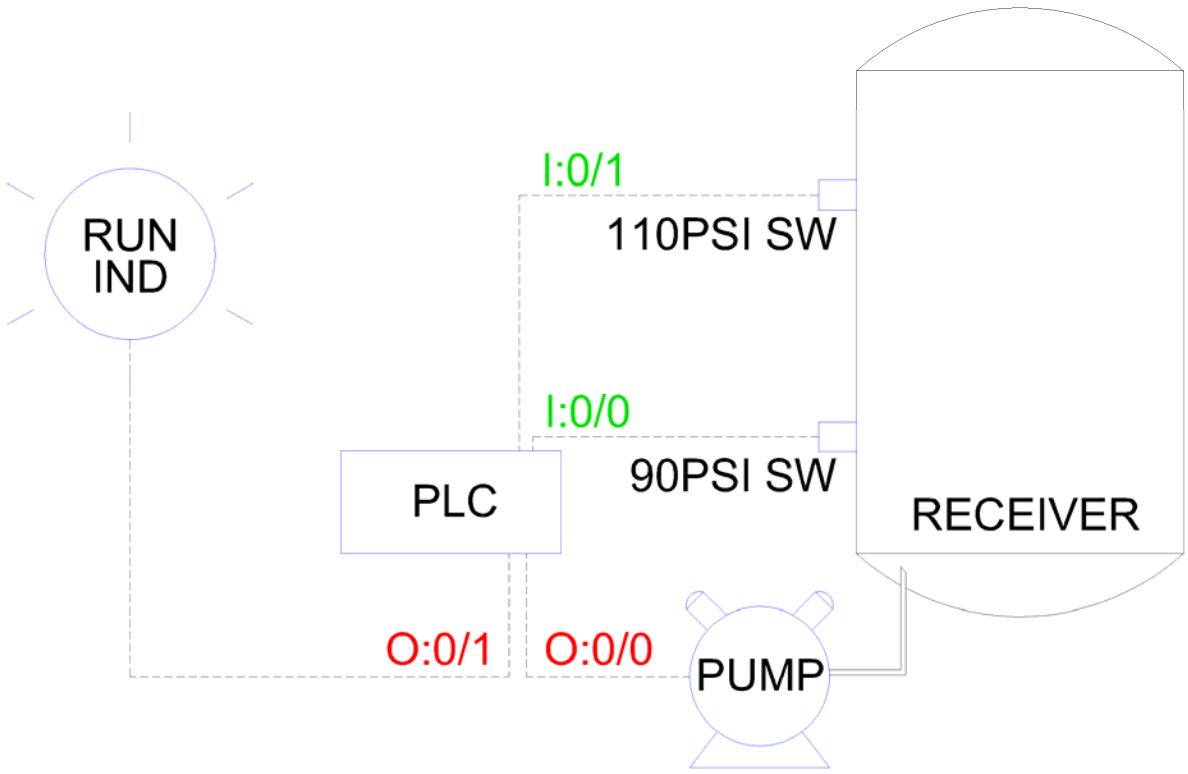
Project 1

PROCESS:



SUMMARY:

Today, we're going to be maintaining the pressure in a receiver on a compressor application. There are two pressure switches which close at 90 and 110psi (low and high). To control the pressure, we have one pump. Additionally, we want to illuminate an indicator light when the pressure is above 90psi.

IO / ASSIGNED MEMORY:

I:0/0 - Low pressure switch (closes at 90psi and above)
I:0/1 - High pressure switch (closes at 110psi and above)
O:0/0 – Pressure pump
O:0/1 – Pressure indicator light

TEST CRITERIA:

To start, run your program on Emulate. The pump should start immediately but the light should be off.

Next, force only the low pressure switch on (closed). The pump should remain energized and the light should now also energize.

Third, leave the low pressure switch closed and force the high pressure switch on as well. The pump should deenergize and the light should remain energized.

Fourth, leave the low pressure switch forced on and force off the high pressure switch. The pump should remain deenergized and the light should remain on.

Lastly, force both pressure switches off and verify that the pump starts back up and the light goes off.

