TECH TIP

PLB / LADDER LOGIC FORCE REPORTING TOOL

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Objective:

- **Describe the work we've done at EOSYS to produce a PLB Force Reporting tool.**
- **Pass on information to allow folks to build a PLB Force report or display.**

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Background:

- IA Systems include the capability to run Ladder Logic in discrete type FBMs.
- Ladder Logic in the IA system is configured and managed with PLB blocks.
- Ladder Logic and PLB interface to the FBM is done with the ECB8.
- It is possible for several PLB blocks to provide ladder logic for a single ECB/FBM but this is rarely done. We have built assuming one PLB block per ECB.
- Ladder Logic in IA is simple but very fast. But the IA tools to configure and manage PLB blocks and Ladder Logic are rudimentary. IA provides no tool to document force use.

TECH TIP

PLB Monitor and PLB View

Forces are put in place or removed using the PLB Monitor.

To see what forces are *currently* in place, one must look into each individual PLB block in PLB Monitor or PLB_View. Tedious at best where there can be dozens of FBMs with ladder logic.

Our Task:

- Build a software tool to look into PLB ladders and report what forces are set.
- Arrange for this to check for forces every day, at some fixed time.
- Record current forces, and a history of forces added or removed from day to day.
- Allow an on-demand ability to run the force collection at any time, for either all CPs on a system, or on any individual CP.
- Store data in files and provide a display to show Forces data on FoxView

So We Built:

- A software tool to look into PLB ladders and report what forces are set.
- This tool operates on a single CP or on all the CPs on an AW host
- The tool can be run from a command line or by a screen pick.
- The tool can be scheduled to run periodically using the Windows Task Scheduler.
- Record current forces, and a history of forces added or removed from day to day.
- Allow an on-demand ability to run the force collection at any time, for either all CPs on a system, or on any individual CP.
- Store data in files and provide a display to show Forces data on FoxView

Operational Overview:

- For each Control Processor, which is on-line.
  - Checkpoint the CP
  - Using the right DBVU tool, create a text file of CP blocks from the checkpoint file.
  - Examine the text file. For each ECB8 in the file,
  - Examine the Force table. For each active force,
    - Determine the Tech ID and force direction (On or Off)
    - Determine the PLB block providing the ladder, and the two descriptors for the Tech ID
    - Record the current state of this force in the Current Forces file
- Compare the file just created with the file from the last time the force report was run. Record the differences in the Force History file
- Create a Blocked Text File for display of current forces

TECH TIP

Current Forces file name:

- **25-02-15_16_11_45_22AW20_AllForces.s**

Date

Time

Host AW name

```
                  22AW20 CP Forces 02/16/25 11:54
F270BA   LADDERS:219021_PLB         CIN_2  cin_2    2nd CI   OFF
F270BA   LADDERS:219021_PLB         IFL_1                     OFF
F270BA   LADDERS:219021_PLB         CIN_1  cin_1    1st CI   ON
F270BA   LADDERS:219021_PLB         CO_16  Pnt 32             ON
```

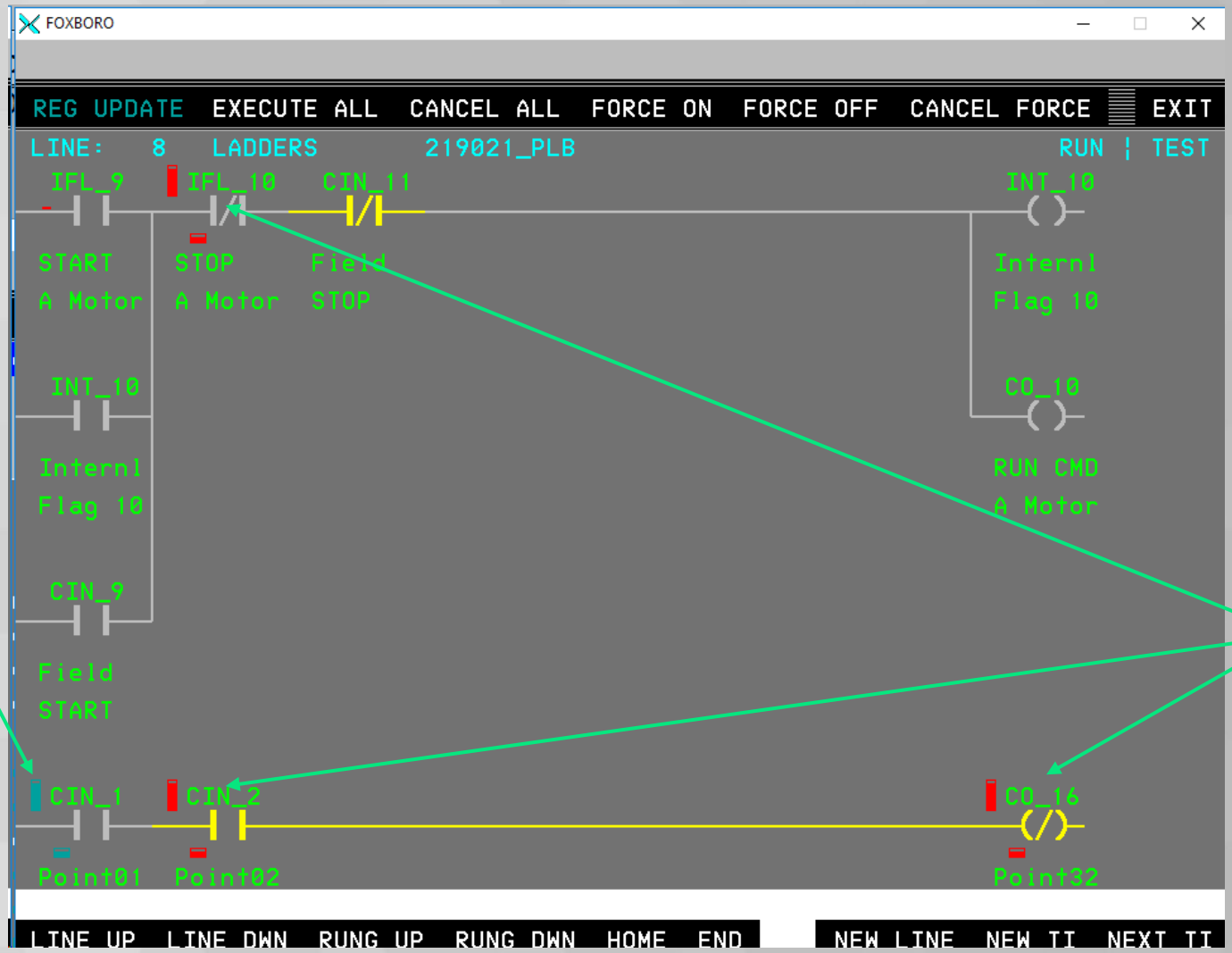
Forces History file name:

- **_ForceHistory.s**

Name starts with underscore so that when the folder file names list is sorted alphabetically, this file is first

```
add  02/16/25_12:25  F270BA  LADDERS:219021_PLB        IFL_10 STOP    A Motor ON

del  02/15/25_12:09  F270BA  LADDERS:219021_PLB        IFL_1  Input   Flag 01 OFF
add  02/15/25_12:09  F270BA  LADDERS:219021_PLB        CO_16  Point32 16thCOU ON
add  02/15/25_12:09  F270BA  LADDERS:219021_PLB        CIN_2  Point02 2nd CIN ON
del  02/15/25_12:09  F270BA  LADDERS:219021_PLB        CIN_1  Point01 1st CIN ON
add  02/15/25_12:09  F270BA  LADDERS:219021_PLB        CIN_1  Point01 1st CIN OFF

add  02/14/25_11:54  F270BA  LADDERS:219021_PLB        IFL_1  Input   Flag 01 OFF
del  02/14/25_11:54  F270BA  LADDERS:219021_PLB        CIN_2  Point02 2nd CIN OFF
add  02/14/25_11:54  F270BA  LADDERS:219021_PLB        CIN_1  Point01 1st CIN OFF
del  02/14/25_11:54  F270BA  LADDERS:219021_PLB        CIN_1  Point01 1st CIN ON
```

