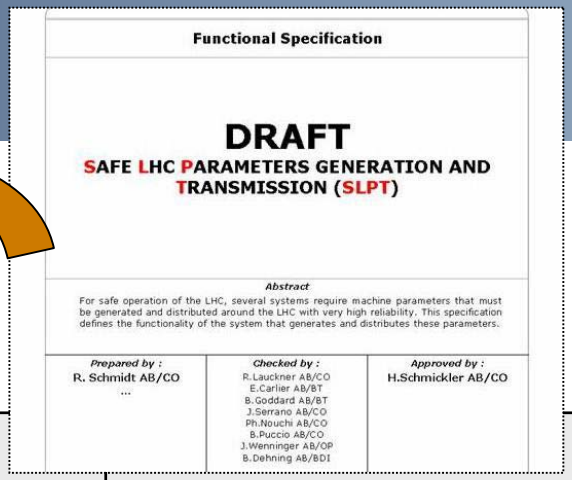
Generation and Transmission

of

Safe Beam Parameters

Reminder on Safe Beam Parameters


Functional Specification

DRAFT

SAFE LHC PARAMETERS GENERATION AND TRANSMISSION (SLPT)

Abstract

For safe operation of the LHC, several systems require machine parameters that must be generated and distributed around the LHC with very high reliability. This specification defines the functionality of the system that generates and distributes these parameters.

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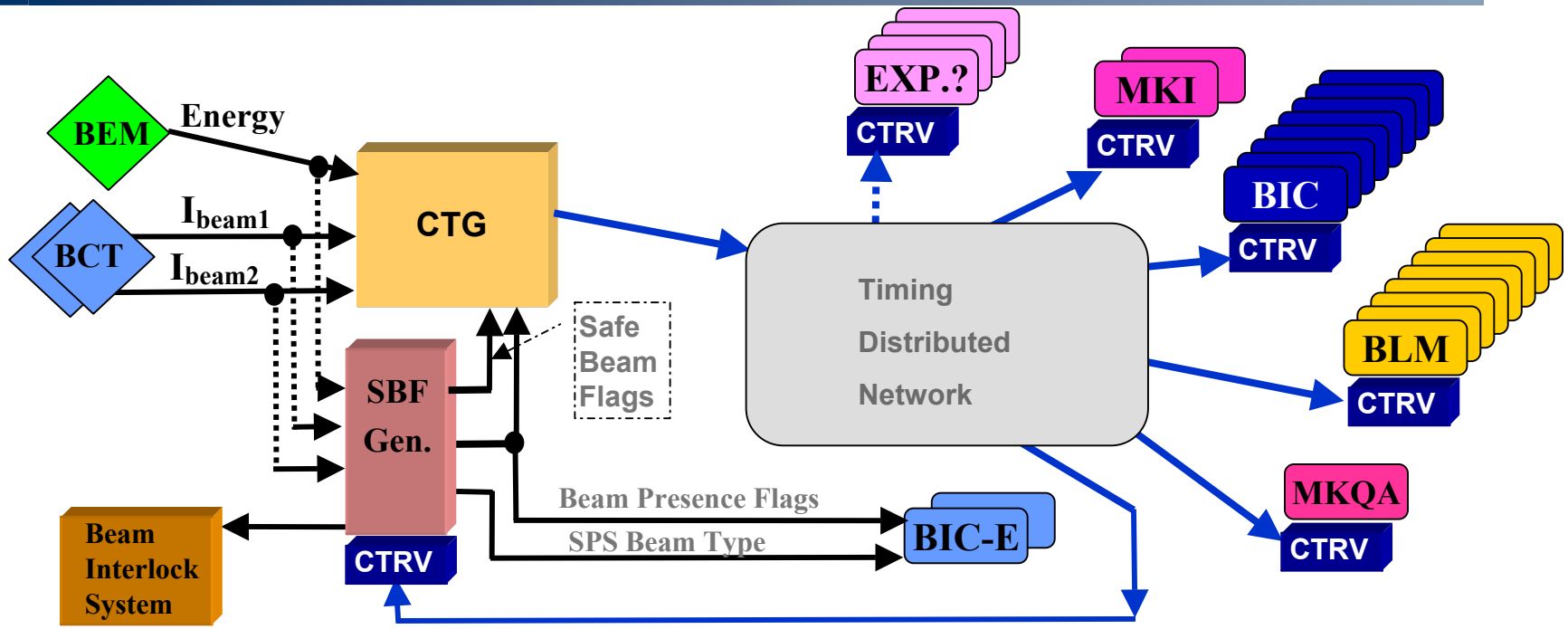
Summary Table:

Name	Format	Rate (at least)	Derived from (producer name)	Distributed to
LHC ENERGY	2 bytes	1Hz	Current in main dipoles (BEM)	Beam Loss Monitors Injection Kickers
SAFE BEAM FLAGS	2 bits (SBF_1 & SBF_2)	1Hz	LHC ENERGY and Beam Intensities (BCT)	LHC Beam Interlock System SPS Extraction Interlock Aperture Kickers
BEAM PRESENCE FLAGS	2 bits (BPF_1 & BPF_2)	**1kHz**	Beam Intensities (BCT)	SPS Extraction Interlock
LHC BEAM MODES	1 byte	1Hz	Automatic (?) process with Operators input	Experiments Injection Kickers Beam Dilutors (at injection)

Layout for Safe Beam Parameters Distribution via the timing



- E & Intensity values are transmitted to the Timing Generator (CTG) and to the SBP Generator
- SBF-G computes (*using on-board FPGA*) the Safe Beam Flags and transmit them to the CTG
- CTG sends regularly (*10Hz is proposed*) Parameters over the Timing network as "standard" frames
- Safe Beam Parameters are received by the Users via standard Timing Receiver VME board ("CTRV")
- SBF-G performs a cross check in receiving Parameters via a CTRV
  => sends alarm and possibly requests a Dump
- SBF-G outputs could still be only used (as for ex. if rate << 1second or if safety level is not sufficient)

CTRV = Timing Receiver board

CTRV: Standard Timing Receiver card for VME systems

- Used to get Hw connections for Safe Beam Parameters.

  As for example:

  - for BLM: Energy data available on P2 connector
  - For BIC: Safe_Beam_Flags available on P2 connector
  - etc…

- Fail-safe state will be implemented in case of missing information *(after a defined time-out)* :

  - Safe_Energy forced to a defined value

    => 0xFFFF for ex.
  - Safe_Beam_Flag forced to “FALSE”
  - etc…

- Remote monitoring and diagnostics available