RSLogix Micro Project Report

Processor Information

Processor Type: Bul.1763 MicroLogix 1100 Series B

Processor Name: UNTITLED

Total Memory Used: 246 Instruction Words Used - 162 Data Table Words Used

Total Memory Left: 6410 Instruction Words Left

Program Files: 3

Data Files: 12

Program ID: 3bdb

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: 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
	2	LADDER	5	No	709

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	24	24	B3:23
TIMER	4	T	Global	No	3	1	T4:0
COUNTER	5	C	Global	No	3	1	C5:0
CONTROL	6	R	Global	No	3	1	R6:0
INTEGER	7	N	Global	No	52	52	N7:51
FLOAT	8	F	Global	No	2	1	F8:0
	15	C	Global	No	3	1	C15:0
	18	F	Global	No	22	11	F18:10
LONG MATH	20	L	Global	No	20	10	L20:9

Perform divide and modulo operations on pulses; 10,000 pulses per rev(olution)
C.f. https://www.plctalk.net/qanda/showthread.php?t=124447

==========
Initialization
==========

1) Set S:2/14 so overflow does not cause major fault

2) Set Long mask to 0xFFFFC000 = -(2^14) = -16,384
2.1) Use MOV -1 (0xFFFFFFFF) and AND so mask will be seen in hex

0000

First Pass
S:1
15

overflow selected
S:2
L
14

long mask

MOV
Move
Source -1
-1<
Dest L20:3
0<

long mask

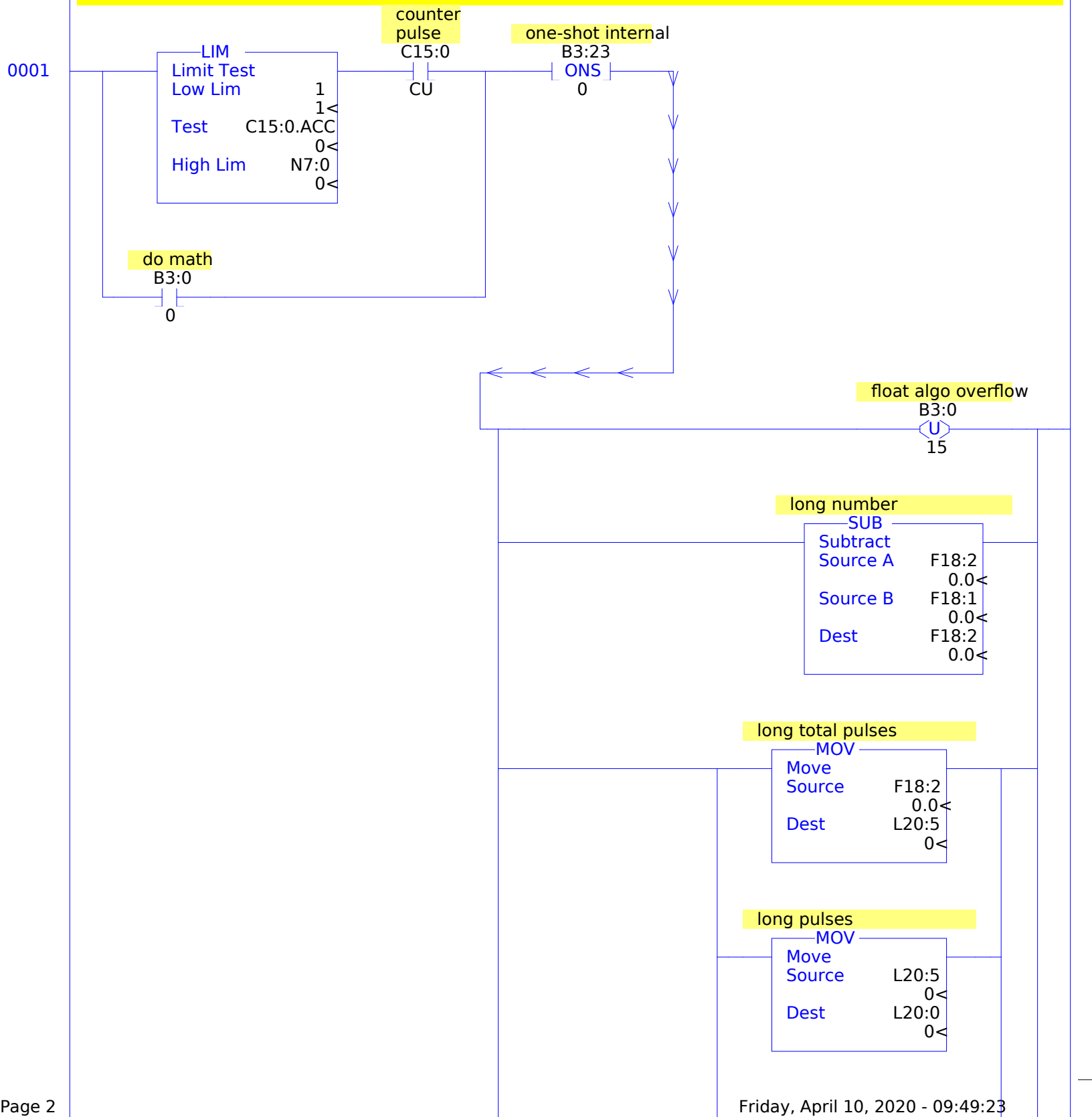
AND
Bitwise AND
Source A L20:3
00000000h<
Source B -16384
-16384<
Dest L20:3
00000000h<

