

Expert GUI for INTT

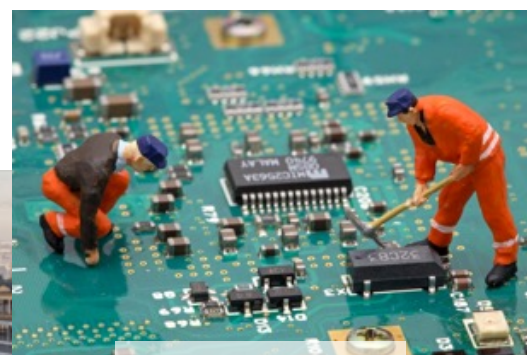
RIKEN/RBRC

Itaru Nakagawa

放射線検出器



コミュニケーション
プレゼンテーション



電子回路



©光プロ

INTTラダーの制御

74 FPHX TestStand DAQ

File

TestStand: Spartans3 ROC ROC+FEM FEM Addr: 15 DB Access: On Off

Global Chip/DAQ Operations

FFR	Enable RO	Latch FPGA	Core Reset	Start DAQ	Check GLINK	test
Init	Disable RO	Calib	JTAG Sync	Stop DAQ	Check FEM	Mass
FD Sync	Set v1	Delay: 5	BCD Start	Global Start	Self Trig	DAC
FPGA RST	Er. EEPROM	Write Page	Read Page	Write All	Cosmic Start	Loop

DAQ Configuration

DAQ Program: C:/Users/RIKEN_INTT/D

NI DAQ Sample Rate (MHz): 5

Num of events (0=inf): 0

Duration HH:MM:SS (00000=inf): HH:MM:SS

Print Output:

FPHX version (for Print): 2

Run Number:

Filename:

Beam Species: None

Beam Energy: 0

Pulsar Configuration

Pulse amplitude (10 bits max): 255

Num of Pulses: 1

BCOs between pulses: 1023

Module Enable

Module 15	On	Off	Both	Side 0	Side 1	Module 7	On	Off	Both	Side 0	Side 1
Module 0	On	Off	Both	Side 0	Side 1	Module 8	On	Off	Both	Side 0	Side 1
Module 1	On	Off	Both	Side 0	Side 1	Module 9	On	Off	Both	Side 0	Side 1
Module 2	On	Off	Both	Side 0	Side 1	Module 10	On	Off	Both	Side 0	Side 1
Module 3	On	Off	Both	Side 0	Side 1	Module 11	On	Off	Both	Side 0	Side 1
Module 4	On	Off	Both	Side 0	Side 1	Module 12	On	Off	Both	Side 0	Side 1
Module 5	On	Off	Both	Side 0	Side 1	Module 13	On	Off	Both	Side 0	Side 1
Module 6	On	Off	Both	Side 0	Side 1	Module 14	On	Off	Both	Side 0	Side 1

Manual Packet Send

Packet file to send:

Communications

USB: None Ethernet IP Addr: 192.168.60.2 Port: 9900

Baud Rate: 115200

ver7

ROOT: ModuleID: 6 Calib External camac ROOT.smg

Reg Desc To Chip From Chip Chip Command

Reg	Desc	To Chip	From Chip	Chip Command
*	Wild	0		Read Write Set255 Reset Default
1	Mask	0		Read Write Set255 Reset Default
2	Dig Ctrl	5		Read Write Set255 Reset Default
3	Vref	1		Read Write Set255 Reset Default
4	DAC0	20		Read Write Set255 Reset Default
5	DAC1	25		Read Write Set255 Reset Default
6	DAC2	30		Read Write Set255 Reset Default
7	DAC3	35		Read Write Set255 Reset Default
8	DAC4	40		Read Write Set255 Reset Default
9	DAC5	45		Read Write Set255 Reset Default
10	DAC6	50		Read Write Set255 Reset Default
11	DAC7	55		Read Write Set255 Reset Default
12	NI Sel <3:0>	6		Read Write Set255 Reset Default
13	NI Sel <7:4>	4		Read Write Set255 Reset Default
14	LeakSel <7:4>	0		Read Write Set255 Reset Default
15	P2Sel <7:4>	4		Read Write Set255 Reset Default
16	P1Sel <2:0>	5		Read Write Set255 Reset Default
17	LVDS Current	3		Read Write Set255 Reset Default
18	Resets	n/a		Read Write Set255 Reset Default

Chip Control

Display/Modify Configuration for Chip ID: 21 Side 15

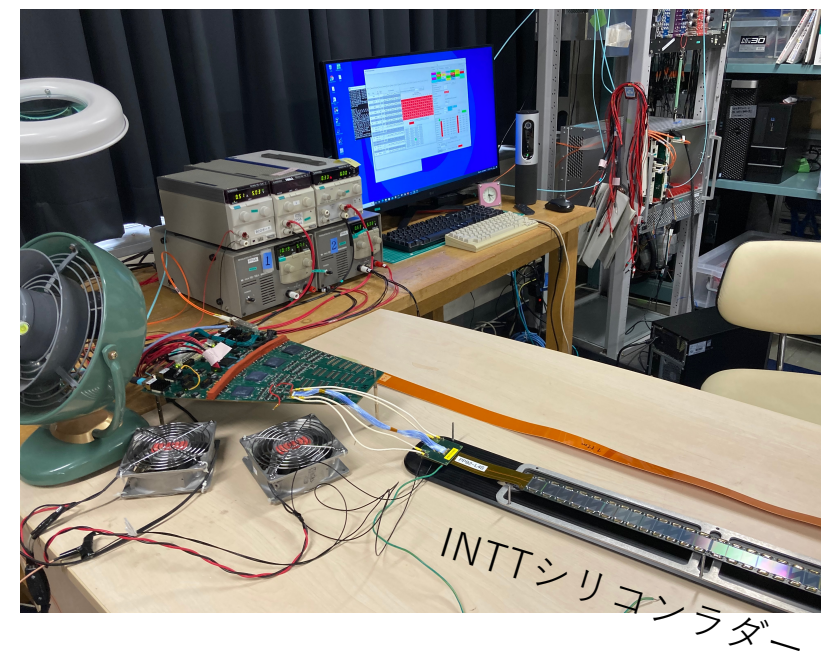
Channel Mask (Red = Off, Green = On)

0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95
96	97	98	99	100	101	102	103	104	105	106	107	108	109	110	111
112	113	114	115	116	117	118	119	120	121	122	123	124	125	126	127

