Programmable Controller

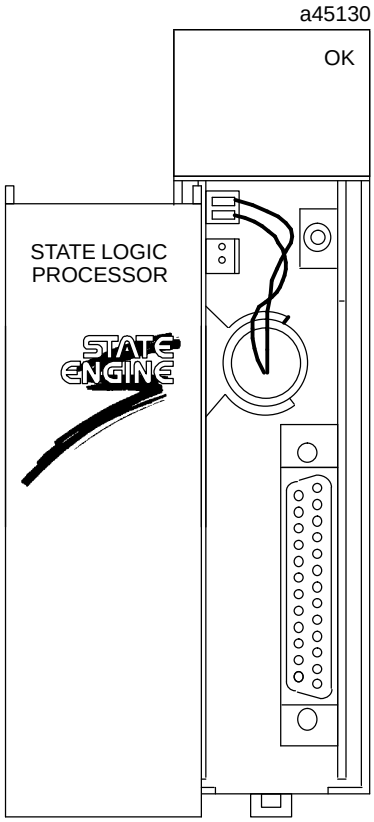
AD693SLP300

State Logic Processor Module (SLP)

GFK-0733A
February 1994

Features

- Natural English Language Programming using ECLiPS™
- Structured State Logic program architecture
- Advanced Diagnostics
- Simulation capabilities
- PID Loop control
- Handles complex math easily (floating point, square root, trig functions)
- Allows any combination of Natural English State Logic and Ladder Logic programs in same system
- Configurable to operate with any IC693 PLC system that uses the model 331 or model 341 CPU
- Up to 512 inputs and 512 outputs
- CCM2 Protocol
- 8 Mhz, 80C188 microprocessor
- 46 Kbytes battery-backed CMOS logic memory on board
- One RS-422 / RS-485 port and one RS-232 serial port
- Soft configuration (No DIP switches or jumpers)
- Restart / ResetPushbutton
- OK Status LED
- Occupies a single slot in an IC693 rack



Functions

The **State Logic Processor Module** (SLP) provides real time multi-tasking control for machine and process applications. It can also be programmed to perform computations, data acquisition, data communications and operator interface functions. The SLP is programmed using the English Control Language Programming System (ECLiPS) software package. It communicates with the PLC CPU over the backplane and can access user and system data. Many SLPs can be supported in a single IC693 PLC system and each SLP can support up to 512 inputs and 512 outputs.

The PLC CPU and SLP modules together in the IC693 PLC provide a dual processor architecture which can be used in a wide variety of applications. The SLP provides total state logic control, including diagnostic and simulation capablities, for those applications requiring reduced development and startup times. For those applications where both ladder logic and state logic programming is desired, the dual processor architecture allows a user to create both ladder logic and state logic application programs in any combination for efficient parallel processing solutions.

In IC693 PLC ladder logic control systems, the SLP module can be added to provide high level machine and process level diagnostics which can drastically reduce total system downtime. Also, the SLP module can provide machine or process simulation capabilities to IC693 PLC ladder logic control systems to help reduce debug and startup times.