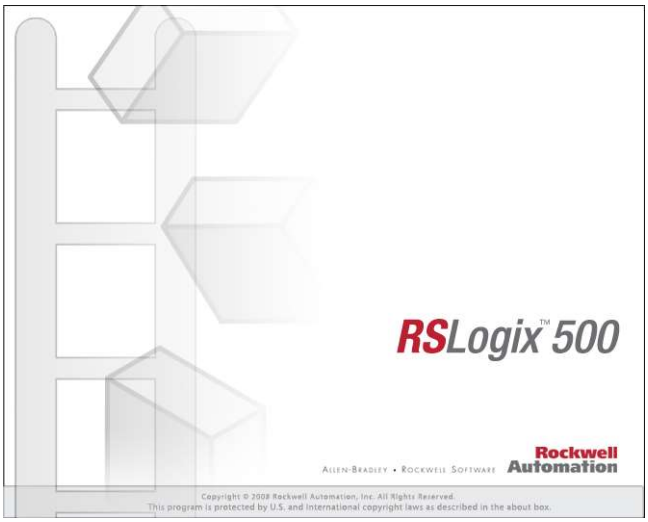
NOTES:

This is the simplest application we'll be doing in this course. ALL of these should make you think a bit and may take some trial and error to get it working right. THAT'S OKAY! That's how real programming works. Try to create your own program. It doesn't HAVE to look just like mine – it just has to pass the test criteria. Remember that programmers all have different styles and approaches, and that's totally expected – there is always more than one "right" way to do something. What's important is what your client sees: a program that does what it's supposed to do.

When I approach these projects in the coming lectures, I won't be creating 'rehearsed' programs. You'll no doubt see me make a few mistakes which I won't catch until I try to emulate my program and realize it doesn't work as desired. This isn't because I'm a terrible programmer or because I was too lazy to go back and re-record my videos. ☺ The point here is that you are going to watch me create programs and approach problems the way I do every day. All programs have a bug or two in them. This is why it's important to TEST TEST TEST your work before you hand it over to your clients or run them on live machines.

The time to feel foolish and make mistakes is not when people are watching. Do that stuff alone, at your desk. The only thing you want the rest of the world to see is a PLC HERO!

RSLogix Micro Project Report



Processor Information

Processor Type: Bul.1763 MicroLogix 1100 Series B

Processor Name: PROJ#1

Total Memory Used: 154 Instruction Words Used - 52 Data Table Words Used

Total Memory Left: 6502 Instruction Words Left

Program Files: 5

Data Files: 9

Program ID: 52e9

I/O Configuration

0	Bul.1763	MicroLogix 1100 Series B
1		
2		
3		
4		

Channel Configuration

CHANNEL 0 (SYSTEM) - Driver: DF1 Full Duplex
CHANNEL 0 (SYSTEM) - Driver: DF1 Full Duplex Edit Resource/Owner Timeout: 60
CHANNEL 0 (SYSTEM) - Driver: DF1 Full Duplex Passthru Link ID: 1
CHANNEL 0 (SYSTEM) - Driver: DF1 Full Duplex Write Protected: No
CHANNEL 0 (SYSTEM) - Driver: DF1 Full Duplex Comms Servicing Selection: Yes
CHANNEL 0 (SYSTEM) - Driver: DF1 Full Duplex Message Servicing Selection: Yes
CHANNEL 0 (SYSTEM) - Driver: DF1 Full Duplex 1st AWA Append Character: \d
CHANNEL 0 (SYSTEM) - Driver: DF1 Full Duplex 2nd AWA Append Character: \a

Source ID: 1 (decimal)
Baud: 19200
Parity: NONE
Control Line : No Handshaking
Error Detection: CRC
Embedded Responses: Auto Detect
Duplicate Packet Detect: Yes
ACK Timeout(x20 ms): 50
NAK Retries: 3
ENQ Retries: 3

CHANNEL 1 (SYSTEM) - Driver: Ethernet
CHANNEL 1 (SYSTEM) - Driver: Ethernet Edit Resource/Owner Timeout: 60
CHANNEL 1 (SYSTEM) - Driver: Ethernet Passthru Link ID: 1
CHANNEL 1 (SYSTEM) - Driver: Ethernet Write Protected: No
CHANNEL 1 (SYSTEM) - Driver: Ethernet Comms Servicing Selection: Yes
CHANNEL 1 (SYSTEM) - Driver: Ethernet Message Servicing Selection: Yes

Hardware Address: 00:00:00:00:00:00
IP Address: 0.0.0.0
Subnet Mask: 0.0.0.0
Gateway Address: 0.0.0.0
Msg Connection Timeout (x 1mS): 15000
Msg Reply Timeout (x mS): 3000
Inactivity Timeout (x Min): 30
Bootp Enable: Yes
Dhcp Enable No
SNMP Enable: No
HTTP Enable: Yes
Auto Negotiate Enable: Yes
Port Speed Enable: 10/100 Mbps Full Duplex/Half Duplex
Contact:
Location:

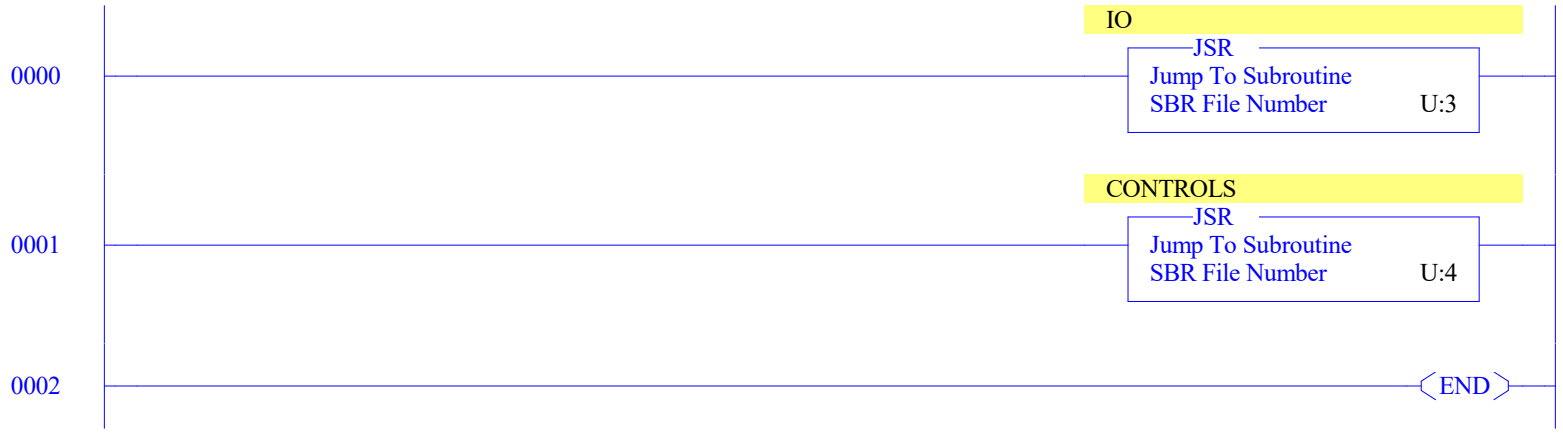
Program File List

Name	Number	Type	Rungs	Debug	Bytes
[SYSTEM]	0	SYS	0	No	0
	1	SYS	0	No	0
MAIN	2	LADDER	3	No	21
IO	3	LADDER	5	No	67
CONTROLS	4	LADDER	11	No	231

