FRIB MPS Device Configuration Guideline

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Revision History

Revision	Issued	Changes
R001	17 October 2022	Original issue
R002	10 February 2023	Updated for 5 kW based on BTP149
R003	6 April 2023	Added destination FS1 FC (FS1_BMS:FC_D2634) up to 20 W for profile measurement
R004	3 October 2023	Specified the coverage of signature. Added destinations: FS1a dump (FS1_BTS:BD_D2498) 135W, FS2 dump (FS2_BTS:BD_D4018) 25W pulse, and FS2 FC (FS2_BMS:FC_D4253) 25 W. Increased threshold power from 20 to 25 W only for designated faraday cups or beam dumps, AP's instruction, and FS2 DCCTs to suppress the noise and efficiently establish beam matching by profile measurements. Added Carbon Stripper RF Ctlr. Removed PLCs that are no longer used (PLC1060, PLC1064, FS Beamline PLC Mode 13, THALL Beamline PLC Mode 13, THALL Beamline PLC Mode 14, THALL Beamline PLC Mode 15, THALL Vacuum PLC Mode 14). Reorganized PLC and other sections into the order they occur in the beamline instead of alphabetical order to be consistent with MPS Operator screen.
R005	27 March 2025	Retrieved 'FS Beamline PLC Mode 13' per CCR25-12908. Updated BIM13 to send primary beam past the TH beam dump according to OSE11. Changed MTCA01, 2, 3, 4, 6, 7, 9, 10, 11, 12, 14, 15, 16, 17, and 19 to always ON due to the use of the Threshold Configuration Tool (CCR24-12820). Removed BLM and BCM maps. Updated Lithium Main PLC according to MPS changes with CCR24-12547'. Removed the "Primary or Secondary Beam" row. Changed the title of the row from "Destination" to "Beam transport up to" and from "Max Beam Power" to "Max Primary Beam Power". Updated BIM13 columns from "DB5 or beyond" to "SCD3" and "beyond SCD3"

Authorizing Document

None.

Authorized Documents

None.

Authorized Committees and Boards

None.

Named Program Roles

None.

Awareness Training

None.

Enabling Training

None.

