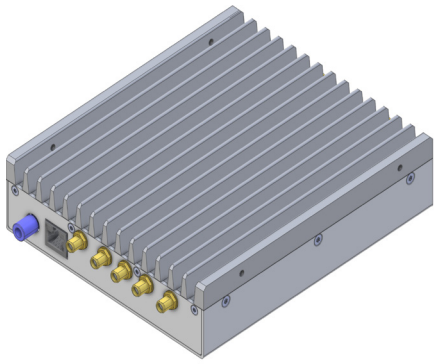
LIBERA

In partnership with Elettra Sincrotrone Trieste

Libera Pilot Tone FE

The Pilot Tone Injector and BPM Front-End



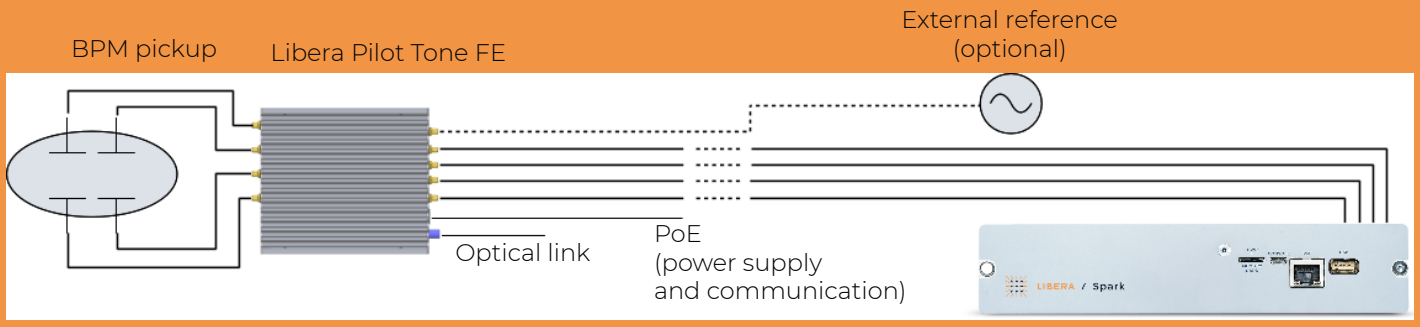
Libera Pilot Tone FE combines the RF and pilot-tone signals at the BPM pickup of electron synchrotrons. Drifts of the cables between the Libera Pilot Tone FE and BPM electronics are compensated by the digital algorithm.

Highlights

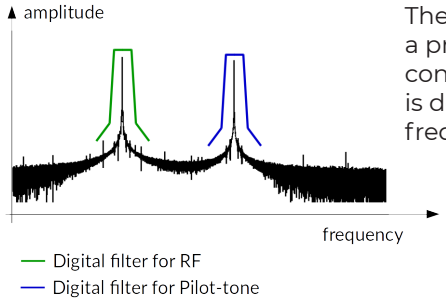
- Enhanced long-term stability for beam-position monitors
- Cable drift compensation
- Capable to measure single bunch fill pattern through a SAW filter
- Clean turn-by-turn data without artificial artifacts
- Remote control and power over PoE

How it works

The Libera Pilot Tone FE is installed in the tunnel and connected between the BPM pickup and BPM electronics. It generates a CW signal at known frequency. Control over its settings (tone frequency, amplitude, gain) is supported through a standard Ethernet interface. Additional RF path through the SAW filter enables the measurements of a single bunch fill pattern. External pilot tone generator is supported.



Specifications	
Product code	LPTF1.000.00X
Frequency versions	500 MHz (LPTF1.000.001) 408 MHz (LPTF1.000.002) 352 MHz (LPTF1.000.003)
Input / output channels	4 / 4 SMA-F
Input impedance	50 Ω
Programmable attenuation	0 ÷ 90 dB
Crosstalk	< -60 dB
1 dB compression point	+16 dBm
Pilot tone generation	Internal or external (SMA-F input)
Control interface	Ethernet
Power supply	PoE



The BPM electronics must support a programmable dual digital down conversion. The compensation is done by combining the two frequency components in real-time.

Libera Pilot Tone FE can be combined with Libera Spark ERPT. The resulting BPM system supports all current synchrotron RF frequencies and provides the user with data out-of-the-box.

The system was tested with beam at few laboratories and demonstrated a long-term stability figure of < 100 nm under standard environmental conditions.

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