Read the CPU ID from the hardwired input points

1 _FirstScan SP0 — LD Kf; AND VX0; OUT CPU ID V2000

Read the Software revision number from the hardwired input points

2 _FirstScan SP0 — LD VX0; SHFR K8; OUT Prog Rev # V2001

stop if we are not using the correct CPU ID #

3 _FirstScan SP0, CPU ID V2000 ≠ K3 — STOP

stop if we are not using the correct Prog Rev #
rev 7: 2008-05-13
add gate valve entrance to PSL DCM
change things some more

rev 6: 2007-10-11,
remove F1 filter
install Kohzu DCM in 33ID-A
move gate valves around

4 _FirstScan SP0, Prog Rev # V2001 ≠ K7 — STOP

A

5 33ID-A (L5) white slits, top&right blades water flow L5 T-R flow X30 — 33ID-A (L5) white slits, bottom&left blades water flow L5 B-L flow X31 — 33ID-A Kohzu DCM water flow Kohzu flow X32 — 33ID-C mask water flow SOE mask flow X33 — 33ID-C Be window water flow SOE window flow X34 — 33ID-C beam stop water flow SOE B.Stop flow X35 — 33ID-C DCM crystal 2 water flow DCM xtal2 flow X36

A

33ID-C DCM liquid nitrogen flow
DCM (LN2) flow
X37

all flows OK for X-rays flow Ok
C30
OUT

GV1 is at the entrance of the 33ID-A Kohzu DCM in the FOE at 31.3m

6

Kohzu DCM entrance gate valve GV1 open 1
X40

Kohzu DCM entrance gate valve GV1 open 2
X41

Kohzu DCM entrance gate valve GV1 closed 1
X42

Kohzu DCM entrance gate valve GV1 closed 2
X43

Kohzu DCM (33ID-A) entrance gate valve is OPEN GV1 open
C40
OUT

7

Kohzu DCM entrance gate valve GV1 open 1
X40

Kohzu DCM entrance gate valve GV1 open 2
X41

Kohzu DCM entrance gate valve GV1 closed 1
X42

Kohzu DCM entrance gate valve GV1 closed 2
X43

Kohzu DCM (33ID-A) entrance gate valve is CLOSED GV1 closed
C41
OUT

GV2 is at the exit of the 33ID-A Kohzu DCM in the FOE at 32.3m

8

Kohzu DCM exit gate valve GV2 open 1
X44

Kohzu DCM exit gate valve GV2 open 2
X45

Kohzu DCM exit gate valve GV2 closed 1
X46

Kohzu DCM exit gate valve GV2 closed 2
X47

Kohzu DCM (33ID-A) exit gate valve is OPEN GV2 open
C44
OUT

9

Kohzu DCM exit gate valve GV2 open 1
X44

Kohzu DCM exit gate valve GV2 open 2
X45

Kohzu DCM exit gate valve GV2 closed 1
X46

Kohzu DCM exit gate valve GV2 closed 2
X47

Kohzu DCM (33ID-A) exit gate valve is CLOSED GV2 closed
C45
OUT

GV3 is on the monochromator (in theSOE) at 45m (at the turbo pump?)

10

PSL DCM (33ID-C) turbo pump gate valve GV3 open 1
X50

PSL DCM (33ID-C) turbo pump gate valve GV3 open 2
X51

PSL DCM (33ID-C) turbo pump gate valve GV3 closed 1
X52

PSL DCM (33ID-C) turbo pump gate valve GV3 closed 2
X53

PSL DCM (33ID-C) turbo gate valve is OPEN GV3 open
C50
OUT

11

PSL DCM (33ID-C) turbo pump gate valve GV3 open 1
X50

PSL DCM (33ID-C) turbo pump gate valve GV3 open 2
X51

PSL DCM (33ID-C) turbo pump gate valve GV3 closed 1
X52

PSL DCM (33ID-C) turbo pump gate valve GV3 closed 2
X53

PSL DCM (33ID-C) turbo gate valve is CLOSED GV3 closed
C51
OUT

GV4 is at the entrance of the 33ID-C PSL DCM in the SOE at ~44m
(2007-10-11: not yet wired)