Mask All Unmask All Toggle All Send

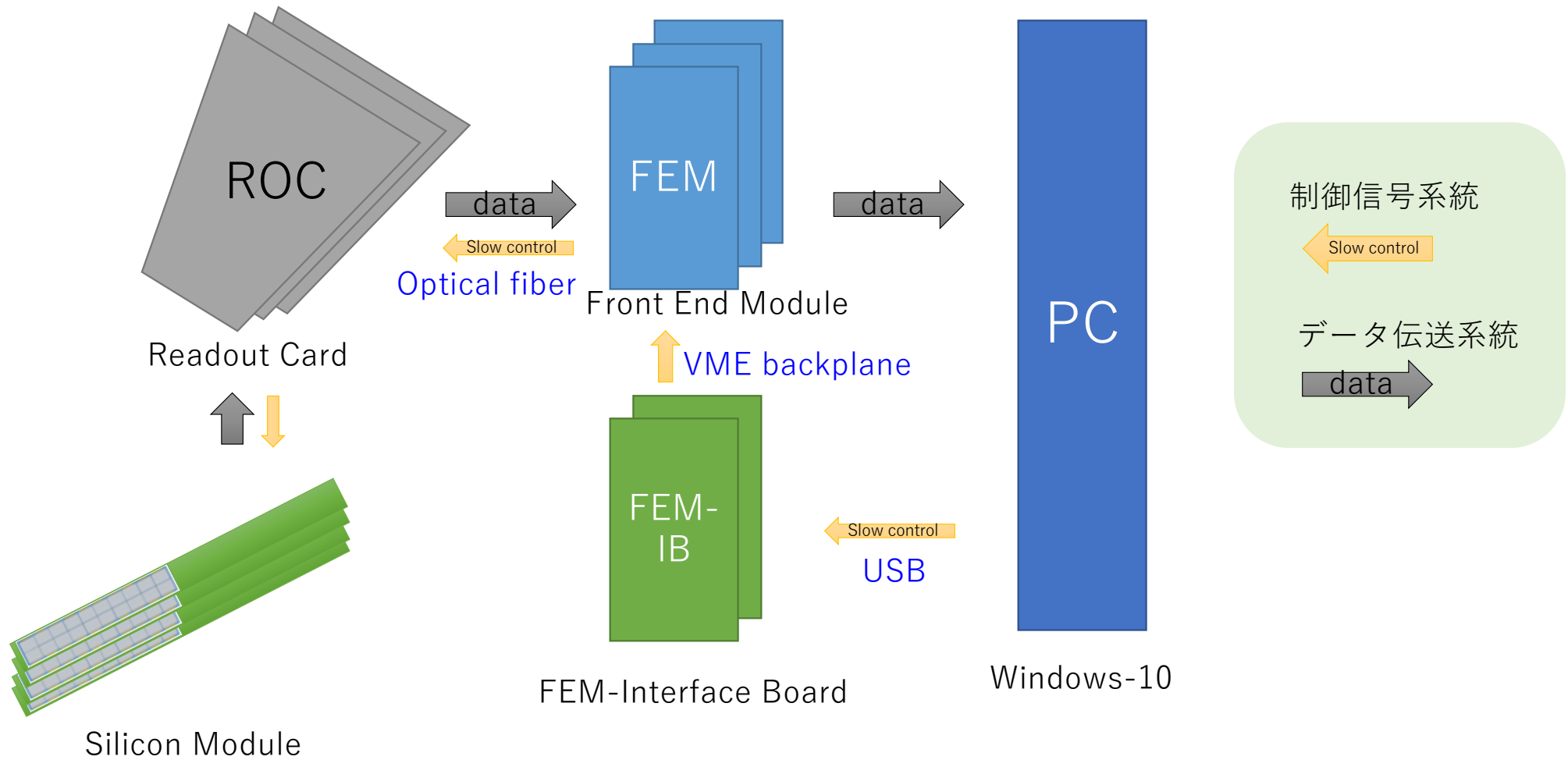
Chip Side Enable

0	15	0	1	16	15	0	1	24	15	0	1
1	15	0	1	17	15	0	1	25	15	0	1
2	15	0	1	18	15	0	1	26	15	0	1
3	15	0	1	19	15	0	1	27	15	0	1
4	15	0	1	20	15	0	1	28	15	0	1
5	15	0	1	21	15	0	1	29	15	0	1
6	15	0	1	22	15	0	1	30	15	0	1
7	15	0	1	23	15	0	1	31	15	0	1

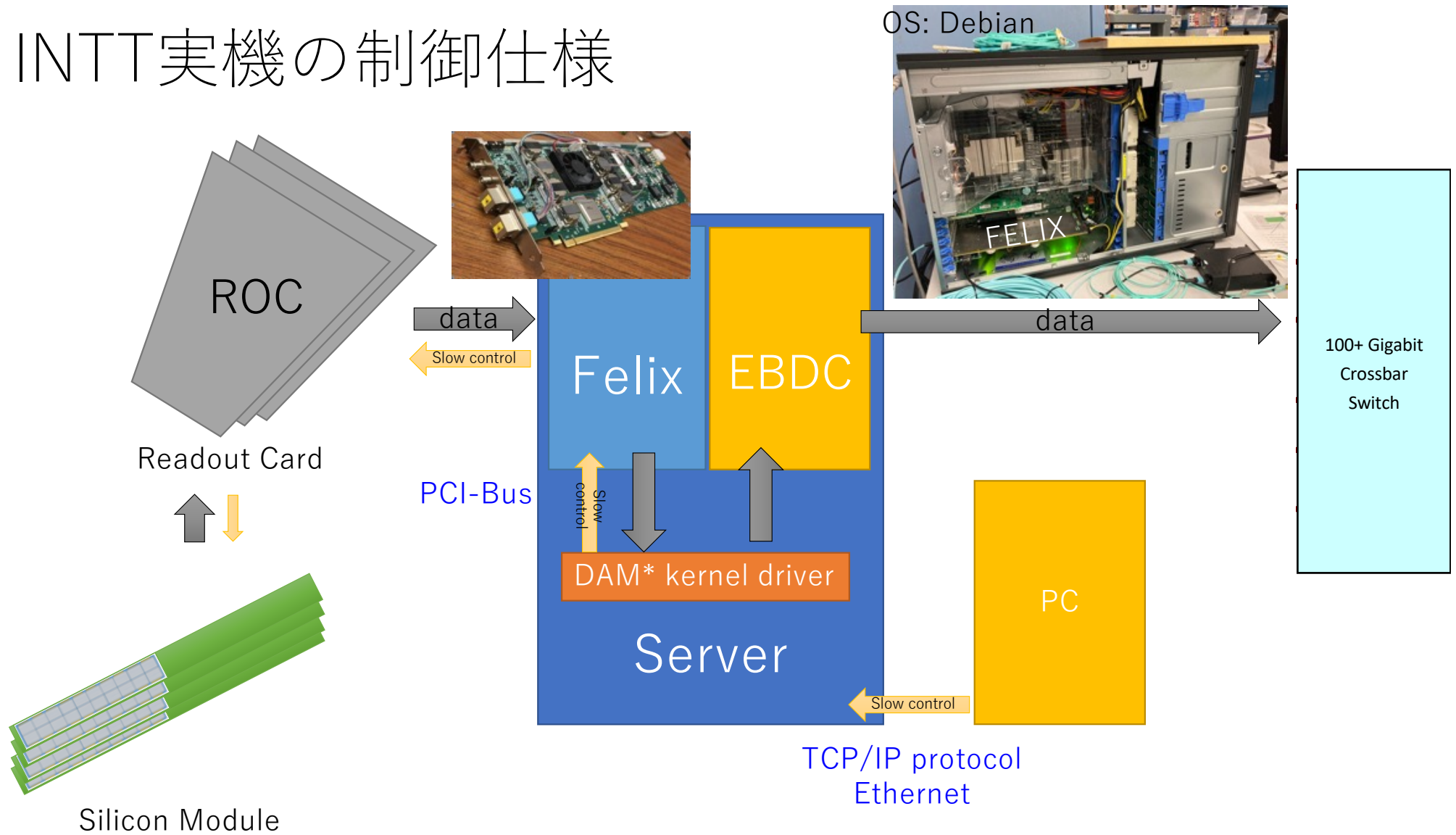


テストベンチ用Graphic User Interface (GUI)。これでINTTシリコンラダーの稼働条件を色々変更することができる。しかし、このGUIはWindowsベースのテストベンチ仕様に限られ、本番実験では使えない。

