Description of Hardware of UITF 200 keV Mott DAQ

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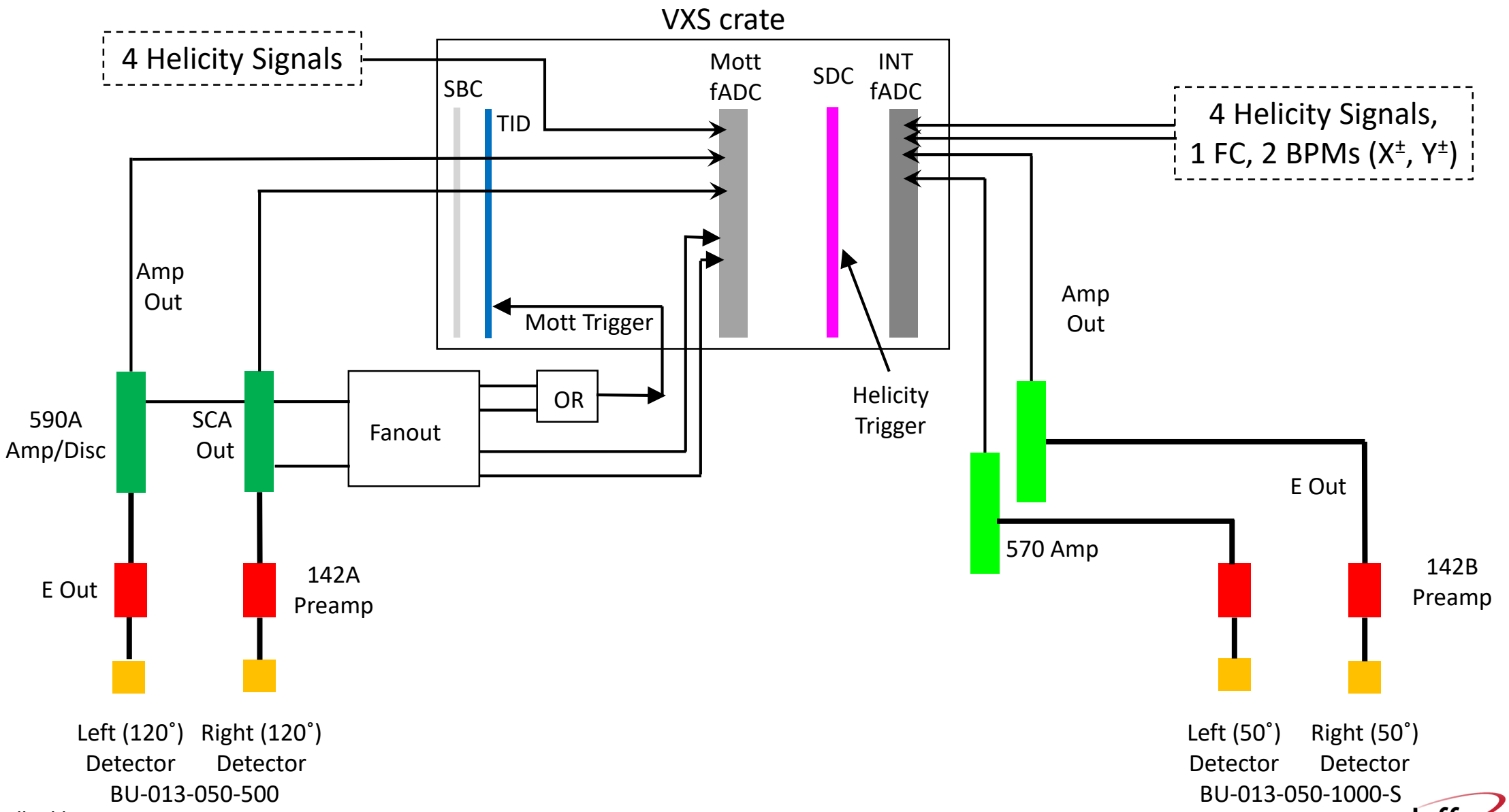
U.S. DEPARTMENT OF ENERGY | Office of Science

