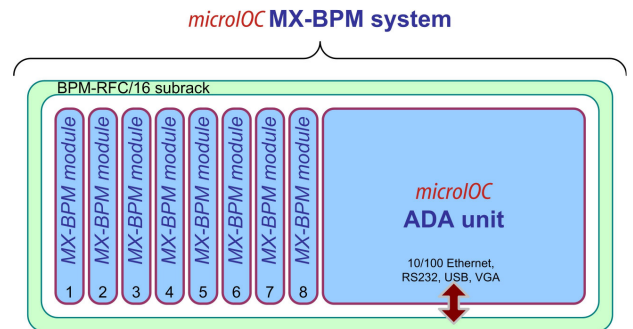cosylab
CONTROL SYSTEM LABORATORY

## what is it?

microIOC MX-BPM is a **plug & play beam position monitoring solution**. It is perfectly suitable for a precise position detection of cycling bunches. Up to 8 channels of BPM pickup electrodes can be connected to and processed by this system.

microIOC MX-BPM system is a complete beam position monitoring solution, based on:

- Multiplexed Beam Position Monitors (MX-BPM) and BPM-RFC/16 subrack from Bergoz[1] and
- microIOC[2] analogue data acquisition (ADA) unit

Up to 8 Bergoz MX-BPM modules and microIOC ADA unit are conveniently integrated into the Bergoz BPM-RFC/16 subrack.

1 – http://www.bergoz.com/products/MX-BPM/MX-BPM.html
2 – http://www.microioc.com/mxbpm.htm

*microIOC* **MX-BPM system**

BPM-RFC/16 subrack

MX-BPM module 1
MX-BPM module 2
MX-BPM module 3
MX-BPM module 4
MX-BPM module 5
MX-BPM module 6
MX-BPM module 7
MX-BPM module 8

*microIOC* **ADA unit**

10/100 Ethernet, RS232, USB, VGA

## operation principle and connection

Bergoz MX-BPM modules sequentially capture and process the beam pickup signals. Each MX-BPM module outputs three analog signals (vertical, horizontal and summation). microIOC ADA unit digitizes and processes these analog outputs. Both, continuous or triggered, samplings are provided.

To validate beam position measurements, PLL-lock status of the MX-BPM unit is monitored and provided for remote access. Debugging of aliasing effects is supported through applying FFT over the range of samples of beam position values (0-3 kHz bandwidth).

Several microIOC MX-BPM systems can be synchronized with a common trigger/clock signal (synchronization port of microIOC ADA). Beam position (X and Y) is sampled at input trigger signal and recorded using 20 μs resolution time-stamping.

microIOC

The following features are provided as standard: industrial-grade components; standard x86 architecture; 10/100 Ethernet, 2xUSB, RS232, and VGA interfaces; complete SW support: Linux Debian, control system integration.

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

## benefits

- turnkey solution for precise beam position monitoring – attach to the BPM pickup electrodes and read data in control system
- compact design; installed into single 3U high chassis
- no extra power supply required
- direct synchronization with beam transition

## key features

- complete monitoring of all signals from MX-BPM units (X, Y, SUM, and PLL-lock)
- 16-bit sampling at 50k samples/sec per channel
- trigger/clock synchronization and time stamping
- 1μm resolution, each button sampled at 10 kHz

**bergoz**
*Instrumentation*

**cosylab**
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*microIOC* **MX-BPM**    Determine beam position. Precisely.

**use case**

- closed orbit detection (FOFB - fast orbit feedback, SOFB - slow orbit feedback)
- optimized for beam position measurement in electron and positron storage rings
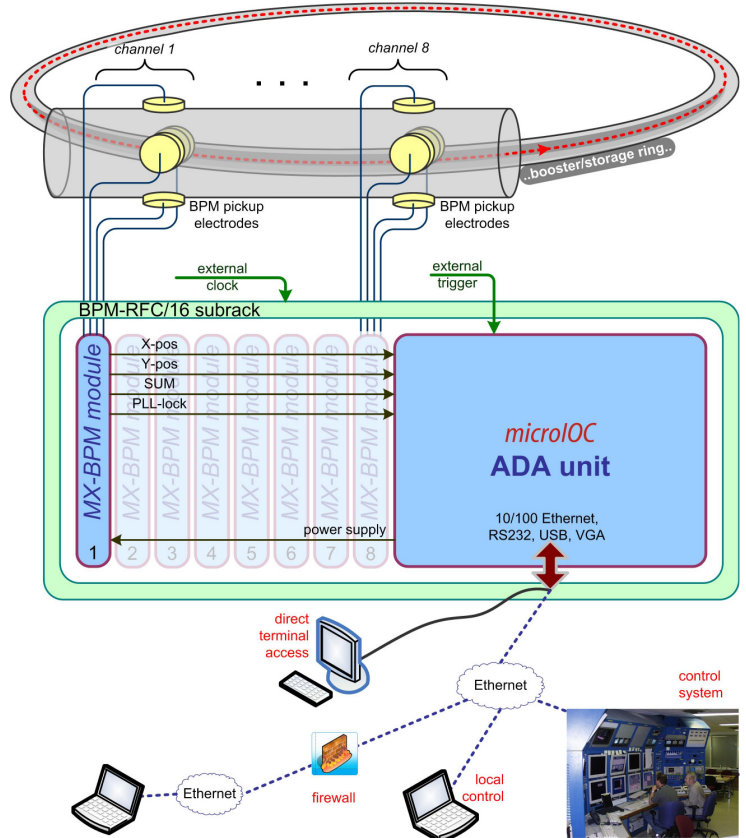


**technical specification**

| microIOC MX-BPM | |
| --- | --- |
| **BPM-RFC/16 subrack** | |
| chassis | - conductive RF-shielded aluminum chassis<br>- height: 3U |
| sub-modules | - microIOC ADA unit<br>- 8 (+2) MX-BPM modules |
| **MX-BPM module** | |
| type of measurement | non-interceptive |
| beam intensity range | >75 dB |
| resolution (X,Y) | 1 µm |
| max. multiplexer switching ratio | 40 kHz |
| width | 4 TE (21 mm) |
| power supply | supplied from microIOC ADA unit |
| **microIOC ADA unit** | |
| analog acquisition | 16-bit resolution, 50 k samples/sec per channel, 24 single ended analogue inputs |
| external trigger | TTL, min. width 20 ns |
| CPU | x86 compatible, 300 MHz AMD GEODE GX1 |
| operating system | Linux Debian and RTEMS |
| control system support | EPICS, ACS and Tango |
| interfaces | 2 x 10/100 Mbps Ethernet, 2 x USB, RS232, VGA |
| power supply | 110/220 V (50/60 Hz), industrial grade, current protected |
| width | 42 TE (213 mm) |