Gulf Coast Community College
EST 2542C Programmable Logic Controllers

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LAB 16-5: Status Files, Fault Messages, and Error Codes

OBJECTIVES:

Upon completion of this lab you should be able to:

- identify faults
- identify error codes
- access the status file to find errors and fault messages.
- Troubleshoot faults and errors.

READING ASSIGNMENTS:

Programmable Logic Controllers Hardware and Programming by Max Rabiee 2nd ed.
Chapter 16: Troubleshooting and Servicing the PLC System
View the Powerpoint by Rabiee: CH16.ppt
View the Powerpoint: Labs 16 Troubleshooting.ppt

INTRODUCTION:

Identifying Controller Faults While a program is executing, a fault may occur within the operating system or your program. When a fault occurs, you have various options to determine what the fault is and how to correct it. This lab describes how to clear faults and provides a list of possible advisory messages with recommended corrective actions.

Automatically Clearing Faults You can automatically clear a fault by cycling power to the controller when the Fault Override at Power-Up bit (S:1/8) is set in the status file.

You can also configure the controller to clear faults and go to RUN every time the controller is power cycled. This is a feature that OEMs can build into their equipment to allow end users to reset the controller. If the controller faults, it can be reset by simply cycling power to the machine. To accomplish this, set the following bits in the status file:

- S2:1/8 - Fault Override at Power-up
- S2:1/12 - Mode Behavior

If the fault condition still exists after cycling power, the controller re-enters the fault mode. Status bits will be set in the System Status File. The status file lets you monitor how your controller works and lets you direct how you want it to work. This is done by using the status file to set up control bits and monitor both hardware and programming device faults and other status information.

NOTE You can declare your own application-specific major fault by writing your own unique value to S:6 and then setting bit S:1/13 to prevent reusing system defined codes. The recommended values for user-defined faults are FF00 to FF0F.

Manually Clearing Faults Using the Fault Routine The occurrence of recoverable or non-recoverable user faults can cause the user fault subroutine to be executed. If the fault is recoverable, the subroutine can be used to correct the problem and clear the fault bit S:1/ 13. The controller then continues in the Run or test mode. The subroutine does not execute for non-user faults. See User Fault Routine on page 18-6 for information on creating a user fault subroutine.

Fault Messages This section contains fault messages that can occur during operation of the MicroLogix 1200 and MicroLogix 1500 programmable controllers. Each table lists the error code description, the probable cause, and the recommended corrective action.

Error Codes: See MicroLogix™ 1200 and MicroLogix 1500 Programmable Controllers Bulletins 1762 and 1764 Instruction Set Reference Manual Appendix D Fault Messages and Error Codes Error codes are listed in HEX. The fault is described and a recommended action is provided.

Error Code (Hex)	Advisory Message	Description	Fault Classification	Recommended Action
0001	NVRAM ERROR	The default program is loaded to the controller memory. This occurs: • if a power down occurred during program download or transfer from the memory module. • RAM integrity test failed. • FLASH integrity test failed *(MicroLogix 1200 only).*	Non-User	• Re-download or transfer the program. • Verify battery is connected *(MicroLogix 1500 only).* • Contact your local Rockwell Automation representative if the error persists.

Major Error Code This register displays a value which can be used to determine what caused a fault to occur. The controller sets (1) this bit when a major error is encountered. The controller enters a fault condition and word S:6 contains the Fault Code that can be used to diagnose the condition. Any time bit S:1/13 is set, the controller: • turns all outputs off and flashes the FAULT LED, • or, enters the User Fault Routine allowing the control program to attempt recovery from the fault condition. If the User Fault Routine is able to clear S:1/13 and the fault condition, the controller continues to execute the control program. If the fault cannot be cleared, the outputs are cleared and the controller exits its executing mode and the FAULT LED flashes.

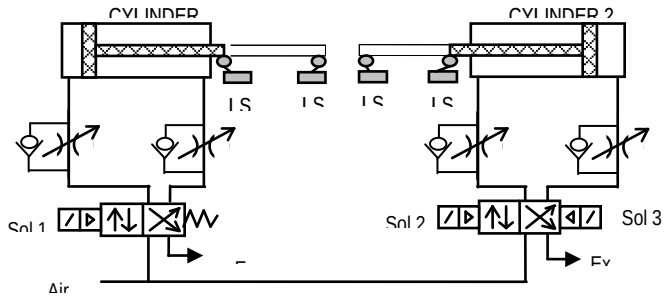
Contacting Rockwell Automation for Assistance: If you need to contact Rockwell Automation or local distributor for assistance, it is helpful to obtain the following information ready: • controller type, series letter, and revision letter of the base unit • series letter, revision letter, and firmware (FRN) number of the processor (on bottom side of processor unit) • controller LED status • controller error codes (found in S2:6 of status file). Rockwell Automation phone numbers are listed on the back cover of this manual. To contact us via the Internet, go to http://www.rockwellautomation.com.

NOTE You can also check the FRN by looking at word S:59 (Operating System FRN) in the Status File.