JSA

Upgraded Injector Test Facility – Mott Data Acquisition

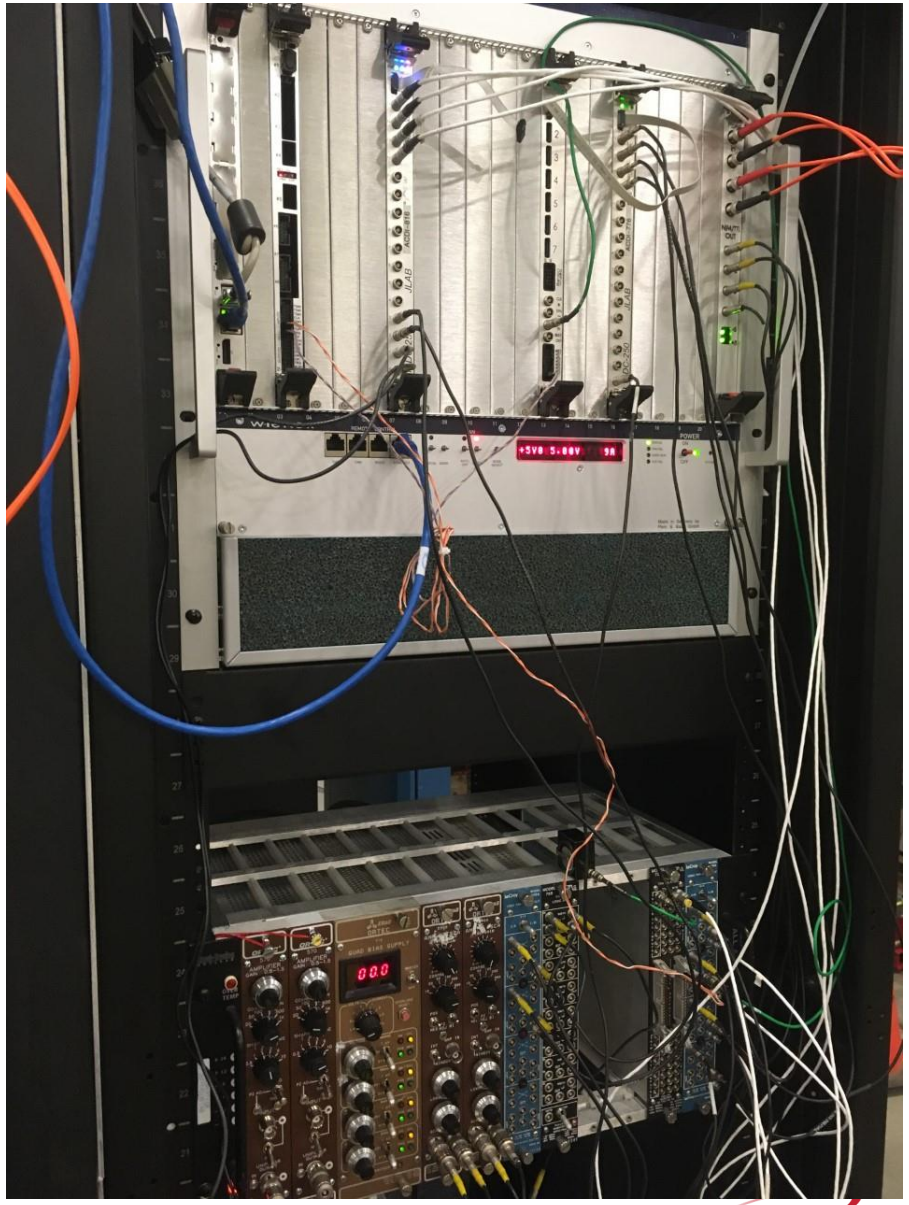


DAQ Hardware

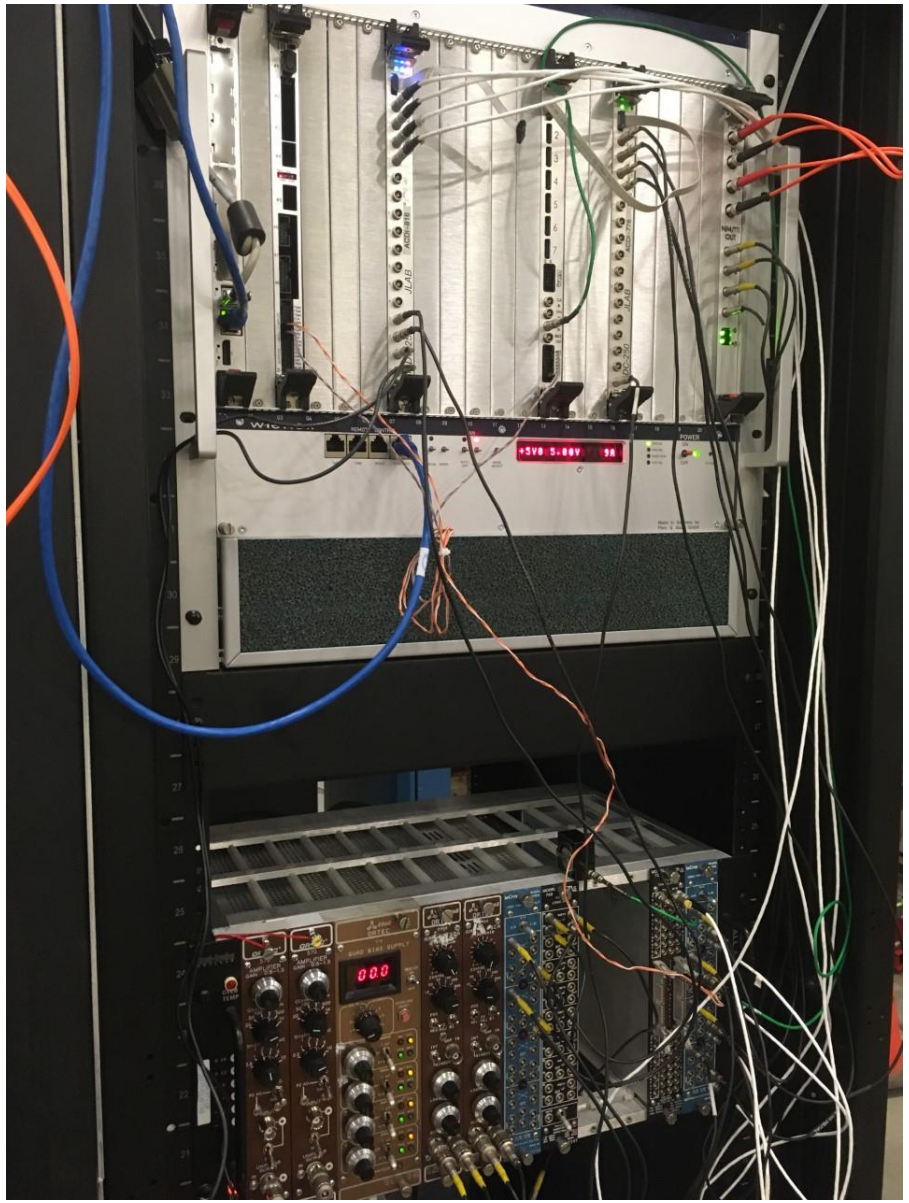
- VXS Crate and NIM Crate

- Mott detectors, Preamps, Amplifiers and Bias Supply