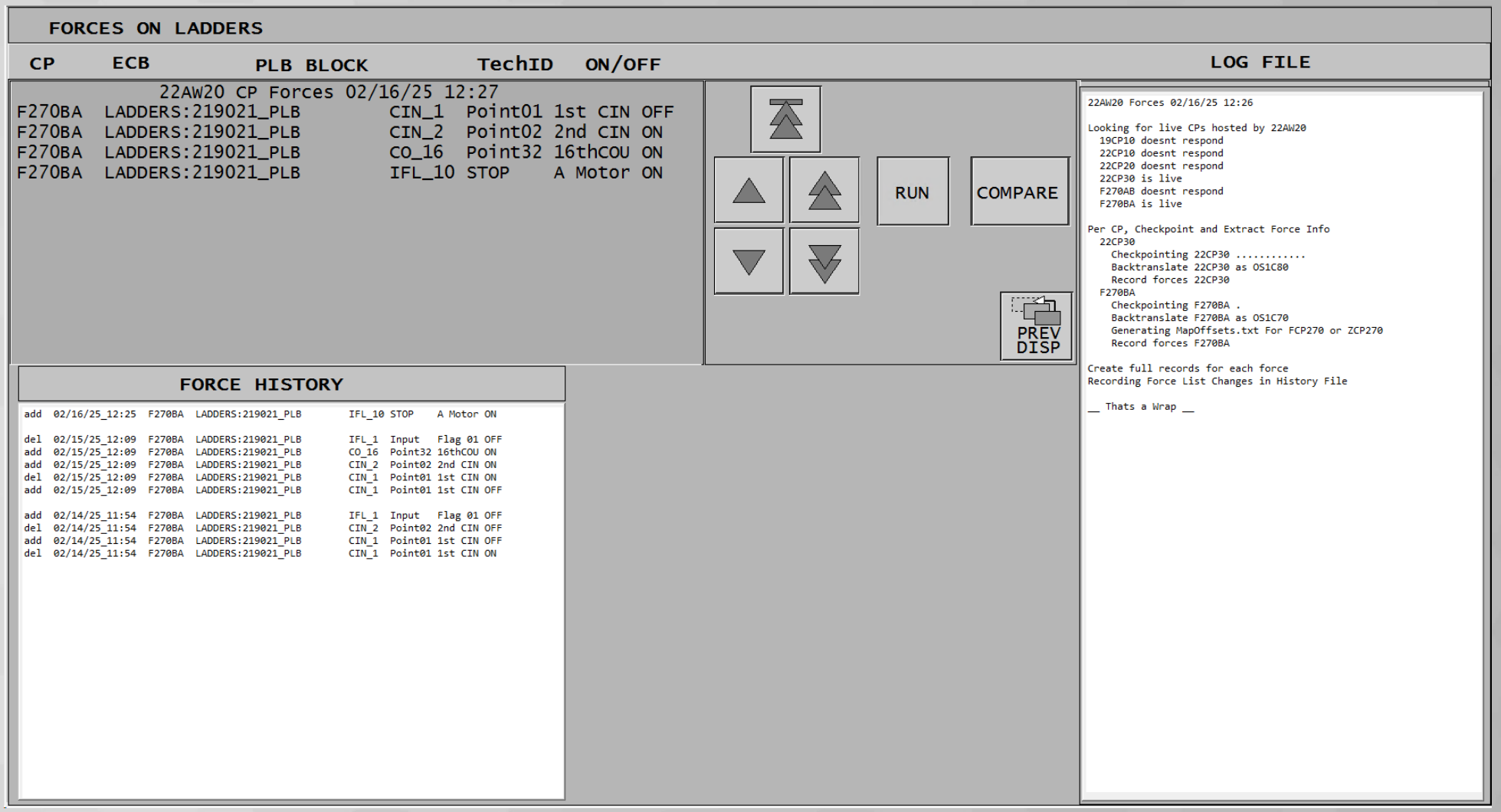
A PLB_Monitor page



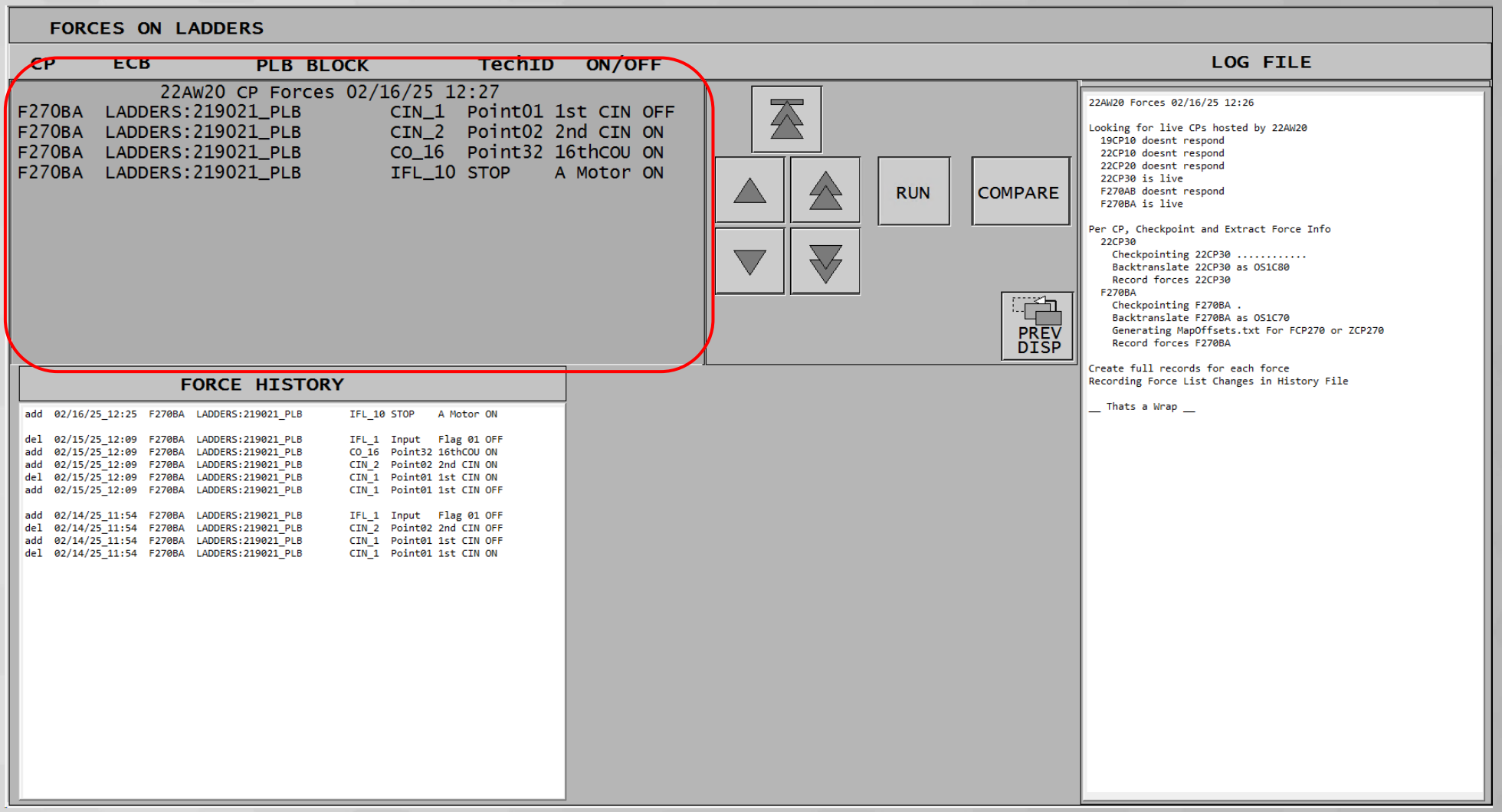
This Blue/Green block shows the TechID is Forced OFF