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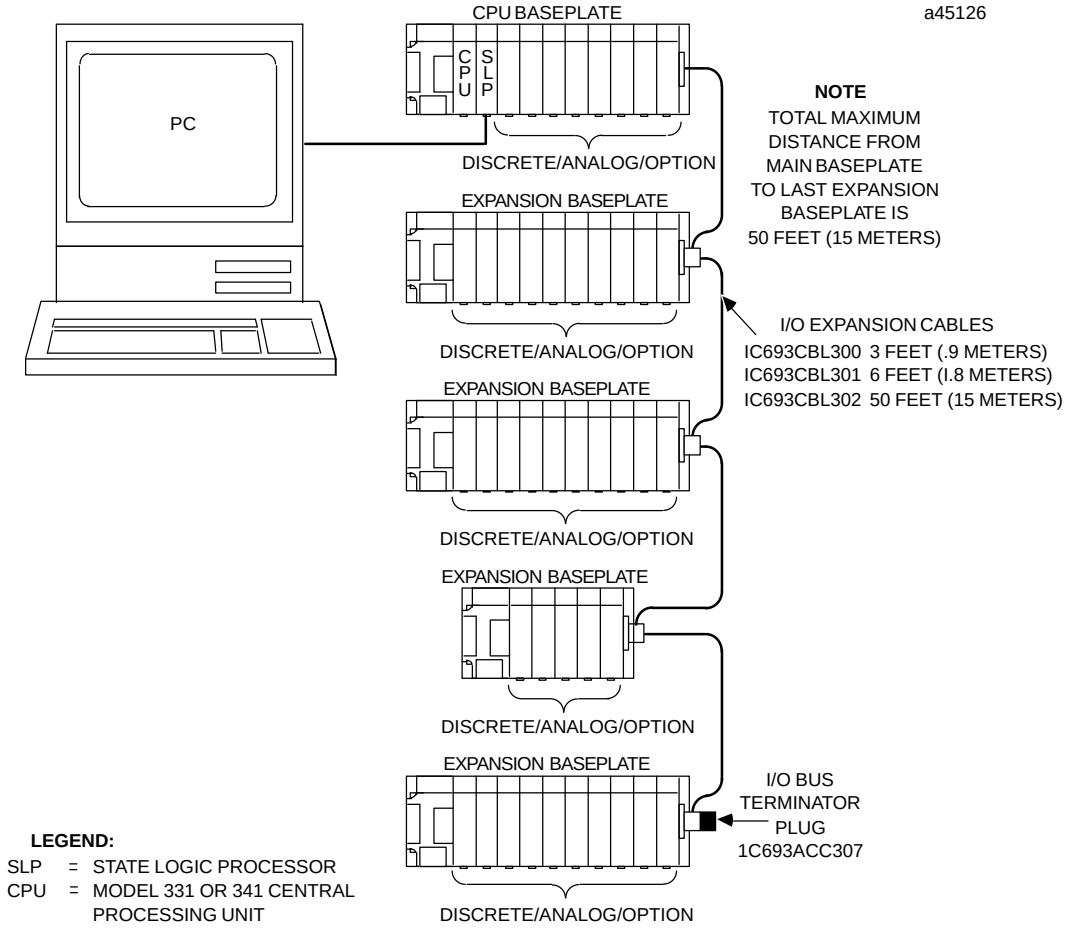

Figure 1. SLP Module in an IC693 PLC System Configuration

Installation

- Installation should not be attempted without referring to the *State Logic Processor User's Guide* (see reference 1).
- The IC693 SLP can only be installed in an IC693 PLC system that uses a model 331 or 341 CPU.
- Make sure baseplate power is off.
- Connect the battery to either of the battery connectors on the module. (See figure 2)
- Install the SLP Module in the baseplate. (Refer to figure 1)
- Turn on power.

The module should power up and blink the top LED, indicating that power up diagnostics are in progress. When the diagnostics have completed successfully the top LED stays on.

Memory

The SLP module has 46 Kbytes of user program memory space. Additional memory exists for Input, Output, Register, and other variable data (see table 3). The battery which supports this memory is located on the SLP module as shown in figure 2.

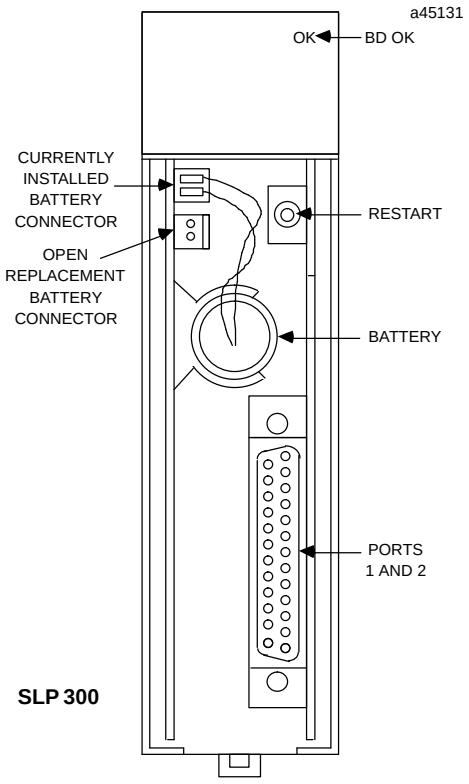

Figure 2. State Logic Processor Module User Details

Programming and Configuration

There are no user DIP switches or jumpers on this module for configuration. However, the module must be configured into the overall PLC system using IC641 configurator software (reference 4). An IBM-compatible PC-XT or AT computer with the ECLiPS programming system software installed is connected to port 1, (top port) as shown in figure 3. Port 1 is the default programming port, but the SLP can also be configured to be programmed through port 2. The Default setting is 19,200 bps. Port 1 is an RS-232 port; Port 2 is an RS-422 / RS-485 port.

Port communication speed, parity, stop bits, and other port parameters can be configured independently for operation with a variety of serial devices such as operator interfaces, bar code readers, weigh scales, etc. One of the two ports can also be configured to communicate with the CCM2 protocol as a slave, typically for use with operator interface terminals.

Signals and their pins for both ports 1 and 2 are provided on the SLP's single 25 pin connector. A WYE cable provided with the SLP module breaks out the single connector to two ports, 1 and 2, as shown in figures 3 and 4. Refer to the *State Logic Processor User's Guide* (reference 1) for details of operation.

