

# BigBite Timing Hodoscope: Manual for JLab Hall A Shifter Workers

A condensed set of instructions for operation and maintenance of the BigBite Timing Hodoscope detector. For questions, please contact an expert, either Ralph Marinaro [r.marinaro.1@research.gla.ac.uk](mailto:r.marinaro.1@research.gla.ac.uk), Rachel Montgomery at [rachel.montgomery@glasgow.ac.uk](mailto:rachel.montgomery@glasgow.ac.uk), or send an email to David Hamilton [david.j.hamilton@glasgow.ac.uk](mailto:david.j.hamilton@glasgow.ac.uk), or contact by sending an email to Gary Penman [g.penman.1@research.gla.ac.uk](mailto:g.penman.1@research.gla.ac.uk).

Created by Ralph Marinaro and Rachel Montgomery.

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Updates will be made in accordance with changes made to the detector and data acquisition system as the SBS experiment run groups progress.

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### **A.1 How to Troubleshoot the Detector:**

If one or a few channels appear to go missing, or become noisy, and the proposed solution requires a controlled access, then simply make a log entry on halog, and we will wait until the next planned access from the RC. If a whole NINO card worth of channels go missing, or are noisy, or the whole

side of one side of the detector, or the whole detector itself, then first check the LV, HV, DAQ, and if necessary, contact an expert, and leave it up to their discretion for how to proceed.

Problem	Cause	Solution
No Hits	Low Voltage	Turn On the Low Voltage**
	OFF High	Turn On the High Voltage*
	Voltage OFF	Contact Expert (by phone)
	DAQ Errors	

Missing/Noisy Channel(s)	One Channel (Bad Connection)	Contact Expert (by email)
	16 Channels (Bad NINO)	Contact Expert (by email)
	All Channels (Bad Repeater)	Contact Expert (by phone)
High/Low Rate	High Voltages set too High/Low	Check settings of High Voltage
	NINO thresholds set too High/Low	Contact Expert (by email)

\*\* Requires controlled access, no remote control through

EPICS \* Check on EPICs first, then consider controlled access

## B.1 How to Check the High Voltage

**Values:** a. Using EPICS to check the high voltage

values:

- Link for table of hodoscope HV values for left and right side:  
<https://docs.google.com/spreadsheets/d/1zLP-EcmTfvqp03FQmC8ZNb2EocsTjxnE2qipitqOwSw/edit?usp=sharing>
- Below is a table of the HV values from the link provided.

HV_BBhodo_0   1300.0 V 12.00 mA 1301.2 V 8.90 mA On 1350   00.0000		
hodo_R0   749.0 V -- 749.6 V -- On --   00.0001		
hodo_R1   897.0 V -- 898.0 V -- On --   00.0002		
hodo_R2   500.0 V -- 500.6 V -- On --   00.0003		
hodo_R3   849.0 V -- 849.6 V -- On --   00.0004		
hodo_R4   1016.0 V -- 1017.0 V -- On --   00.0005		
hodo_R5   950.0 V -- 951.0 V -- On --   00.0006		
hodo_R6   500.0 V -- 500.2 V -- On --   00.0007		
hodo_R7   787.0 V -- 787.8 V -- On --   00.0008		
hodo_R8   873.0 V -- 873.8 V -- On --   00.0009		
hodo_R9   812.0 V -- 812.6 V -- On --   00.0010		
hodo_R10   883.0 V -- 883.8 V -- On --   00.0011		

hodo_R11   736.0 V -- 736.8 V -- On --   00.0012		
hodo_R12   876.0 V -- 877.0 V -- On --   00.0013		
hodo_R13   891.0 V -- 892.4 V -- On --   00.0014		
hodo_R14   921.0 V -- 922.4 V -- On --   00.0015		
hodo_R15   883.0 V -- 883.8 V -- On --   00.0016		

