cosylab
CONTROL SYSTEM LABORATORY

bergoz
Instrumentation

microIOC BLM

Monitor the number of lost particles.

Product Descriptions

what is it?

microIOC-BLM is a turnkey solution for monitoring beam loss in synchrotron and particle accelerators. Knowing the beam loss is crucial for the machine to be running at optimal efficiency. Since the system is highly portable, it can be used to pinpoint loss locations. Readings are obtained in a matter of seconds, thus making the system ideal for optimizing the machine parameters.

The system consists of the following components:

- Bergoz BLM detectors where the signal pulse is generated.
- BCS units used for acquisition and processing of pulses from the BLM detectors. Two BLM detectors can be connected to a single BCS.
- microIOC-CosyIcon used as a central unit to aggregate data from multiple BCS units.

who is it for?

- Due to very small size and low unit cost of detectors, and low cost of cabling and other electronics, the microIOC-BLM system is an excellent solution to monitor beam loss over the whole machine.
- It is for facilities that want to have one solution to cover all beam loss monitoring applications, wheather it is monitoring at fixed places in normal operation, pin-pointing irregular losses, commisioning new devices, optimizing the machine or performing scientific measurements.
- It is ideal in cases when the final number of BLM detectors in not known, since additional detectors can be added to the system at any time. Due to possible connection of the BSCs in a daisy chain, additional BSCs can be added without pulling cables from outside of the ring.

The microIOC-BLM system is being used at ASP and ALBA.

microIOC

The following features are provided as standard: industrial-grade components; standard x86 architecture; dual Ethernet, 2xUSB, RS232, and VGA interfaces; complete SW support: Linux Debian or RTEMS, control system integration.

Please check microIOC baseline for the details of the microIOC family.

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Product specifications version: 1.5

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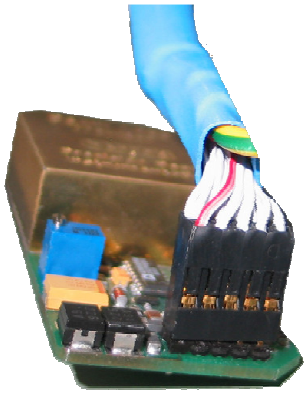
benefits

- Machine parameters can be optimized to reduce beam loss.
- Reducing beam loss improves machine efficiency and beam lifetime.
- Low beam loss helps protecting equipment and environment.
- Decrease in machine performance is immediately observed.
- Beam loss sources can be easily identified.
- Precise energy calibration of the beam.

BSC unit

key features

- Plug&Play solution with EPICS support and EDM, WebCA and java GUI.
- Highly distributable, portable and extendable.
- Daisy chain configuration can be used to reduce cable lengths and ease adding new detectors.
- Inexpensive and flexible UTP cabling between signal conditioning units.
- Cables length between microIOC and BSC unit up to 1200 m.
- Cables length between BSC unit and BLM sensor up to 30 m.
- Up to two BLM detectors per single BSC.
- No extra power supply is required.
- Wall and DIN rail mountable BSC units.
- Very small size and low unit cost detectors.



Bergoz detecor

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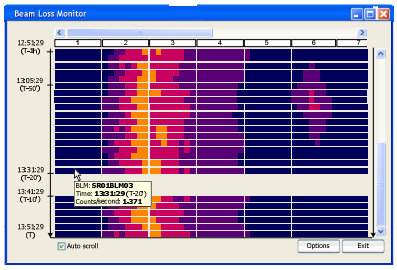
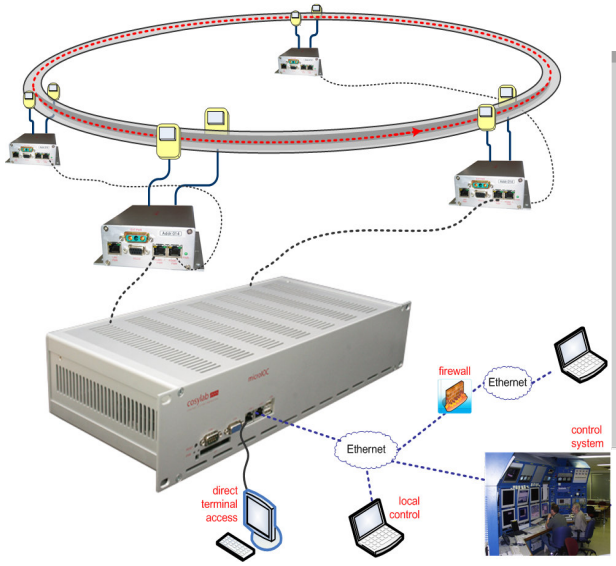
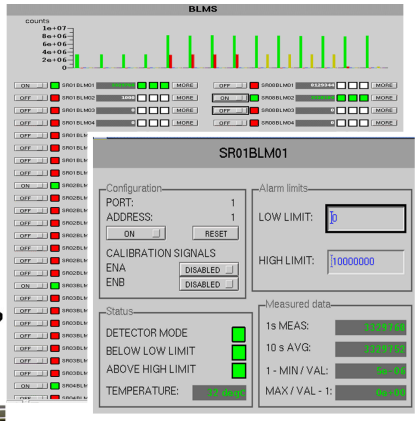
use case

- Beam loss monitoring at normal operation at fixed positions; any irregularities such as changes in the beta function of vacuum drop can be immediately detected.
- Pin-pointing beam loss sources in case of problems by moving the detectors around the machine.
- Optimizing machine parameters to reduce beam loss thus achieving maximum efficiency and beam lifetime.
- Optimizing machine parameters when new devices are inserted; the detectors can be concentrated around the new device.
- Beam energy calibration.
- The combination of a scraper and a BLM offers useful applications for beam lifetime studies, e.g. ground motion observation, beam diffusion measurements and tail scans.



Java GUI: a color coded time chart of all BLM detector readings in the system.





EDM GUI: overview screen for a complete BLM system and a detailed screen for control of one BLM sensor.

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technical specification

microIOC BLM	
microIOC control unit	
CPU	Embedded Intel® Ultra Low Voltage Celeron 400MHz
interfaces	10/100 Ethernet , 2xUSB, RS232, VGA
SW	Linux Debian, full control system integration (EPICS, ACS and Tango)
power supply	110/220 V (50/60 Hz), 150 W, industrial grade, current protection
casing	rack-mount 19" 2U (440 mm x 88 mm x 200 mm)
RS-485 ports	up to 12
BSC unit	
power supply	42~55 V, max 4 W (2 BLM sensors)
communication	RS-485, 19,200 bps
dimensions	164 mm x 130 mm x 45 mm
weight	0.23 kg
Bergoz detector	
maximum count rate	10 MHz
spurious count rate	<0.1 Hz
active size / efficiency / detection energy	7.34 m^2 / 30 % / > 1MeV
dimensions	69 mm x 34 mm x 18 mm
connections	
BSC → BLM sensor	two BLM sensors per BSC cable length up to 30 m
microIOC → BSC, BSC → BSC	up to 4 BSC units per RS-485 port UTP, net cable length per RS-485 port up to 1200 m

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