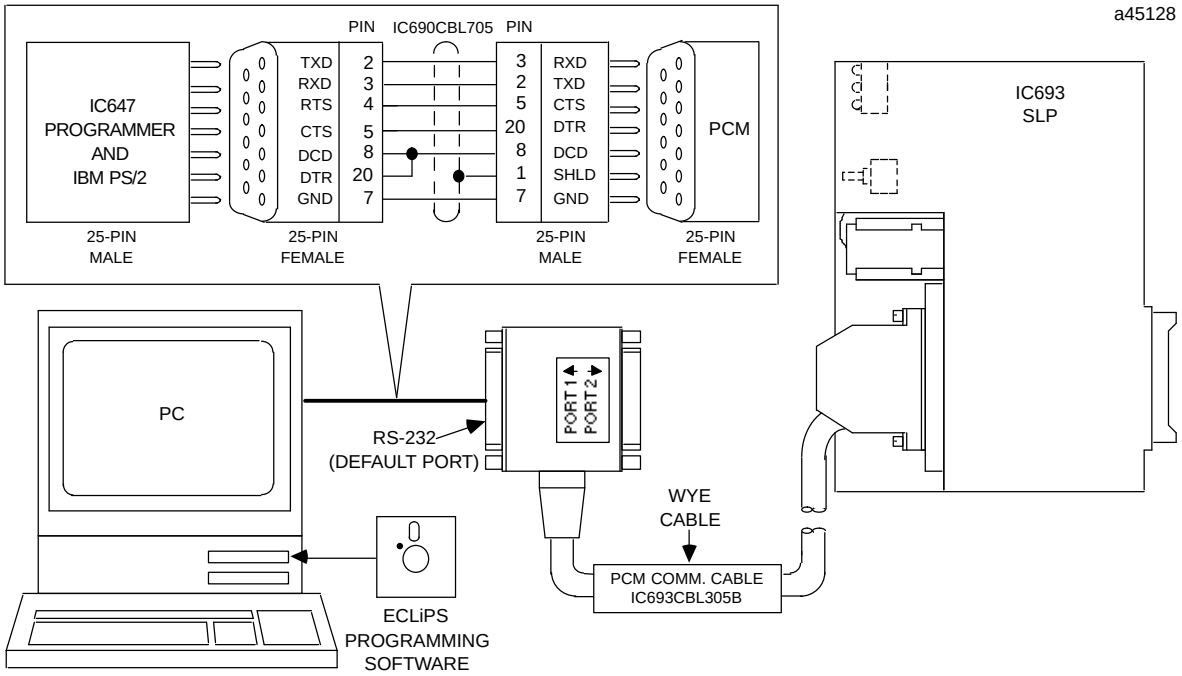

Figure 3. Development PC System Running ECLiPS and its Connection to SLP

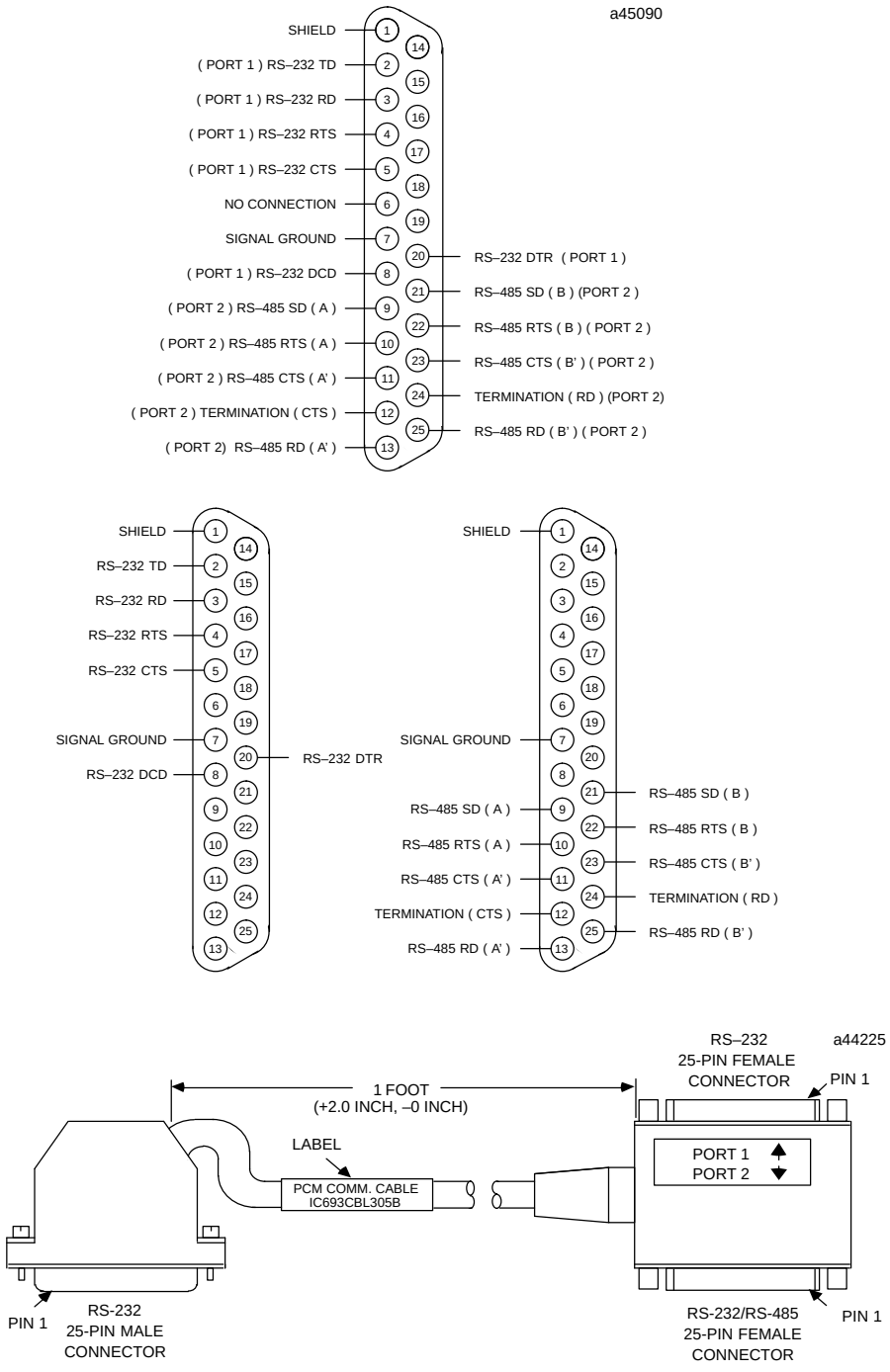

Figure 4. WYE Cable connections for the IC693 SLP

Status Indication

There is one visable status LED located on the SLP module as shown in figure 2. This LED (**OK**) indicates the condition of the module and is ON during normal operation. There are two other LEDs on the board which are not used and will always be off.

Controls

One pushbutton is provided. Push and hold the pushbutton for less than 5 seconds will simply restart the user application program if it was configured to "auto-run" at power up. Push and hold for more than 5 seconds and the module is reinitialized and the user application program must be reloaded.

Battery

A lithium battery (IC697ACC301) is installed as shown in figure 2. This battery maintains user memory when power is removed. Be sure to install a new battery before removing the old battery (two connectors are provided). Indication of a low battery is provided through the ECLiPS programming system software (see reference 2) and IC641 Programming Software (see reference 4).

Table 1. References

Reference	Title
1	*PLC State Logic Processor User's Guide*
2	*PLC ECLiPS User's Manual*
