



Multiplexed BPM electronics

Optimized for electron/positron storage rings

1 μm X and Y resolution

Handles > 75 dB beam intensity range

Each button sampled up to 10 000 times per second

Main features

MX-BPM is an all-analog beam position monitor electronics module with superior performance in a very small volume

The four BPM pickup signals are time-multiplexed to avoid measurement errors due to amplifier gain and offset differences

X / Y output $\pm 10\text{V}$, 0V for on-center beam

On-board microstrip filters eliminate noise and unnecessary signal components

GaAs switches provide superior button-to-button isolation and low insertion loss

On-board synthesized local oscillator eliminates the problem of external oscillator signal distribution with power splitters

Automatic Gain Control range >90dB provides optimum level for demodulator, independent of beam intensity or number of bunches

Phase-locked synchronous demodulation gives high linearity and noise suppression

Button signal range -70dBm ... $+5\text{dBm}$ at selected harmonic

Operating principle

The signal from the BPM buttons are time-multiplexed into a single signal applied to a superheterodyne receiver. The demodulated signal is demultiplexed into four button values stored in analog memories. The four signals are summed, and the sum is maintained constant by an automatic gain control. The sum of all buttons being a factory-adjusted constant value, the beam position is obtained by the analog summations $X=A-B-C+D$ and $Y=A+B-C-D$ for 45° buttons, and $Y=D-B$ and $Y=A-C$ for orthogonal buttons, without the need of further normalization.

MANUFACTURER

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India: GEEBEE International
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China: Beijing Conveyi Limited
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Specifications

Beam intensity range	>75 dB
Input signals	+5 dBm...-70 dBm, 50 Ω
Operating frequency	60...800 MHz
Noise rms	<2 mV [0...1 kHz] in +10 V @ +5 dBm <5 mV [0...1 kHz] in +10 V @ -35 dBm <50 mV [0...1 kHz] in +10 V @ -60 dBm
Linearity error	On-center: <5 mV [+5 dBm...-35 dBm] 2 mm off: <20 mV [+5 dBm...-35 dBm]
Sensitivity	User's choice. 1 V/mm recommended
X and Y gain	factory set according to pickup aperture
Buttons sampling	2 kSamples/s with internal clock Up to 10 kSamples/s with external clock
Local oscillator	Factory-set frequency
Intermediate frequency	21.4 MHz or 10.7 MHz, depending on prev.
Outputs	X: ±10 V, A-B-C+D, or D-B Y: ±10 V, A+B-C-D, or A-C Sum: A+B+C+D, constant value (≈ 3 V)
Front panel LED	PLL in lock
Single button sampling commands	Enable and Reset TTL
Button address	Two TTL addressing lines
Fast gate mode	Enable TTL command
Fast gate option	NIM (50 Ω negative-going -16 mA pulse)
Power supply	+15 V, <200 mA, -15 V, <40 mA
Connectors	Rear connector: DIN41612-M, 24+8 coax Coaxial connectors: 1.0/2.3 (4 units) Front panel connectors: DB9 female for test signal

Order codes

MX-BPM-xxxMHz-	BPM plug-in module, tuned to xxx-MHz operating frequency
-XxxxV/%-YxxxV/%	X and Y sensitivity
MX-BPM/CUS.xxx	One-time customizing charge for new frequency

Options:

MX-BPM-FG	Fast NIM gate
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Accessories:

BPM-RFC/xx	Chassis with xx stations
BPM-LPF/1kHz	X and Y LP-filter
BPM-BPF/500MHz	SMA-SMA RF input BP-filter
BPM-KIT	Table-top test kit 100~245 V 50~60 Hz powered kit Pickup inputs on SMAs Outputs on BNCs and DB15
BPM-XTD	Module extender card
BPM-SERV/RF	RF service module Passive module. Brings the pickup signals from the back connectors to front panel BNCs
BPM-SERV/CMD	TTL controls service module. Same size as BPM module, without electronics. Connects the external control signals from the chassis to a front panel DB9

Packaging

S-BPM module is 3U-high x 160mm shielded Euromodule; 20-mm wide.

Interchangeable / plug-compatible with other Bergoz Instrumentation's BPM modules.

S-BPM can be installed in same chassis as LR-BPM, BB-BPM and MX-BPM for mixed application.

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