- Helicity signals from Helicity Board



Mott DAQ

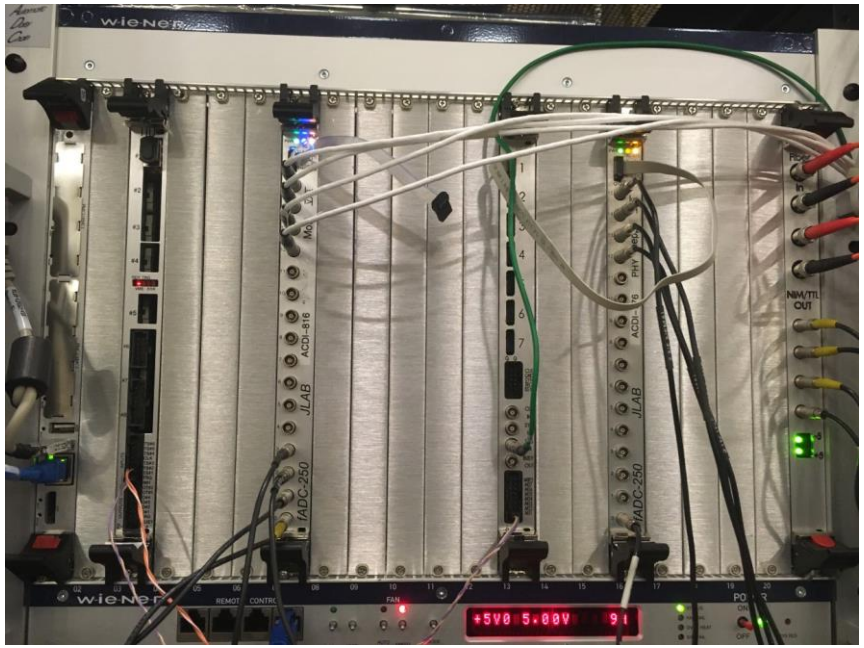


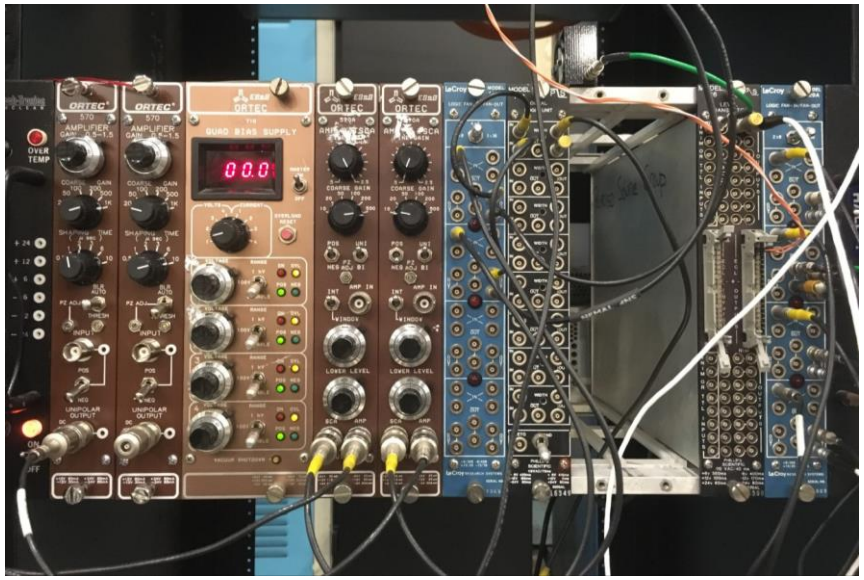
Hardware	Rack
itfmdaq0	ITF 07
Mott VXS Crate	
Mott NIM Crate	

Mott DAQ crates

VXS Crate

Slot	Board
1	Linux SBC
2	Empty
3	TID
4	Empty
5	Empty
6	Empty
7	Mott FADC
8	Empty
9	Empty
10	Empty
11	Empty
12	Empty
13	FADC250 Signal Distribution Card
14	Empty
15	Empty
16	INT FADC
17	Empty
18	Empty
19	Empty
20	Empty
21	FT