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hodo_R16   853.0 V -- 853.6 V -- On --   00.0017		
hodo_R17   844.0 V -- 844.8 V -- On --   00.0018		
hodo_R18   856.0 V -- 857.0 V -- On --   00.0019		
hodo_R19   867.0 V -- 867.8 V -- On --   00.0020		
hodo_R20   852.0 V -- 852.8 V -- On --   00.0021		
hodo_R21   791.0 V -- 792.0 V -- On --   00.0022		
hodo_R22   910.0 V -- 911.0 V -- On --   00.0023		
hodo_R23   909.0 V -- 909.8 V -- On --   00.0024		
hodo_R24   943.0 V -- 944.0 V -- On --   00.0025		
hodo_R25   918.0 V -- 919.0 V -- On --   00.0026		
hodo_R26   840.0 V -- 840.8 V -- On --   00.0027		
hodo_R27   886.0 V -- 886.8 V -- On --   00.0028		
hodo_R28   926.0 V -- 926.8 V -- On --   00.0029		
hodo_R29   897.0 V -- 898.2 V -- On --   00.0030		
hodo_R30   0.0 V -- 468.8 V -- On Ovr --   00.0031		

hodo_R31   932.0 V -- 932.8 V -- On --   00.0032		
hodo_R32   954.0 V -- 954.8 V -- On --   00.0033		
hodo_R33   824.0 V -- 825.0 V -- On --   00.0034		
hodo_R34   794.0 V -- 794.8 V -- On --   00.0035		
hodo_R35   828.0 V -- 828.8 V -- On --   00.0036		
hodo_R36   804.0 V -- 804.6 V -- On --   00.0037		
odo_R37   897.0 V -- 898.0 V -- On --   00.0038		
hodo_R38   807.0 V -- 807.8 V -- On --   00.0039		
hodo_R39   875.0 V -- 875.6 V -- On --   00.0040		
hodo_R40   884.0 V -- 884.6 V -- On --   00.0041		
hodo_R41   976.0 V -- 977.2 V -- On --   00.0042		
hodo_R42   873.0 V -- 873.8 V -- On --   00.0043		
hodo_R43   941.0 V -- 942.2 V -- On --   00.0044		
hodo_R44   837.0 V -- 837.6 V -- On --   00.0045		
hodo_R45   950.0 V -- 951.2 V -- On --   00.0046		
hodo_R46   929.0 V -- 930.4 V -- On --   00.0047		
hodo_R47   957.0 V -- 958.2 V -- On --   00.0048		

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HV_BBhodo_1   1300.0 V 12.00 mA 1302.2 V 9.14 mA On 1350   02.0000		
hodo_L0   500.0 V -- 537.2 V -- On --   02.0001		
hodo_L1   964.0 V -- 965.0 V -- On --   02.0002		

hodo_L2   737.0 V -- 737.6 V -- On --   02.0003		
hodo_L3   837.0 V -- 837.4 V -- On --   02.0004		
hodo_L4   812.0 V -- 812.8 V -- On --   02.0005		
hodo_L5   825.0 V -- 825.6 V -- On --   02.0006		
hodo_L6   1087.0 V -- 1087.8 V -- On --   02.0007		
odo_L7   1003.0 V -- 1003.6 V -- On --   02.0008		
hodo_L8   929.0 V -- 930.0 V -- On --   02.0009		
hodo_L9   904.0 V -- 904.8 V -- On --   02.0010		
hodo_L10   777.0 V -- 777.2 V -- On --   02.0011		
hodo_L11   0.0 V -- 628.2 V -- On Ovw --   02.0012		
hodo_L12   853.0 V -- 853.6 V -- On --   02.0013		
hodo_L13   973.0 V -- 973.8 V -- On --   02.0014		
hodo_L14   910.0 V -- 910.6 V -- On --   02.0015		
hodo_L15   973.0 V -- 973.6 V -- On --   02.0016		
hodo_L16   973.0 V -- 973.6 V -- On --   02.0017		
hodo_L17   828.0 V -- 828.6 V -- On --   02.0018		
hodo_L18   825.0 V -- 825.6 V -- On --   02.0019		
hodo_L19   882.0 V -- 882.6 V -- On --   02.0020		
hodo_L20   716.0 V -- 716.6 V -- On --   02.0021		
hodo_L21   838.0 V -- 838.6 V -- On --   02.0022		
hodo_L22   978.0 V -- 978.8 V -- On --   02.0023		



