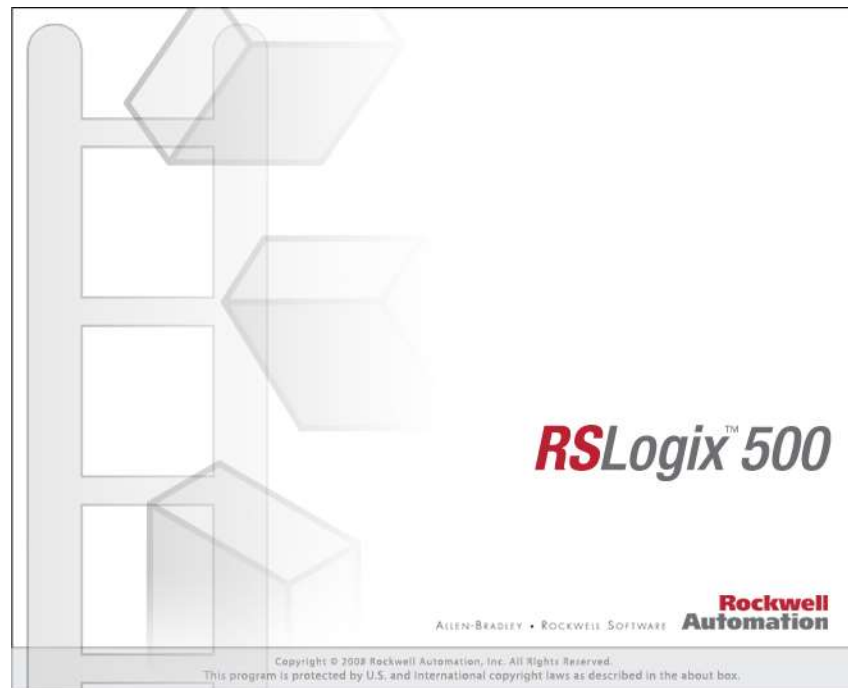


## RSLogix Micro Project Report



Processor Information

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Processor Type: Bul.1763      MicroLogix 1100 Series B

Processor Name: UNTITLED

Total Memory Used: 195 Instruction Words Used - 75 Data Table Words Used

Total Memory Left: 6461 Instruction Words Left

Program Files: 5

Data Files: 9

Program ID: 1b5e

## I/O Configuration

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

## Channel Configuration

## CHANNEL 0 (SYSTEM) - Driver: Modbus RTU Master

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

Baud: 19200  
Parity: NONE  
Control Line : No Handshaking  
InterCharacter Timeout(x1 ms): 0  
Pre Transmit Delay(x1 ms): 0

## 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: 00:0F:73:01:72:04  
IP Address: 192.168.1.112  
Subnet Mask: 255.255.255.0  
Gateway Address: 192.168.1.1  
Msg Connection Timeout (x 1mS): 15000  
Msg Reply Timeout (x mS): 3000  
Inactivity Timeout (x Min): 30  
Bootp Enable: No  
Dhcp Enable Yes  
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
TRAINING	2	LADDER	5	No	421
FILTERDATA	3	LADDER	2	No	91
LOADCELLIN	4	LADDER	5	No	64

## 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	3	3	B3:2
TIMER	4	T	Global	No	3	1	T4:0
COUNTER	5	C	Global	No	6	2	C5:1
CONTROL	6	R	Global	No	3	1	R6:0
INTEGER	7	N	Global	No	10	10	N7:9
FLOAT	8	F	Global	No	20	10	F8:9

Cf. <https://www.plctalk.net/qanda/showthread.php?t=133372>

Train PLC to get obtain or three load cell values that are steady

#### Inputs and Outputs

- RESET\_TRAINING
  - Discrete momentary (push button?)
  - When pressed, initializes training values
  - When released (falling edge), starts a training rung
- LOAD\_CELL\_INPUT
  - Analog float value that is loaded from load cell in response to a rising edge of Boolean SEND\_LOAD\_CELL\_DATUM
- SEND\_LOAD\_CELL\_DATUM (both output-ish and input-ish)
  - Output: written to as a 1 by this routine to indicate 100ms have expired and it is time for the next load cell value
  - Input: written to as a 0 by another entity to after putting a new value into LOAD\_CELL\_INPUT
    - This falling edge indicates a new LOAD\_CELL\_INPUT is ready
    - The other entity could be an I/O mapping routine, or the Python script [emulate\_load\_cell.py]