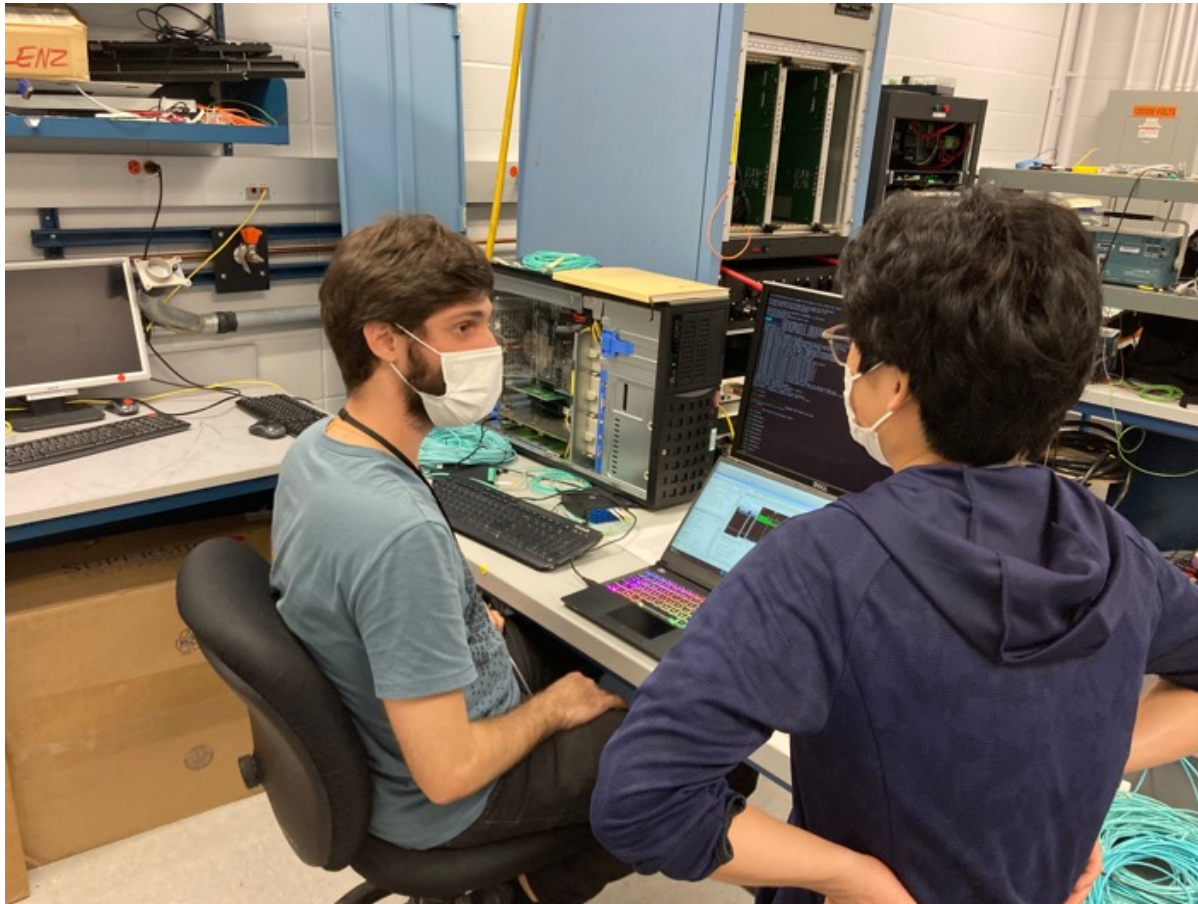
INTTテストベンチの制御系統



INTT実機の制御仕様



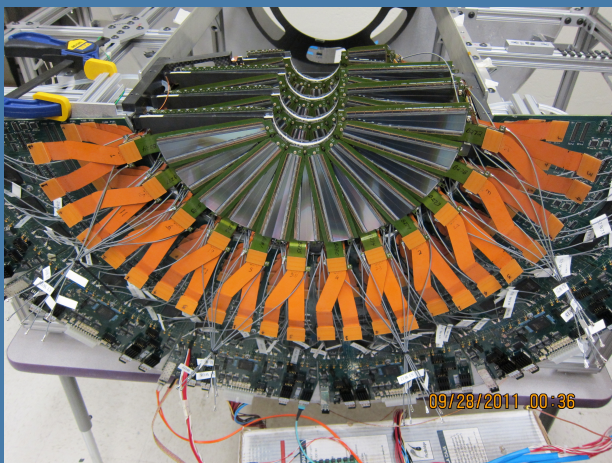
FELIX Readout Development



- 現在BNLにて開発中。

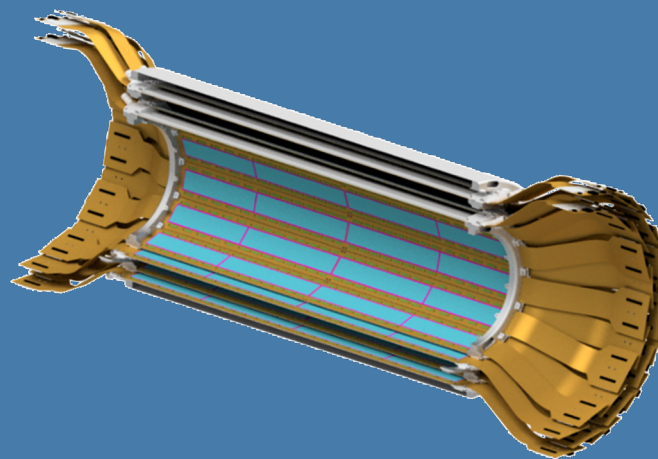
BNL Engineer Raul Guidolini Cacato

FVTX



- ディスクタイプの形状
- 4層構造
- シリコンストリップセンサー
- 合計100万読み出しチャンネル
- FPHX読み出しチップ（消費電力が65mWと小さい）

INTT



- バレル(円筒)タイプの形状
- 2層構造
- シリコンストリップセンサー
- 合計40万読み出しチャンネル
- FPHX読み出しチップ

FVTXの制御

Slow Control

Graphical Representation

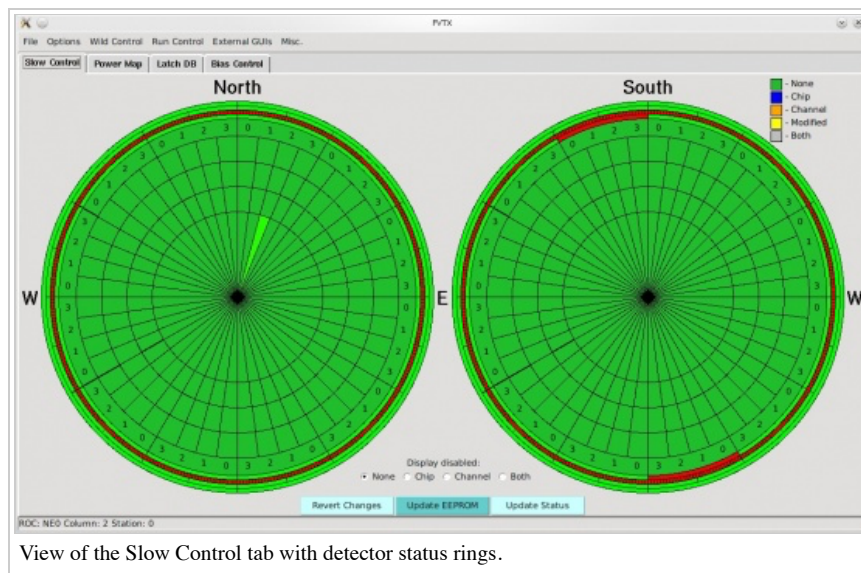
The Slow Control tab of the expert GUI is comprised of the frontal view of both detector arms (North/South) when looking *out* from the interaction point.

As such, the locations of **East** and **West** are reversed for each arm.

To aid in orientation **E** and **W** labels are placed in the corresponding locations.

- From the inside out the various layers of information provided are:

FVTX Expert GUI



View of the Slow Control tab with detector status rings.

FVTX Expert GUI

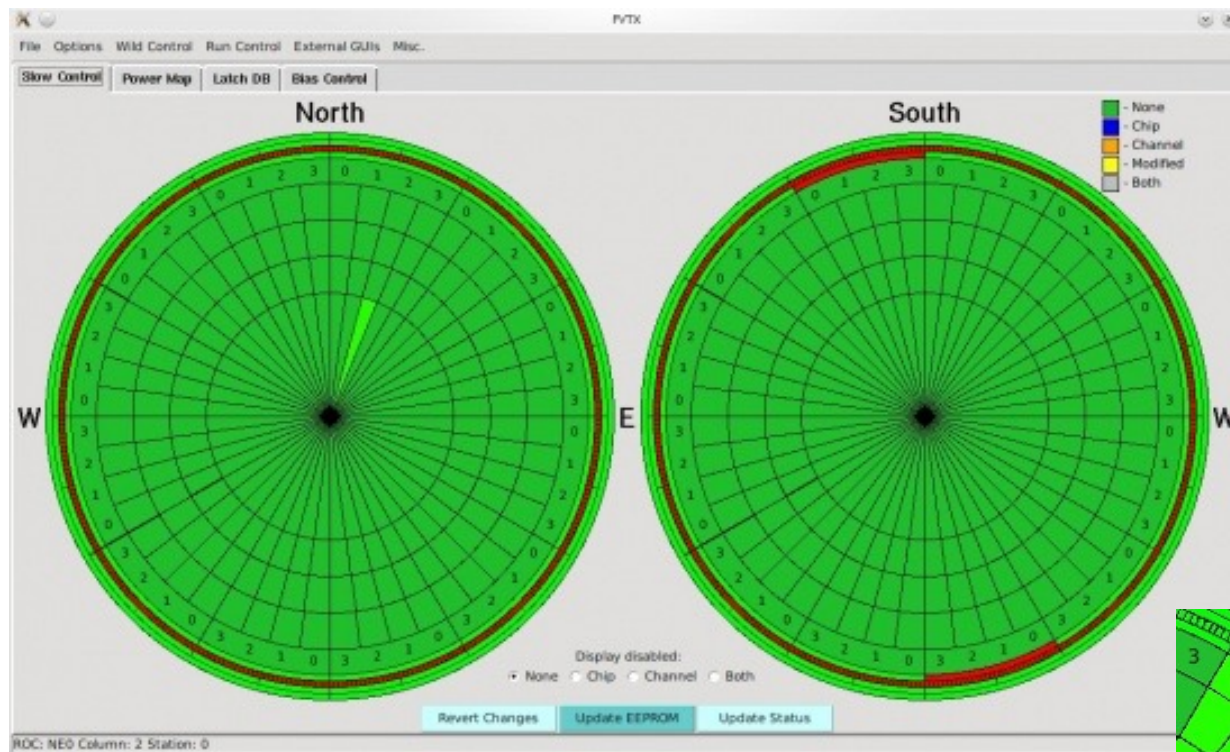
From Wikioffline

The FVTX Expert GUI is designed to enable in-depth control of all aspects of the FVTX detector.