0001

Original floating-point algorithm by roxusa
- Valid for pulse counts less than 16777215
  - Which is one less than what can be entered; see Diagnostics rung

Non-functional changes made by drbitboy:

- Add [do integer math] bit
- Store delta pulses (F18:2) into Longs
- Clear manual [do math] bit
- Clear any overflow at end of rung



long revs

MOV
Move
Source 0
0<
Dest L20:1
0<

do integer math
B3:23
15

do math
B3:0
0

do math
B3:0
U
0

real revs quotient

DIV
Divide
Source A F18:2
0.0<
Source B 10000.0
10000.0<
Dest F18:3
0.0<

rounded revs

MOV
Move
Source F18:3
0.0<
Dest N7:50
0<

rounded revs

GRT
Greater Than (A>B)
Source A N7:50
0<
Source B F18:3
0.0<

revs

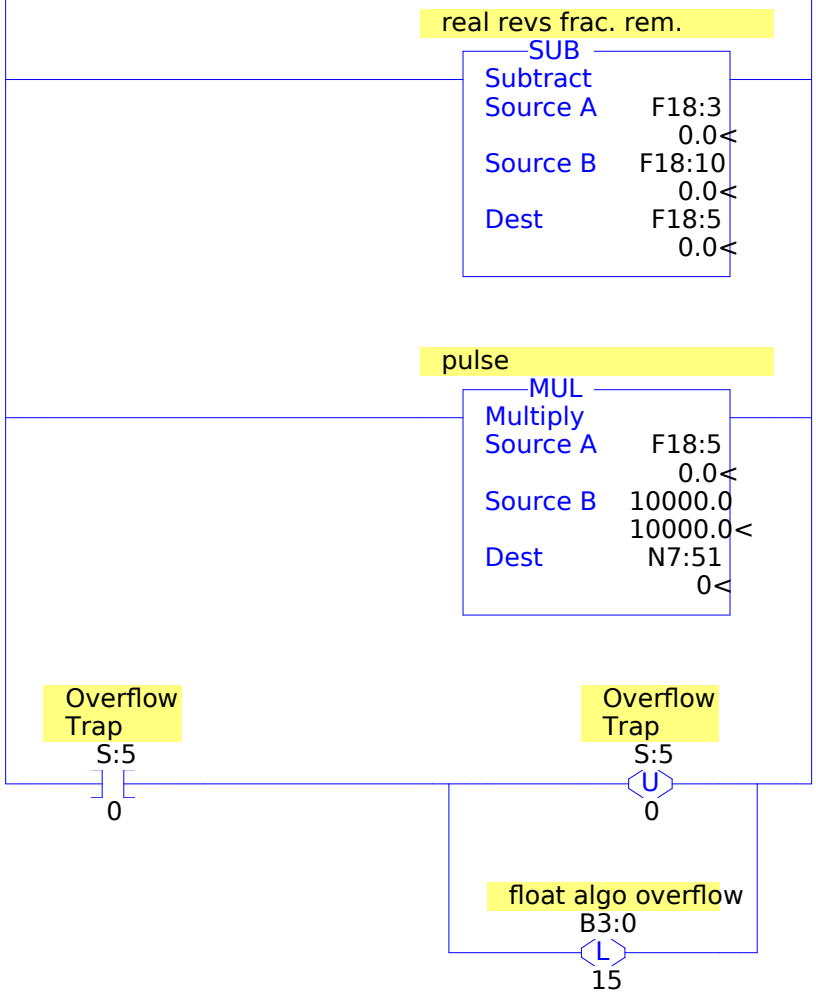
SUB
Subtract
Source A N7:50
0<
Source B 1.0
1.0<
Dest F18:10
0.0<

