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MX-BPM User's Manual Spear-3 options

Rev. 1.0

This User's Manual complements "Multiplexed Beam Position Monitor User's Manual"
It describes options:

- **External LO input on BPM chassis rear panel**
- **Button input multiplexing chassis-wide synchronization**
- **16.645-MHz IF output on MX-BPM front panel**

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BUTTON INPUT MULTIPLEXING CHASSIS-WIDE SYNCHRONIZATION Synchronization pulse timing

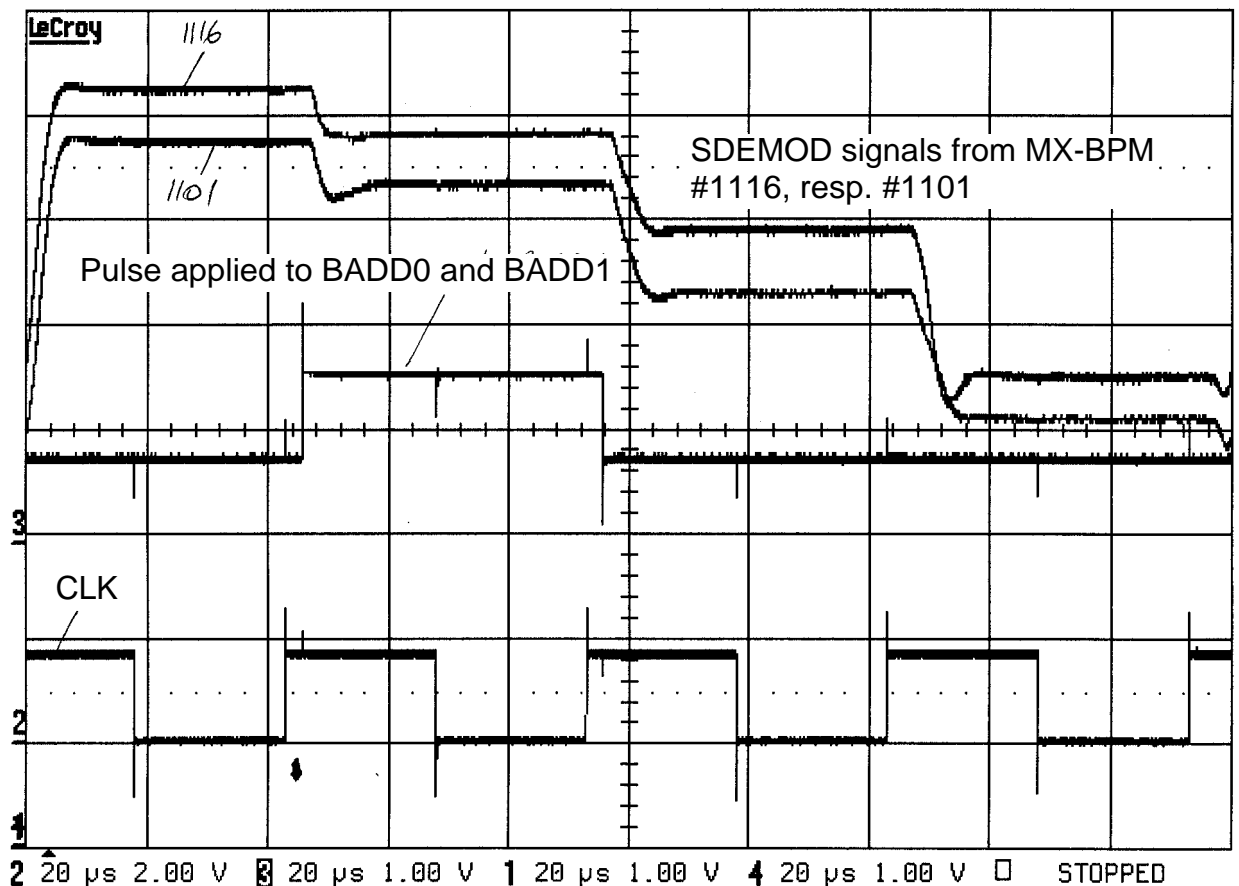
Chassis-wide input multiplexing synchronization, specifications

The synchronization pulse timing is defined in respect to the multiplexing clock CLK signal. Synchronization of the input multiplexing applies only when the multiplexing clock CLK is driven by external control signal. To drive CLK externally, it is sufficient to apply an external clock signal. After ~5ms, the external signal overrides the on-board clock of all MX-BPMs in the chassis.