This Red block shows the TechID is Forced ON

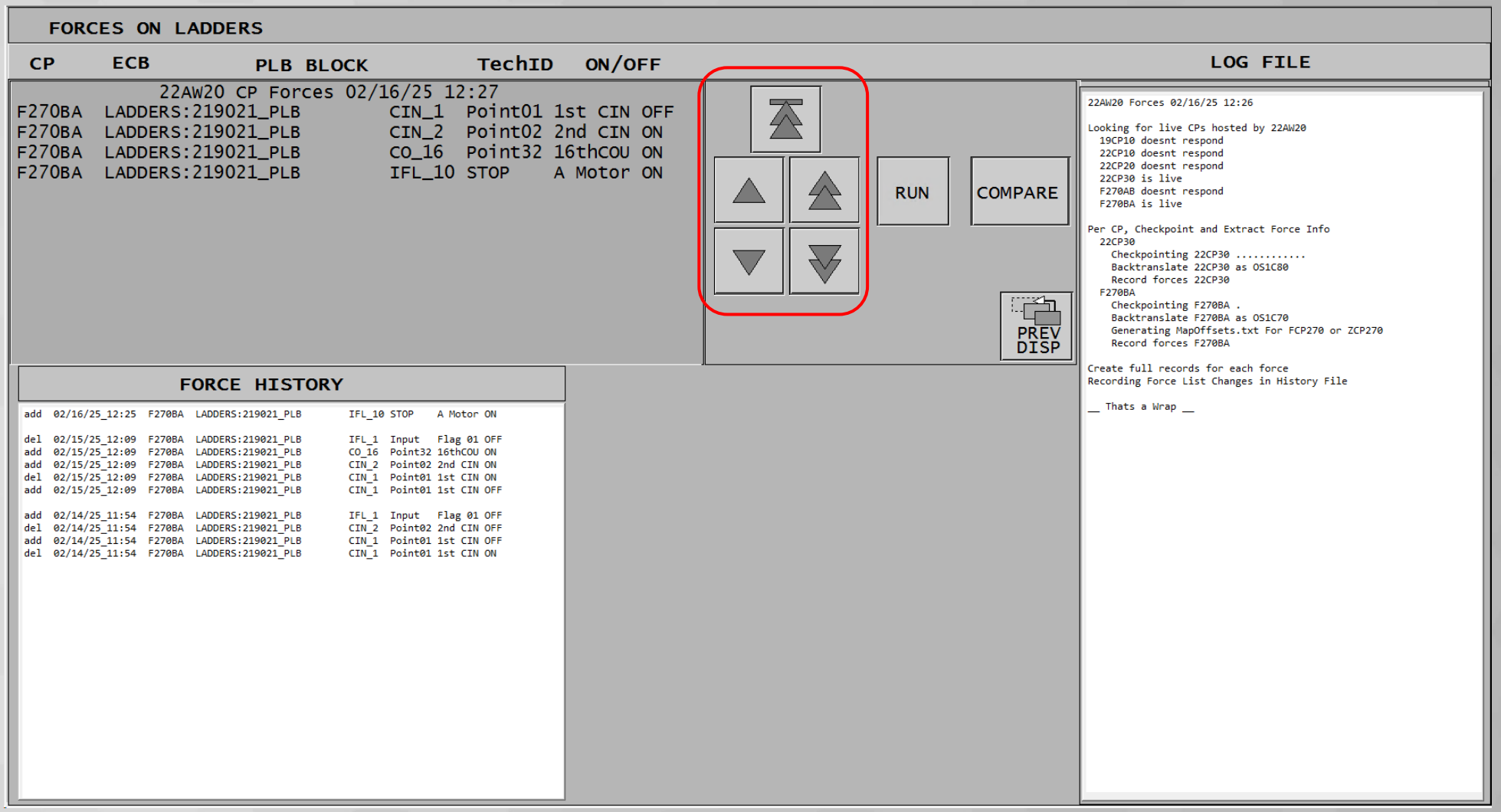
Force Display including TechID Labels



Force Display including TechID Labels



Force Display including TechID Labels



Force Display including TechID Labels

FORCES ON LADDERS

CP	ECB	PLB BLOCK	TechID	ON/OFF

22AW20 CP Forces 02/16/25 12:27

```
F270BA  LADDERS:219021_PLB        CIN_1  Point01 1st CIN OFF
F270BA  LADDERS:219021_PLB        CIN_2  Point02 2nd CIN ON
F270BA  LADDERS:219021_PLB        CO_16  Point32 16thCOU ON
F270BA  LADDERS:219021_PLB        IFL_10 STOP    A Motor ON
```

RUN

COMPARE

PREV DISP

LOG FILE

```
22AW20 Forces 02/16/25 12:26

Looking for live CPs hosted by 22AW20
  19CP10 doesnt respond
  22CP10 doesnt respond
  22CP20 doesnt respond
  22CP30 is live
  F270AB doesnt respond
  F270BA is live

Per CP, Checkpoint and Extract Force Info
  22CP30
    Checkpointing 22CP30 ............
    Backtranslate 22CP30 as OS1C80
    Record forces 22CP30
  F270BA
    Checkpointing F270BA .
    Backtranslate F270BA as OS1C70
    Generating MapOffsets.txt For FCP270 or ZCP270
    Record forces F270BA

Create full records for each force
Recording Force List Changes in History File

__ Thats a Wrap __
```

FORCE HISTORY

```
add  02/16/25_12:25  F270BA  LADDERS:219021_PLB        IFL_10 STOP    A Motor ON

del  02/15/25_12:09  F270BA  LADDERS:219021_PLB        IFL_1  Input   Flag 01 OFF
add  02/15/25_12:09  F270BA  LADDERS:219021_PLB        CO_16  Point32 16thCOU ON
add  02/15/25_12:09  F270BA  LADDERS:219021_PLB        CIN_2  Point02 2nd CIN ON
del  02/15/25_12:09  F270BA  LADDERS:219021_PLB        CIN_1  Point01 1st CIN ON
add  02/15/25_12:09  F270BA  LADDERS:219021_PLB        CIN_1  Point01 1st CIN OFF

add  02/14/25_11:54  F270BA  LADDERS:219021_PLB        IFL_1  Input   Flag 01 OFF
del  02/14/25_11:54  F270BA  LADDERS:219021_PLB        CIN_2  Point02 2nd CIN OFF
add  02/14/25_11:54  F270BA  LADDERS:219021_PLB        CIN_1  Point01 1st CIN OFF
del  02/14/25_11:54  F270BA  LADDERS:219021_PLB        CIN_1  Point01 1st CIN ON
```

Force Display including TechID Labels

FORCES ON LADDERS

CP	ECB	PLB BLOCK	TechID	ON/OFF

22AW20 CP Forces 02/16/25 12:27

```
F270BA   LADDERS:219021_PLB        CIN_1   Point01 1st CIN OFF
F270BA   LADDERS:219021_PLB        CIN_2   Point02 2nd CIN ON
F270BA   LADDERS:219021_PLB        CO_16   Point32 16thCOU ON
F270BA   LADDERS:219021_PLB        IFL_10 STOP     A Motor ON
```