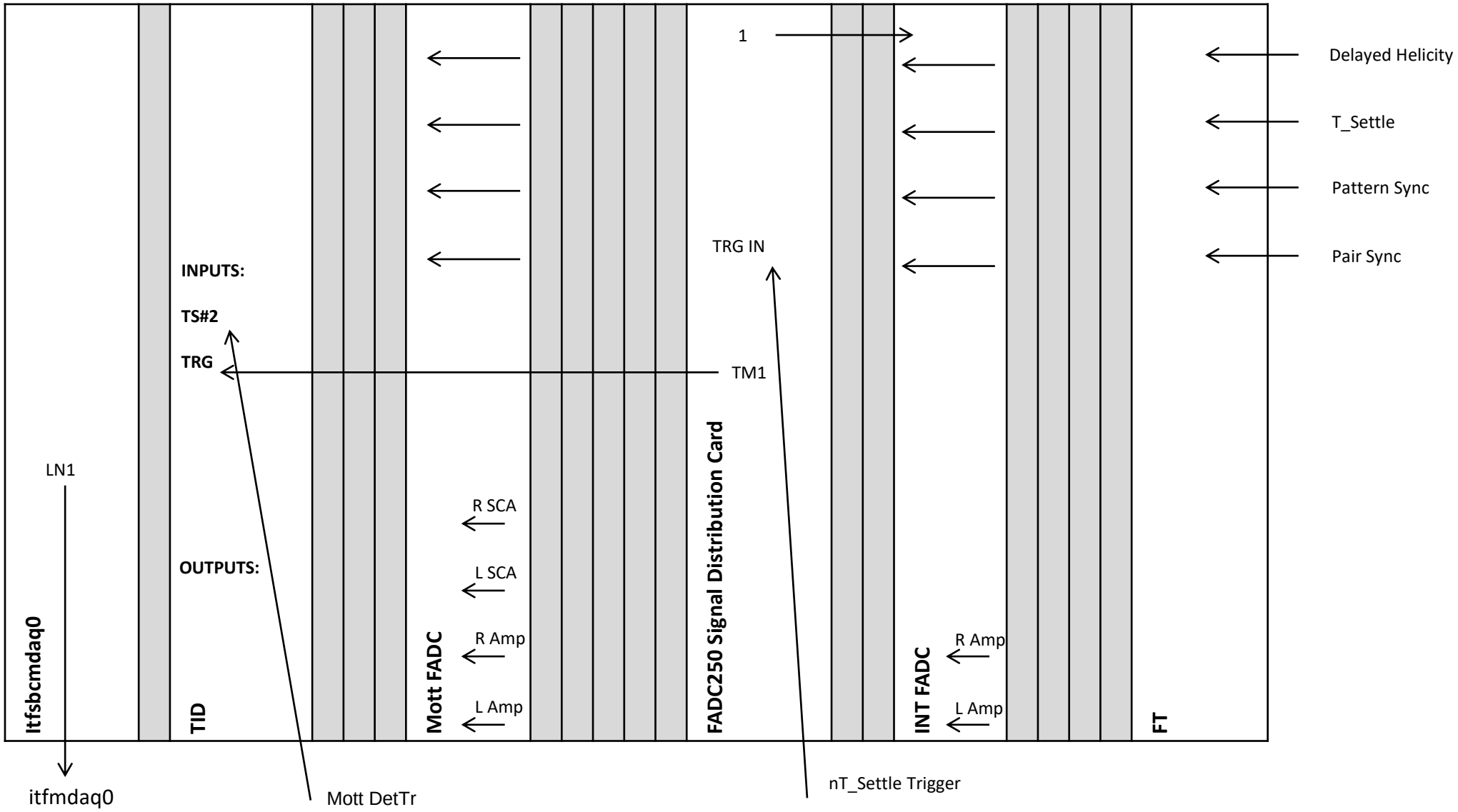




Mott NIM Crate

Slot	Board
1	570 Amplifier
2	570 Amplifier
3-4	ORTEC QUAD BIAS SUPPLY
5	590A Amplifier
6	590A Amplifier
7	LOGIC FAN IN/OUT LeCroy 429A
8	Empty
9	Empty
10	Empty
11	LEVEL TRANSLATOR PS726
12	LOGIC FAN IN/OUT LeCroy 429A