CLK CLK is determined by its rising edge.
CLK must stay up > 5us.
CLK must fall $\geq 5\mu\text{s}$ before the next CLK rising edge.
Maximum frequency: 40 kHz
TTL signal levels.

BADD0 BADD0 and BADD1 must be driven high simultaneously >6us after CLK
BADD1 rising edge
BADD0 and BADD1 must remain high > 5us.
Then, the multiplexing address "B" is imposed, until the next CLK rising edge.
BADD0 and BADD1 must be released (high-Z or low) at the latest before the next CLK rising edge.

TIMING DIAGRAM



16.645-MHz IF OUTPUT

To approach a 781ns-long Bessel response to a single bunch passage, a 4-pole Gaussian filter designed by James J. Sebek [1]¹ is implemented in MX-BPM:

Center frequency:

16.645 MHz

Bandwidth:

~2.2 MHz (-3dB)

Its input signal is taken after the first IF amplifier stage, at a fixed average amplitude regulated by the Automatic Gain Control (AGC) circuit; unless AGC is disabled by the AGC-Disable (AGCD) external control.

A buffer output (AD8001) drives the front panel SMA jack "IFOUT" output with 50 Ω impedance.

Signals

IFOUT

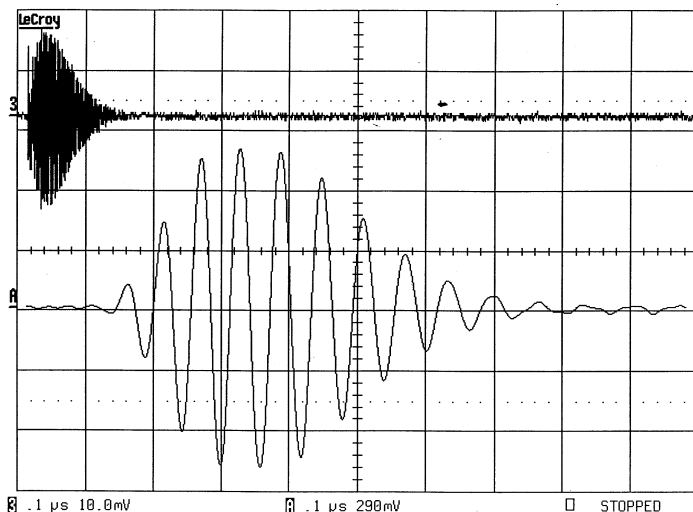
IF output

MX-BPM front panel, SMA jack

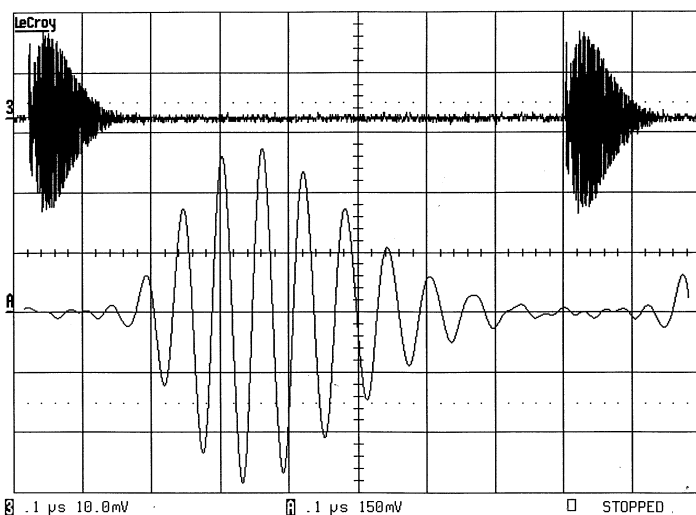
Amplitude

For centered beam: 125mVrms, -5 dBm, in 50-ohm termination

Filter response



Single bunch



Bunches @ ~1.28037 MHz

¹ [1] Elements of Passive Filter Design, J. Sebek, July 26, 2001, private communication