3	*PLC OnTOP User's Guide*
4	*Programming Software User's Manual*
5	*Programmable Logic Controller Reference Manual*
6	*PLC Installation Manual*

Table 2. Module Hardware Specifications

Battery:	
Shelf Life	10 years at 20°C (68°F)
Memory Retention	6 months nominal without applied power
Environmental:	
Operating Temperature	0 to 60°C (140°F)
Storage Temperature	–40 to +85°C (–40 to +185°F)
Humidity	5 to 95% non-condensing
Vibration	3.5 mm, 5-9 Hz 1.0 G 9-150 Hz
Shock:	15 G's 11 msec
Serial Ports:	Two RS-232 / 422 / 485 compatible
Current required from 5 VDC backplane bus:	400 mA
Complies with Standards:	
UL	508, 840
CSA	C.22.2 No. 142
FCC	15J Part A
NEMA/ICS	1-109.60 through 1-109.66 (showering arc)
ANSI/IEEE	C-37.90A, 37.90.1
IEC	801-3:1984

Table 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 Variabales	100
String Variable Size	80 characters
Character Variables	64
PID Loops	10
Number of Timers	unlimited
Timer Resolution	1/100 second
Maximum Total Number of States	600
Available Program Memory	46 Kbytes
User Reference Type and Quantity Available	
%I	512
%Q	512
%AI	128
%AQ	64
%T	256
%M	1024
%G	1280
%S	32
%SA	32
%SB	32
%SC	32
%R	2048

Table 4. Ordering Information

Description of Item	Catalog Number
IC693 State Logic Processor Module (46 Kbytes)	AD693SLP300
Lithium Battery	IC693ACC301