are not used for RS-422 / 485 communications.

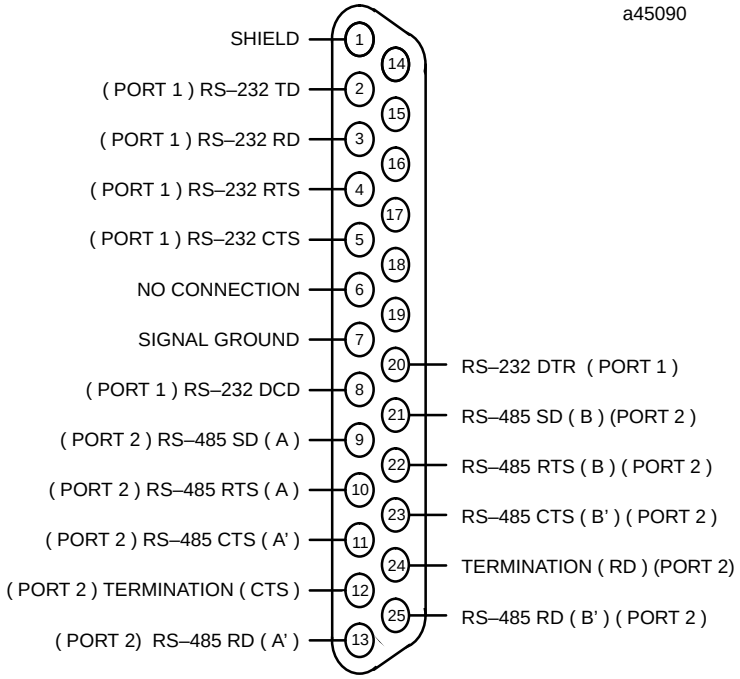

Figure 4-3. Serial Port Assignments for Series 90-30 SLP

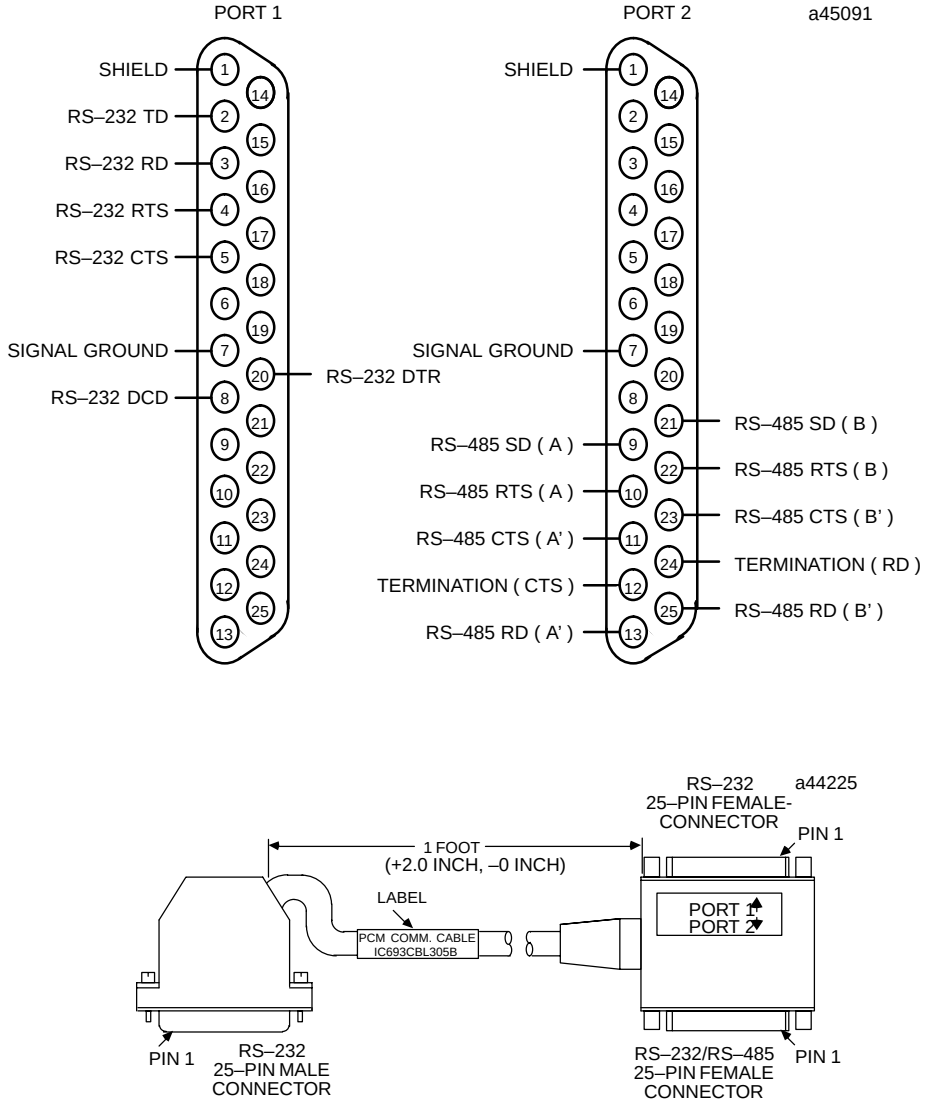

Figure 4-4. WYE Cable Connections for Series 90-30 SLP

NOTE

In the drawing above, the SD (Send Data) and RD (Receive Data) connections are the same as TXD and RXD used in other terminologies. (A) and (B) are the same as - and +. A' and B' denote inputs, and A and B denote outputs.

Chapter 5 Specifications

Table 5-1. Hardware Specifications

Serial Ports	1 RS-232 1 RS-422 / 485
Memory Backup Battery	3 Volt Lithium
Battery Shelf LIfe	10 years
Battery Memory Retention with Power OFF	6 months nominal
Operating Temperature	0 to 60°C
Storage Temperature	–40 to 85°C
Humidity (non-condensing)	5-95%
Vibration	3.5 mm, 5-9 Hz: 1.0 G 9-150 Hz
Shock	15 G's 11 msec

Table 5-2. Standards

IEC	485, 380
JIS	C 0912, JIS C 0911
DIN	435, 380
UL	508, 1012
CSA	C22.2 No. 142, C22.2
NEMA / ICS	2-230.40
ANSI / IEEE	C-37.90A-1978
VDE	805, 806, 871-877
FCC	15J Part A
VME	Supports VME Standard C.1

Table 5-3. Firmware Specifications

Tasks	256
States Per Task	255
Integer Variables (range –32768 to +32767)	1000
Floating Point Variables (range +/– 1.175494E–38 to +/– 3.402823E+38) 32 BIT IEEE Format.	1000
String Variables	100
String Variable Size	80 Characters
Character Variables	64
PID Loops	20
Number of Timers	Unlimited
Timer Resolution	1/100second
Maximum Total Number of States	3000
Available Program Memory	46 K Bytes
Flags	1000
Total Variables Plus I/O	3000

90-30 SLP I/O and Register Specifications

Type	Capacity
%I	512
%Q	512
%AI	128
%AQ	64
%T	256
%M	1024
%G	1280
%S	32
%SA	32
%SB	32
%SC	32
%R	2048