VXS CRATE


1
Delayed Helicity
T_Settle
Pattern Sync
Pair Sync
TRG IN
INPUTS:
TS#2
TRG
TM1
LN1
R SCA
L SCA
OUTPUTS:
R Amp
L Amp
R Amp
L Amp
Itfsbcmdaq0
TID
Mott FADC
FADC250 Signal Distribution Card
INT FADC
FT
itfmdaq0
Mott DetTr
nT_Settle Trigger

Mott NIM Crate

570 Amp (50°) LEFT	570 Amp (50°) RIGHT	ORTEC QUAD BIAS SUPPLY	590A Amp (120°) LEFT	590A Amp (120°) RIGHT	FAN 429A	LOGIC 758			LT 726	FAN 429A
→ IN E ← OUT E	→ IN E ← OUT E	142A Preamp (120°) LEFT **+115 V**	→ IN E ← OUT E ← SCA	→ IN E ← OUT E ← SCA	→SCA	→SCA →SCA			→ nT_Settle IN ← TTL/ECL OUT	→ Delayed Helicity
		142A Preamp (120°) RIGHT **+115 V**			→SCA					→ T_Settle
		142B Preamp (50°) LEFT **+115 V**								→ Pattern Sync
		142B Preamp (50°) RIGHT **+115 V**								→ Pair Sync

CHANNEL ASSIGNMENT – ORTEC QUAD BIAS SUPPLY

OUTPUTS	Detector	HV
1	142A Preamp (120°) LEFT	**+115**
2	142A Preamp (120°) RIGHT	**+115**
3	142B Preamp (50°) LEFT	**+115**
4	142B Preamp (50°) RIGHT	**+115**

CHANNEL ASSIGNMENT – PREAMPLIFIERS

OUTPUTS	142A Preamp (120°) LEFT
E	590A Amp E IN
T OUT	-

OUTPUTS	142A Preamp (120°) RIGHT
E	590A Amp E IN
T OUT	-

OUTPUTS	142B Preamp (50°) LEFT
E	570 Amp E IN
T OUT	-

OUTPUTS	142B Preamp (50°) RIGHT
E	570 Amp E IN
T OUT	-

CHANNEL ASSIGNMENT – AMPLIFIERS

Channel	590A Amp (120°) LEFT
E IN	142A Preamp E
E OUT	Mott FADC CH0
SCA	Mott FADC CH2

Channel	570 Amp (50°) LEFT
E IN	142B Preamp E
E OUT	INT FADC CH0
SCA OUT	-

Channel	590A Amp (120°) RIGHT
E IN	142A Preamp E
E OUT	Mott FADC CH1
SCA	Mott FADC CH3

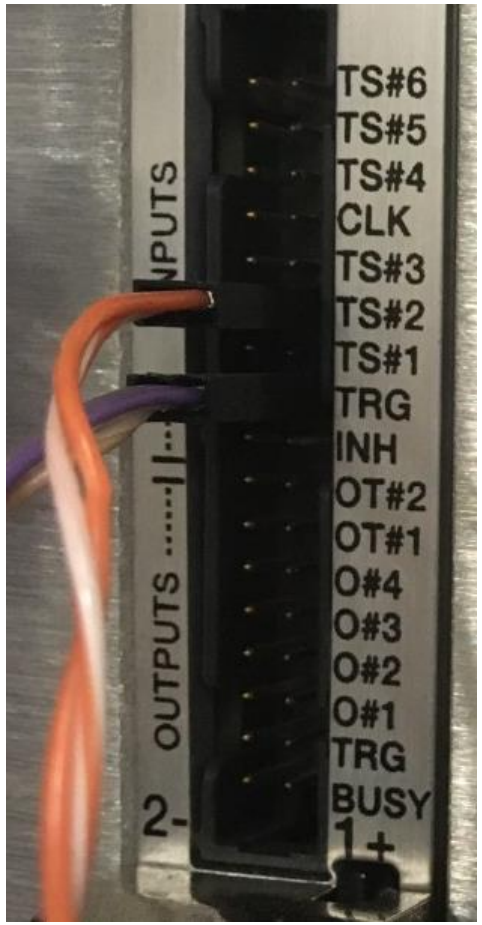
Channel	570 Amp (50°) RIGHT
E IN	142B Preamp E
E OUT	INTFADC CH1
SCA OUT	-