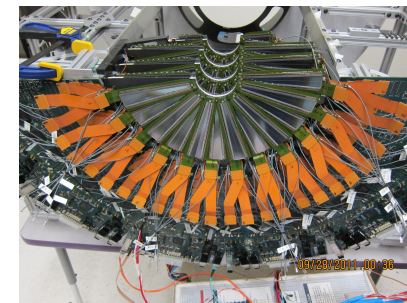
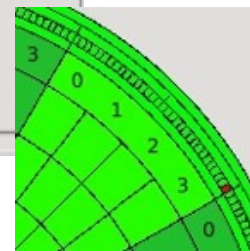
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 - 2.4.5 Basic Usage
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INTT制御用コントロールパネルの開発



- FVTX実験用に開発されたツールを参考に、INTT用にカスタマイズ
- 56ラダーをこのGUIで集中制御
- 場合によっては全く新しい制御ソフトを開発することになるかもしれない。

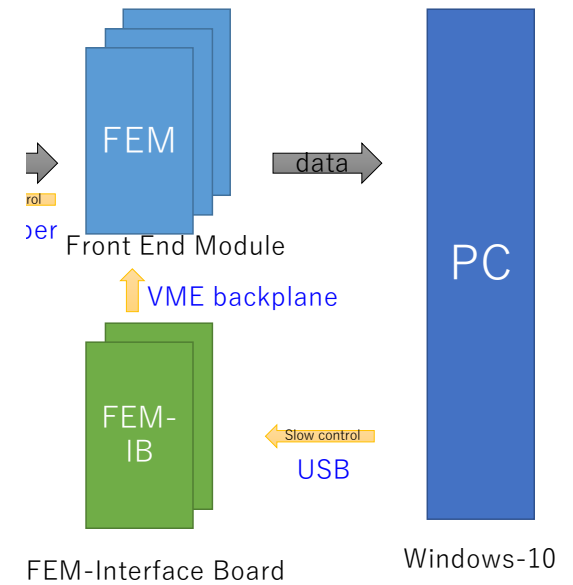


```

macbook-pro-9:fvtx itaru$ ls
#VMEStartRun.sh#
#run_cailb.txt#
#run_calib.txt#
#runphysics.sh#
Fun4FVTX_RecoPRDF.C
InitGTM.sh
JSebCleanUp.sh
Makefile
Makefile.am
Makefile.in
Makefile.org
README
SetDAC0Thresholds.sh
SetDACHighThresholds.sh
SetDACThresholds.sh
SetDelay.pl
SetDelay.sh
VME095StartRun_calib.sh
VMEDownload.sh
VMEGlobalSync.sh
VMELatchAll.sh
VMEStartRun.sh
VMEStartRunJin.sh
VMEStartRun_190621.sh
VMEStartRun_2018.sh
VMEStartRun_calib.sh
VME_FRR.sh
VME_TestBeam_Check.sh
VME_TestBeam_Check.sh.org
aclocal.m4
autogen.sh
build.sh
config.guess
config.status
macbook-pro-9:fvtx itaru$
config.sub
configure
configure.in
create_fvtx_scalars.sql
data
depcomp
download_FVTX.pl
ftplib.cpp
ftplib.h
ftplib.lo
fvtx.cc
fvtx.h
fvtx.o
fvtx_automatich.sh
fvtx_commands.h
fvtx_connection.cc
fvtx_connection.cc.20171120-0920
fvtx_connection.cc.orig
fvtx_connection.h
fvtx_connection.h.orig
fvtx_vme_communication.cc
fvtx_vme_communication.o
fvtxcalibrun.prdf
fvtxdata.prdf
fvtxvme
fvtxvme_org
fvtxvme_send_fo_sync.txt
fvtxvme_start_run.sh
fvtxvme_start_run_error.txt
fvtxvme_start_run_successful.txt
include
install-sh
is_GLINK_locked.txt
lib
libftplib.la
libfvtx_connection.la
libtool
ltmain.sh
macros
missing
postgres96install.txt
postrestest
postrestest.cc
postrestest.o
postsetup.sh
pqex.txt
pqexamplecode.txt
procedure.txt
run_cailb.txt
run_calib.txt
run_calib.txt.190605
run_is_FEM_present.csh
runcalib.sh
runphysics.sh
runphysics_2018.sh
startFvtx.sh
startFvtx.sh.orig
startpostgrescmds.txt
startrun_FVTX_JSEB.sh
stoprun_FVTX.pl
test.sh
test.txt
test2
usrlocalpq4pluslib.tar
usrlocalpq4plusinclude.tar
vme_setup.sh

```

Codes



```

macbook-pro-9:expert_GUI itaru$ ls
CVS
ColorMap.py
FVTXArrays.py
FVTXComm.py
macbook-pro-9:expert_GUI itaru$
FVTXIndexTrans.py
FVTXInfo.py
FVTXObjects.py
FVTXRegisterManip.py
FVTXScriptSelect.py
FVTXScripts.py
FVTXScripts.py.bak
FVTXScriptsDefault.py
MaskIndicator.py
X.ppm
crate_server.dat
defaults.dat
fphx_comm.py
fvtx_gui.py
fvtx_gui.py.old
mask_defaults.dat

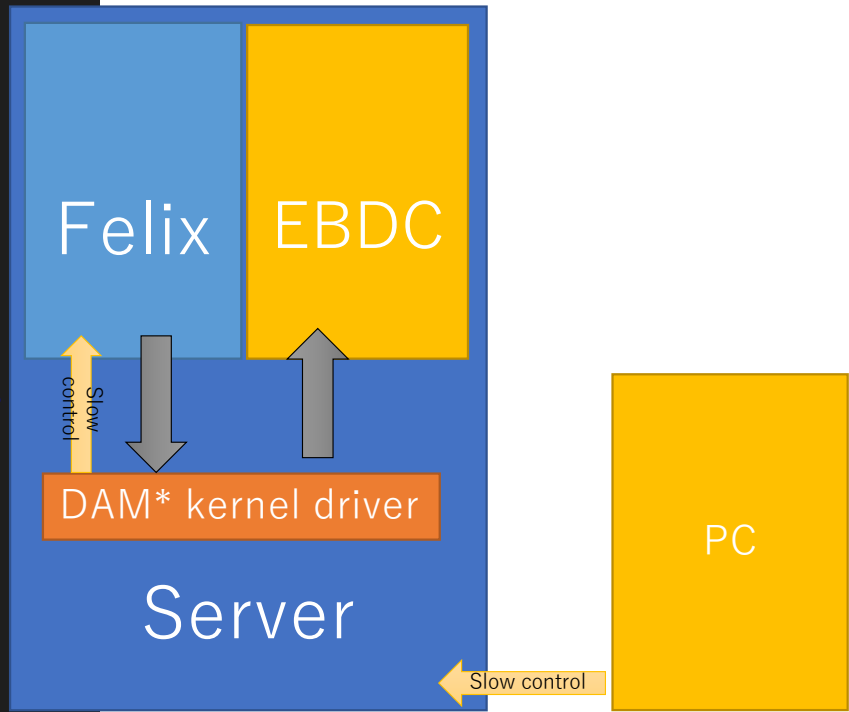
```