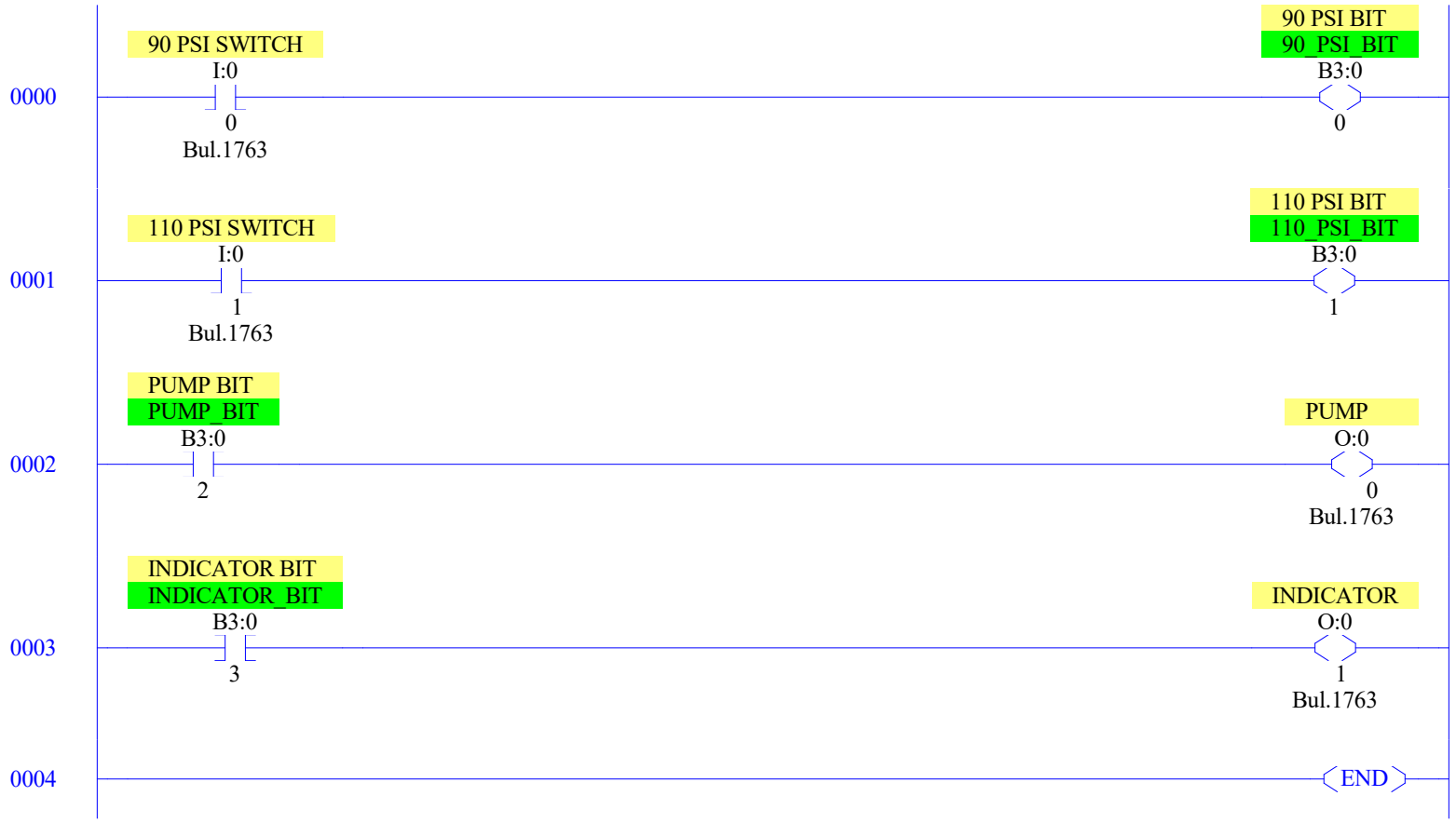
Data File List

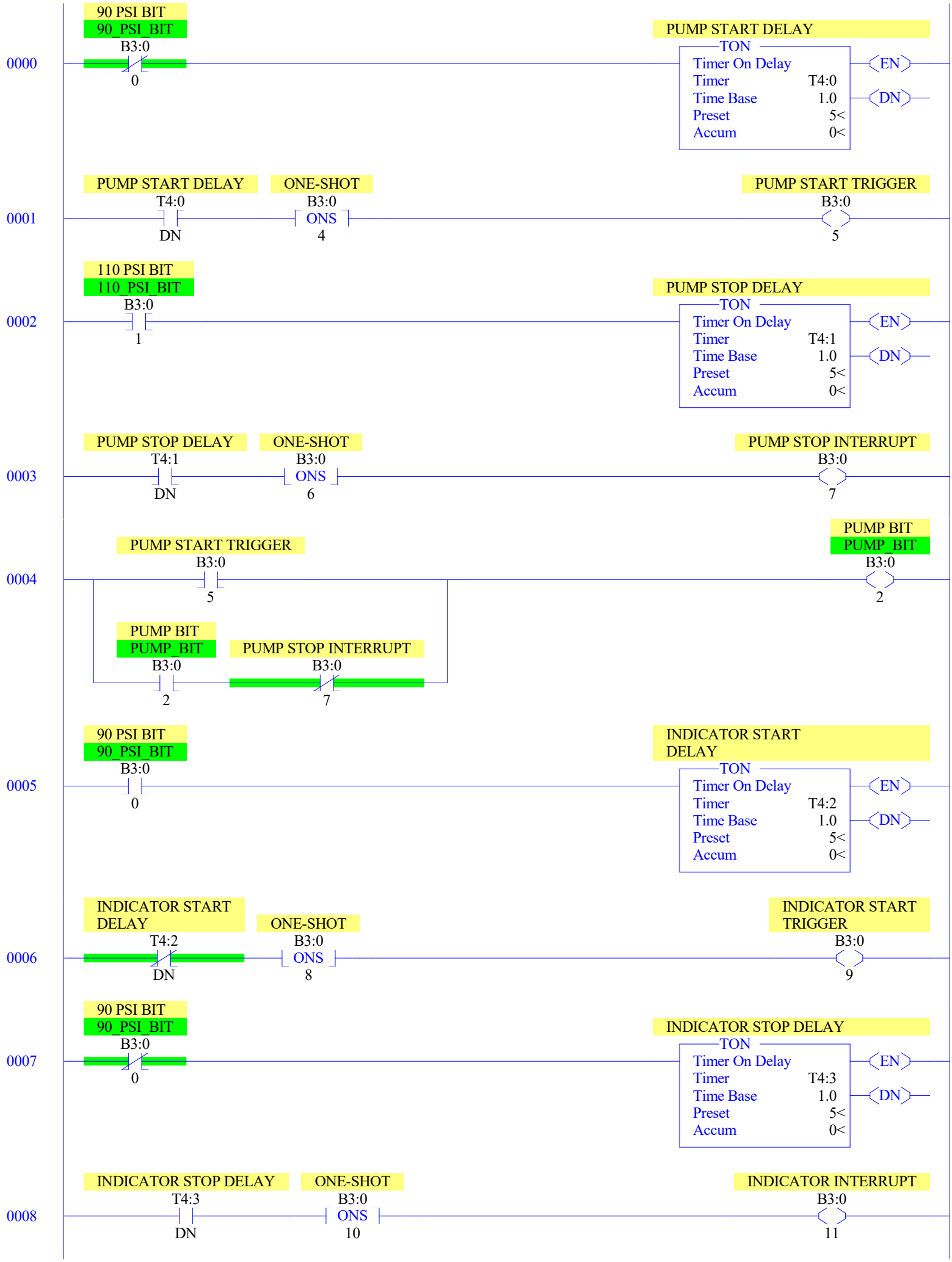
Name	Number	Type	Scope	Debug	Words	Elements	Last
OUTPUT	0	O	Global	No	12	4	O:3
INPUT	1	I	Global	No	18	6	I:5
STATUS	2	S	Global	No	0	66	S:65
BINARY	3	B	Global	No	1	1	B3:0
TIMER	4	T	Global	No	12	4	T4:3
COUNTER	5	C	Global	No	3	1	C5:0
CONTROL	6	R	Global	No	3	1	R6:0
INTEGER	7	N	Global	No	1	1	N7:0
FLOAT	8	F	Global	No	2	1	F8:0