AMPLIFIERS CONTROLS

Controls	590A Amp (120°) LEFT	590A Amp (120°) RIGHT
FINE GAIN	1	1
COARSE GAIN	100	100
INPUT POS/NEG	NEG	NEG
OUTPUT UNI-BI	UNI	UNI
PZ ADJ	50 µs	50 µs
INT/WINDOW		
WINDOW		
LOWER LEVEL		
LL REF (INT/EXT) (rear panel)	INT (front- panel control)	INT (front- panel control)
SHAPING TIME (side panel)	1.5 µs	1.5 µs
Window (internal jumper)	0 – 1 V	0 – 1 V

Controls	570 Amp (50°) LEFT	570 Amp (50°) RIGHT
FINE GAIN	1	1
COARSE GAIN	100	100
SHAPING TIME		
BLR AUTO		
PZ ADJ		
THRESH		
Input Polarity (POS/NEG)	NEG	NEG
COARSE GAIN Attenuation (internal jumper)	X0.1	X0.1

CHANNEL ASSIGNMENT – TRIGGER INTERFACE (TID)



TID Chan	INPUTS
7	
6	
5	
4	
3	
2	TS#2 (Mott DetTr)
1	
0	TRG (FADC SDC MT1)
INH	

TID Chan	OUTPUTS
7	
6	
5	
4	
3	
2	
1	
0	

FADC

Mott

FADC Chan	Signal
1	L EFT Amp
2	RIGHT Amp
3	LEFT SCA
4	RIGHT SCA
5	
6	
7	
8	
9	
10	
11	
12	
13	Delayed Helicity
14	T_Settle
15	Pattern–Sync
16	Pair–Sync

INT

FADC Chan	Signal
1	LEFT Amp
2	RIGHT Amp
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	Delayed Helicity
14	T_Settle
15	Pattern–Sync
16	Pair–Sync

Mott NIM – QUAD FAN IN/OUT 429A

QUAD FAN IN/OUT		
		Delayed Helicity – IN
		INT FADC CH12
		Mott DADC CH12
		T_Settle – IN
	INT FADC SDC TRG IN	INT FADC CH13
	50 Ω	Mott DADC CH13
		Pattern Sync – IN
		INT FADC CH14
		Mott DADC CH14
		Pair Sync – IN
		INT FADC CH15
		Mott DADC CH15

Mott NIM – LEVEL TRANSLATOR 726

	LT			
	NIM IN	TTL/ECL OUT	NIM OUT	NIM OUT
1	Mott DetTr **(NOW a 10.13 kHz NIM Pulser)**	TID TS#2	50 Ω	SCOPE
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				