rounded revs

LES
Less Than (A<B)
Source A N7:50
0<
Source B F18:3
0.0<

revs

MOV
Move
Source N7:50
0<
Dest F18:10
0.0<


real revs frac. rem.
SUB
Subtract
Source A F18:3
0.0<
Source B F18:10
0.0<
Dest F18:5
0.0<
pulse
MUL
Multiply
Source A F18:5
0.0<
Source B 10000.0
10000.0<
Dest N7:51
0<
Overflow Trap
S:5
0
Overflow Trap
S:5
U
0
float algo overflow
B3:0
L
15

```
================================================================================
Algorithm by drbitboy using Longs
- Valid for pulse counts up to 2G
  - Although current REAL pulse count source precision is limited to 16M
================================================================================
Initial total pulses are in L20:5 and Long pulses (L20:0)
- Moved from F18:2 in rung 0001 above

Summary
- Long pulses will be reduced to the remaining pulses = L20:5 MODULO 10000
- Long revs (L 20:1) will contain the number of 10kpulse revs

Implementation details
- Loop
  - Get truncated quotient Long delta = (Long pulses) / 16384
  - Add Long delta to Long revs (L20:1)
  - Subtract (10000 * (Long delta)) from Long pulses
  - Repeat loop as long as (Long pulses) valule is greater than 16383,
- After looping is complete, if Long pulses value is greater than 9999
  - Add 1 to revs
  - Subtract 10000 from Long pulses
```

cycle 16384 do integer math

0002 LBL Q2:0 — B3:23 15

long delta

AND
Bitwise AND
Source A L20:0 00000000h<
Source B L20:3 00000000h<
Dest L20:2 00000000h<

long delta

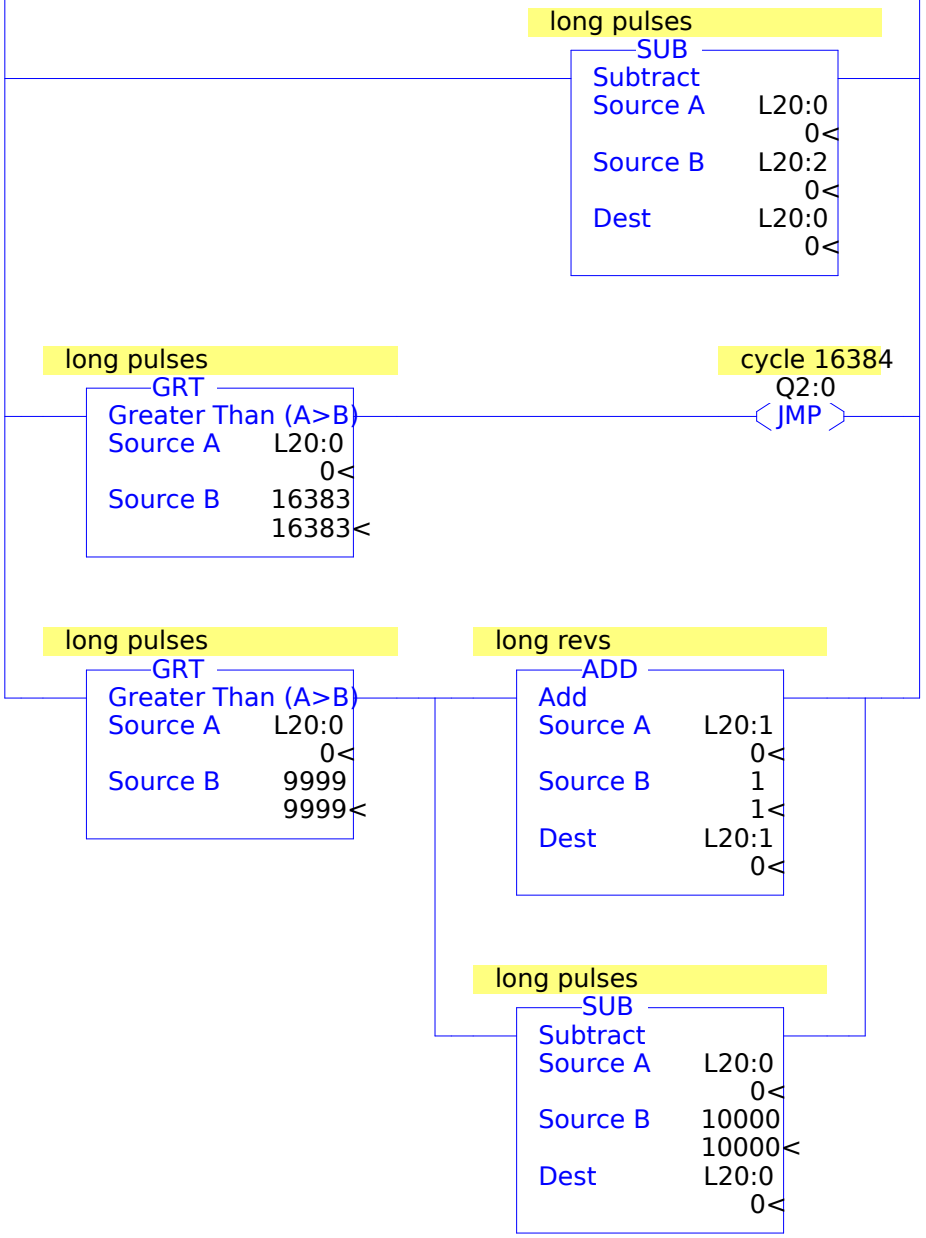
DIV
Divide
Source A L20:2 0<
Source B 16384 16384<
Dest L20:2 0<