12
- 33ID-C PSL entrance gate valve open NO switch GV4 open NO X24 (NO)
- 33ID-C PSL entrance gate valve open NC switch GV4 open NC X25 (NC)
- 33ID-C PSL entrance gate valve closed NO switch GV4 closed NO X26 (NC)
- 33ID-C PSL entrance gate valve closed NC switch GV4 closed NC X27 (NO)
- → PSL DCM (33ID-C) entrance gate valve is OPEN GV4 open C52 OUT

13
- 33ID-C PSL entrance gate valve open NO switch GV4 open NO X24 (NC)
- 33ID-C PSL entrance gate valve open NC switch GV4 open NC X25 (NO)
- 33ID-C PSL entrance gate valve closed NO switch GV4 closed NO X26 (NO)
- 33ID-C PSL entrance gate valve closed NC switch GV4 closed NC X27 (NC)
- → PSL DCM (33ID-C) entrance gate valve is CLOSED GV4 closed C53 OUT

All the gate valves in the correct position?
GV1 (BIV) removed from BL-EPS 2003-12-22

2007-10-11 gate valves rearranged
GV1 is entrance to Kohzu DCM
GV2 is exit from Kohzu DCM
GV3 is PSL DCM Turbo pump
GV4 is entrance to PSL DCM

14
- Kohzu DCM (33ID-A) entrance gate valve is OPEN GV1 open C40
- Kohzu DCM (33ID-A) exit gate valve is OPEN GV2 open C44
- PSL DCM (33ID-C) turbo gate valve is CLOSED GV3 closed C51
- PSL DCM (33ID-C) entrance gate valve is OPEN GV4 open C52
- → all gate valves are OK GV Ok C47 OUT

15
- FOE (33ID-A) ion gauge vacuum OK FOE vac 1 X54
- Kohzu DCM (33ID-A) ion gauge vacuum OK Kohzu DCM vac X56
- PSL DCM (33ID-C) ion gauge vacuum OK PSL DCM vac X55
- → all vacuum signals are OK for X-rays vac Ok C54 OUT

16
- all vacuum signals are OK for X-rays vac Ok C54
- → beam line vacuum OK signal to FE-EPS BL vac Ok Y0 OUT

17
- all flows OK for X-rays flow Ok C30
- all gate valves are OK GV Ok C47
- all vacuum signals are OK for X-rays vac Ok C54
- Alarm system request EPS to remove the white beam shutter open permit Alarm: close WBS X57 (NC)
- → white (FE) shutter enabled signal to FE-EPS FE shuter enable Y1 OUT

always enable the mono (P5) shutter

18 _On SP1 — mono (P5) shutter enabled signal to FE-EPS P5 enable Y2 OUT

pass white beam shutter state along to the alarm system and EPICS and permit the F1 filter to operate

19 white (FE) shutter closed signal from FE-EPS FE shuter closed X20 — White beam shutter closed, signal to EPICS (iad) WBS closed EPICS Y4 OUT; White beam shutter closed, signal to Alarm system WBS closed Alarm Y6 OUT

pass mono beam shutter state along to EPICS

20 mono (P5) shutter closed signal from ? P5 shuter closed X22 — P5 (mono) beam shutter closed, signal to EPICS (iad) MBS closed EPICS Y5 OUT