Codes for INTT

```

macbook-pro-9:fvtx itaru$ ls
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#run_calib.txt#
#runphysics.sh#
Fun4FVTX_RecoPRDF.C
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Makefile
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Makefile.org
README
SetDAC0Thresholds.sh
SetDACHighThresholds.sh
SetDACThresholds.sh
SetDelay.pl
SetDelay.sh
VME095StartRun_calib.sh
VMEDownload.sh
VMEGlobalSync.sh
VMELatchAll.sh
VMEStartRun.sh
VMEStartRunJin.sh
VMEStartRun_190621.sh
VMEStartRun_2018.sh
VMEStartRun_calib.sh
VME_FRR.sh
VME_TestBeam_Check.sh
VME_TestBeam_Check.sh.org
aclocal.m4
autogen.sh
build.sh
config.guess
config.status
macbook-pro-9:fvtx itaru$
config.sub
configure
configure.in
create_fvtx_scalars.sql
data
depcomp
download_FVTX.pl
ftplib.cpp
ftplib.h
ftplib.lo
fvtx.cc
fvtx.h
fvtx.o
fvtx_automatic.sh
fvtx_commands.h
fvtx_connection.cc
fvtx_connection.cc.20171120-0920
fvtx_connection.cc.orig
fvtx_connection.h
fvtx_connection.h.orig
fvtx_vme_communication.cc
fvtx_vme_communication.o
fvtxcalibrun.prdf
fvtxdata.prdf
fvtxvme
fvtxvme_org
fvtxvme_send_fo_sync.txt
fvtxvme_start_run.sh
fvtxvme_start_run_error.txt
fvtxvme_start_run_successful.txt
include
install-sh
is_GLINK_locked.txt
lib
libftplib.la
libfvtx_connection.la
libtool
ltmain.sh
macros
missing
postgres96install.txt
postrestest
postrestest.cc
postrestest.o
postsetup.sh
pqex.txt
pqexamplecode.txt
procedure.txt
run_cailb.txt
run_calib.txt
run_calib.txt.190605
run_is_FEM_present.csh
runcalib.sh
runphysics.sh
runphysics_2018.sh
startFvtx.sh
startFvtx.sh.orig
startpostgrescmds.txt
startrun_FVTX_JSEB.sh
stoprun_FVTX.pl
test.sh
test.txt
test2
usrlocalpq4pluslib.tar
usrlocalpqplusinclude.tar
vme_setup.sh

```

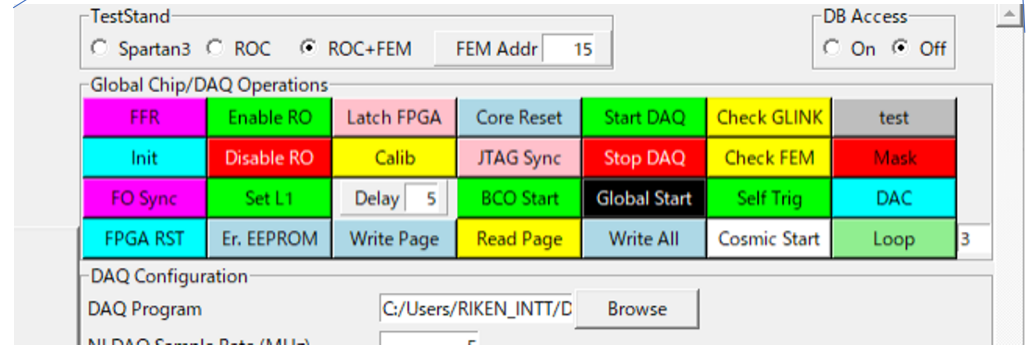
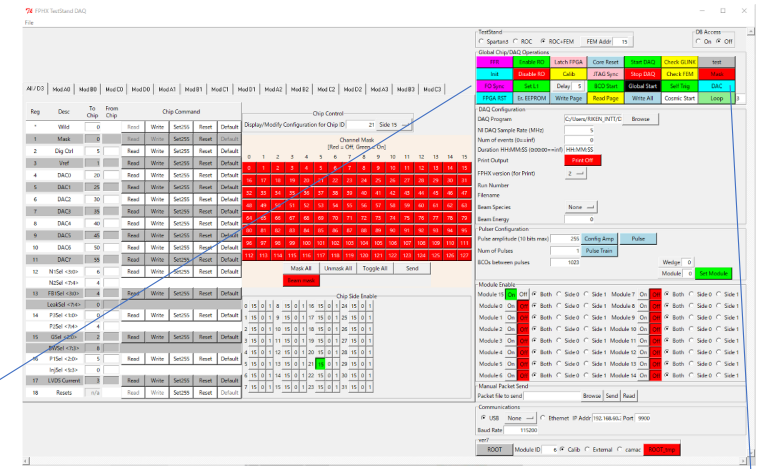
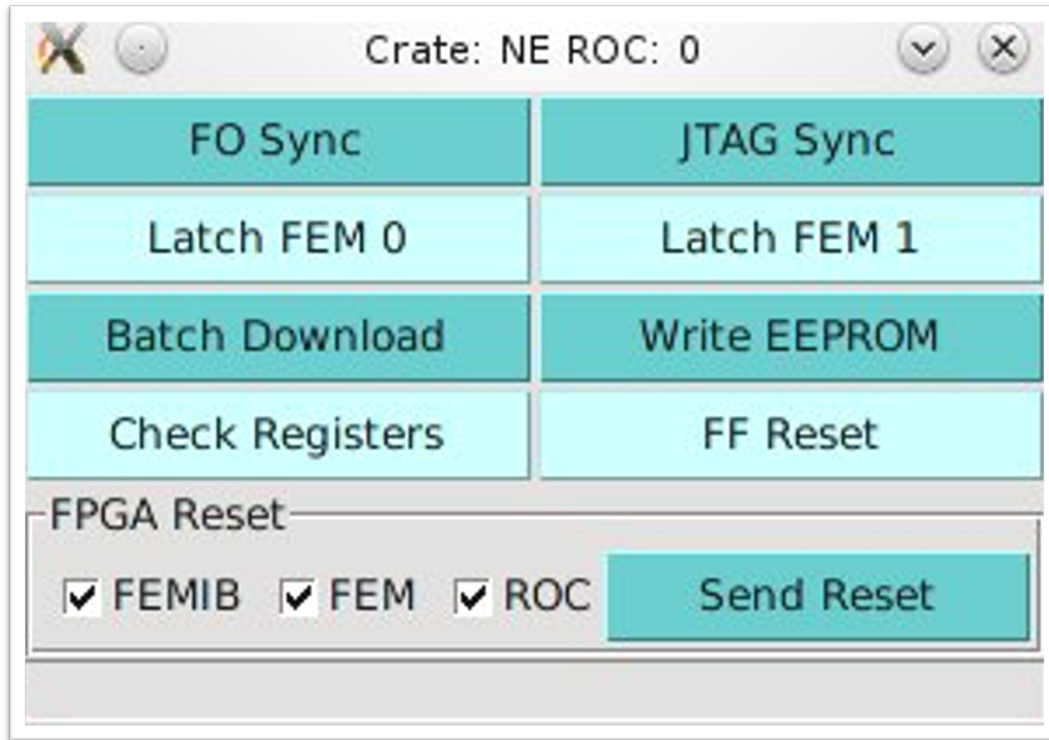


```

macbook-pro-9:expert_GUI itaru$ ls
CVS
ColorMap.py
FVTXArrays.py
FVTXComm.py
FVTXIndexTrans.py
FVTXInfo.py
FVTXObjects.py
FVTXRegisterManip.py
FVTXScriptSelect.py
FVTXScripts.py
FVTXScripts.py.bak
FVTXScriptsDefault.py
MaskIndicator.py
X.ppm
crate_server.dat
defaults.dat
fphx_comm.py
fvtx_gui.py
fvtx_gui.py.old
mask_defaults.dat
macbook-pro-9:expert_GUI itaru$

