



**Fermilab**

**Beams Division / RF Department / HLRF Group**  
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## **Booster RF Bias Supply Startup / Shutdown Procedure**

This Procedure is used for two purposes. The first is to bring the Bias Supply from an isolated **AC Source of Energy State** to Bias Supply Ready State (**Startup**). The Second is to bring the Bias Supply from a ready state, to an isolated state where the **AC Source of energy that feeds** the stations Bias Supply is locked out using LOTO (**Shutdown**). One must be familiar with and can follow all LOTO procedures mentioned in this document.

### **Personnel required**

- 1.) At least one authorized and knowledgeable about the Booster RF System. **Need two**, at least one authorized if going into the Galleries Anode Power Supply.

### **Prepare and Notify**

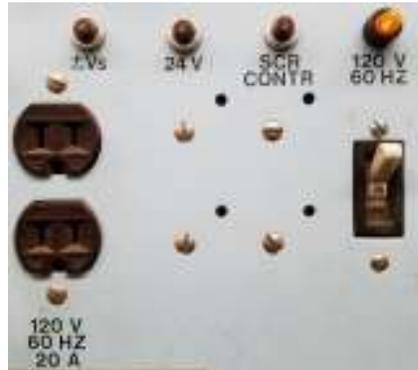
- 1) **Prepare:** The authorized employee shall understand the hazards involved and how to control them. If an authorized employee does not have this knowledge, he/she is not qualified to perform the LOTO procedure or maintenance activity.

**The authorized employee shall understand and follow the **Booster Ferrite Bias Supply LOTO procedure** (ADDP-RF 2016-0006) to isolate the sources of AC energy feeding the Bias Supply supply.**

- 2) **Notify:** The authorized employee should or should have, as necessary, notify affected area personnel of the LOTO and maintenance activity. Affected personnel include those who might normally use the equipment or who would be affected by the unavailability of the equipment

## Ferrite Bias Supply Startup Procedure

- 1) Turn on the 120V breaker located on the right front of the Bias Supply.



- 2) Turn on the Ferrite Bias Supplies 24V/50KHz Supply. This is accomplished by place the Control Unit into Local and pushing the (Red) button marked 24v – 50 KHz ON it's usually a (Red) button on the left-hand side of the Contactor Control Unit.



- 3) The authorized employee shall then follow the **Booster Ferrite Bias Supply LOTO procedure** (ADDP-RF 2016-0006) for restoring all the sources of AC energy to the Bias Supply if the supplies 480V has been locked out. Also, the LCW valve in.  
**NOTE: Steps 1 & 2 must be performed before the 480v circuit breaker is thrown. Serious damage to the FBS will occur if the 120v breaker is not on or the 50 KHz supply.**
- 4) Reset all Faults shown on the Bias Supplies Contactor Control Unit and Diagnostic panel. This is accomplished by pushing the reset buttons on the right-hand side of the Contactor Control Unit.



- 5) Check the Bias Supplies **and** the Cavity water flow to see if present. If not correct problem.
- 6) Take the Cavity short out, this is accomplished by using the IRM's control panel and pushing the switch marked cavity short in/out.



- 7) From the Console Turn Ferrite Bias Supply (FBS) to on from page B-25 or locally by placing Ferrite Bias Supply control units in LOCAL mode and pushing the contactor closed (**Red**) button located on the contactor control unit.



### **Ferrite Bias Supply Shutdown Procedure**

- 1) From the Console turn the stations modulator to HV off from page B-25 or locally by placing modulator in LOCAL mode and pushing the HV off button
- 2) From the Console Turn Ferrite Bias Supply (FBS) to off from page B-25 or locally by placing Ferrite Bias Supply control units in LOCAL mode and pushing the contactor open (**Green**) button located on the control unit.



- 3) The authorized employee shall then follow the **Booster Ferrite Bias Supply LOTO procedure** (ADDP-RF 2016-0006) for isolating the sources of AC energy to the Bias Supply.
- 4) Turn OFF the Ferrite Bias Supplies 24V/50Khz supply. This is accomplished by pushing the button marked 24v – 50 KHz OFF it's usually a (Green) button on the left-hand side of the Contactor Control Unit.



- 5) Turn OFF the 120V breaker located on the right front of the Bias Supply.