MPS Device Configuration Guideline

		Beam transport up to	FC D738	D814-998	FC D1102	FC D1224	FS1a Dump	FS1a Dump	FS1a Dump	FSEE	FS1b Dump	FS1b Dump	FS1 FC	FS1 FC	FS2 Dump	FS2 Dump	FS2 Dump	FS2 FC	FS2 FC	BDS Dump	BDS Dump	BDS Dump	TH Dump	TH Dump	TH Dump	TH Dump	TH Dump	SCD3	beyond SCD3
		Beam Inhibit Mode	BIM1	BIM2-3	BIM4	BIM5	BIM6	BIM6	BIM6	BIM 6a	BIM7	BIM7	BIM8	BIM8	BIM9	BIM9	BIM9	BIM10	BIM10	BIM11	BIM11	BIM11	BIM12	BIM12	BIM12	BIM13	BIM13	BIM13	BIM13
		Max Primary Beam Power				2W	2W	15W pulsed	135W	2W	2W	500W	2W	25W	2W	25W pulse	135W	2W	25W	2W	25W pulse	135W	2W pulse	25W	Greater than 25W	2W pulse	Greater than 2W	200W	
		MPS Level			1	1	1	2c		1	1	2d	1	2c	2a		3a	2b		2b	2c	3b		5	6		6	4	6
		Extra Notes									Dipole Disc.	Dipole Disc.											SCD2 off	SCD2 off	SCD2 off	Dump =0mm	Dump =0mm	SCD3 off	primary stops on THDump
Mitigation Systems																													
E-bend Lower SW1	Always ON		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
E-bend Lower SW2	Always ON		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
E-bend Upper SW1	Always ON		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
E-bend Upper SW2	Always ON		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
Chopper Monitor	Always ON		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
PPS RF Permit	(If it trips, it turns off beam, LLRF, and IS HV)		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
PPS Beam Permit	Always ON (to send NPERMIT to LLRF and Diag to freeze circle buffer)		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
PLC																													
FE Beamline PLC Beam Inhibit	Always ON		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
LS1 Beamline PLC, CA01-CA03					ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
LS1 Beamline PLC, CB01-CB06						ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
LS1 Beamline PLC, CB07-BTS						ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
Lithium CEC PLC	Not yet functional																												
Lithium Main PLC	Only when lithium stripper is in use per BDS and Operational Status screen					ON	ON	ON		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
FS1 Beamline PLC						ON	ON	ON		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
FS1 Beamline PLC SEE									ON																				
LS2 Beamline PLC, CC01-CC06															ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
LS2 Beamline PLC, CD01-CD06															ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
FS2 Beamline PLC															ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
LS3 Beamline PLC																				ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
BDS Beamline PLC, Mode 11	Not required for Mode 12 - 15																			ON	ON	ON							
BDS Beamline PLC, Mode 12																							ON	ON	ON	ON	ON	ON	ON
Target and Beam Dump PLC																							ON	ON	ON	ON	ON		ON
FS Beamline PLC, Mode 12																							ON	ON	ON	ON	ON	ON	ON
FS Beamline PLC, Mode 13																										ON	ON	ON	ON
A1900 Vacuum PLC, Mode 13 PLC1062																													ON
A1900 Vacuum PLC, Mode 13 PLC1066																													ON
S3 PLC, Mode 15																													
Micro TCA	All MTCAs set up by Diagnostics																												
MTCA01 (Faraday Cups, FE_N0106)	Always ON		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
MTCA02 (BPMs, LS1_N0206)	Always ON		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
MTCA03 (Diag)	Always ON FS2 BMS - LS3 CD03		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
MTCA04 (LS1 HMRs, NDs)	Always ON RFQ - LS1 CB03		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
MTCA05 (Diag)																													
MTCA06 (BCMs)	Always ON Peak current of BCM_D1055, DBCMs		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
MTCA07 (Diag)	Always ON LS1 CB04 - LS1 BTS		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
MTCA08 (Diag)																													
MTCA09 (Diag)	Always ON FS1 STRIP - FS1a BD & FS1b BD		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
MTCA10 (Diag)	Always ON		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
MTCA11 (Diag)	Always ON FS1 MGB02 - LS2 CC06		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
MTCA12 (Diag)	Always ON LS2 CC08 - LS2 CD08		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
MTCA13 (Diag)																													
MTCA14 (Diag)	Always ON LS2 CD10 - LS2 CD12		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
MTCA15 (Diag)	Always ON FS2 BTS - FS2 BD & BBS		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
MTCA16 (Diag)	Always ON LS3 CD05 - LS3 CD06		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
MTCA17 (Diag)	Always ON LS3 BTS (Upstream Cryo Shaft)		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
MTCA18 (Diag)																													
MTCA19 (Diag)	Always ON LS3 BTS (Downstream Cryo Shaft)		ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON	ON
MTCA20 (Diag)																													
MTCA21 (Target Hall & ARIS)																													
Other																													
Carbon Stripper STPC	Only when carbon stripper is in use per BDS and Operational Status screen						ON	ON			ON		ON		ON	ON		ON			ON	ON		ON	ON		ON		ON
Carbon Stripper RF Ctlr	Only when carbon stripper is in use per BDS and Operational Status screen						ON	ON			ON		ON		ON	ON		ON			ON	ON		ON	ON		ON		ON
FS1_CSS:DCCT_D2163	Not yet functional																												
FS1_CSS:DCCT_D2293	Not yet functional																												
FS1_BBS:DCCT_D2394	Not yet functional																												
FS2_BBS:DCCT_D3979																						ON			ON		ON		ON
FS2_BBS:DCCT_D4034																						ON			ON		ON		ON
FS2_BBS:DCCT_D4072																						ON			ON		ON		ON
FS2_BBS:DCCT_D4127																						ON			ON		ON		ON
BDS_BBS:DCCT_D5578																							ON		ON		ON		ON
FS_F1S1:DCCT_D1064																							ON	ON	ON	ON	ON		ON
FS SCD1-SCD4 QD, Mode 13																								ON	ON	ON	ON	ON	ON
NCU																							ON	ON	ON	ON	ON	ON	ON
Wedge PIN Rate Meter																													
RFC																													
RFC FE							ON*1	ON			ON		ON*1		ON*1	ON		ON*1		ON*1	ON		ON*1	ON		ON*1		ON*1	
RFC LS1	SRF needs to specify excluded cavities						ON*	ON			ON		ON*1		ON*1	ON		ON*1		ON*1	ON		ON*1	ON		ON*1		ON*1	
RFC FS1							APs request	ON			ON		ON*1		ON*1	ON		ON*1		ON*1	ON		ON*1	ON		ON*1		ON*1	
RFC LS2	SRF needs to specify excluded cavities														ON*1	ON		ON*1		ON*1	ON		ON*1	ON		ON*1		ON*1	
RFC LS3	SRF needs to specify excluded cavities																			ON*1	ON		ON*1	ON		ON			

Always ON
Always ON
Always ON
Always ON
Always ON
Always ON
Always ON

FS2 DCCTs need to be disabled when less than or equal to 25W for beam tuning

BLMs can be disabled temporarily by AP's instruction for PM measurement when less than or equal to 25 W

*1) LLRF controllers can be disabled temporarily by AP's instruction when less than or equal to 25