RUN

COMPARE

PREV DISP

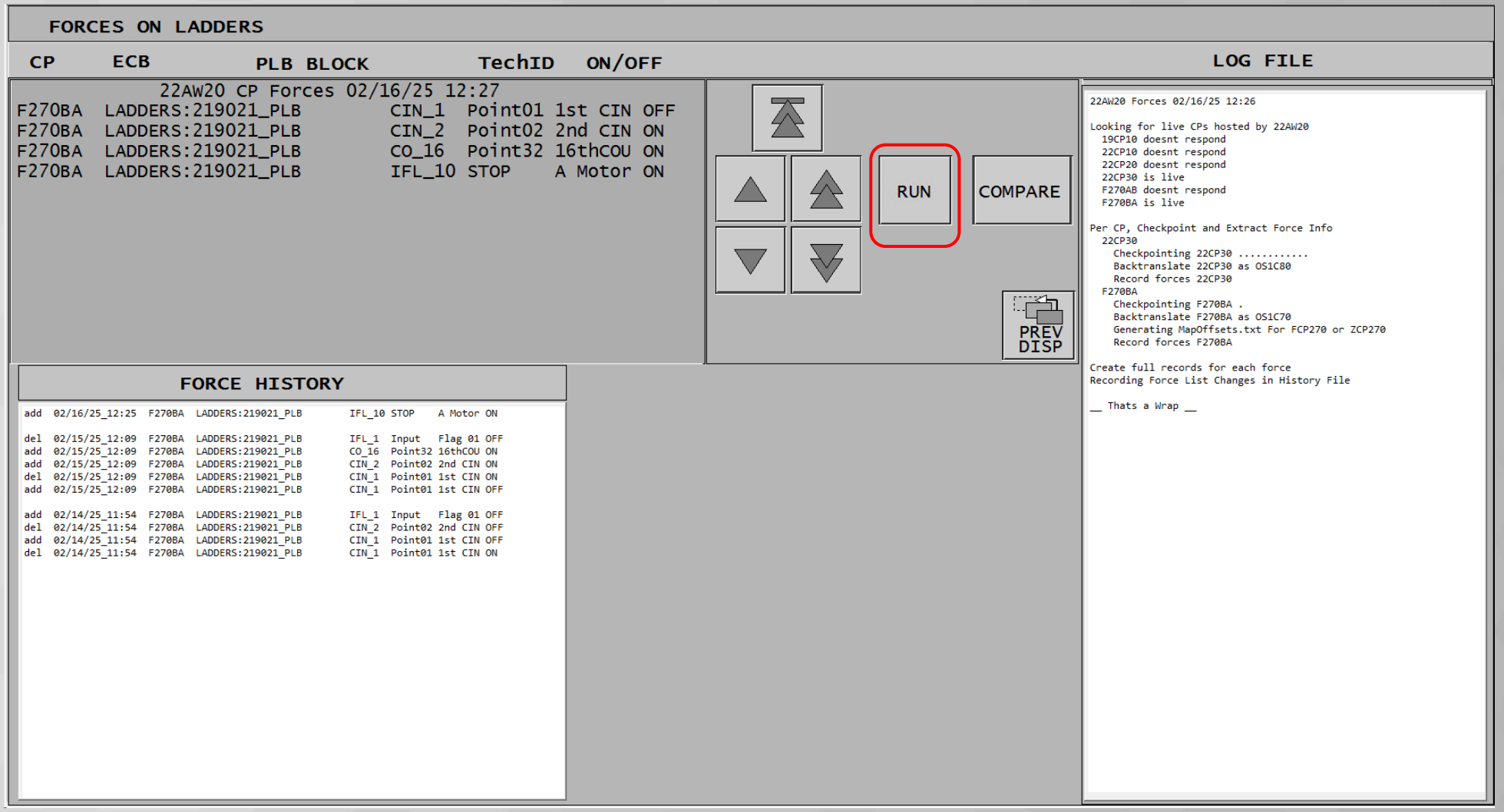
FORCE HISTORY

```
add  02/16/25_12:25  F270BA  LADDERS:219021_PLB       IFL_10 STOP    A Motor ON

del  02/15/25_12:09  F270BA  LADDERS:219021_PLB       IFL_1  Input   Flag 01 OFF
add  02/15/25_12:09  F270BA  LADDERS:219021_PLB       CO_16  Point32 16thCOU ON
add  02/15/25_12:09  F270BA  LADDERS:219021_PLB       CIN_2  Point02 2nd CIN ON
del  02/15/25_12:09  F270BA  LADDERS:219021_PLB       CIN_1  Point01 1st CIN ON
add  02/15/25_12:09  F270BA  LADDERS:219021_PLB       CIN_1  Point01 1st CIN OFF

add  02/14/25_11:54  F270BA  LADDERS:219021_PLB       IFL_1  Input   Flag 01 OFF
del  02/14/25_11:54  F270BA  LADDERS:219021_PLB       CIN_2  Point02 2nd CIN OFF
add  02/14/25_11:54  F270BA  LADDERS:219021_PLB       CIN_1  Point01 1st CIN OFF
del  02/14/25_11:54  F270BA  LADDERS:219021_PLB       CIN_1  Point01 1st CIN ON
```

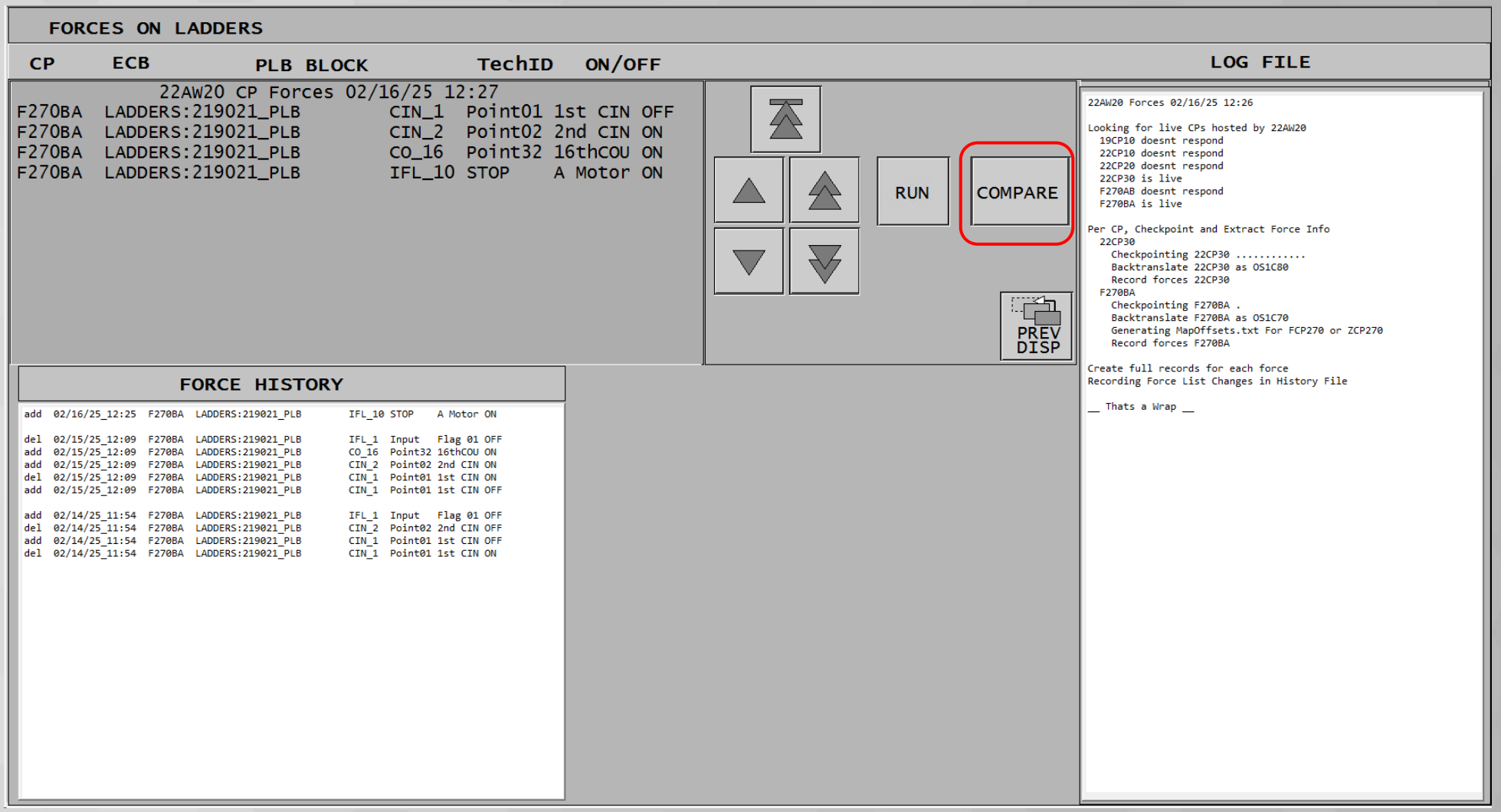
LOG FILE

```
22AW20 Forces 02/16/25 12:26

Looking for live CPs hosted by 22AW20
  19CP10 doesnt respond
  22CP10 doesnt respond
  22CP20 doesnt respond
  22CP30 is live
  F270AB doesnt respond
  F270BA is live

Per CP, Checkpoint and Extract Force Info
  22CP30
    Checkpointing 22CP30 ............
    Backtranslate 22CP30 as OS1C80
    Record forces 22CP30
  F270BA
    Checkpointing F270BA .
    Backtranslate F270BA as OS1C70
    Generating MapOffsets.txt For FCP270 or ZCP270
    Record forces F270BA

Create full records for each force
Recording Force List Changes in History File

__ Thats a Wrap __
```