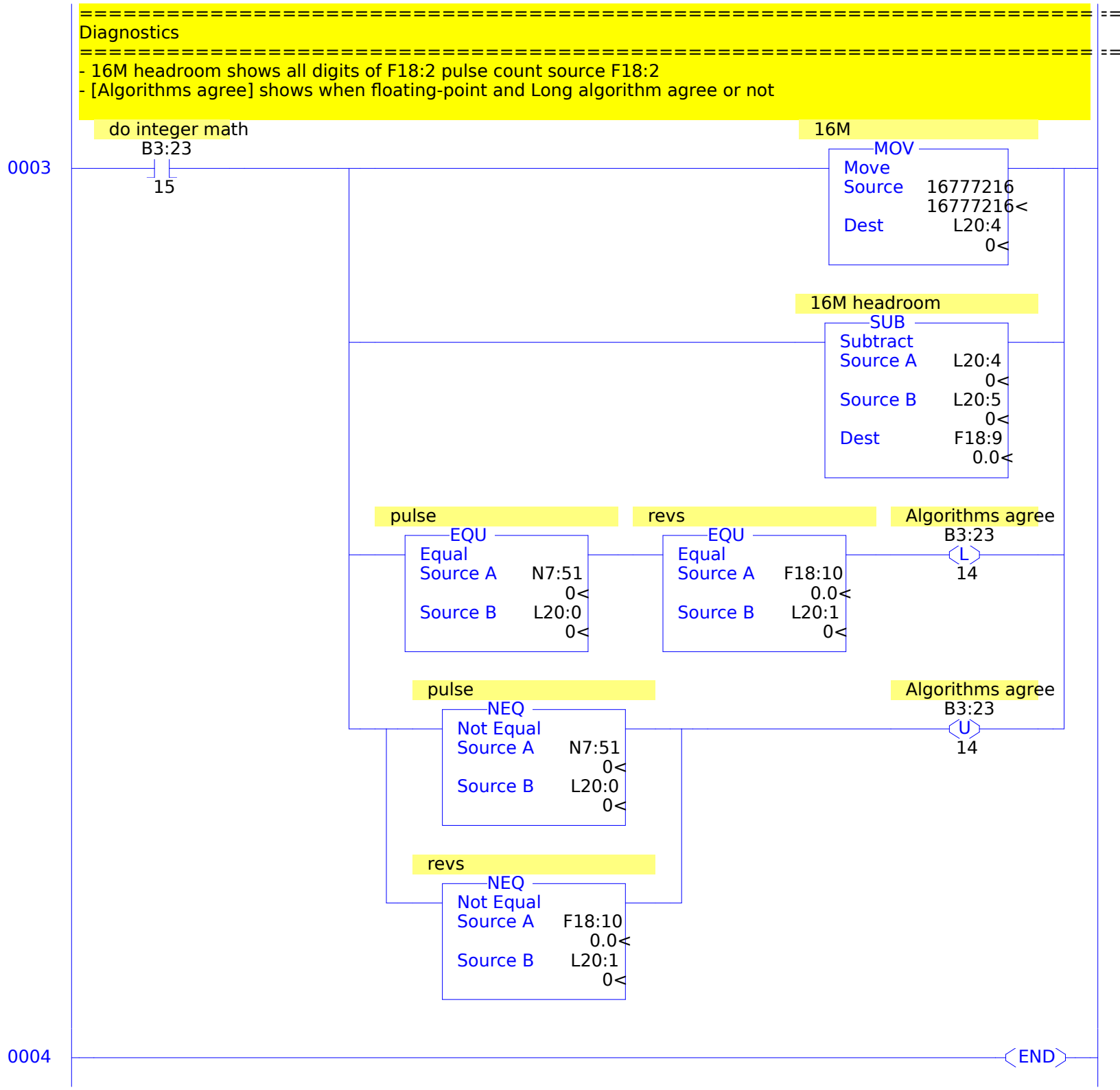
long revs

ADD
Add
Source A L20:2 0<
Source B L20:1 0<
Dest L20:1 0<

long delta

MUL
Multiply
Source A L20:2 0<
Source B 10000 10000<
Dest L20:2 0<


long pulses
SUB
Subtract
Source A L20:0
0
Source B L20:2
0
Dest L20:0
0
long pulses
GRT
Greater Than (A>B)
Source A L20:0
0
Source B 16383
16383
cycle 16384
Q2:0
JMP
long pulses
GRT
Greater Than (A>B)
Source A L20:0
0
Source B 9999
9999
long revs
ADD
Add
Source A L20:1
0
Source B 1
1
Dest L20:1
0
long pulses
SUB
Subtract
Source A L20:0
0
Source B 10000
10000
Dest L20:0
0


Diagnostics
- 16M headroom shows all digits of F18:2 pulse count source F18:2
- [Algorithms agree] shows when floating-point and Long algorithm agree or not
do integer math
B3:23
15
16M
MOV
Move
Source 16777216
16777216<
Dest L20:4
0<
16M headroom
SUB
Subtract
Source A L20:4
0<
Source B L20:5
0<
Dest F18:9
0.0<
pulse
EQU
Equal
Source A N7:51
0<
Source B L20:0
0<
revs
EQU
Equal
Source A F18:10
0.0<
Source B L20:1
0<
Algorithms agree
B3:23
L
14
pulse
NEQ
Not Equal
Source A N7:51
0<
Source B L20:0
0<
Algorithms agree
B3:23
U
14
revs
NEQ
Not Equal
Source A F18:10
0.0<
Source B L20:1
0<
0003
0004
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-Analog Inp 0
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-Analog Inp 1

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

Data File S2 (hex) -- STATUS

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	
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	
B3:3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:7	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:11	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:12	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:14	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:16	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:17	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:18	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:19	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:20	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:21	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:22	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