hodo_L23   919.0 V -- 919.6 V -- On --   02.0024		
hodo_L24   929.0 V -- 929.6 V -- On --   02.0025		
hodo_L25   867.0 V -- 867.6 V -- On --   02.0026		
odo_L26   712.0 V -- 712.4 V -- On --   02.0027		
hodo_L27   833.0 V -- 833.6 V -- On --   02.0028		
hodo_L28   788.0 V -- 788.6 V -- On --   02.0029		
hodo_L29   884.0 V -- 884.4 V -- On --   02.0030		
hodo_L30   962.0 V -- 962.8 V -- On --   02.0031		

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hodo_L31   975.0 V -- 975.6 V -- On --   02.0032		
hodo_L32   796.0 V -- 796.0 V -- On --   02.0033		
hodo_L33   880.0 V -- 880.8 V -- On --   02.0034		
hodo_L34   797.0 V -- 797.6 V -- On --   02.0035		
hodo_L35   846.0 V -- 846.6 V -- On --   02.0036		
hodo_L36   924.0 V -- 924.6 V -- On --   02.0037		
hodo_L37   847.0 V -- 847.6 V -- On --   02.0038		
hodo_L38   829.0 V -- 829.4 V -- On --   02.0039		
hodo_L39   1041.0 V -- 1041.8 V -- On --   02.0040		
hodo_L40   854.0 V -- 854.8 V -- On --   02.0041		
hodo_L41   851.0 V -- 851.8 V -- On --   02.0042		
hodo_L42   905.0 V -- 905.8 V -- On --   02.0043		

hodo_L43   910.0 V -- 910.8 V -- On --   02.0044		
hodo_L44   831.0 V -- 831.6 V -- On --   02.0045		
hodo_L45   920.0 V -- 920.4 V -- On --   02.0046		
hodo_L46   946.0 V -- 946.8 V -- On --   02.0047		
hodo_L47   1104.0 V -- 1105.0 V -- On --   02.0048		
HV_BBhodo_2   1300.0 V 12.00 mA 1301.4 V 8.92 mA On 1350   04.0000		
hodo_R48   1014.0 V -- 1014.8 V -- On --   04.0001		
hodo_R49   748.0 V -- 748.8 V -- On --   04.0002		
hodo_R50   903.0 V -- 904.0 V -- On --   04.0003		
hodo_R51   922.0 V -- 922.8 V -- On --   04.0004		
hodo_R52   826.0 V -- 826.6 V -- On --   04.0005		
hodo_R53   977.0 V -- 977.6 V -- On --   04.0006		
hodo_R54   833.0 V -- 833.6 V -- On --   04.0007		
hodo_R55   838.0 V -- 838.6 V -- On --   04.0008		
hodo_R56   915.0 V -- 915.8 V -- On --   04.0009		
hodo_R57   895.0 V -- 895.8 V -- On --   04.0010		
hodo_R58   843.0 V -- 843.6 V -- On --   04.0011		
hodo_R59   927.0 V -- 927.8 V -- On --   04.0012		
hodo_R60   882.0 V -- 883.0 V -- On --   04.0013		
hodo_R61   789.0 V -- 789.6 V -- On --   04.0014		

