



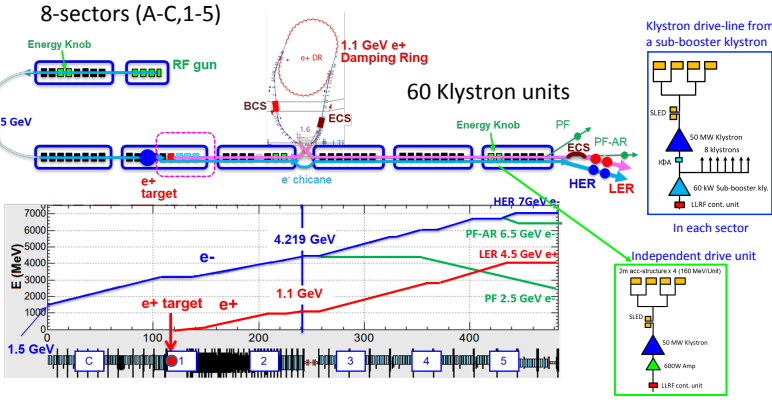
LLRF CONTROL UNIT FOR SuperKEKB INJECTOR LINAC

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WEPAK018

Introduction

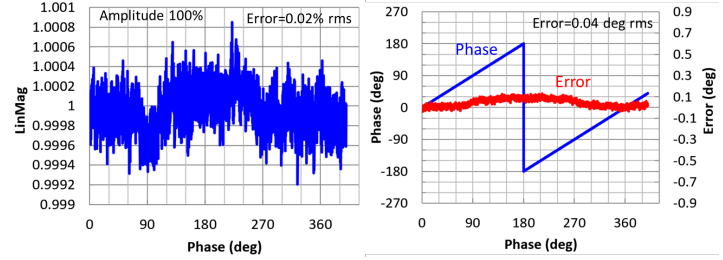
SuperKEKB Injector LINAC provides the beams to four storage rings: SuperKEKB HER/LER, PF, and PF-AR.
RF phase is switched at 50-Hz for the each mode by the **event system**.



Layout and beam energy patterns of KEK injector linac.

RF Pulse Modulator

Frequency	2856 MHz
RF output level	+10 dBm (100%)
Linearity of amp.	0.3% rms and max < ±0.5%
RF pulse rise time	< 35 ns (0 - 90%)
Phase setting-range	0 - 400°
Linearity of phase	0.3° rms and max < ±0.5°

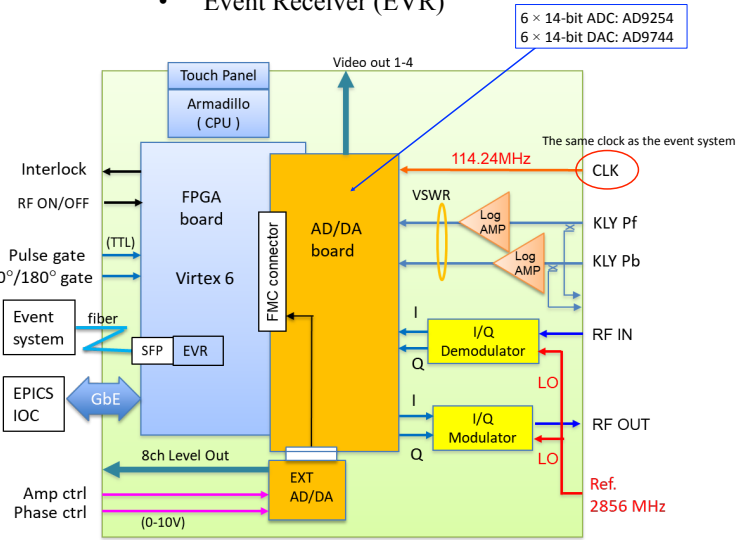


Amplitude and phase error of RF output

The nonlinearity of the I/Q modulator is corrected by using the I/Q calibration table stored in the compact flash memory on the FPGA board.

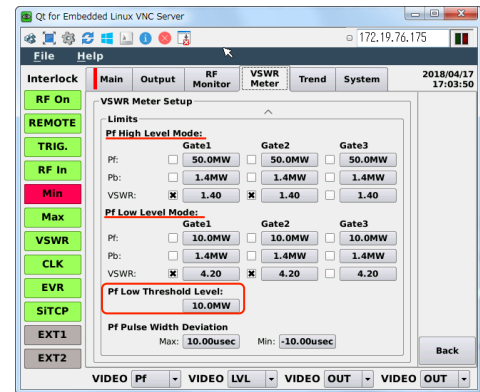
LLRF Control Unit

- Functions**
- RF pulse modulator
 - RF monitor
 - VSWR meter
 - Pulse-shortening detector
 - Event Receiver (EVR)



Block diagram of the LLRF control unit

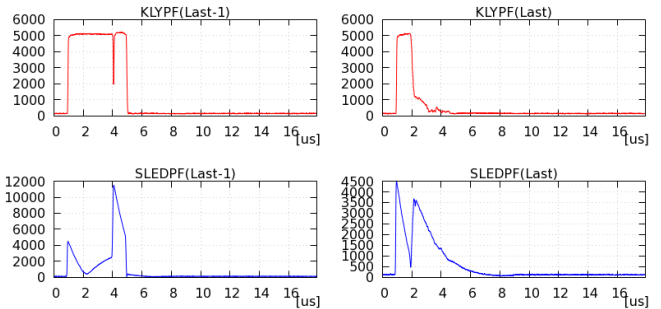
VSWR Meter



The interlock level is switched in the high- or low-level mode for the threshold level

Pulse-shortening Detector

The pulse-shortening is detected by comparing the pulse gate width and the measured pulse width.



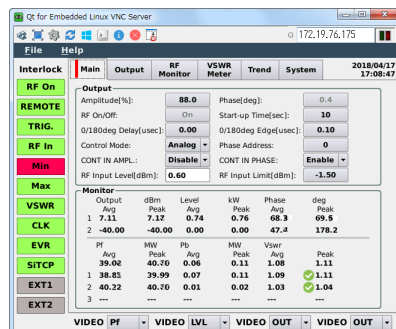
When the pulse-shortening occurs, the VSWR interlock may occur because of the low or zero forward power.

In the case of the pulse-shortening, we can choose whether to disable the VSWR interlock.

The information of the pulse-shortening events is stored in a log-file.



Front/rear panel of LLRF control unit



Main panel