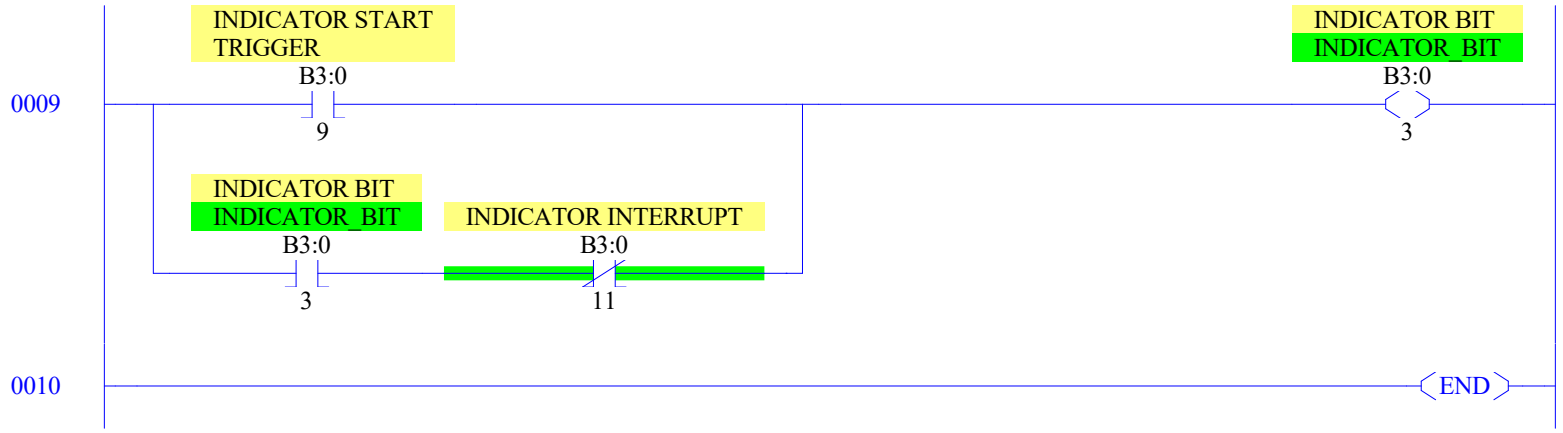
LAD 2 - MAIN --- Total Rungs in File = 3