event log: trigger when "BL vac Ok" changes

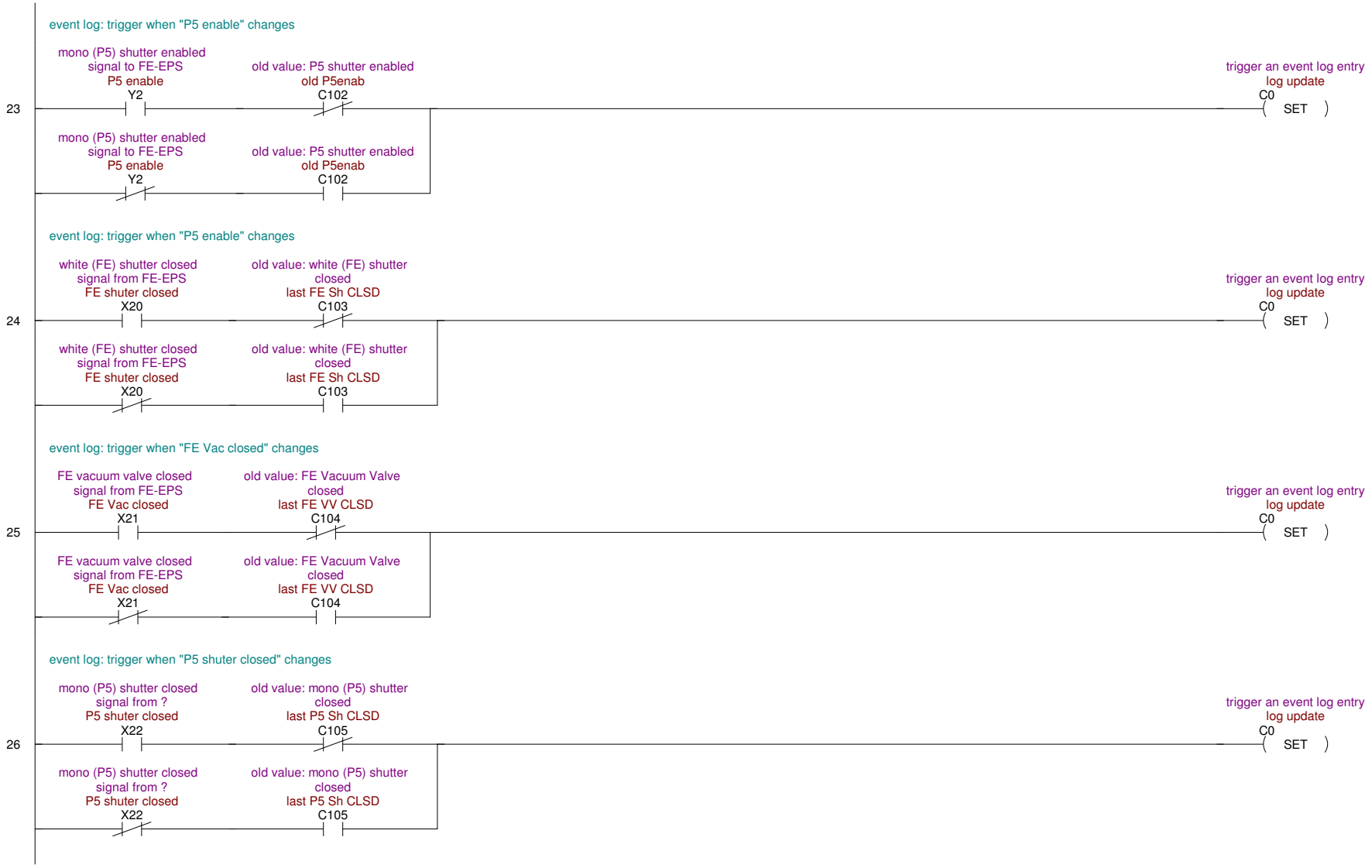
21 beam line vacuum OK signal to FE-EPS BL vac Ok Y0 — old value: beam line vacuum OK old BLvacOk C100 — trigger an event log entry log update C0 SET

beam line vacuum OK signal to FE-EPS BL vac Ok Y0 — old value: beam line vacuum OK old BLvacOk C100

event log: trigger when "FE shuter enable" changes

22 white (FE) shutter enabled signal to FE-EPS FE shuter enable Y1 — old value: FE shutter enabled old FEshuterEnab C101 — trigger an event log entry log update C0 SET

white (FE) shutter enabled signal to FE-EPS FE shuter enable Y1 — old value: FE shutter enabled old FEshuterEnab C101