Mott NIM – OCTAL LOGIC UNIT PS 758

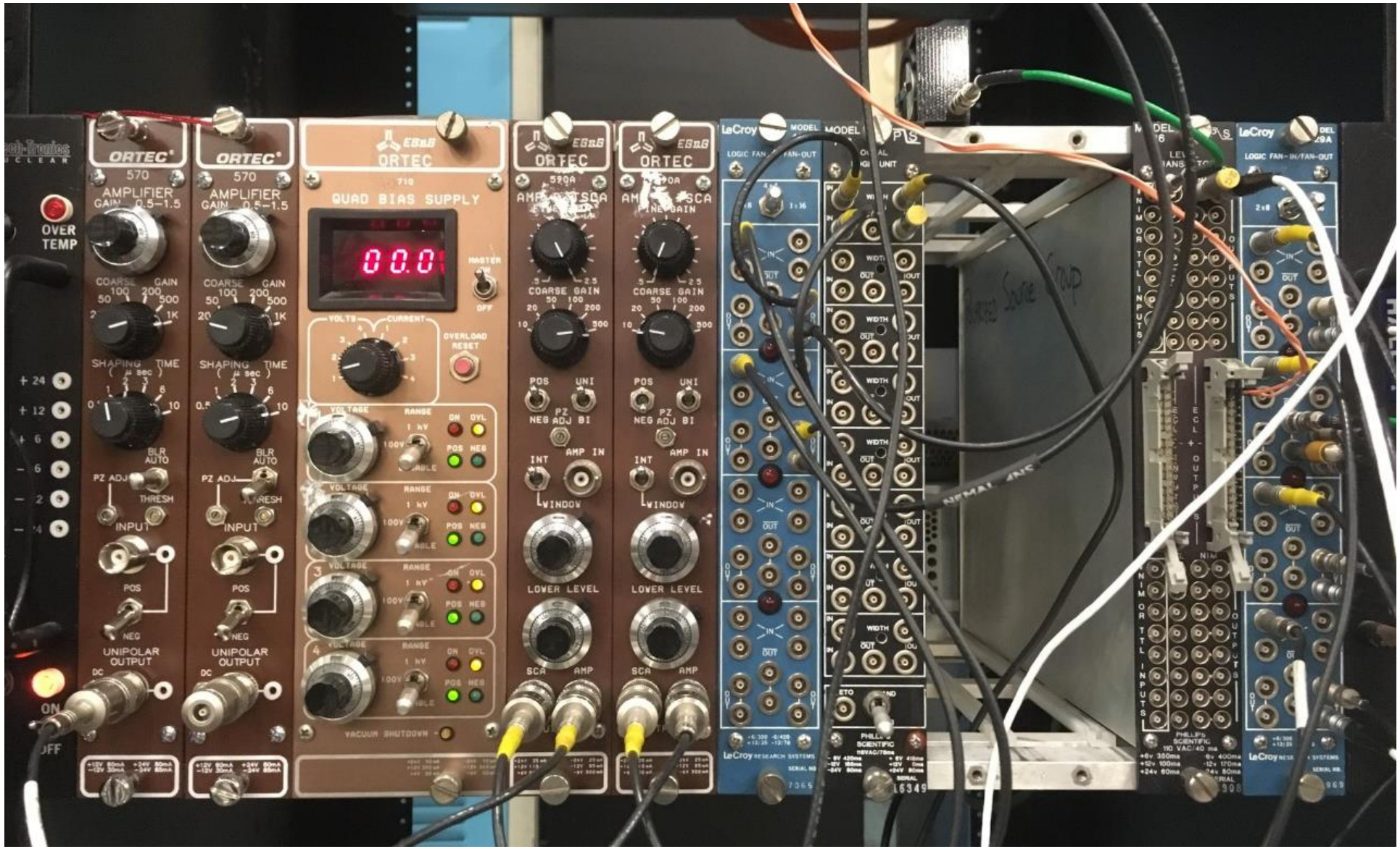
Mott NIM – QUAD FAN IN/OUT 429A

QUAD FAN IN/OUT		
		LEFT SCA – IN
		OCTAL LOGIC UNIT
		Mott DADC CH2
		RIGHT SCA – IN
		OCTAL LOGIC UNIT
		Mott DADC CH3

Data Taking Modes

Name	Readout	Output	Trigger
Mott_Sample	Mott FADC (Mode=1), INT FADC	Mott_Sample_%d.dat	Mott Detector
Mott_Int	INT FADC	Mott_Int_%d.dat	nT_Settle

VXS Crate

fADC-250
JLAB
ACDI-816
ACDI-76
PHY
Fiber
In
NIM/TTL
OUT
FAN
+5V0 5.00V
ON
OFF

Mott NIM Crate