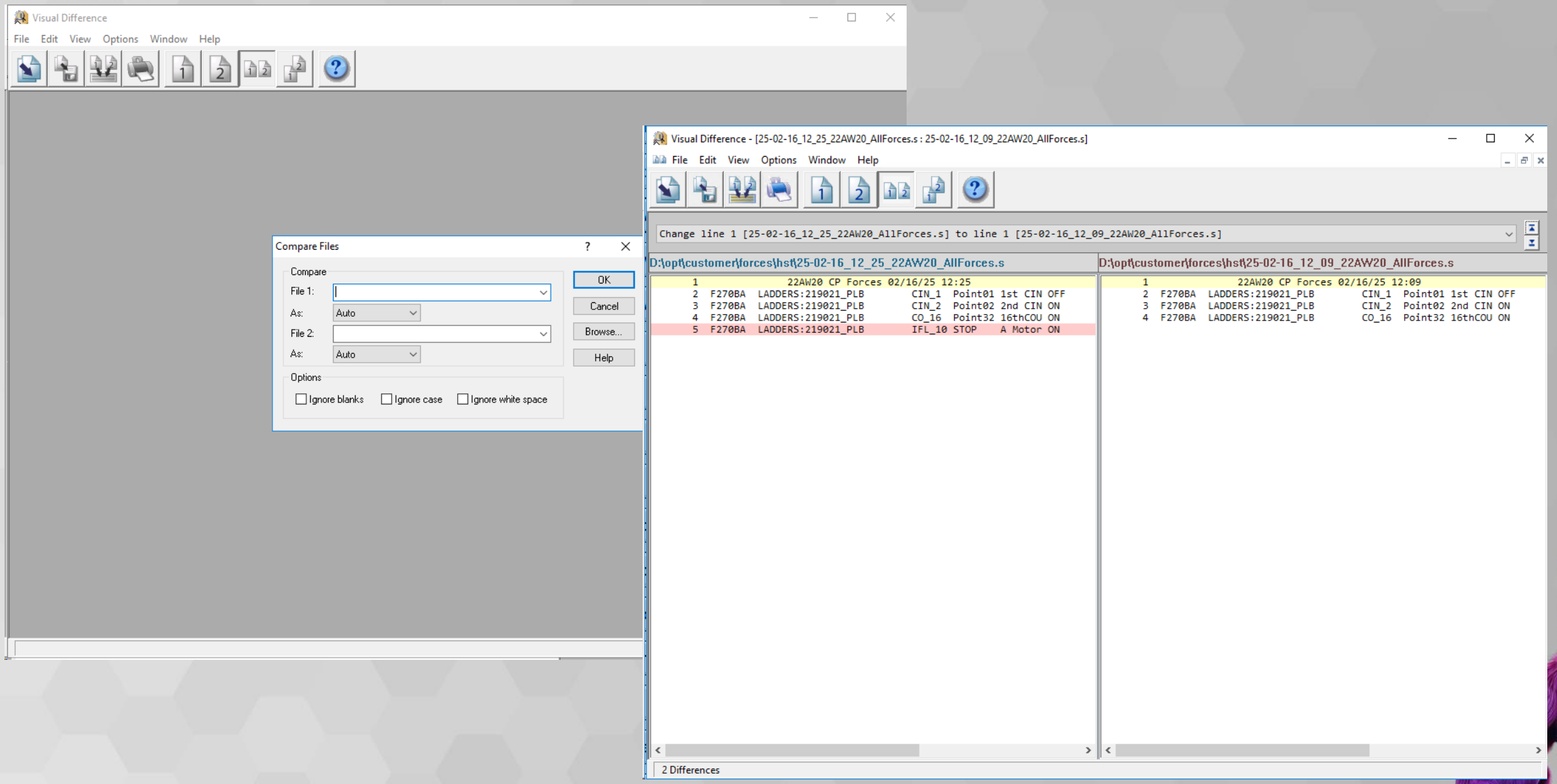
Force Display including TechID Labels

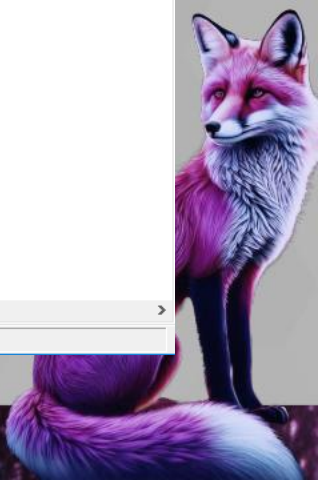


Force Display including TechID Labels



TECH TIP


Visual Difference
File Edit View Options Window Help
Compare Files
Compare
File 1:
As: Auto
File 2:
As: Auto
OK
Cancel
Browse...
Help
Options
Ignore blanks
Ignore case
Ignore white space
Visual Difference - [25-02-16_12_25_22AW20_AllForces.s : 25-02-16_12_09_22AW20_AllForces.s]
File Edit View Options Window Help
Change line 1 [25-02-16_12_25_22AW20_AllForces.s] to line 1 [25-02-16_12_09_22AW20_AllForces.s]
D:\opt\customer\forces\hst\25-02-16_12_25_22AW20_AllForces.s
D:\opt\customer\forces\hst\25-02-16_12_09_22AW20_AllForces.s
1 22AW20 CP Forces 02/16/25 12:25
2 F270BA LADDERS:219021_PLB CIN_1 Point01 1st CIN OFF
3 F270BA LADDERS:219021_PLB CIN_2 Point02 2nd CIN ON
4 F270BA LADDERS:219021_PLB CO_16 Point32 16thCOU ON
5 F270BA LADDERS:219021_PLB IFL_10 STOP A Motor ON
1 22AW20 CP Forces 02/16/25 12:09
2 F270BA LADDERS:219021_PLB CIN_1 Point01 1st CIN OFF
3 F270BA LADDERS:219021_PLB CIN_2 Point02 2nd CIN ON
4 F270BA LADDERS:219021_PLB CO_16 Point32 16thCOU ON
2 Differences



Force Display without TechID Labels

FORCES ON LADDERS

CP	ECB	PLB BLOCK	TechID	ON/OFF
		22AW20 CP Forces 08/29/23 16:32		
F270BA	219021	219021_PLB:219021_PLB	INT_03	ON
F270BA	239026	239026_PLB:239026_PLB	CIN_1	ON
F270BA	241027	241027_PLB:241027_PLB	CO_3	OFF
F270BA	241027	241027_PLB:241027_PLB	CIN_4	ON
F270BA	207028	207028_PLB:207028_PLB	IFL_2	OFF
F270BA	207028	207028_PLB:207028_PLB	TC04_O	OFF
F270BA	207028	207028_PLB:207028_PLB	OFL_6	OFF
F270BA	207028	207028_PLB:207028_PLB	CIN_1	ON

RUN

COMPARE

PREV DISP

FORCE HISTORY

del	02/15/25_17:58	F270BA	241027	241027_PLB:241027_PLB	CO_3	OFF
del	02/15/25_17:58	F270BA	241027	241027_PLB:241027_PLB	CIN_4	ON
del	02/15/25_17:58	F270BA	239026	239026_PLB:239026_PLB	CIN_1	ON
del	02/15/25_17:58	F270BA	219021	219021_PLB:219021_PLB	INT_03	ON
del	02/15/25_17:58	F270BA	207028	207028_PLB:207028_PLB	TC04_O	OFF
del	02/15/25_17:58	F270BA	207028	207028_PLB:207028_PLB	OFL_6	OFF
del	02/15/25_17:58	F270BA	207028	207028_PLB:207028_PLB	IFL_2	OFF
del	02/15/25_17:58	F270BA	207028	207028_PLB:207028_PLB	CIN_1	ON
add	08/29/23_16:32	F270BA	241027	241027_PLB:241027_PLB	CO_3	OFF
add	08/29/23_16:32	F270BA	241027	241027_PLB:241027_PLB	CIN_4	ON
add	08/29/23_16:32	F270BA	239026	239026_PLB:239026_PLB	CIN_1	ON
add	08/29/23_16:32	F270BA	219021	219021_PLB:219021_PLB	INT_03	ON
add	08/29/23_16:32	F270BA	207028	207028_PLB:207028_PLB	TC04_O	OFF
add	08/29/23_16:32	F270BA	207028	207028_PLB:207028_PLB	OFL_6	OFF
add	08/29/23_16:32	F270BA	207028	207028_PLB:207028_PLB	IFL_2	OFF
add	08/29/23_16:32	F270BA	207028	207028_PLB:207028_PLB	CIN_1	ON