event log: trigger when "P5 enable" changes
23
mono (P5) shutter enabled signal to FE-EPS P5 enable Y2
old value: P5 shutter enabled old P5enab C102
trigger an event log entry log update C0 SET
mono (P5) shutter enabled signal to FE-EPS P5 enable Y2
old value: P5 shutter enabled old P5enab C102
event log: trigger when "P5 enable" changes
24
white (FE) shutter closed signal from FE-EPS FE shuter closed X20
old value: white (FE) shutter closed last FE Sh CLSD C103
trigger an event log entry log update C0 SET
white (FE) shutter closed signal from FE-EPS FE shuter closed X20
old value: white (FE) shutter closed last FE Sh CLSD C103
event log: trigger when "FE Vac closed" changes
25
FE vacuum valve closed signal from FE-EPS FE Vac closed X21
old value: FE Vacuum Valve closed last FE VV CLSD C104
trigger an event log entry log update C0 SET
FE vacuum valve closed signal from FE-EPS FE Vac closed X21
old value: FE Vacuum Valve closed last FE VV CLSD C104
event log: trigger when "P5 shuter closed" changes
26
mono (P5) shutter closed signal from ? P5 shuter closed X22
old value: mono (P5) shutter closed last P5 Sh CLSD C105
trigger an event log entry log update C0 SET
mono (P5) shutter closed signal from ? P5 shuter closed X22
old value: mono (P5) shutter closed last P5 Sh CLSD C105

event log: trigger when "33ID-D BeamStop" changes

27
33ID-D closed signal from ? 33ID-D BeamStop X23
old value: 33ID-D beam stop closed last D BS CLSD C106
trigger an event log entry log update C0 SET

33ID-D closed signal from ? 33ID-D BeamStop X23
old value: 33ID-D beam stop closed last D BS CLSD C106

event log: start
increment the "log event index" counter

28
trigger an event log entry log update C0
INC log event index V3120

event log: wrap the "log event index" to even multiple of 32
32*312=9984 (to prevent the auto-wrap at 9999)

29
trigger an event log entry log update C0
log event index V3120 ≥ K9984
LD K0
OUT log event index V3120

event log: 0.01 s time (0000-0099)

30
trigger an event log entry log update C0
LD V7747
OUT V3121

event log: S:M:H (0000 0000 0000 - 0059 0059 0023)

31
trigger an event log entry log update C0
LD K3
LDA O7766
MOV V3122

event log: D/M/Y (0001 0001 0000 - 0031 0012 0099)

32 trigger an event log entry
log update
C0

LD	K3
LDA	O7772
MOV	V3125

event log: X00 - X57

33 trigger an event log entry
log update
C0

LD	K3
LDA	O40400
MOV	V3130

event log: C00 - C57

34 trigger an event log entry
log update
C0

LD	K3
LDA	O40600
MOV	V3133

event log: Y00 -Y07

35 trigger an event log entry
log update
C0

LD	VY0
OUT	V3136

event log: event table index = log event event index % 32
32 entries in event log

36 trigger an event log entry
log update
C0

LD	log event index V3120
DIV	K32
POP	

event log: base memory address in event log
each entry takes 16 words
table base address is v4000

00	event number
01-04	time stamp
05-07	date stamp
10-12	X00-X57 relays
13-15	C00-C57 relays
16	Y00-Y07 relays
17	unused

37 trigger an event log entry
log update
C0

MUL K16
BIN
LDA O4000
ADDBS
OUT log index addres V3140

event log: move from buffer to log entry
16 words = 0x10 words, from V3120 to P3140

38 trigger an event log entry
log update
C0

LD K10
LDA O3120
MOV log index ptr P3140

copy the X inputs to a common area for the PLC network

39 _On
SP1

LD K4
LDA O40400
MOV V3100

copy the Y outputs to a common area for the PLC network

40 _On SP1 → LD K1 / LDA O40500 / MOV V3104

copy the C control relays to a common area for the PLC network

41 _On SP1 → LD K4 / LDA O40600 / MOV V3105

event log: end

42 trigger an event log entry log update C0 → trigger an event log entry log update C0 RST

event log: save the old value for the next PLC cycle

43 beam line vacuum OK signal to FE-EPS BL vac Ok Y0 → old value: beam line vacuum OK old BLvacOk C100 OUT