hodo_R62   880.0 V -- 880.6 V -- On --   04.0015		
hodo_R63   893.0 V -- 893.6 V -- On --   04.0016		
hodo_R64   981.0 V -- 981.8 V -- On --   04.0017		
hodo_R65   1013.0 V -- 1014.0 V -- On --   04.0018		
hodo_R66   985.0 V -- 985.8 V -- On --   04.0019		
hodo_R67   940.0 V -- 940.6 V -- On --   04.0020		
hodo_R68   806.0 V -- 806.4 V -- On --   04.0021		
hodo_R69   992.0 V -- 992.8 V -- On --   04.0022		
hodo_R70   972.0 V -- 972.4 V -- On --   04.0023		
hodo_R71   893.0 V -- 893.8 V -- On --   04.0024		
hodo_R72   970.0 V -- 970.4 V -- On --   04.0025		
hodo_R73   827.0 V -- 827.6 V -- On --   04.0026		
hodo_R74   903.0 V -- 903.8 V -- On --   04.0027		
hodo_R75   905.0 V -- 906.0 V -- On --   04.0028		
hodo_R76   719.0 V -- 719.6 V -- On --   04.0029		
hodo_R77   991.0 V -- 991.8 V -- On --   04.0030		
hodo_R78   897.0 V -- 897.8 V -- On --   04.0031		
hodo_R79   859.0 V -- 859.6 V -- On --   04.0032		
hodo_R80   908.0 V -- 908.8 V -- On --   04.0033		
hodo_R81   800.0 V -- 800.6 V -- On --   04.0034		
hodo_R82   824.0 V -- 824.8 V -- On --   04.0035		

hodo_R83   882.0 V -- 882.4 V -- On --   04.0036		
hodo_R84   1073.0 V -- 1073.8 V -- On --   04.0037		
hodo_R85   983.0 V -- 983.8 V -- On --   04.0038		
hodo_R86   811.0 V -- 811.6 V -- On --   04.0039		
hodo_R87   954.0 V -- 954.6 V -- On --   04.0040		
hodo_R88   824.0 V -- 824.6 V -- On --   04.0041		
hodo_R89   500.0 V -- 536.0 V -- On --   04.0042		
spare   500.0 V -- 500.4 V -- On --   04.0043		
spare   867.0 V -- 867.6 V -- On --   04.0044		
spare   919.0 V -- 919.6 V -- On --   04.0045		
spare   966.0 V -- 966.8 V -- On --   04.0046		

spare   500.0 V -- 500.2 V -- On --   04.0047		
spare   500.0 V -- 500.4 V -- On --   04.0048		
HV_BBhodo_3   1300.0 V 12.00 mA 1301.8 V 8.61 mA On 1350   06.0000		
hodo_L48   714.0 V -- 714.4 V -- On --   06.0001		
hodo_L49   788.0 V -- 788.4 V -- On --   06.0002		
hodo_L50   1085.0 V -- 1085.6 V -- On --   06.0003		
hodo_L51   883.0 V -- 883.8 V -- On --   06.0004		
hodo_L52   760.0 V -- 760.8 V -- On --   06.0005		
hodo_L53   855.0 V -- 855.8 V -- On --   06.0006		

hodo_L54   946.0 V -- 946.8 V -- On --   06.0007		
hodo_L55   833.0 V -- 833.6 V -- On --   06.0008		
hodo_L56   782.0 V -- 782.4 V -- On --   06.0009		
hodo_L57   861.0 V -- 861.4 V -- On --   06.0010		
hodo_L58   846.0 V -- 846.6 V -- On --   06.0011		
hodo_L59   781.0 V -- 781.4 V -- On --   06.0012		
hodo_L60   948.0 V -- 948.6 V -- On --   06.0013		
hodo_L61   884.0 V -- 884.4 V -- On --   06.0014		
hodo_L62   883.0 V -- 883.6 V -- On --   06.0015		
hodo_L63   853.0 V -- 853.8 V -- On --   06.0016		
hodo_L64   886.0 V -- 886.6 V -- On --   06.0017		
hodo_L65   852.0 V -- 852.8 V -- On --   06.0018		
hodo_L66   870.0 V -- 870.8 V -- On --   06.0019		
hodo_L67   981.0 V -- 981.6 V -- On --   06.0020		
hodo_L68   978.0 V -- 978.8 V -- On --   06.0021		
hodo_L69   977.0 V -- 977.8 V -- On --   06.0022		
hodo_L70   893.0 V -- 893.8 V -- On --   06.0023		
odo_L71   873.0 V -- 873.6 V -- On --   06.0024		
hodo_L72   857.0 V -- 857.8 V -- On --   06.0025		
hodo_L73   921.0 V -- 921.6 V -- On --   06.0026		
hodo_L74   844.0 V -- 844.8 V -- On --   06.0027		