```

Slow Control Command GUI



FPHXチップの制御

RDC: NE0 Column: 0 Station: 0

Side 0 Side 1

Side 0 Chip Settings [Editable] Side 0 Controls

Vref	1	1	1	1	1	Vref	1
DAC 0	8	8	8	8	8	DAC 0	8
DAC 1	16	16	16	16	16	DAC 1	16
DAC 2	32	32	32	32	32	DAC 2	32
DAC 3	48	48	48	48	48	DAC 3	48
DAC 4	80	80	80	80	80	DAC 4	80
DAC 5	112	112	112	112	112	DAC 5	112
DAC 6	144	144	144	144	144	DAC 6	144
DAC 7	176	176	176	176	176	DAC 7	176
N1Sel	6	6	6	6	6	N1Sel	6
N2Sel	4	4	4	4	4	N2Sel	4
FB1Sel	4	4	4	4	4	FB1Sel	4
LeakSel	0	0	0	0	0	LeakSel	0
P3Sel	0	0	0	0	0	P3Sel	0
P2Sel	4	4	4	4	4	P2Sel	4
GSel	2	2	2	2	2	GSel	2
BWSel	4	4	4	4	4	BWSel	4
P1Sel	5	5	5	5	5	P1Sel	5
InjSel	0	0	0	0	0	InjSel	0
LVDS Current	7	7	7	7	7	LVDS Current	7
Accept Hits	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Accept Hits	<input checked="" type="checkbox"/>
Global Inject	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Global Inject	<input type="checkbox"/>
Serial Select	0 1	0 1	0 1	0 1	0 1	Serial Select	0 1
Channel Mask	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Channel Mask	<input type="checkbox"/>

Chip 1 Chip 2 Chip 3 Chip 4 Chip 5

Revert Changes Read Chips Update EEPROM Write to Chips Wedge FFR

RDC: NW3 Column: 3 Station: 2 Side: 0 Chip: 1

Register Values Channel Mask

Reg	Desc	Value
3	Vref	1
4	DAC 0	8
5	DAC 1	16
6	DAC 2	32
7	DAC 3	48
8	DAC 4	80
9	DAC 5	112
10	DAC 6	144
11	DAC 7	176
12	N1Sel	6
	N2Sel	4
13	FB1Sel	4
	LeakSel	0
14	P3Sel	0
	P2Sel	4
15	GSel	2
	BWSel	4
16	P1Sel	5
	InjSel	0
17	LVDS Current	7
2	Accept Hits	<input checked="" type="checkbox"/>
2	Global Inject	<input type="checkbox"/>
2	Serial Select	0 1
		0+1

[Red = Masked, Green = Unmasked]

0	1	2	3	4	5	6	7
8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23
24	25	26	27	28	29	30	31
32	33	34	35	36	37	38	39
40	41	42	43	44	45	46	47
48	49	50	51	52	53	54	55
56	57	58	59	60	61	62	63
64	65	66	67	68	69	70	71
72	73	74	75	76	77	78	79
80	81	82	83	84	85	86	87
88	89	90	91	92	93	94	95
96	97	98	99	100	101	102	103
104	105	106	107	108	109	110	111
112	113	114	115	116	117	118	119
120	121	122	123	124	125	126	127