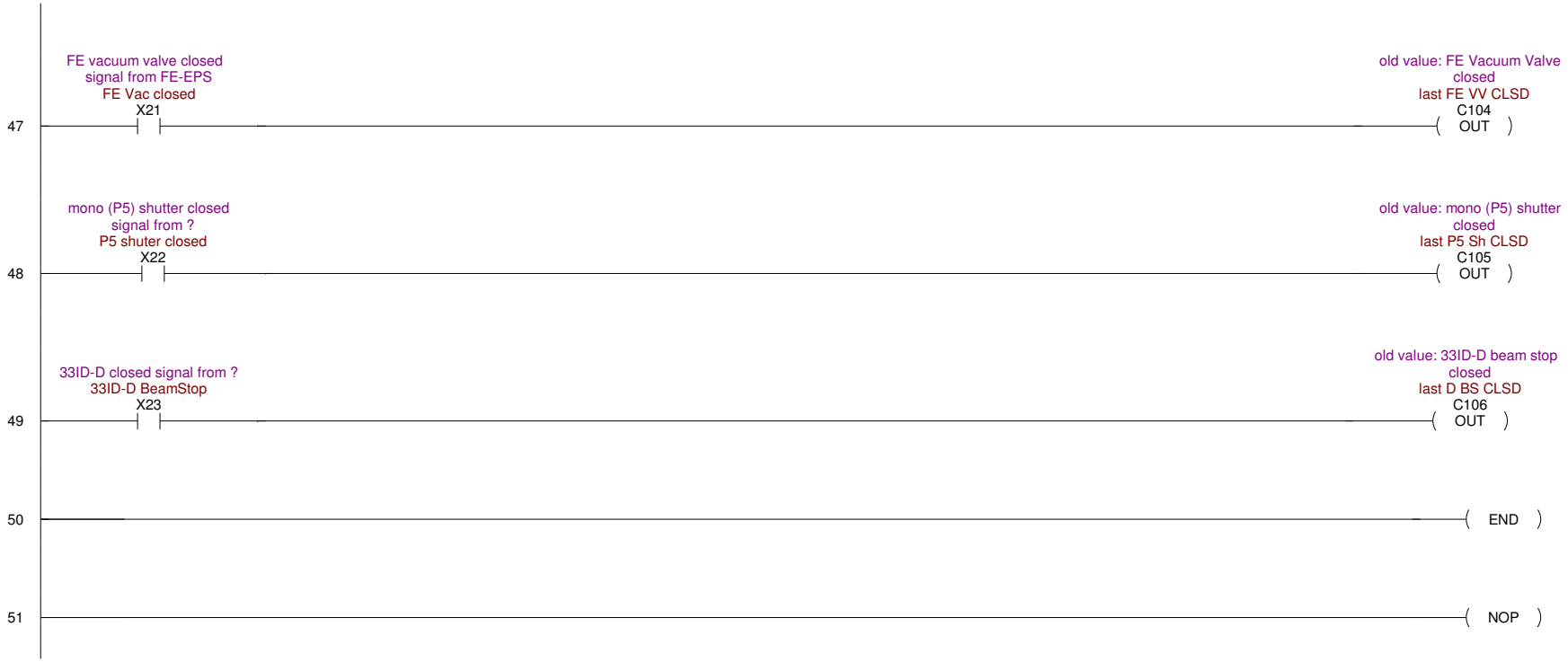
event log: save the old value for the next PLC cycle

44 white (FE) shutter enabled signal to FE-EPS FE shuter enable Y1 → old value: FE shutter enabled old FEshuterEnab C101 OUT

event log: save the old value for the next PLC cycle

45 mono (P5) shutter enabled signal to FE-EPS P5 enable Y2 → old value: P5 shutter enabled old P5enab C102 OUT

46 white (FE) shutter closed signal from FE-EPS FE shuter closed X20 → old value: white (FE) shutter closed last FE Sh CLSD C103 OUT


47
FE vacuum valve closed
signal from FE-EPS
FE Vac closed
X21
old value: FE Vacuum Valve
closed
last FE VV CLSD
C104
OUT
48
mono (P5) shutter closed
signal from ?
P5 shuter closed
X22
old value: mono (P5) shutter
closed
last P5 Sh CLSD
C105
OUT
49
33ID-D closed signal from ?
33ID-D BeamStop
X23
old value: 33ID-D beam stop
closed
last D BS CLSD
C106
OUT
50
END
51
NOP