B3:23	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	.01 sec	0	0		

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	0	0	0	0	0	0	0	0	0
N7:10	0	0	0	0	0	0	0	0	0	0
N7:20	0	0	0	0	0	0	0	0	0	0
N7:30	0	0	0	0	0	0	0	0	0	0
N7:40	0	0	0	0	0	0	0	0	0	0
N7:50	0	0								

Data File F8 -- FLOAT

Offset	0	1	2	3	4
F8:0	0				

Offset	CU	CD	DN	OV	UN	UA	PRE	ACC	(Symbol)	Description
C15:0	0	0	0	0	0	0	0	0		

Offset	0	1	2	3	4
F18:0	0	0	0	0	0
F18:5	0	0	0	0	0
F18:10	0				

Data File L20 (dec) -- LONG MATH

Offset	0	1	2	3	4
L20:0	0	0	0	0	0
L20:5	0	0	0	0	0

Address/Symbol Database

Address	Symbol	Scope	Description	Sym Group	Dev. Code	ABV	BLW
B3:0/0			do math				
B3:0/15			float algo overflow				
B3:23/0			one-shot internal				
B3:23/14			Algorithms agree				
B3:23/15			do integer math				
C15:0/CU			counter pulse				
F18:1			drop amount				
F18:2			long number				
F18:3			real revs quotient				
F18:5			real revs frac. rem.				
F18:9			16M headroom				
F18:10			revs				
L20:0			long pulses				
L20:1			long revs				
L20:2			long delta				
L20:3			long mask				
L20:4			16M				
L20:5			long total pulses				
N7:0			Bundle Preset				
N7:50			rounded revs				
N7:51			pulse				
Q2:0			cycle 16384				
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:2/14			overflow selected				
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				

Address/Symbol Database

Address	Symbol	Scope	Description	Sym Group	Dev. Code	ABV	BLW
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				
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				

Instruction Comment Database

Address	Instruction	Description

Group_Name Description