LAD 3 - IO --- Total Rungs in File = 5




0000
90 PSI BIT
90_PSI_BIT
B3:0
0
PUMP START DELAY
TON
Timer On Delay
Timer T4:0
Time Base 1.0
Preset 5<
Accum 0<
EN
DN
0001
PUMP START DELAY
T4:0
DN
ONE-SHOT
B3:0
ONS
4
PUMP START TRIGGER
B3:0
5
0002
110 PSI BIT
110_PSI_BIT
B3:0
1
PUMP STOP DELAY
TON
Timer On Delay
Timer T4:1
Time Base 1.0
Preset 5<
Accum 0<
EN
DN
0003
PUMP STOP DELAY
T4:1
DN
ONE-SHOT
B3:0
ONS
6
PUMP STOP INTERRUPT
B3:0
7
0004
PUMP START TRIGGER
B3:0
5
PUMP BIT
PUMP_BIT
B3:0
2
PUMP BIT
PUMP_BIT
B3:0
2
PUMP STOP INTERRUPT
B3:0
7
0005
90 PSI BIT
90_PSI_BIT
B3:0
0
INDICATOR START DELAY
TON
Timer On Delay
Timer T4:2
Time Base 1.0
Preset 5<
Accum 0<
EN
DN
0006
INDICATOR START DELAY
T4:2
DN
ONE-SHOT
B3:0
ONS
8
INDICATOR START TRIGGER
B3:0
9
0007
90 PSI BIT
90_PSI_BIT
B3:0
0
INDICATOR STOP DELAY
TON
Timer On Delay
Timer T4:3
Time Base 1.0
Preset 5<
Accum 0<
EN
DN
0008
INDICATOR STOP DELAY
T4:3
DN
ONE-SHOT
B3:0
ONS
10
INDICATOR INTERRUPT
B3:0
11


INDICATOR START TRIGGER
B3:0
9
INDICATOR BIT
INDICATOR_BIT
B3:0
3
INDICATOR BIT
INDICATOR_BIT
B3:0
3
INDICATOR INTERRUPT
B3:0
11
0009
0010
END

Data File O0 (bin) -- OUTPUT

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
O:0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1763	MicroLogix 1100 Series B
O:0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1763	MicroLogix 1100 Series B
O:0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1763	MicroLogix 1100 Series B
O:0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1763	MicroLogix 1100 Series B

Data File I1 (bin) -- INPUT

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0		
I:0.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1763	MicroLogix 1100 Series B
I:0.1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1763	MicroLogix 1100 Series B
I:0.2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1763	MicroLogix 1100 Series B
I:0.3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1763	MicroLogix 1100 Series B
I:0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1763	MicroLogix 1100 Series B-Analo
I:0.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	Bul.1763	MicroLogix 1100 Series B-Analo

Data File S2 (hex) -- STATUS

Main

Processor Mode S:1/0 - S:1/4 = Remote Program Mode
On Power up Go To Run (Mode Behavior) S:1/12 = 0
First Pass S:1/15 = No
Free Running Clock S:4 = 0000-0000-0000-0000

Proc

OS Catalog Number S:57 = 1100
OS Series S:58 = A
OS FRS S:59 =
Processor Catalog Number S:60 =
Processor Series S:61 = A
Processor FRN S:62 =
User Program Type S:63 = 8001h
Compiler Revision Number S:64 =

Scan Times

Maximum (x10 ms) S:22 = 0
Watchdog (x10 ms) S:3 (high byte) = 10
Last 100 uSec Scan Time S:35 = 0
Scan Toggle Bit S:33/9 = 0

Math

Math Overflow Selected S:2/14 = 0
Overflow Trap S:5/0 = 0
Carry S:0/0 = 0
Overflow S:0/1 = 0
Zero Bit S:0/2 = 0
Sign Bit S:0/3 = 0
Math Register (lo word) S:13 = 0
Math Register (high word) S:14-S:13 = 0
Math Register (32 Bit) S:14-S:13 = 0

Chan 0

Processor Mode S:1/0- S:1/4 = Remote Program Mode
Node Address S:15 (low byte) = 0
Baud Rate S:15 (high byte) = ?
Channel Mode S:33/3 = 0
Comms Active S:33/4 = 0
Incoming Cmd Pending S:33/0 = 0
Msg Reply Pending S:33/1 = 0
Outgoing Msg Cmd Pending S:33/2 = 0

Debug

Suspend Code S:7 = 0
Suspend File S:8 = 0

Errors

Fault Override At Power Up S:1/8 = 0
Startup Protection Fault S:1/9 = 0
Major Error Halt S:1/13 = 0
Overflow Trap S:5/0 = 0
Control Register Error S:5/2 = 0
Major Error Executing User Fault Rtn. S:5/3 = 0
Battery Low S:5/11 = 0
Input Filter Selection Modified S:5/13 = 0
ASCII String Manipulation error S:5/15 = 0
Fault Routine S:29 = 0
Major Error S:6 = 0h
Error Description:

Protection

Deny Future Access S:1/14 = No
Data File Overwrite Protection Lost S:36/10 = False