LOG FILE

```
22AW20 Forces 08/29/23 16:32

Looking for live CPs hosted by 22AW20
  19CP10 is live
  22CP10 doesnt respond
  22CP20 is live
  22CP30 is live
  F270AB doesnt respond
  F270BA is live

Per CP, Checkpoint and Extract Force Info
  19CP10
    Checkpointing 19CP10 ....
    Backtranslate 19CP10 as OS1C80
    Record forces 19CP10
  22CP20
    Checkpointing 22CP20 .......
    Backtranslate 22CP20 as OS1C80
    Record forces 22CP20
  22CP30
    Checkpointing 22CP30 ...
    Backtranslate 22CP30 as OS1C80
    Record forces 22CP30
  F270BA
    Checkpointing F270BA .
    Backtranslate F270BA as OS1C70
    Generating MapOffsets.txt For FCP270 or ZCP270
    Record forces F270BA

Create full records for each force
Recording Force List Changes in History File

__ Thats a Wrap __
```

FBMs which may contain Ladder Logic

200 Series FBMs

Type	Module Name
FBM207	Redundant Ready 16-Channel Voltage Monitoring
FBM217	Redundant Ready 32-Channel Discrete Input
FBM219	24-Channel Voltage Monitor, Plus 8-Channel Discrete Output
FBM238	24-Channel Voltage Monitor, Plus8-Channel Discrete Output
FBM239	16-Channel Voltage Monitor, Plus16-Channel Discrete Output
FBM241	8-Channel Voltage Monitor, Plus8-Channel Discrete Output
FBM242	16-Channel Externally Sourced Discrete Output

100 Series FBMs

Type	Module Name
FBM07	Contact/dc, 16 Input Interface
FBM08	Contact 120 V ac 16 Input Interface
FBM09	Contact/dc 8 Input/ 8 Output Interface
FBM10	120 V ac 8 Input/ 8 Output Interface
FBM11	240 V ac 8 Input/ 8 Output Interface
FBM20	240 V ac 16 Input Interface
FBM24	Contact/125 V dc 16 Input Interface
FBM26	Contact/125 V dc 8 Input/ 8 Output Interface
FBM41	High Power Contact/dc 8 Input/8 Output Interface

100 Series Extenders

Type	Module Name
FBM12	Contact/dc Expansion 16 Input Interface
FBM13	120 V ac Expansion 16 Input Interface
FBM14	Contact/dc Expansion 8 Input/ 8 Output Interface
FBM15	120 V ac Expansion 8 Input/ 8 Output Interface
FBM16	240 V ac Expansion 8 Input/ 8 Output Interface
FBM21	240 V ac Expansion 16 Input Interface
FBM25	Contact/125 V dc Expansion 16 Input Interface
FBM27	Contact/125 V dc Expansion 8 Input/ 8 Output Interface
FBM42	High Power Contact/dc Expansion 8 Input/ 8 Output Interface

TechIDs used by Ladder Logic

Tech ID	Range	
CIN	CIN_1 to CIN_32	Physical Contact Inputs to the FBM
CO	CO_1 to CO_16	Physical Contact Outputs from the FBM
IFL	IFL_1 to IFL_32	Input Flags from the CP to the Ladder
OFL	OFL_1 to OFL_32	Output Flags from the Ladder to the CP
TCxx_S	TC01_S to TC16_S	Timer /Counter Status
TCxx_O	TC01_O to TC16_O	Timer/Counter Overflow bit for each
INT	INT_01 to INT_32	Internal Flags within the Ladder (can't be forced)

Identifying the Control Processors

The list of CPs hosted by the AW is in file */etc/nt_cplns*.

```
19CP10
22CP10
22CP20
22CP30
F270AB
F270BA
```

The type of each CP is shown in file */usr/fox/sp/IIF.pkg*

```
.
.
.
22AW20 19CP10 19CP10 OS1C80 F280FT DONE   0772 00 00 0000 00000
22AW20 22CP10 22CP10 OS1C80 F280FT DONE   06d2 00 00 0000 00000
22AW20 22CP20 22CP20 OS1C80 F280FT DONE   06de 00 00 0000 00000
22AW20 22CP30 22CP30 OS1C80 F280FT DONE   06da 00 00 0000 00000
22AW20 F270AB F270AB OS1C70 FCP270 DONE   11b6 00 00 0000 00000
22AW20 F270BA F270BA OS1C70 FCP270 DONE   11bc 00 00 0000 00000
.
.
.
```

Host AW name

CP Name

CP Operating system file (used by DBVU)

CP Type

TECH TIP

For an FCP270 or ZCP270, use DBVU270 to create a text file from the latest checkpoint.

Creates the "MapOffsets.txt" file in the local directory

```
/opt/fox/bin/tools/mkblkma.sh /usr/fox/sp/files/FCP270.MAP
/opt/fox/bin/tools/dbvu270 -t -I /usr/fox/sp/files/OS1C70 -O MapOffsets.txt -D /usr/fox/sp/files /DBF270BA.UC  -f  > F270BA.txt
```

Creates a text file of current content of the checkpoint file

"f" for FCP270, "z" for ZCP270

Within the text file, the parameters related to PLB Forcing

```
NAME   = F270BA_ECB:219021        TYPE=208 PERIOD=1    PHASE=0      DESCRP='LADDER LOGIC ECB'
              .
              .
              .
              EXTYPE      ==          0
              .
              FOFMSK      |=          0 -128 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
              .
              FONMSK      |=          -128 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
              .
              .
              .
              HWTYPE      ==          219
```

Indicates ECB8

FOFMSK shows bits which are forced OFF

FONMSK shows bits which are forced ON

Indicates FBM Type, an FBM219

For an FCP280 use DBVU280 to create a text file from the latest checkpoint.

Copies the "BlockTypeMap.txt" file to the local directory

```
cp  /opt/fox/bin/tools/BlockTypeMap.txt .
/opt/fox/bin/tools/dbvu280  –t  –L  19CP10   > 19CP10.txt
```

Creates a text file of current content of the checkpoint file

Control Processor name

Within the text file, the parameters related to PLB Forcing

Indicates ECB8

```
NAME  = 19CP10_ECB:120801        TYPE=208  PERIOD=2    PHASE=1       DESCRP=' LADDER LOGIC ECB'
              .
              .
              .
            EXTYPE      ==          0
              .
            FOFMSK      |=          0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
              .
            FONMSK      |=          0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
              .
            HWTYPE      ==          8
```