hodo_L75   935.0 V -- 935.6 V -- On --   06.0028			
hodo_L76   973.0 V -- 973.8 V -- On --   06.0029			

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hodo_L77   967.0 V -- 967.4 V -- On --   06.0030			
hodo_L78   798.0 V -- 798.4 V -- On --   06.0031			
hodo_L79   913.0 V -- 913.6 V -- On --   06.0032			
hodo_L80   814.0 V -- 814.8 V -- On --   06.0033			
hodo_L81   814.0 V -- 814.4 V -- On --   06.0034			
hodo_L82   817.0 V -- 817.4 V -- On --   06.0035			
hodo_L83   947.0 V -- 948.0 V -- On --   06.0036			
hodo_L84   976.0 V -- 976.8 V -- On --   06.0037			
hodo_L85   950.0 V -- 950.6 V -- On --   06.0038			
hodo_L86   777.0 V -- 777.6 V -- On --   06.0039			
hodo_L87   910.0 V -- 910.6 V -- On --   06.0040			
hodo_L88   939.0 V -- 939.8 V -- On --   06.0041			
spare   0.0 V -- 612.0 V -- On Ovw --   06.0042			
pare   928.0 V -- 928.8 V -- On --   06.0043			
spare   945.0 V -- 945.8 V -- On --   06.0044			
spare   0.0 V -- 613.2 V -- On Ovw --   06.0045			
spare   500.0 V -- 542.2 V -- On --   06.0046			
spare   0.0 V -- 613.2 V -- On Ovw --   06.0047			

spare   500.0 V -- 540.2 V -- On --   06.0048			
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- Do not edit the values in the link provided above unless you are one of the hodoscope experts

- From the command line type:

- ssh aslow@adaqsc (password 12daq:CODA3)
- go\_hv

- The EPICS gui will open with no vnc server necessary, give it a few seconds. There will be drop down menus for all detectors, find the

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primary, left side, and right side menus for hodoscope high voltage values.

- If the primary channels are off, then all other channels on the left and right will be off as well. If the primary channels are on, then all other channels on the left and right should be on as well. The primary channels should look as follows. To turn the whole detector off use primary channels.

Ch ID	On/Off	Status	Vmax	Imax	Volt	Itrip	Vmax	RngUp	RngDwn
H00_S0_Primary	ON	ON	1301.20	9	1300.0	12.0	1350.0	150.0	150.0
H00_S2_Primary	ON	ON	1302.20	9	1300.0	12.0	1350.0	150.0	150.0
H00_S4_Primary	ON	ON	1301.40	9	1300.0	12.0	1350.0	150.0	150.0
H00_S6_Primary	ON	ON	1301.80	9	1300.0	12.0	1350.0	150.0	150.0
ALL CHANNELS	OFF	ON							
						0.000	0.000	0.000	0.000

## ON/OFF CONTROL BUTTONS

- To check the high voltage values are set correctly, compare the values in EPICS to the values set using telnet.
- To telnet into the high voltage main frame from the command line type:
  - ssh bbhodo@tedbbdaq (password D4q!23)
  - telnet bbth-hv 1527
    - (username BBhodo, password bbhodo19)

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- Use keyboard arrows and tab key to maneuver through the channels, navigate to Main, hit enter, navigate to Channels, hit enter, navigate through the columns and rows to change values, use the VOSet column to change HV values.