Mem Module

Memory Module Loaded On Boot S:5/8 = 0
Password Mismatch S:5/9 = 0
Load Memory Module On Memory Error S:1/10 = 0
Load Memory Module Always S:1/11 = 0
On Power up Go To Run (Mode Behavior) S:1/12 = 0
Program Compare S:2/9 = 0
Data File Overwrite Protection Lost S:36/10 = 0

Forces

Forces Enabled S:1/5 = Yes
Forces Installed S:1/6 = No

Data File B3 (bin) -- BINARY

Offset	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	(Symbol)	Description
B3:0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		

Data File T4 -- TIMER

Offset	EN	TT	DN	BASE	PRE	ACC	(Symbol) Description
T4:0	0	0	0	1.0 sec	5	0	PUMP START DELAY
T4:1	0	0	0	1.0 sec	5	0	PUMP STOP DELAY
T4:2	0	0	0	1.0 sec	5	0	INDICATOR START DELAY
T4:3	0	0	0	1.0 sec	5	0	INDICATOR STOP DELAY

Data File C5 -- COUNTER

Offset	CU	CD	DN	OV	UN	UA	PRE	ACC	(Symbol)	Description
C5:0	0	0	0	0	0	0	0	0		

Data File R6 -- CONTROL

Offset	EN	EU	DN	EM	ER	UL	IN	FD	LEN	POS	(Symbol)	Description
R6:0	0	0	0	0	0	0	0	0	0	0		

Data File N7 (dec) -- INTEGER

Offset	0	1	2	3	4	5	6	7	8	9
N7:0	0									

Data File F8 -- FLOAT

Offset	0	1	2	3	4
F8:0	0				

Address/Symbol Database

Address	Symbol	Scope	Description	Sym Group	Dev. Code	ABV
B3:0/0	90_PSI_BIT	Global	90 PSI BIT			
B3:0/1	110_PSI_BIT	Global	110 PSI BIT			
B3:0/2	PUMP_BIT	Global	PUMP BIT			
B3:0/3	INDICATOR_BIT	Global	INDICATOR BIT			
B3:0/4			ONE-SHOT			
B3:0/5			PUMP START TRIGGER			
B3:0/6			ONE-SHOT			
B3:0/7			PUMP STOP INTERRUPT			
B3:0/8			ONE-SHOT			
B3:0/9			INDICATOR START TRIGGER			
B3:0/10			ONE-SHOT			
B3:0/11			INDICATOR INTERRUPT			
I:0/0			90 PSI SWITCH			
I:0/1			110 PSI SWITCH			
O:0/0			PUMP			
O:0/1			INDICATOR			
S:0			Arithmetic Flags			
S:0/0			Processor Arithmetic Carry Flag			
S:0/1			Processor Arithmetic Underflow/ Overflow Flag			
S:0/2			Processor Arithmetic Zero Flag			
S:0/3			Processor Arithmetic Sign Flag			
S:1			Processor Mode Status/ Control			
S:1/0			Processor Mode Bit 0			
S:1/1			Processor Mode Bit 1			
S:1/2			Processor Mode Bit 2			
S:1/3			Processor Mode Bit 3			
S:1/4			Processor Mode Bit 4			
S:1/5			Forces Enabled			
S:1/6			Forces Present			
S:1/7			Comms Active			
S:1/8			Fault Override at Powerup			
S:1/9			Startup Protection Fault			
S:1/10			Load Memory Module on Memory Error			
S:1/11			Load Memory Module Always			
S:1/12			Load Memory Module and RUN			
S:1/13			Major Error Halted			
S:1/14			Access Denied			
S:1/15			First Pass			
S:2/0			STI Pending			
S:2/1			STI Enabled			
S:2/2			STI Executing			
S:2/3			Index Addressing File Range			
S:2/4			Saved with Debug Single Step			
S:2/5			DH-485 Incoming Command Pending			
S:2/6			DH-485 Message Reply Pending			
S:2/7			DH-485 Outgoing Message Command Pending			
S:2/15			Comms Servicing Selection			
S:3			Current Scan Time/ Watchdog Scan Time			
S:4			Time Base			
S:5/0			Overflow Trap			
S:5/2			Control Register Error			
S:5/3			Major Err Detected Executing UserFault Routine			
S:5/4			M0-M1 Referenced on Disabled Slot			
S:5/8			Memory Module Boot			
S:5/9			Memory Module Password Mismatch			
S:5/10			STI Overflow			
S:5/11			Battery Low			
S:6			Major Error Fault Code			
S:7			Suspend Code			
S:8			Suspend File			
S:9			Active Nodes			
S:10			Active Nodes			
S:11			I/O Slot Enables			
S:12			I/O Slot Enables			
S:13			Math Register			
S:14			Math Register			
S:15			Node Address/ Baud Rate			
S:16			Debug Single Step Rung			
S:17			Debug Single Step File			
S:18			Debug Single Step Breakpoint Rung			
S:19			Debug Single Step Breakpoint File			
S:20			Debug Fault/ Powerdown Rung			
S:21			Debug Fault/ Powerdown File			
S:22			Maximum Observed Scan Time			
S:23			Average Scan Time			
S:24			Index Register			
S:25			I/O Interrupt Pending			
S:26			I/O Interrupt Pending			
S:27			I/O Interrupt Enabled			
S:28			I/O Interrupt Enabled			
S:29			User Fault Routine File Number			
S:30			STI Setpoint			
S:31			STI File Number			
S:32			I/O Interrupt Executing			
S:33			Extended Proc Status Control Word			
S:33/0			Incoming Command Pending			
S:33/1			Message Reply Pending			
S:33/2			Outgoing Message Command Pending			
S:33/3			Selection Status User/DF1			
S:33/4			Communicat Active			