**Booster R.F. Disconnect Locations and Designations  
480 vac Tables**

<b>East Booster RF Mod/SSD 480 Volt Distribution</b>						
			<b>DHP-Y-BE3</b>	<b>DHP-BE6 Cir#40</b>	<b>PHP-BE5</b>	
<b>RF Station</b>	<b>BSTR Period</b>	<b>FBS Switch</b>	<b>FBS Breaker#</b>	<b>Modulator Switch</b>	<b>Mod Breaker#</b>	<b>SSD Breaker#</b>
1	14	G14-SS-01	13-15-17	G14-SS-02	01-03-05	01-03-05
2	14	G14-SS-04	19-21-23	G14-SS-03	02-04-06	02-04-06
3	15	G15-SS-01	14-16-18	G15-SS-02	07-09-11	07-09-11
4	15	G15-SS-04	20-22-24	G15-SS-03	08-10-12	08-10-12
5	16	G16-SS-02	26-28-30	G16-SS-01	13-15-17	13-15-17
6	16	G16-SS-04	44-46-48	G16-SS-03	14-16-18	14-16-18
20	16	G16-SS-06	56-58-60	G16-SS-05	26-28-30	26-28-30
19	16	G16-SS-08	50-52-54	G16-SS-07	25-27-29	25-27-29
7	17	G17-SS-02	68-70-72	G17-SS-01	19-21-23	19-21-23
8	17	G17-SS-04	62-64-66	G17-SS-03	20-22-24	20-22-24
<b>West Booster RF Mod/SSD 480 Volt Distribution</b>						
			<b>DHP-Y-BW1</b>			<b>DHP-L4-1-1</b>
<b>RF Station</b>	<b>BSTR Period</b>	<b>FBS Switch</b>	<b>FBS Breaker#</b>	<b>Modulator Switch</b>	<b>Mod Breaker#</b>	<b>SSD Breaker#</b>
17	20	G20 RF SS-2	80-82-84	G20 RF SS-1	80-82-84	01-03-05
18	20	G20 RF SS-3	74-76-78	G20 RF SS-4	74-76-78	02-04-06
9	21	G21 RF SS-2	13-15-17	G21 RF SS-1	13-15-17	07-09-11
10	21	G21 RF SS-4	19-21-23	G21 RF SS-3	19-21-23	08-10-12
11	22	G22 RF SS-2	25-27-29	G22 RF SS-1	25-27-29	13-15-17
12	22	G22 RF SS-4	31-33-25	G22 RF SS-3	31-33-25	14-16-18
						<b>DHP-BW-1-1</b>
13	23	G23 RF SS-1	50-52-54	G23 RF SS-2	50-52-54	01-03-05
14	23	G23 RF SS-10	56-58-60	G23 RF SS-9	56-58-60	02-04-06
15	24	G24 RF SS-2	62-64-66	G24 RF SS-1	62-64-66	07-09-11
16	24	G24 RF SS-6	68-70-72	G24 RF SS-5	68-70-72	08-10-12

<b>West Booster BWG-124 RF FBS/Mod/SSD 480 Volt Distribution - Fed From DHP-L4-1</b>							
			<b>DHP-L4-1-2</b>				
<b>RF Station</b>	<b>Period</b>	<b>FBS Switch</b>	<b>Breaker#</b>	<b>MOD Switch</b>	<b>Breaker#</b>	<b>SSD Switch</b>	<b>Breaker#</b>
21	20	FBS #21	02-04-06	MOD #21	20-22-24	SSD #21	25-27-29
22	20	FBS #22	08-10-12	MOD #22	26-28-30	SSD #22	19-21-23

## 120vac Tables

East Booster RF FBS/SSD 120 Volt Distribution				
RF Station	FBS BSTR Panel	120 Breaker#	SSD BSTR Panel	120 Breaker#
1	G15-PP-01	#22	G15-PP-06	#25
2	G15-PP-01	#24	G15-PP-06	#27
3	LP-BE-7/G15-PP-02	#30	G15-PP-06	#21
4	LP-BE-7/G15-PP-02	#29	G15-PP-06	#23
5	LP-BE-7/G15-PP-02	#20	G15-PP-06	#13
6	LP-BE-7/G15-PP-02	#19	G15-PP-06	#15
20	G15-PP-06	#20	G15-PP-06	#18
19	LP-BE-7/G15-PP-02	#19	LP-BE7/G15-PP-02	#18
7	LP-BE-7/G15-PP-02	#18	G15-PP-06	#17
8	LP-BE-7/G15-PP-02	#17	G15-PP-06	#19

West Booster RF FBS/SSD 120 Volt Distribution				
RF Station	FBS BSTR Panel	120 Breaker#	SSD BSTR Panel	120 Breaker#
9	LP-BW-7/G23-PP-02	#18	PP-BW-1-1	#01
10	LP-BW-7/G23-PP-02	#17	PP-BW-1-1	#03
11	LP-BW-7/G23-PP-02	#24	PP-BW-1-1	#17
12	LP-BW-7/G23-PP-02	#23	PP-BW-1-1	#19
13	LP-BW-7/G23-PP-02	#30	PP-BW-1-1	#11
14	LP-BW-7/G23-PP-02	#29	PP-BW-1-1	#09
15	LP-BW-7/G23-PP-02	#08	PP-BW-1-1	#15
16	LP-BW-7/G23-PP-02	#06	PP-BW-1-1	#13
17	LP-BW-7/G23-PP-02	#02	PP-BW-1-1	#07
18	LP-BW-7/G23-PP-02	#04	PP-BW-1-1	#05

BWG-124 Booster RF FBS/SSD 120 Volt Distribution				
RF Station	FBS BSTR Panel	120 Breaker#	SSD BSTR Panel	120 Breaker#
21	PP-L4-1-2	#01	PP-L4-1-2	#02
22	PP-L4-1-2	#03	PP-L4-1-2	#04

### Booster R.F Anode Power Supply Breaker Locations and Designations

East Anode Power Supplies	13.8 KV	EAPS
	208	G11-PP-02
Anode Power Supplies Water Skid	480	DHP-BE-4 fka G12-PP-05
West Anode Power Supplies	13.8 KV	WAPS
	208	LP-BW-6 fka G02-PP-02
Anode Power Supplies Water Skid	480	DHP-BW4 fka G02-PP-01

# Block Diagram