First rung: initialize and set up for training run

#### RESET\_TRAINING

B3:0

1

#### FILTERED\_DATA

MOV

Move	
Source	F8:0 175.0<
Dest	F8:1 182.7075<

#### HI\_LO\_PASS\_NUMBER

CLR

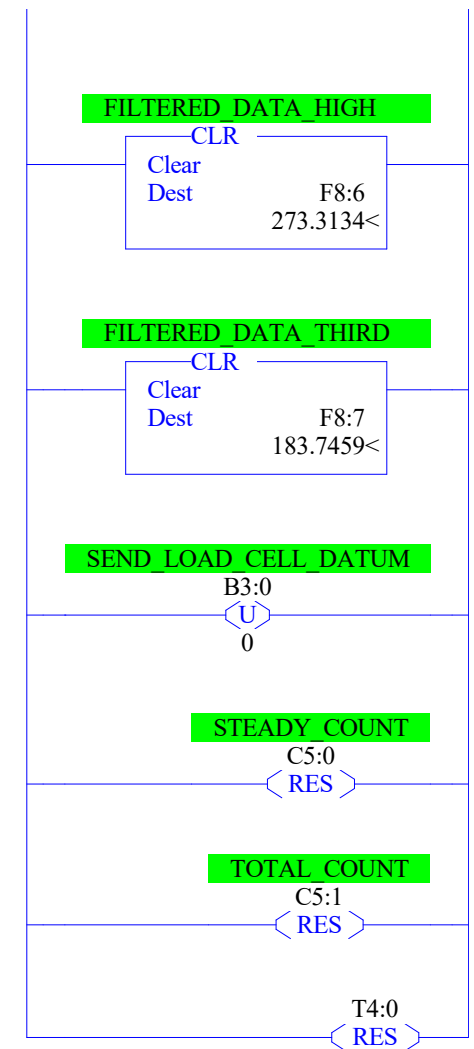
Clear	
Dest	N7:0 3<

#### FILTERED\_DATA\_LOW

CLR

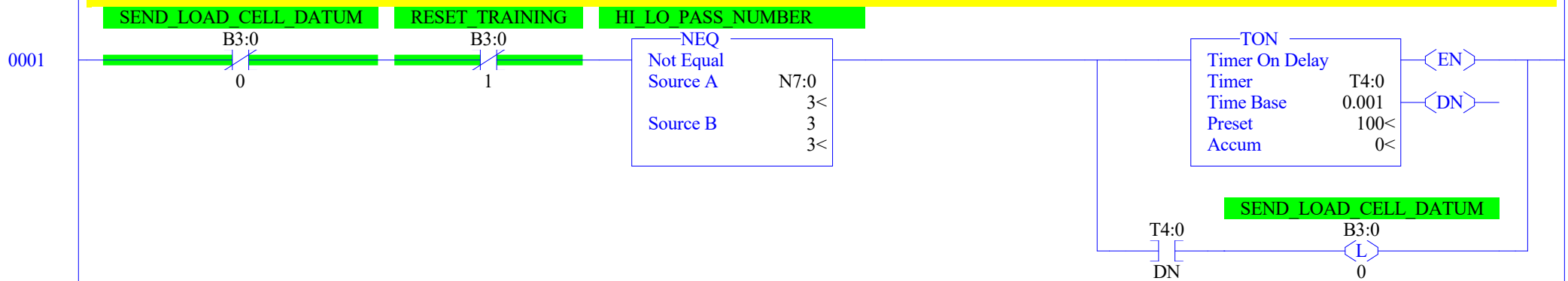
Clear	
Dest	F8:5 182.8817<

0000

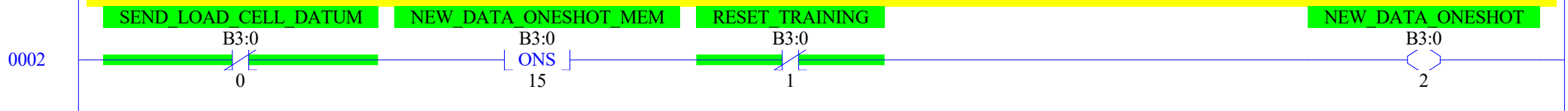




When SEND\_LOAD\_CELL\_DATUM is 0, indicating a new load cell value is available, start a 100ms timer  
 When that timer expires, latch a 1 into SEND\_LOAD\_CELL\_DATUM to trigger an external process to get the next load cell value  
 \*\*\* N.B. the external process will unlatch a 0 into SEND\_LOAD\_CELL\_DATA to indicate the next load cell value is ready



Detect the falling edge (one-shot) of SEND\_LOAD\_CELL\_DATUM, to respond to the next load cell value



On any scan when a new load cell value is available (see one-shot on previous rung)

- Call the low-pass filtering routine
- Calculate the difference between the new load cell value and the low-pass-filtered value
- Count the total number of load cell values used
- Count the steady number of load cell values, i.e. where the calculated difference's magnitude is less than 5
- If the calculated difference's magnitude is 5 or more
  - If the steady count reached 100 values, increment HI\_LO\_PASS\_NUMBER to move to the next pass
  - Clear the steady count
- On the scan when the steady count reaches 100, save the current filtered value to float of the current pass

### NEW\_DATA\_ONESHOT

B3:0

2

### FILTER\_DATA

JSR

Jump To Subroutine  
SBR File Number

U:3

### DATA\_DIFFERENCE

SUB

Subtract

Source A F8:0  
175.0<

Source B F8:1  
182.7075<

Dest F8:4  
-5.707489<

### TOTAL\_COUNT

CTU

Count Up

Counter C5:1

Preset 100<

Accum 1546<

<CU>

<DN>

### DATA\_DIFFERENCE

GRT

Greater Than (A>B)

Source A F8:4  
-5.707489<

Source B -5.0  
-5.0<

### DATA\_DIFFERENCE

LES

Less Than (A<B)