Channel Name	V0Set	I0Set	VMon	IMon	Pw	Status	SVMax	Ch#
<b>HV_BBhodo_0</b>	1300.0 V	12.00 mA	1301.4 V	8.90 mA	On		1350	00.0000
hodo_R0	749.0 V	--	749.8 V	--	On		--	00.0001
hodo_R1	877.0 V	--	877.8 V	--	On		--	00.0002
hodo_R2	500.0 V	--	500.4 V	--	On		--	00.0003
hodo_R3	849.0 V	--	849.6 V	--	On		--	00.0004
hodo_R4	966.0 V	--	966.8 V	--	On		--	00.0005
hodo_R5	950.0 V	--	951.0 V	--	On		--	00.0006
hodo_R6	500.0 V	--	500.4 V	--	On		--	00.0007
hodo_R7	787.0 V	--	787.8 V	--	On		--	00.0008
hodo_R8	873.0 V	--	873.6 V	--	On		--	00.0009
hodo_R9	812.0 V	--	812.8 V	--	On		--	00.0010
hodo_R10	883.0 V	--	884.0 V	--	On		--	00.0011
hodo_R11	756.0 V	--	756.8 V	--	On		--	00.0012
hodo_R12	876.0 V	--	877.0 V	--	On		--	00.0013
hodo_R13	891.0 V	--	892.0 V	--	On		--	00.0014
hodo_R14	921.0 V	--	922.2 V	--	On		--	00.0015
hodo_R15	883.0 V	--	883.8 V	--	On		--	00.0016
hodo_R16	853.0 V	--	853.8 V	--	On		--	00.0017
hodo_R17	844.0 V	--	844.6 V	--	On		--	00.0018

Channels Display/Edit Screen      LocEn V0 I0      N | CAEN SY1527

- The set values in telnet should match the set values in EPICS. If not, then adjust the set values in EPICS to what the values are set to in telnet.

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## **B.2 How to Turn On the High Voltage:**

**\*remote control is always the preferred first action a.** Remotely Turning On High Voltage Main Frame:

- From the command line type:
  - ssh aslow@adaqsc (password 12daq:CODA3)

- go\_hv
- Use the EPICS gui to turn the high voltage on remotely, either press the ON button at the very bottom to turn on all channels in that tab or press the ON/OFF button on individual channels to turn on channels individually.
- To telnet into the high voltage main frame from the command line type:
  - ssh bbhodo@tedbbdaq (password D4q!23)
  - telnet bbth-hv 1527
    - (username BBhodo, password bbhodo19)
  - Use keyboard arrows and tab key to maneuver through the channels (See Section B.1)
- Use the telnet connection to turn the high voltage on remotely, this is as an alternative to using EPICS. In EPICS the primary channels can be turned on individually, as well as the individual channels on the left and right sides. In telnet the primary channels can be turned on individually, but the individual channels can only be turned off and on in groups of eight on the left and right sides.

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## **b. Manually Turning On High Voltage Main Frame:**

### **\*requires controlled access**

- Only power cycle HV manually as a last resort and with agreed controlled access permission from the RC.
- Locate the SBS detector electronics bunker in Hall A



### **TIMING HODOSCOPE ELECTRONICS RACK**

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- Locate the electronics rack housing the high voltage main frame **HIGH**

## VOLTAGE MAIN FRAME

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- Turn the power key from “OFF” position to the right so the power key is in the “LOCAL” position



### **LED LIGHTS POWER KEY**

- “MAIN”, “OK”, “5+”, “12+”, and “12-” LEDs should turn on, as well as LEDs for “48+” corresponding to the high voltage channels being used
- If the high voltage main frame does not turn on, or if one of the LEDs is not turned on, check the power switch on the back of the high voltage main frame. If that does not work, then please contact an expert for help.

