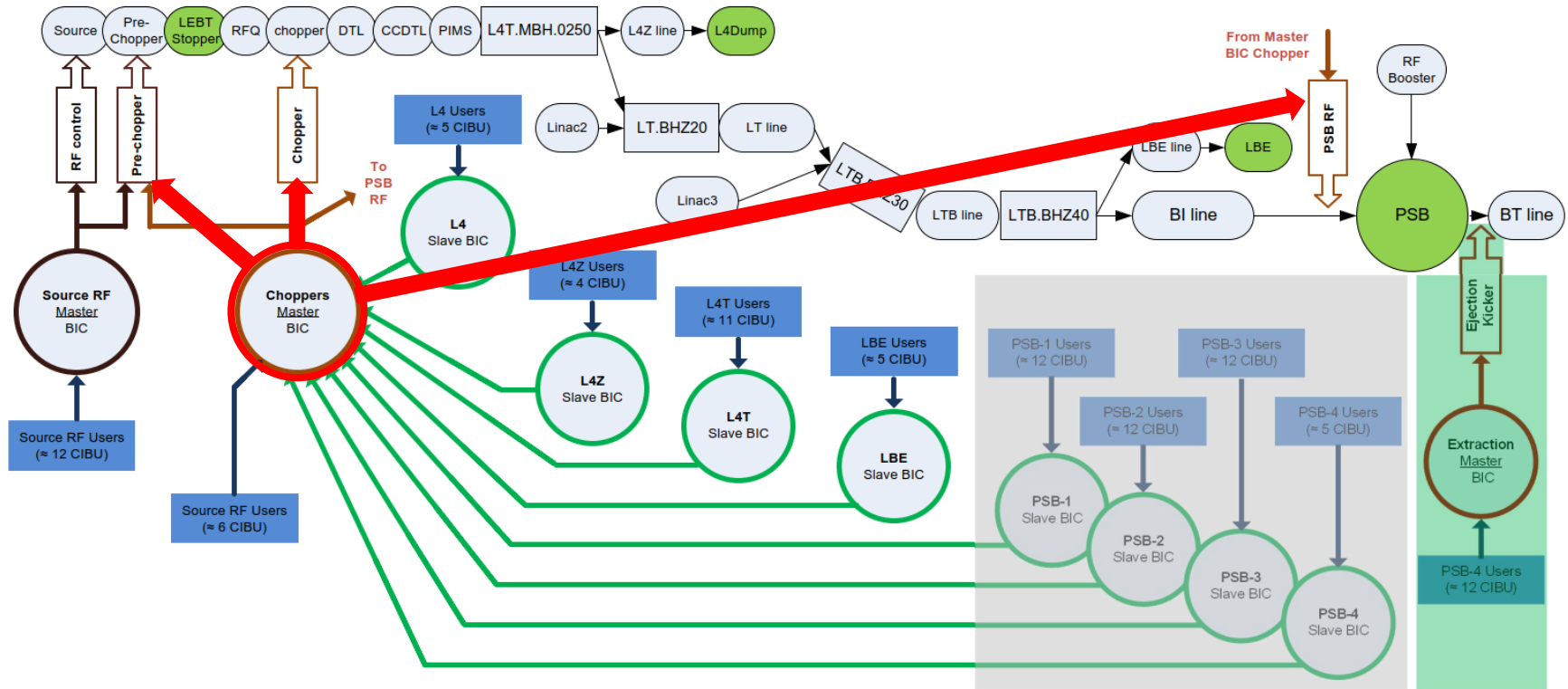# Linac4 BIS modification

Linac4 BIS layout before modification

In the original specification the Master Chopper BIC acts on 3 actuators :
- The Chopper as main actuator
- The Pre-chopper as first redundance
- The PSB RF as second redundance

The Beam Permit pulse length delivered by the Chopper Master BIC depends on the different User system connected to it:

Ch.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	OUT	
Interlock Users	SIS	Source Beam Stoppers Out / Mov_CH	Source Beam Stoppers In_CH	Linac4 OK	AQN L4T.MBH_DUMP	L4Z OK	AQN L4T.MBH_LT	Linac4 Transfer OK	AQN LTB.BHZ40_LBE	LBE OK	AQN LTB.BHZ40_PSB	PSB 1 OK	PSB 2 OK	PSB 3 OK	PSB 4 OK	Choppers Master Beam_Permit	
Matrix Equation	1	0	1	x	x	x	x	x	x	x	x	x	x	x	x	1	Beam to Stoppers
	1	1	0	1	1	1	0	x	x	x	x	x	x	x	x	1	Beam to Dump
	1	1	0	1	0	x	1	1	1	1	0	x	x	x	x	1	Beam to LBE
	1	1	0	1	0	x	1	1	0	x	1	1	1	1	1	1	Beam to PSB

Figure 5 :   Truth table of the 'Choppers' Master BIC.

The same Beam Permit is delivered to all actuators
This Beam Permit has a typical duration of 600us (depending on the Linac4 configuration). The pulse duration is to short for the PSB RF actuator and is not synchronised on the PSB RF timing.

The RF electronic should have been modified to take into account this Beam Permit (extend the length, resynchronise on PSB RF …)

As the PSB RF actuator is a "second" redundance, it has been decide to not connect the Chopper Master BIC output to the PSB RF.

The BIS Linac4 engineering specification has been modified and is under approval (no ECR, just new version to be approved by involved experts)

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the
Linac4
project

LINAC4 Project Document No.
L4-CIB-ES-0001 rev. 2.2

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TE/MPE

EDMS Document No.
1016233

Date: 2020-06-05

Engineering Specification

BEAM INTERLOCK SYSTEM SPECIFICATIONS FOR LINAC4, TRANSFER LINES AND PS BOOSTER

Abstract

LINAC4 Project Document No.
L4-CIB-ES-0001 rev. 2.2

History of Changes

Rev. No.	Date	Pages	Description of Changes
2.2	13/08/2021	All	Removed BIS connection to the PS Booster RF actuator.