Source A F8:4  
-5.707489<

Source B 5.0  
5.0<

### STEADY\_COUNT

CTU

Count Up

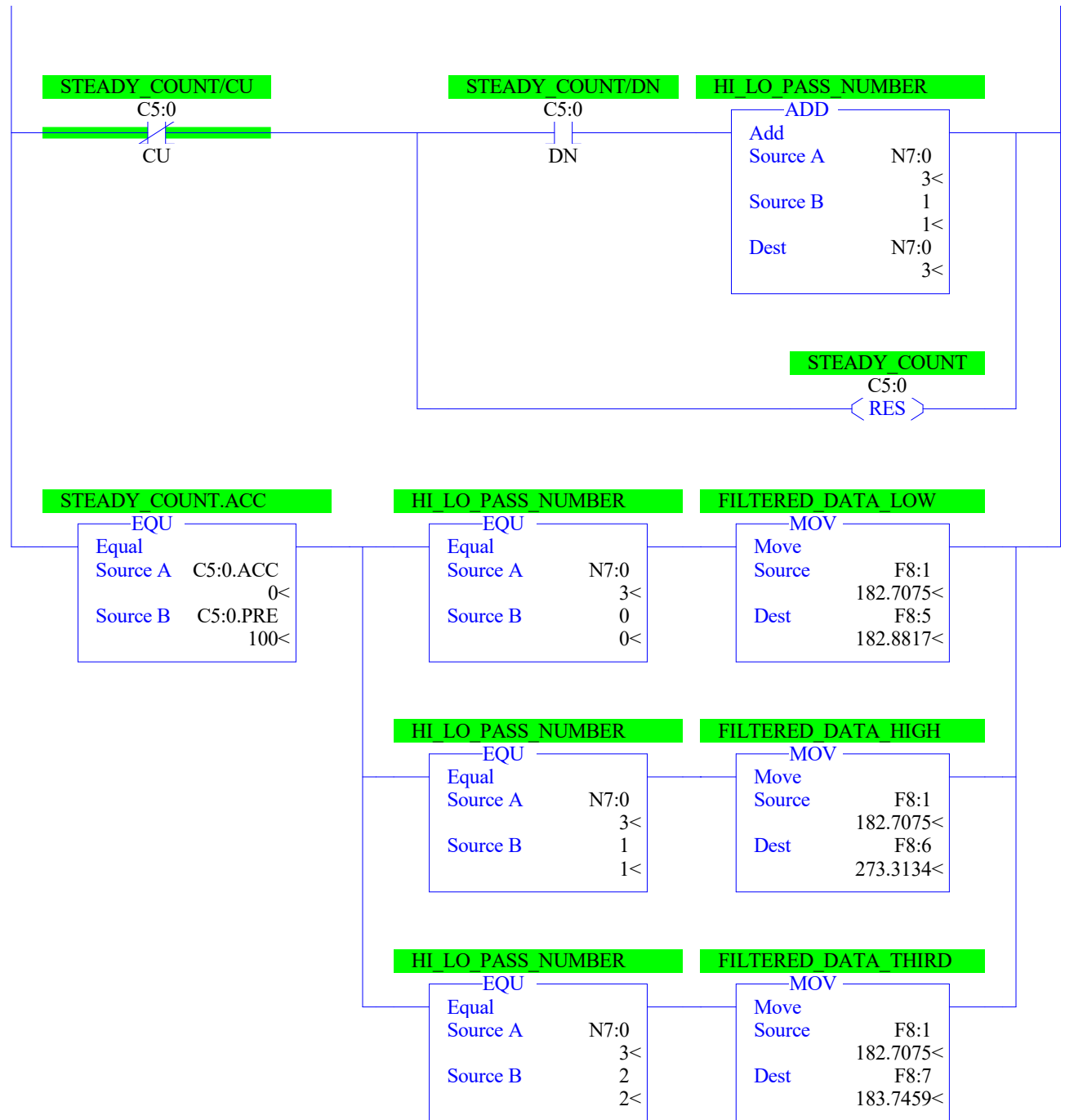
Counter C5:0

Preset 100<  
0<

<CU>

<DN>

0003



LAD 2 - TRAINING --- Total Rungs in File = 5

0004

⟨END⟩

Implement a low-pass filter on incoming load cell data:

$$\text{FILTERED\_DATA}(n+1) = [(1 - f) \times \text{New\_Load\_Cell\_Value}] + [f \times \text{FILTERED\_DATA}(n)]$$

where  $0.0 < f < 1.0$ ;  $f$  is the FILTER\_PARAMETER, and is typically near 1.0

#### TEMPORARY FLOAT

SUB	
Subtract	
Source A	1.0
	1.0<
Source B	F8:2
	0.965<
Dest	F8:3
	6.195004<

#### TEMPORARY FLOAT

MUL	
Multiply	
Source A	F8:3
	6.195004<
Source B	F8:0
	175.0<
Dest	F8:3
	6.195004<

#### FILTERED DATA

MUL	
Multiply	
Source A	F8:1
	182.7075<
Source B	F8:2
	0.965<
Dest	F8:1
	182.7075<

#### FILTERED DATA

ADD	
Add	
Source A	F8:1
	182.7075<
Source B	F8:3
	6.195004<
Dest	F8:1
	182.7075<

0000

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

0001

⌵END⌶

0000

Notional routine to scall the input load cell data from an analog input card channel when SEND\_LOAD\_CELL\_DATUM becomes 1, and indicate that value is ready by unlatching SEND\_LOAD\_CELL\_DATUM to 0

- N.B. this first rung disables this routine, as it is for information only;  
this duty is performed by Python script [emulate\_load\_cell.py] via module pycomm3

RET  
Return

0001

When the routine is enabled, if SEND\_LOAD\_CELL\_DATA is 0 i.e. not 1, then return and do nothing

SEND\_LOAD\_CELL\_DATUM

B3:0  
0

RET  
Return

0002

If SEND\_LOAD\_CELL\_DATUM is 1, indicating a new load cell datum has been requested by the training routine, then scale the input (N7:1 here to make this compile; I:N.M in a non-emulated application) into float LOAD\_CELL\_INPUT and unlatch SEND\_LOAD\_CELL\_DATUM to 0, which falling edge will indicate to the training routine the new value is ready