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### **B.3 How to Turn Off the High Voltage:**

**\*remote control is always the preferred first action a. Remotely Turning Off High Voltage Main Frame:**

- From the command line type:

- ssh aslow@adaqsc (password 12daq:CODA3)
- go\_hv
- Use the EPICS gui to turn the high voltage off remotely, either press the OFF button at the very bottom to turn off all channels in that tab or press the ON/OFF button on individual channels to turn off channels individually.
- To telnet into the high voltage main frame from the command line type:
  - ssh bbhodo@tedbbdaq (password D4q!23)
  - telnet bbth-hv 1527
    - (username BBhodo, password bbhodo19)
  - Use keyboard arrows and tab key to maneuver through the channels (See Section B.1)
- Use the telnet connection to turn the high voltage off remotely, this is as an alternative to using EPICs. In EPICs the primary channels can be turned off individually, as well as the individual channels on the left and right sides. In telnet the primary channels can be turned off individually, but the individual channels only be turned off and on in groups of eight on the left and right sides.

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## **b. Manually Turning Off the High Voltage Main Frame:**

### **\*requires controlled access**

- Only power cycle HV manually as a last resort and with agreed controlled access permission from the RC.
- Locate the SBS detector electronics bunker in Hall A



### **TIMING HODOSCOPE ELECTRONICS RACK**

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- Locate the electronics rack housing the high voltage main frame **HIGH**

## **VOLTAGE MAIN FRAME**

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- The power key should be in the “LOCAL” position, turn the power key to the left so the power key is in the “OFF” position.





**LED LIGHTS POWER KEY**

- “MAIN”, “OK”, “5+”, “12+”, and “12-” LEDs should turn off, as well as LEDs for “48+” corresponding to the high voltage channels being used
- If the high voltage main frame does not turn on, or if one of the LEDs is not turned on, check the power switch on the back of the high voltage main frame. If that does not work, then please contact an expert for help.

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## **B.4 How to Turn On the Low**

**Voltage:** \*requires controlled access

**a. Manually Turning On Low Voltage Power Supply:**

- Locate the SBS detector electronics bunker in Hall A



### **TIMING HODOSCOPE ELECTRONICS RACK**

22

- Locate the electronics rack housing the low voltage power supply **LOW**

## VOLTAGE POWER SUPPLY

23

- The power switch should be in the off position, flip the power switch to the on position. Adjust the voltage or current controls until the supply reads ~**7.1** volts and ~**15.79** amps.
- These values are set such that the NINO cards receive the minimum **5** volts necessary, and their thresholds are set to **1.6** volts.



## POWER SWITCH SUPPLY CONTROLS

- If the low voltage power supply does not turn on, or if one of the supply controls do not work properly, then please contact an expert for help.

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### **B.5 How to Turn Off the Low**

**Voltage:** \*requires controlled access

**a.** Manually Turning Off Low Voltage Power Supply:

- Locate the SBS detector electronics bunker in Hall A



### **TIMING HODOSCOPE ELECTRONICS RACK**

25

- Locate the electronics rack housing the low voltage power supply **LOW**

## VOLTAGE POWER SUPPLY

26

- The power switch should be in the on position. Adjust the voltage or current controls until the supply reads ~**0.0** volts and ~**0.0** amps, then flip the power switch to the off position.



### **POWER SWITCH SUPPLY CONTROLS**

- If the low voltage power supply does not turn off, or if one of the supply controls do not work properly, then please contact an expert for help.

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## **B.6 How to Power Cycle VME Crate:**

**\*requires controlled access**

**a. Manually Power Cycling the VME Crate:**

- Locate the SBS detector electronics bunker in Hall A



### **TIMING HODOSCOPE ELECTRONICS RACK**

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- Locate the electronics rack housing the VME crate. **VME CRATE**



- The power switch should be in the on position. Flip the power switch to the off position and then the on position to power cycle the VME crate.

## **POWER SWITCH**

- If the VME crate does not power cycle correctly, then please contact an expert for help.