Synchronization & Machine Protection System

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08/10/2018

PRAE International Workshop, 08-10 October 2018
Outline

➢ PRAE Synchronization System
  • Role
  • Architecture
  • Hardware

➢ PRAE Machine Protection System
  • Role
  • Architecture
  • Operation
SYNCHRONIZATION SYSTEM
The task of a timing system is to synchronize all the (relevant) components in an accelerator complex.

One part of this task usually is to Control the injection by triggering the particle source (gun)

Triggering beam diagnostic components like beam position monitors, current transformers, profile monitors and so on, to be synchronized to the passage of the beam.

Fast timing, Slow timing
Pilote Schematic
Clocs Hardware

Datasheet du GFT1020

GFT1020
20 Channel Digital Delay Generator

Features

- 20 independent delay Channels
  - 100 ps resolution
  - 25 ps rms jitter
  - 10 second range
- Output pulse up to 6 V/50 Ω
- Independent trigger for every channel
- Fours Triggers
  - Three are repetitive from three internal generators
  - One is single-shot from External input, Push button or Software
- External Clocking up to 100 MHz

Time Delay Generator
Informations needed

**RF source:**
- Laser oscillator frequency
- Gun Bandwith
- Pre-amplifier input power

**Timing:**
- Number of channels
- Time delay limits
- Timing frequency
- Tolerated jitter
MACHINE PROTECTION SYSTEM
The Machine protection system is a vital part of the machine which protect the accelerator elements from damage.

damage of accelerator equipment by beam impact or equipment damage due to its own malfunctioning.

Machine protection system is operating in a very reliable manner.

This system collects the critical defaults from the machine subsystems to switch off the RF which kills the beam.
- **Process Level**: monitor the variations of different parameters of the machine subsystems, and generates default signal in case of operation problem.

- **Interlock Level**: gathers and process all the default signals from subsystems, and stops the beam.
MPS Operation

Siemens S7-1500

supervision

Pupitre Siemens
Informations needed

- Concerned elements
- Action to be taken
- Reset default
- Operator mode / Expert mode
- Alarm/interlock
Thank You