LOAD\_CELL\_INPUT

SCP	
Scale w/Parameters	
Input	N7:1
	0<
Input Min.	0.0
	0.0<
Input Max.	4095.0
	4095.0<
Scaled Min.	0.0
	0.0<
Scaled Max.	1000.0
	1000.0<
Output	F8:0
	175.0<

0003

SEND\_LOAD\_CELL\_DATUM

B3:0  
U  
0

0004

END

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



Page 1 (Radix Binary)

Data File S2 (hex) -- STATUS

**Main**

Processor Mode S:1/0 - S:1/4 = Remote Run  
On Power up Go To Run (Mode Behavior) S:1/12 = 0  
First Pass S:1/15 = No  
Free Running Clock S:4 = 0010-0000-0010-1000

**Proc**

OS Catalog Number S:57 = 1100                      User Program Type S:63 = 8108h  
OS Series S:58 = B                                  Compiler Revision Number S:64 =  
OS FRS S:59 =  
Processor Catalog Number S:60 =  
Processor Series S:61 = A  
Processor FRN S:62 =

**Scan Times**

Maximum (x10 ms) S:22 = 34  
Watchdog (x10 ms) S:3 (high byte) = 10  
Last 100 uSec Scan Time S:35 = 13  
Scan Toggle Bit S:33/9 = 0

**Math**

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

**Chan 0**

Processor Mode S:1/0- S:1/4 = Remote Run  
Node Address S:15 (low byte) = 0                      Outgoing Msg Cmd Pending S:33/2 = 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

**Debug**

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

Data File S2 (hex) -- STATUS

**Errors**

Fault Override At Power Up S:1/8 = 0                      Fault Routine S:29 = 0  
Startup Protection Fault S:1/9 = 0                      Major Error S:6 = 0h  
Major Error Halt S:1/13 = 0  
Overflow Trap S:5/0 = 0                      Error Description:  
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

**Protection**

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

**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 = 1

**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	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
B3:1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0		
B3:2	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	.001 sec	100	0		

Data File C5 -- COUNTER

Offset	CU	CD	DN	OV	UN	UA	PRE	ACC	(Symbol)	Description
C5:0	0	0	0	0	0	0	100	0	(STEADY COUNT)	
C5:1	0	0	1	0	0	0	100	1546	(TOTAL_COUNT)	

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	16	0		

Data File N7 (dec) -- INTEGER

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



Data File F8 -- FLOAT

Offset	0	1	2	3	4
F8:0	175	182.7075	0.965	6.195004	-5.707489
F8:5	182.8817	273.3134	183.7459	0	0

## Address/Symbol Database

Address	Symbol	Scope	Description	Sym Group	Dev. Code	ABV	BLW
B3:0/0	SEND_LOAD_CELL_DATUM	Global					
B3:0/1	RESET_TRAINING	Global					
B3:0/2	NEW_DATA_ONESHOT	Global					
B3:0/15	NEW_DATA_ONESHOT_MEM	Global					
C5:0	STEADY_COUNT	Global					
C5:1	TOTAL_COUNT	Global					
F8:0	LOAD_CELL_INPUT	Global					
F8:1	FILTERED_DATA	Global					
F8:2	FILTER_PARAMETER	Global					
F8:3	TEMPORARY_FLOAT	Global					
F8:4	DATA_DIFFERENCE	Global					
F8:5	FILTERED_DATA_LOW	Global					
F8:6	FILTERED_DATA_HIGH	Global					
F8:7	FILTERED_DATA_THIRD	Global					
N7:0	HI_LO_PASS_NUMBER	Global					
N7:1	LOAD_CELL_RAW_INPUT	Global					
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				

## Address/Symbol Database

Address	Symbol	Scope	Description	Sym Group	Dev. Code	ABV	BLW
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				
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				

## Address/Symbol Database

Address	Symbol	Scope	Description	Sym Group	Dev. Code	ABV	BLW
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				
U:3	FILTER_DATA	Global					

## Instruction Comment Database

Address	Instruction	Description
---------	-------------	-------------

## Symbol Group Database

Group_Name	Description
------------	-------------