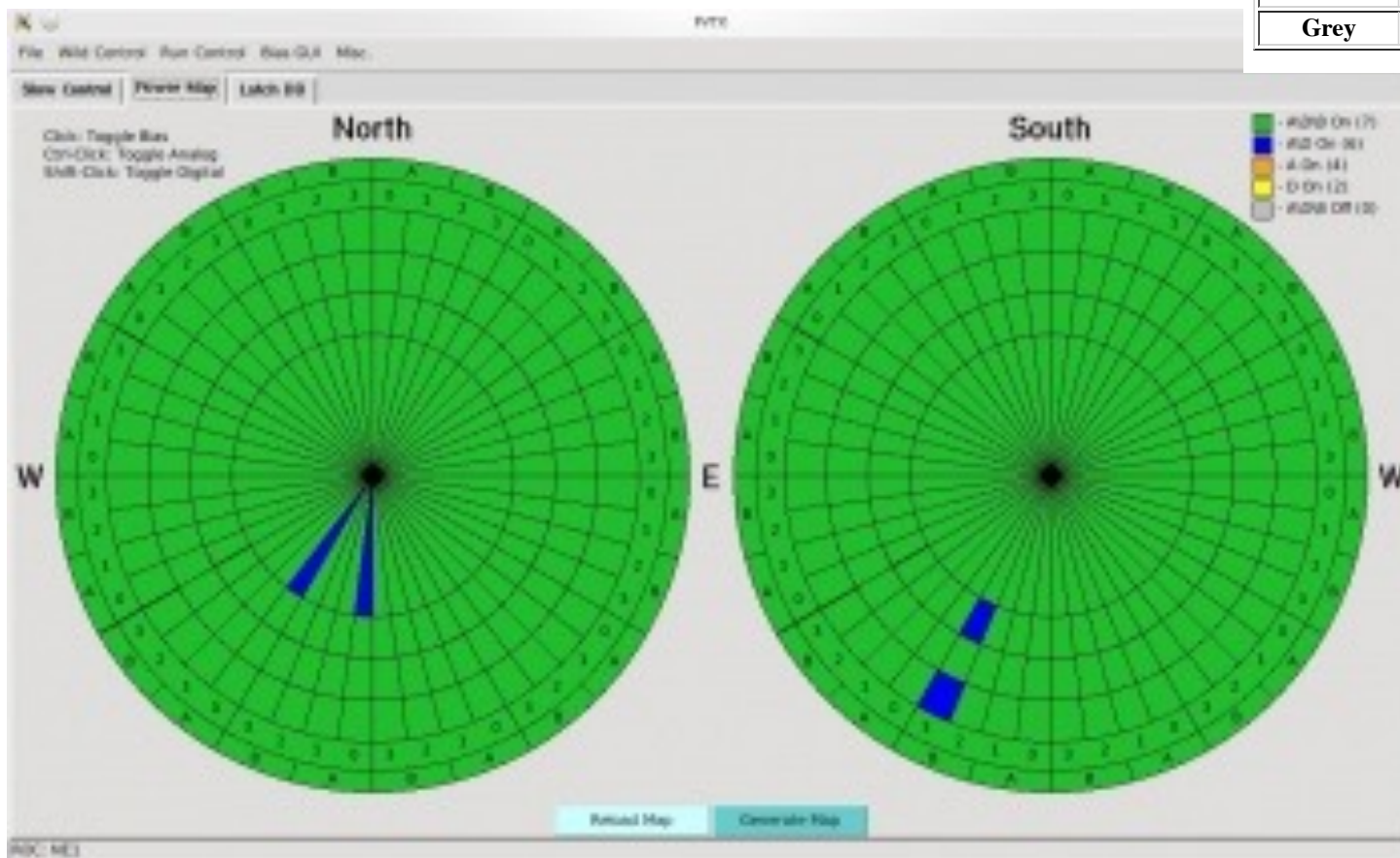
Mask All Unmask All

Revert Changes Read Chip Update EEPROM Write to Chip

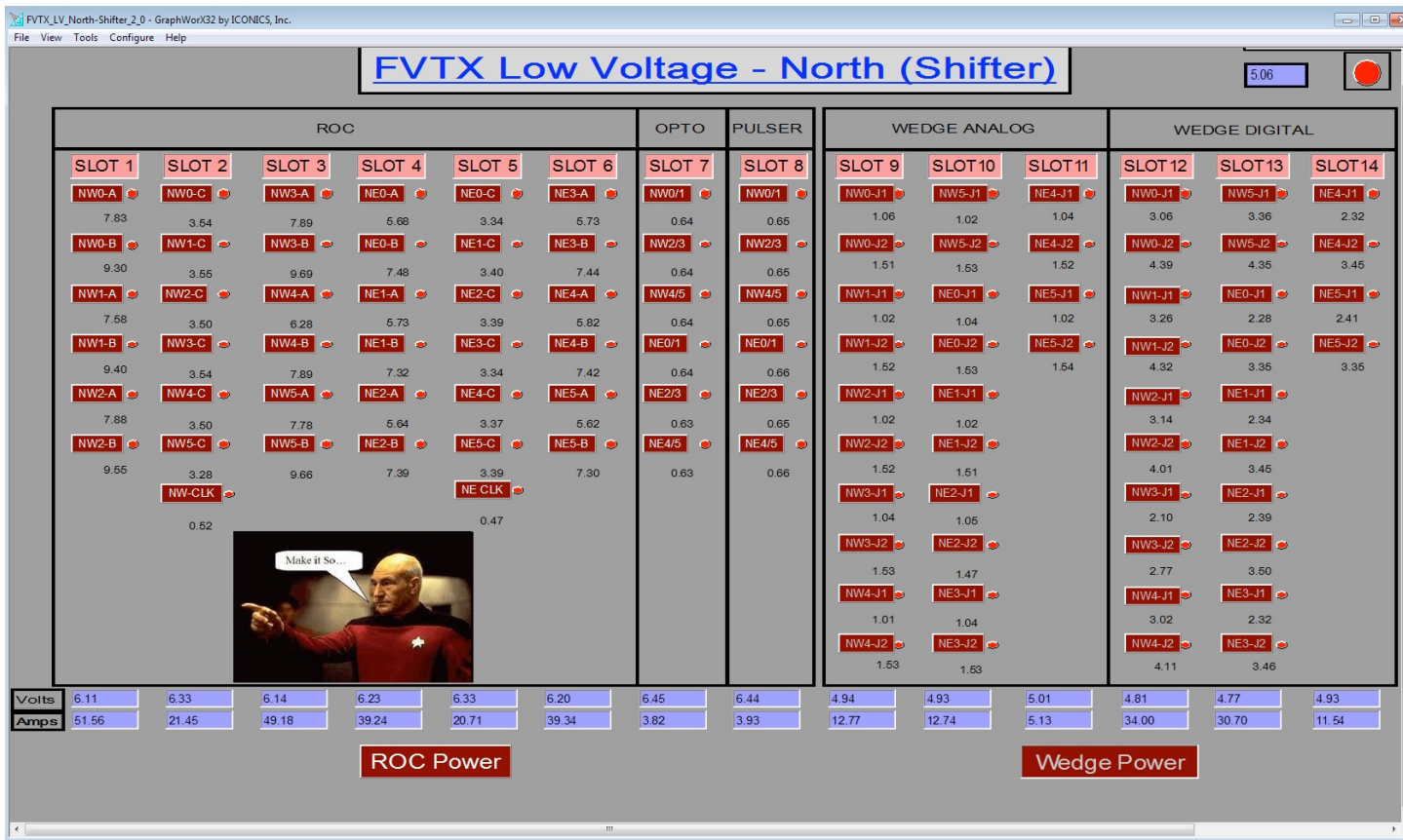
電源モ二夕一

Color Key

Color	Bias	LV Analog	LV Digital
Green	On	On	On
Blue	Off	On	On
Orange	Off	On	Off
Yellow	Off	Off	On
Grey	Off	Off	Off



Conventional LV Control Screen on Windows



- Available only on dedicated windows machine in 1008.
- Better to have remote access

Application: GraphWorX32

https://cache.industry.siemens.com/dl/files/984/29240984/att_76366/v1/GraphWorX32.pdf

データファイバーのシンク状況モニター

Fibers Latched Database

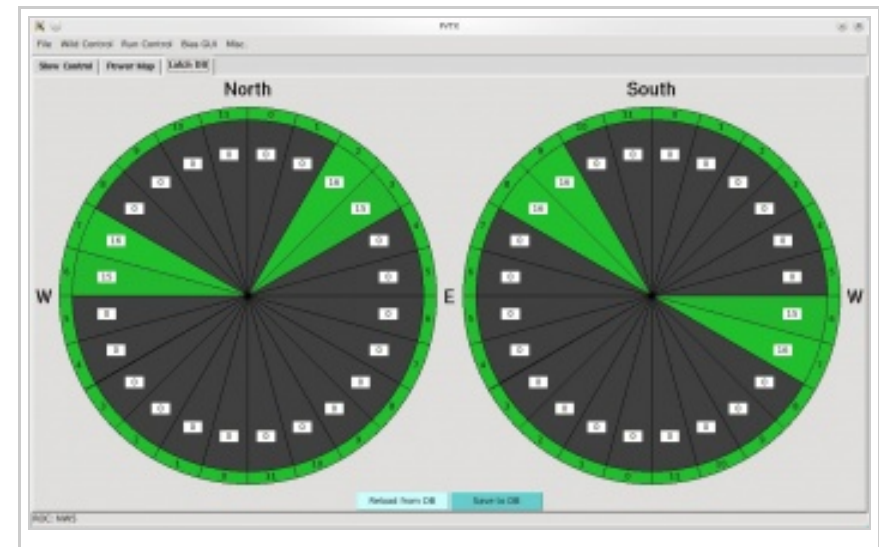
Overview

The `fvtx_fibers_latched` database is utilized by the Slow Control C++ code to know how many fibers are expected to establish latch for any given FEM.

This tab allows for simple manipulation of this database.

Usage

- Interaction:
 - Text entry for direct entry of a number of latches
 - Click on the slice underneath to toggle between 16 and 0 latches



Thermistat Monitor and Interlock

ftvt102 - GraphWorX32 by ICONICS, Inc.

File View Tools Configure Help

FVTX Thermocouple Monitoring

Thursday, March 29, 2012 4:34:20 PM

ALM_SP 200

Toggle to reset

NE				NW			
NE0-Top	4.6	160	0 RST	NW0-Top	5.6	160	0 RST
NE0-Bot	7.1	160	0 RST	NW0-Bot	5.8	160	0 RST
NE1-Top	7.5	160	0 RST	NW1-Top	11.6	160	0 RST
NE1-Bot	11.5	160	0 RST	NW1-Bot	8.9	160	0 RST
NE2-Top	7.9	160	0 RST	NW2-Top	14.8	200	0 RST
NE2-Bot	18.4	220	0 RST	NW2-Bot	12.7	160	0 RST
NE3-Top	11.2	160	0 RST	NW3-Top	10.9	160	0 RST
NE3-Bot	14.9	200	0 RST	NW3-Bot	14.6	160	0 RST
EW-Top	14.6	200	0 RST	BW-Top	14.4	200	0 RST
EW-Bot	20.8	260	0 RST	BW-Bot	21.2	260	0 RST

SE				SW			
SE0-Top	0.6	160	0 RST	SW0-Top	2.2	160	0 RST
SE0-Bot	3.3	160	0 RST	SW0-Bot	3.7	160	0 RST
SE1-Top	7.3	160	0 RST	SW1-Top	5.5	160	0 RST
SE1-Bot	7.7	160	0 RST	SW1-Bot	5.8	160	0 RST
SE2-Top	6.8	160	0 RST	SW2-Top	6.2	160	0 RST
SE2-Bot	9.1	160	0 RST	SW2-Bot	8.3	160	0 RST
SE3-Top	10.2	160	0 RST	SW3-Top	8.6	160	0 RST
SE3-Bot	11.3	160	0 RST	SW3-Bot	9.4	160	0 RST
EW-Top	10.9	200	0 RST	BW-Top	13.2	200	0 RST
EW-Bot	18.7	260	0 RST	BW-Bot	20.1	260	0 RST

DEF ALM_SP RST ALL DEF ALM_SP RST ALL

Flashes RED when tripped

Electronics Temperatures

File View Tools Configure Help

Crate A	Crate B	Water Input	Station 2	Station 3
37.06	35.85	23.69 Deg C	Octant 1 27.33	23.90
32.99	33.44		Octant 2 27.27	23.78
31.81	29.81		Octant 3 24.31	24.36
31.72	29.72	Station 1	Octant 4 24.36	24.22
35.27	28.97	Quadrant 1 19.28	Octant 5 24.34	23.78
31.08	358.20	Quadrant 2 18.92	Octant 6 24.39	23.69
31.32	31.38	Quadrant 3 25.48	Octant 7 24.34	23.72
		Quadrant 4 27.18	Octant 8 27.33	23.72

North	South
28.50	0 46.50
33.50	1 53.50
36.00	2 55.00
35.50	3 48.50
29.00	4 43.50
28.00	5 47.00
33.50	6 48.50
32.50	7 42.00
1.30	Slot9 27.88

FEE Temp	SMTr	Water Temp
Crate A	Crate B	Water Input
32.30	33.20	18.62 Deg C
21.80	31.20	Station 2
26.30	28.20	Octant 1 19.28
30.96	27.90	Octant 2 19.25
29.20	29.00	Octant 3 19.49
0.00	24.50	Octant 4 19.04
23.70	31.75	Octant 5 18.68
		Octant 6 18.44
		Octant 7 18.41
		Octant 8 19.37

MuID	North	South
North	1 39.80	1 38.05
	2 38.70	2 39.59
	3 30.80	3 28.74
	4 31.60	4 31.11
	5 29.30	5 29.09

MPC	North	South
North	1 29.50	1 22.47
	2 24.84	2 22.56
	3 26.20	3 22.35
	4 29.50	7 21.64
		8 21.79