FOFMSK shows bits which are forced OFF

FONMSK shows bits which are forced ON

Indicates FBM Type, an FBM08

Force Flags in FOFMSK and FONMSK for Input/Output Tech IDs

FBM Point #	DI (7,8,20,207)	DI (12,13,21)	DI/DO (9,10,11,241)	DI/DO (14,15,16)	DI (217)	DI/DO (219,238)	DI/DO (239)	DO (242)	Force Flags	
									Byte	Bit
CH 1	cin_1	---	cin_1	---	cin_1	cin_1	cin_1	co_1	1	0
CH 2	cin_2	---	cin_2	---	cin_2	cin_2	cin_2	co_2	1	1
CH 3	cin_3	---	cin_3	---	cin_3	cin_3	cin_3	co_3	1	2
CH 4	cin_4	---	cin_4	---	cin_4	cin_4	cin_4	co_4	1	3
CH 5	cin_5	---	cin_5	---	cin_5	cin_5	cin_5	co_5	1	4
CH 6	cin_6	---	cin_6	---	cin_6	cin_6	cin_6	co_6	1	5
CH 7	cin_7	---	cin_7	---	cin_7	cin_7	cin_7	co_7	1	6
CH 8	cin_8	---	cin_8	---	cin_8	cin_8	cin_8	co_8	1	7
CH 9	cin_9	---	co_1	---	cin_9	cin_9	co_1	co_9	2	0
CH 10	cin_10	---	co_2	---	cin_10	cin_10	co_2	co_10	2	1
CH 11	cin_11	---	co_3	---	cin_11	cin_11	co_3	co_11	2	2
CH 12	cin_12	---	co_4	---	cin_12	cin_12	co_4	co_12	2	3
CH 13	cin_13	---	co_5	---	cin_13	cin_13	co_5	co_13	2	4
CH 14	cin_14	---	co_6	---	cin_14	cin_14	co_6	co_14	2	5
CH 15	cin_15	---	co_7	---	cin_15	cin_15	co_7	co_15	2	6
CH 16	cin_16	---	co_8	---	cin_16	cin_16	co_8	co_16	2	7
CH 17	---	cin_17	---	cin_17	cin_17	cin_17	cin_17	---	3	0
CH 18	---	cin_18	---	cin_18	cin_18	cin_18	cin_18	---	3	1
CH 19	---	cin_19	---	cin_19	cin_19	cin_19	cin_19	---	3	2
CH 20	---	cin_20	---	cin_20	cin_20	cin_20	cin_20	---	3	3
CH 21	---	cin_21	---	cin_21	cin_21	cin_21	cin_21	---	3	4
CH 22	---	cin_22	---	cin_22	cin_22	cin_22	cin_22	---	3	5
CH 23	---	cin_23	---	cin_23	cin_23	cin_23	cin_23	---	3	6
CH 24	---	cin_24	---	cin_24	cin_24	cin_24	cin_24	---	3	7
CH 25	---	cin_25	---	co_9	cin_25	co_9	co_9	---	4	0
CH 26	---	cin_26	---	co_10	cin_26	co_10	co_10	---	4	1
CH 27	---	cin_27	---	co_11	cin_27	co_11	co_11	---	4	2
CH 28	---	cin_28	---	co_12	cin_28	co_12	co_12	---	4	3
CH 29	---	cin_29	---	co_13	cin_29	co_13	co_13	---	4	4
CH 30	---	cin_30	---	co_14	cin_30	co_14	co_14	---	4	5
CH 31	---	cin_31	---	co_15	cin_31	co_15	co_15	---	4	6
CH 32	---	cin_32	---	co_16	cin_32	co_16	co_16	---	4	7

Force Flags in FOFMSK and FONMSK for Non-Input/Output Tech IDs

FBM Point #	IFL Force Flags		OFL Force Flags		INT Force Flags		TC Force Flags		
	Byte	Bit	Byte	Bit	Byte	Bit		Byte	Bit
CH 1	7	0	15	0	19	0	TC01_S	11	0
CH 2	7	1	15	1	19	1	TC01_O	11	1
CH 3	7	2	15	2	19	2	TC02_S	11	2
CH 4	7	3	15	3	19	3	TC02_O	11	3
CH 5	7	4	15	4	19	4	TC03_S	11	4
CH 6	7	5	15	5	19	5	TC03_O	11	5
CH 7	7	6	15	6	19	6	TC04_S	11	6
CH 8	7	7	15	7	19	7	TC04_O	11	7
CH 9	8	0	16	0	20	0	TC05_S	12	0
CH 10	8	1	16	1	20	1	TC05_O	12	1
CH 11	8	2	16	2	20	2	TC06_S	12	2
CH 12	8	3	16	3	20	3	TC06_O	12	3
CH 13	8	4	16	4	20	4	TC07_S	12	4
CH 14	8	5	16	5	20	5	TC07_O	12	5
CH 15	8	6	16	6	20	6	TC08_S	12	6
CH 16	8	7	16	7	20	7	TC08_O	12	7
CH 17	9	0	17	0	21	0	TC09_S	13	0
CH 18	9	1	17	1	21	1	TC09_O	13	1
CH 19	9	2	17	2	21	2	TC10_S	13	2
CH 20	9	3	17	3	21	3	TC10_O	13	3
CH 21	9	4	17	4	21	4	TC11_S	13	4
CH 22	9	5	17	5	21	5	TC11_O	13	5
CH 23	9	6	17	6	21	6	TC12_S	13	6
CH 24	9	7	17	7	21	7	TC12_O	13	7
CH 25	10	0	18	0	22	0	TC13_S	14	0
CH 26	10	1	18	1	22	1	TC13_O	14	1
CH 27	10	2	18	2	22	2	TC14_S	14	2
CH 28	10	3	18	3	22	3	TC14_O	14	3
CH 29	10	4	18	4	22	4	TC15_S	14	4
CH 30	10	5	18	5	22	5	TS15_O	14	5
CH 31	10	6	18	6	22	6	TC16_S	14	6
CH 32	10	7	18	7	22	7	TC16_O	14	7

Decoding Byte values into Bits

Decimal Value	Hex Value	Bit Numb	Tech ID Numbers in each byte			
			1st Byte	2nd Byte	3rd Byte	4th Byte
-128	1000 0000	0	1	9	17	25
64	0100 0000	1	2	10	18	26
32	0010 0000	2	3	11	19	27
16	0001 0000	3	4	12	20	28
8	0000 1000	4	5	13	21	29
4	0000 0100	5	6	14	22	30
2	0000 0010	6	7	15	23	31
1	0000 0001	7	8	16	24	32

The value of each byte is the sum of the decimal values for each of the bits which are set.

If bit 6 is set, the byte value is 2.
If bits 5 and 6 are set, the value is 4 + 2 or 6
If bits 1 and 8 are set, the value is 64 + 1 or 65
If bits 0 and 1 are set, the value is -128 + 1 or -127

TECH TIP

FOFMSK means Force Off
Byte 2, Bit 0 is CO_1 -128

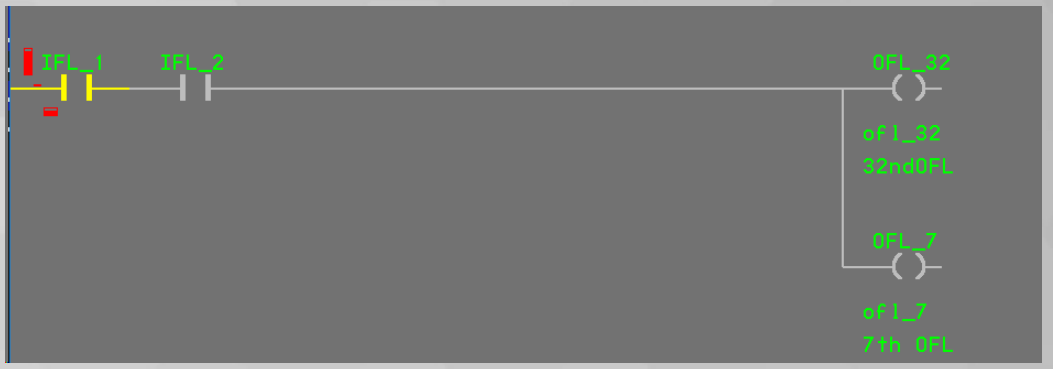
```
FOFMSK      |=        0 -128 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
.
FONMSK      |=        -128 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

FONMSK means Force On
Byte 1, Bit 0 is CIN_1 -128