Address/Symbol Database

Address	Symbol	Scope	Description	Sym Group	Dev. Code	ABV
S:33/5			Communicat Servicing Selection			
S:33/6			Message Servicing Selection Channel 0			
S:33/7			Message Servicing Selection Channel 1			
S:33/8			Interrupt Latency Control Flag			
S:33/9			Scan Toggle Flag			
S:33/10			Discrete Input Interrupt Reconfigur Flag			
S:33/11			Online Edit Status			
S:33/12			Online Edit Status			
S:33/13			Scan Time Timebase Selection			
S:33/14			DTR Control Bit			
S:33/15			DTR Force Bit			
S:34			Pass-thru Disabled			
S:34/0			Pass-Thru Disabled Flag			
S:34/1			DH+ Active Node Table Enable Flag			
S:34/2			Floating Point Math Flag Disable,Fl			
S:35			Last 1 ms Scan Time			
S:36			Extended Minor Error Bits			
S:36/8			DII Lost			
S:36/9			STI Lost			
S:36/10			Memory Module Data File Overwrite Protection			
S:37			Clock Calendar Year			
S:38			Clock Calendar Month			
S:39			Clock Calendar Day			
S:40			Clock Calendar Hours			
S:41			Clock Calendar Minutes			
S:42			Clock Calendar Seconds			
S:43			STI Interrupt Time			
S:44			I/O Event Interrupt Time			
S:45			DII Interrupt Time			
S:46			Discrete Input Interrupt- File Number			
S:47			Discrete Input Interrupt- Slot Number			
S:48			Discrete Input Interrupt- Bit Mask			
S:49			Discrete Input Interrupt- Compare Value			
S:50			Processor Catalog Number			
S:51			Discrete Input Interrupt- Return Number			
S:52			Discrete Input Interrupt- Accumulat			
S:53			Reserved/ Clock Calendar Day of the Week			
S:55			Last DII Scan Time			
S:56			Maximum Observed DII Scan Time			
S:57			Operating System Catalog Number			
S:58			Operating System Series			
S:59			Operating System FRN			
S:61			Processor Series			
S:62			Processor Revision			
S:63			User Program Type			
S:64			User Program Functional Index			
S:65			User RAM Size			
S:66			Flash EEPROM Size			
S:67			Channel 0 Active Nodes			
S:68			Channel 0 Active Nodes			
S:69			Channel 0 Active Nodes			
S:70			Channel 0 Active Nodes			
S:71			Channel 0 Active Nodes			
S:72			Channel 0 Active Nodes			
S:73			Channel 0 Active Nodes			
S:74			Channel 0 Active Nodes			
S:75			Channel 0 Active Nodes			
S:76			Channel 0 Active Nodes			
S:77			Channel 0 Active Nodes			
S:78			Channel 0 Active Nodes			
S:79			Channel 0 Active Nodes			
S:80			Channel 0 Active Nodes			
S:81			Channel 0 Active Nodes			
S:82			Channel 0 Active Nodes			
S:83			DH+ Active Nodes			
S:84			DH+ Active Nodes			
S:85			DH+ Active Nodes			
S:86			DH+ Active Nodes			
T4:0			PUMP START DELAY			
T4:0/0			LOW PRESSURE TIMER			
T4:0/DN						
T4:1			PUMP STOP DELAY			
T4:1/DN						
T4:2			INDICATOR START DELAY			
T4:2/DN						
T4:3			INDICATOR STOP DELAY			
T4:3/DN						
U:3			IO			
U:4			CONTROLS			

Instruction Comment Database

Address	Instruction	Description

Symbol Group Database

Group_Name	Description