LAB PROCEDURE:

> **NOTE: THE ADDRESSES SHOWN IN THIS LAB ARE FOR ILLUSTRATION ONLY. THE PLC BENCH TRAINER AND PLC CASE TRAINER MAY HAVE DIFFERENT ADDRESS. SEE LAB 1-2 FOR THE CHART THAT SHOWS TO ACTUAL ADDRESS USED IN THE PLC CASE TRAINER.**

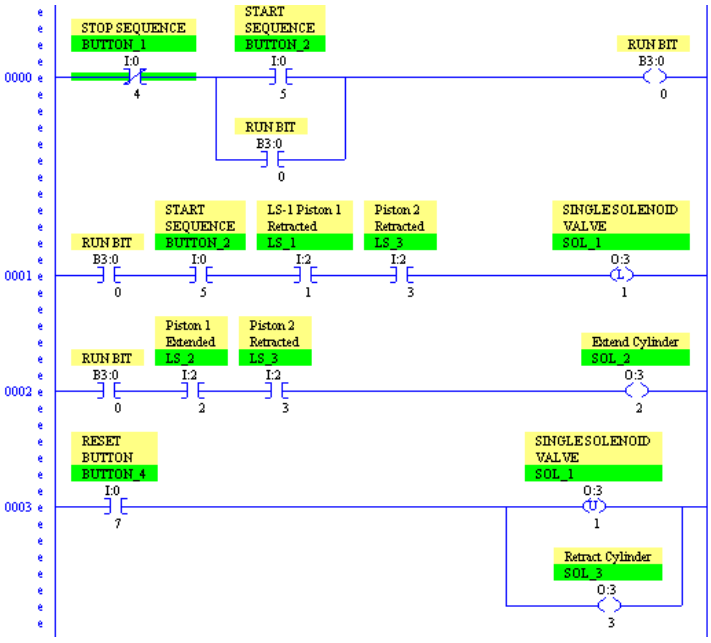
1. In this lab assignment, two instructions will be demonstrated that is often helpful in troubleshooting or developing a program. You will use the pnematic panel.



Pneumatic Panel Trainer Schematic

2. Load in the sequencing program from lab 13-1: This is event driven , single cycle sequence.

Event 1: Cylinder 1 Extends
Event 2: Cylinder 2 Extends
Event 3: Cylinder 1 and Cylinder 2 Retracts



3. Change the address for solenoid 2 to O:6/0 and download an run. Describe how a fault is indicated.

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4. Go to the status file by clicking on the S2 file, next click on the Errors tab. Describe the fault.

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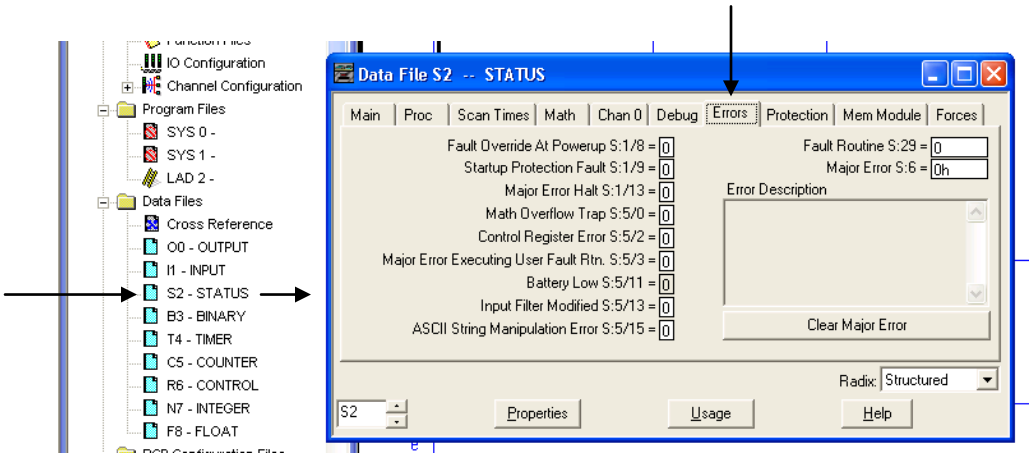

5. Clear the fault at the top left of the screen with the drop down tab for downloading. Go off line, change the adress to a valid address download and rung again to check for proper operation.

6. Error codes are listed in the MicroLogix™ 1200 and MicroLogix 1500 Programmable Controllers Bulletins 1762 and 1764 Instruction Set Reference Manual. Appendix D Fault Messages and Error Codes. Following is a sample of the list of error codes. There are 8 pages of error codes listed in appendix D of the MicroLogix™ 1200 and MicroLogix 1500 Programmable Controllers Bulletins 1762 and 1764 Instruction Set Reference Manual.

0032	SQO/SQC/SQL OUTSIDE OF DATA FILE SPACE	A sequencer instruction length/ position parameter references outside of the entire data file space.	Recoverable	• Correct the program to ensure that the length and position parameters do not point outside data file space. • Re-compile, reload the program and enter the Run mode.
0033	BSL/BSR/FFL/FFU/LFL/ LFU CROSSED DATA FILE SPACE	The length/position parameter of a BSL, BSR, FFL, FFU, LFL, or LFU instruction references outside of the entire data file space.	Recoverable	• Correct the program to ensure that the length and position parameters do not point outside of the data space. • Re-compile, reload the program and enter the Run mode.
0034	NEGATIVE VALUE IN TIMER PRESET OR ACCUMULATOR	A negative value was loaded to a timer preset or accumulator.	Recoverable	• If the program is moving values to the accumulated or preset word of a timer, make certain these values are not negative. • Reload the program and enter the Run mode

7. Demonstrate the use of the status file to your instructor for lab approval.

SUMMARY:

1. There are three types of faults:
Non-User
Non-Recoverable
Recoverable

2. Error codes are listed in the MicroLogix™ 1200 and MicroLogix 1500 Programmable Controllers Bulletins 1762 and 1764 Instruction Set Reference Manual. Appendix D Fault Messages

3. The major fault is set at S:1/13 with the description displayed and a tab to clear the fault.