```
FOFMSK      |=        0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
.
FONMSK      |=        64 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
```

Byte 1, Bit 1 is CIN_2 64

TECH TIP

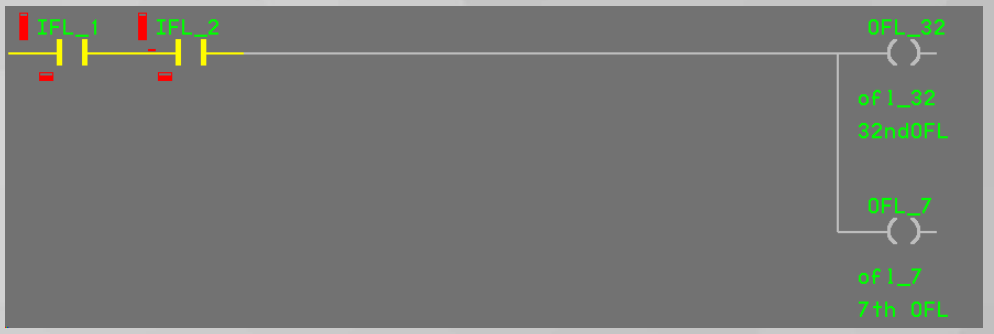


FOFMSK |= 0 0 0 0 0 0 -128 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

.

FONMSK |= 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Byte 7, Bit 0 is IFL_1 -128



FOFMSK |= 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

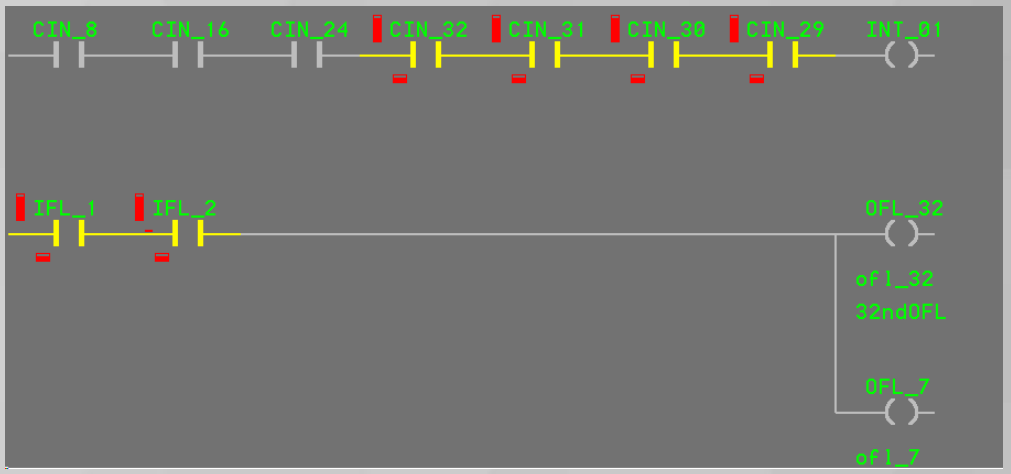
.

FONMSK |= 0 0 0 0 0 0 -64 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Byte 7, Bit 0 is IFL_1 -128
Byte 7, Bit 1 is IFL_2 64

-64

TECH TIP



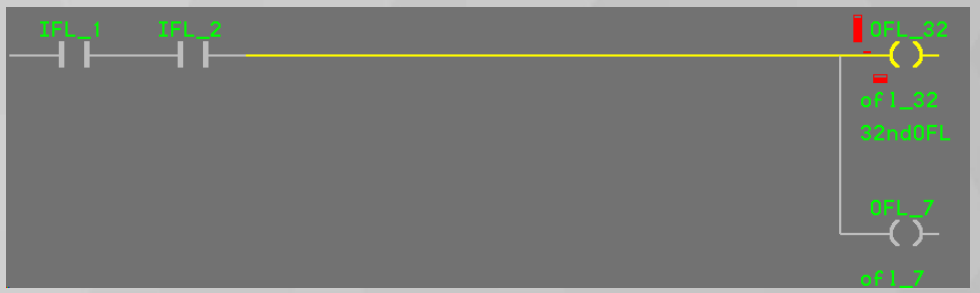
Byte 4, Bits 3 = CIN_29	*8*	
Byte 4, Bits 2 = CIN_20	*4*	
Byte 4, Bits 1 = CIN_31	*2*	
Byte 4, Bits 0 = CIN_32	*1*	
	15	

FOFMSK |= 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

.

FONMSK |= 0 0 0 15 0 0 -64 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Byte 7, Bit 0 is IFL_1	*-128*	
Byte 7, Bit 1 is IFL_2	*64*	
	-64	



FOFMSK |= 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

.

FONMSK |= 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0

Byte 18, Bit 0 is OFL_32

TECH TIP

Where to find PLB Block and Descriptive Labels for the Tech IDs

In the text file created by DBVU, find the PLB block which uses as it's IOM_ID the name of the ECB being interrogated for forces.

```
.
.
.
NAME     =    LADDERS:219021_PLB    TYPE=181 PERIOD=1    PHASE=0      DESCRP='AN EXAMPLE LADDER IN AN FBM219'
.
.
.
IOM_ID   ==   219021
.
```

Use plb_dump to print the labels for the TechIDs of the ladders for that PLB block.

```
plb_dump  -la  -p0  LADDERS  219021_PLB
```

Use awk or some text facility to parse out the labels for the TechID

```
                    LIST OF ALL TECHID LABELS

  TechID  Label     Type                  TechID  Label     Type
  ------  -----     ----                  ------  -----     ----
  TC01_S            NotUsed               TC01_O            NotUsed

  TC02_S            NotUsed               TC02_O            NotUsed
.
.
.
  INIT              NotUsed               FAILS             NotUsed

  COMMF             NotUsed               POWERF            NotUsed

  CIN_1   Point01   --| |--               CIN_2   Point02   --| |--
          1st CIN                                 2nd CIN
```

Running every morning via the Windows Task Scheduler

Name	Status	Triggers	Next Run Time	Last Run Time	Last Run Result	Author	Created
CreateExplorerShellUn...	Ready	When the task is created or modified		12/20/2022 10:08:06 AM	(0x1)	ExplorerShellUnelevated	
Daily Force Reporting	Ready	At 5:58 PM every day	2/16/2025 5:58:00 PM	2/15/2025 5:58:00 PM	The operation completed successfully. (0x0)	32AW10\IAEngineer	8/3/2023 5
nWizard_{B2FE1952-0...	Ready	At log on of any user		12/29/2024 12:39:46 PM	The operation completed successfully. (0x0)	NVIDIA Corporation	

General | Triggers | Actions | Conditions | Settings | History (disabled)

Name: Daily Force Reporting

Location: \

Author: 32AW10\IAEngineer

Description: Report force usein all Ladder Logic FBMs

Security options

When running the task, use the following user account:

IAEngineer

- Run only when user is logged on
- Run whether user is logged on or not
  - Do not store password. The task will only have access to local resources
- Run with highest privileges

Hidden Configure for: Windows Vista™, Windows Server™ 2008

General | Triggers | Actions | Conditions | Settings | History (disabled)

When you create a task, you can specify the conditions that will trigger the task. To change these triggers, open the task property pages using the Properties command.

Trigger	Details	Status
Daily	At 5:58 PM every day	Enabled

General | Triggers | Actions | Conditions | Settings | History (disabled)

When you create a task, you must specify the action that will occur when your task starts. To change these actions, open the task property pages using the Properties command.

Action	Details
Start a program	D:\nutc\mksnt\sh.exe d:\opt\customer\forces\bin\GetForceDataFromCP.sh -s

TECH TIP

Look at time and date on current checkpoint file	**$** ls -l /usr/fox/sp/files/DBf270BA.UC
.	-rwxrwxrwa 1 Administrators None 121484 Feb 3 21:17 /usr/fox/sp/files/DBF270BA.UC
Checkpoint F270BA hosted by 22AW20	**$** /opt/fox/bin/tools/cpoint f270ba 22AW20
Look at time and date on current checkpoint file	**$** ls -l /usr/fox/sp/files/DBf270BA.UC
Wait till it changes; checkpoint is done	-rwxrwxrwa 1 Administrators None 121484 Feb 3 21:32 /usr/fox/sp/files/DBF270BA.UC
Now make text from the checkpoint file	**$** /opt/fox/bin/tools/dbvu270 -t -l /usr/fox/sp/files/OS1C70 -O MapOffsets.txt -D /usr/fox/sp/files/DBF270BA.UC -f >F270BA.txt

Look at time and date on current checkpoint file	**$** ls -l /usr/fox/sp/files/DB 10CP11.UC
.	-rwxrwxrwa 1 Administrators None 121484 Feb 3 21:17 /usr/fox/sp/files/DB 10CP11.UC
Checkpoint F270BA hosted by 22AW20	**$** /opt/fox/bin/tools/cpoint 10CP11 22AW20
Look at time and date on current checkpoint file	**$** ls -l /usr/fox/sp/files/DB 10CP11.UC
Wait till it changes; checkpoint is done	-rwxrwxrwa 1 Administrators None 121484 Feb 3 21:32 /usr/fox/sp/files/DB 10CP11.UC
Now make text from the checkpoint file	**$** /opt/fox/bin/tools/dbvu280 -t –L 10CP11 > 10CP11.txt

Functions *dbvu270* and *dbvu280* are part of the standard IA system. They are located in folder *D:\opt\fox\bin\tools*

Functions *plb_dump* was written by Kevin Millar of W Arthur Fisher in New Zeeland back in 1999. It can be downloaded from the Cassandra Project website.

TECH TIP

PLB / LADDER LOGIC FORCE REPORTING TOOL

Thank You!

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