South	North
upper 20.17	25.71 29.71
lower 20.08	25.72 29.56
	high 28.06 28.86
	low 25.25 28.85
	med 25.04 29.07
	high 25.20 29.56

Rich - E	Rich - W
upper 20.17	low 22.70
lower 21.29	upper 22.00
	lower 22.00
	high 22.00

TOF	North	South
LVPS (°C)	39.81 41.28 40.29 30.38	45.12 39.84 36.14 34.22
FEM Left (°C)	23.70 24.30 25.60 25.10	23.90 23.40 24.10 23.40
FEM Right (°C)	24.10 25.60 23.40	24.10 24.30 23.70 23.20

WEST	FEM	20.69	1.94	39.06	41.77			
	0	1	2	3	0	1	2	3
	37.00	40.50	43.50	33.50	45.50	41.00	43.50	31.00
Preamps	4	5	6	7	4	5	6	7
	38.00	32.00	37.50	32.00	38.50	33.50	37.00	34.00

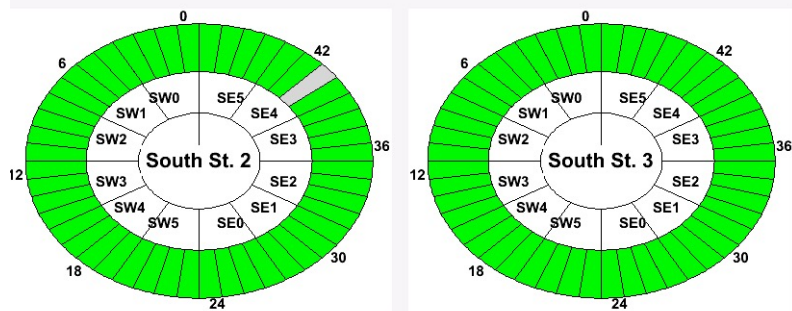
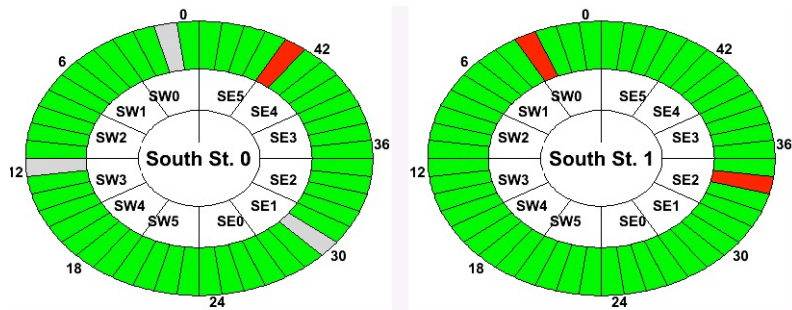
Mu Trig	
Thermocouples	
STA1,QUAD 2 45.73	STA1,Q2 43.17
STA1,QUAD 4 42.27	STA1,Q4 41.71
STA2,OCT3 45.92	STA2,OCT3 43.73
STA2,OCT7 40.89	STA2,OCT7 43.20
STA3,OCT3 43.31	STA3,OCT3 43.93
STA3,OCT7 36.89	STA3,OCT7 42.30

VTX Overtemp
See VTX Thermocouple page for details
P1 P2 P3 P4 S1 S2 S3

FVTX Overtemp
See FVTX Thermocouple page for details
NE NW SE SW

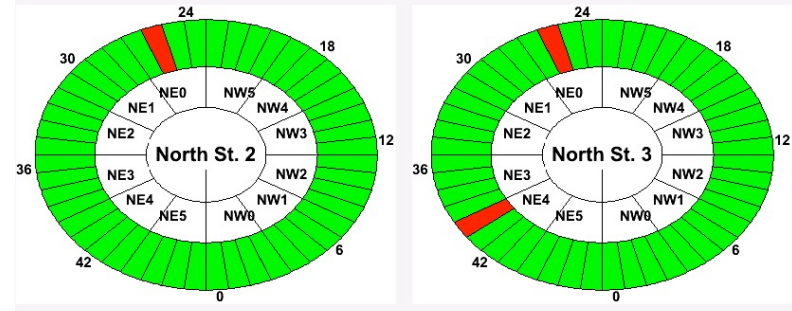
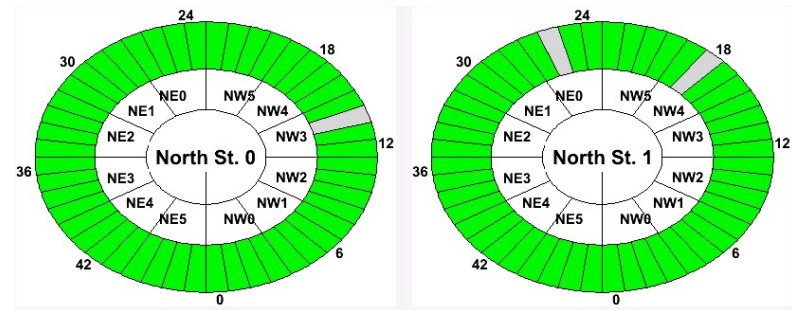
Tripped Thermalcouple

Online Monitor



Run# 447413 Nevt:73082 Date:Mon Mar 7 05:56:00 2016

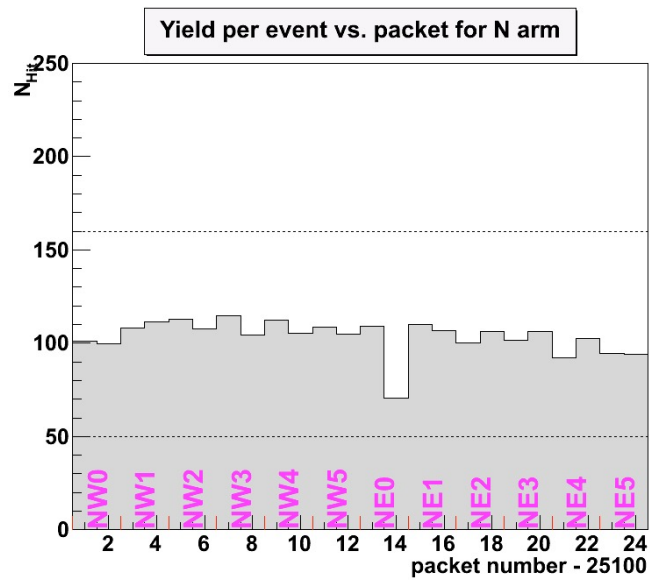
Good Low hit rate Disabled



Run# 447413 Nevt:73082 Date:Mon Mar 7 05:56:00 2016

Good Low hit rate Disabled

Online Monitor

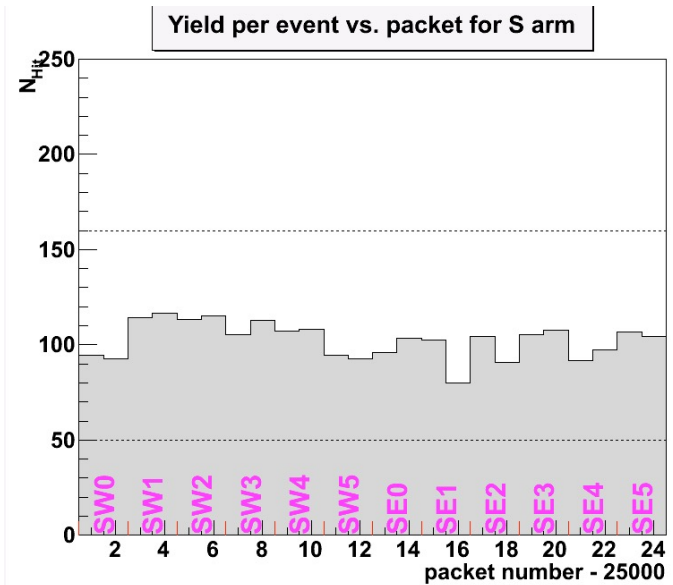


Run# 447413 Nevt:73082 Date:Mon Mar 7 05:56:00 2016

Blue arrows indicate new cold packets

Red arrows indicate new hot packets

Green arrows indicate known hot/cold packets



Run# 447413 Nevt:73082 Date:Mon Mar 7 05:56:00 2016

Blue arrows indicate new cold packets

Red arrows indicate new hot packets

Green arrows indicate known hot/cold packets

Online Monitor

