

MI BPM Upgrade Status Report

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Effort Reporting and Project Activities Covered:	Project Activity?	Effort Activity?
MI BPM UPGRADE / MI BPM Commissioning	X	X

Project Leader's Report

This is the first report for the Computing Division. A monthly report is generated by the project and can be found in the Beams docDB as document number beams-doc-1951.

The project definition can be found here:

Project Definition:

The MI BPM Upgrade will replace the current BPM electronics and the data acquisition system used to transfer information between the BPMs and the Accelerator Controls Systems. As part of the project, the software used to read out, transfer, store, and analyze the BPM data will be upgraded. The goal of the project is to provide a BPM system based on modern hardware and software that gives the higher resolution and expanded functionality necessary to efficiently understand and operate the Main Injector now and for the foreseeable future including the needs for Run 2 and NUMI. Deliverables of the project include all relevant documentation, manuals, user's guides and any other written records necessary for maintaining the system.

July Report:

The MI BPM upgrade project continues to ramp up effort and activities aimed at installing and commissioning the upgrade as expeditiously as possible. People have been freed up from other projects (TeV BPM upgrade, transfer line BPM, other) and are starting to work on many aspects of the upgrade. Progress has been made on the upgrade requirements, the overall design, the combiner board, the transition board, and other components necessary for the upgrade to be successful.

A requirements and general readiness review was held on July 25, 2005. The presentation to the review committee can be found in the Beams docDB #1904-1910. The review report is not yet available. The verbal closeout emphasized completion of the requirements so that detailed design and planning can proceed.

The design and prototyping of the combiner boards is essentially complete. All parts are on order and the boards should be assembled before the scheduled shutdown. The plan is to install all 200+ boards in the MI tunnel during the fall 2005 shutdown. These boards replace existing boards in the MI tunnel. The existing boards are being replaced to remove the 53 MHz band-pass filter (the new system requires measurement of both 2.5 MHz and 53 MHz) and to remove relays that allow each BPM to be switched from horizontal to vertical (or back). The capability to switch between vertical and horizontal measurement mode is not required for the upgraded system and in fact has been a source of some trouble for the current system.

A test setup has been established in MI30 to investigate the signal amplitudes and signal to noise, to validate the measurement approach with prototype hardware and software, and to further develop the system. Measurements have been made and documented and will continue during the coming months.

The first transition board prototype, consisting of two channels and no remote control, will be ready in the latter part of August or early September. A full prototype with 8 channels will follow.

August Report:

The final report from the July 25 requirements review was received this month. The report recommends that the project finalize and clarify the requirements so that detailed design can proceed. The project recognizes the issue and is working to finish the requirements and to move into design wherever possible. No design work at the moment is impacted by not having all of the final requirements. However, the final requirements document is important for the long-term and will be a high priority.

In August progress was made on many parts of the project. The combiner boards went into production and should all be delivered by the end of August or early September. Plans will be made to install them in the MI tunnel. Detailed plans will depend on the shutdown or shutdowns schedule, which should be known soon.

Effort was made to understand which VME subrack should be purchased for the project. Experience of the TeV BPM Dawn crates has been used to help update the specifications. The project plans to go forward to acquire the necessary subracks.

MVME processors were investigated to decide which model should be acquired for the project. Considerations include the support lifetime of the particular model, memory available, experience at the lab, etc. The 2400, 5500 and 6100 models are all under consideration.

Progress continues on the transition board prototype. The first prototype, a 2 channel analog only board, should be complete by the end of August. The next version (the "pre-series"), a full 8 channel board including the I/O control, should be designed by mid-

September with layout coming directly after. Testing of the first prototype will begin immediately.

Many people were involved working to provide MI BPM clock signals to the FCC3 test stand. Accelerator Division and Computing Division Networking, Controls, and MI BPM project members were all involved in the discussions to come up with a workable solution. Most of the work was completed by the end of August. A quiet time with all accelerators off is needed to make the final connections and to make the signals available in FCC3.

A test stand at MI30 has been used to test some of the concepts needed for the MI BPM upgrade, including using 4 channels of the Graychip DDC in the Echotek boards, testing the quality of the measurements available using 2.5 MHz and 53 MHz components of the beam, testing a modified TeV BPM timing board, etc. These tests will continue and may branch out to include prototype MI BPM front end software as appropriate and desired.

Work has begun to understand the final electronics position and cabling in the MI service buildings. A full survey of the buildings is being discussed so that many of the long lead time issues can be thought about and resolved long before the actual installation date of the upgraded systems.

Front-end and Online software work continues. Work is focused on how the requirements impact the design of the software and the data structures. At the same time work continues on prototype and first versions of software to be tested in the MI30 test stand or the FCC test stand.

Schedule/Milestones

1.1.3.2.1.2	MI BPM: Review (Milestone)	7/25/2005
1.1.3.2.4.2	All Combiner boxes available	10/25/2005
1.1.3.2.3.1.3.5	Transition module PO issued	1/10/2006
1.1.3.2.6	MI BPM system complete	8/15/2006

The first milestone was achieved – the review was held, a verbal closeout occurred, and a final report was delivered to the project. The next major milestone will likely be achieved. The boards are expected in early September.

Resources used (budget, effort)

The resources used by the project are listed below. Some small efforts were captured prior to July and were primarily used for Echotek digital signal receiver board checkout and for project organization. Purchases include the 75 Echotek boards required by the project and the parts needed to fabricate the combiner boards (needed in the MI tunnel).

Month	AD Effort	CD Effort	Total Effort
July, 2005	2.1	2.4	4.5
August, 2005	1.4	2.7	4.1
SUM (through Aug, 2005)	3.5	5.1	8.6

Purchase requisitions/procard obligations through August, 2005:

Name	Req #/PO/Fermi	Item	Cost
MI BPM DDC Electronics Delivery	PO556099	Digital Recievers	\$540,000.00
MI BPM Misc Electronics Delivery		Misc.	
Combiner Box (Purchase complete)	PO564173		\$2,350.00
Brackets	PO# 563823 Req# 180362 June20,2005 Don Rogus		\$6,450.00
	PO# 563823 Req# 180362 June20,2005 Don Rogus		\$6,450.00
	PRN# 64960 Jim Franzen		
	PO# 563836 Req# 180363 June21,2005 GaryGolinski		\$945.00
	PRN# 64958 Jim Franzen		
	PRN# 64956 Jim Franzen		
	PO# 564173 Req# 180559 July11,2005 R. Evans		\$4,712.00
Fabrication	PO564712		
MIBPM Timing Fanout Generator module			\$1,765.00
MIBPM Analog Transition module	PRN#66940	Avnet	\$837.50
	PRN#67451	Avnet	
	PRN#66941	Mouser	\$2,350.00
MIBPM Digital Crates			
MIBPM MVME			
Cable etc.			
MIBPM T&M			
Total			\$565,859.50

Related presentations, reports and/or documents

- [1526-v2 MI BPM Meeting Notes and Minutes](#) [Steve Wolbers](#) 31 Aug 2005
- [1939-v1 Status Update of Dawn Crate Failures](#) [Timothy J. Kasza](#) 23 Aug 2005
- [1937-v2 Main Injector BPM Review Committee Report of July 25, 2005](#) [Alan Baumbaugh](#) *et. al.* 22 Aug 2005
- [1914-v3 Tevatron BPM front-end data acquisition cycles](#) [Luciano Piccoli](#) 02 Aug 2005
- [1910-v1 Main Injector Operations in the Future](#) [Ioanis Kourbanis](#) 29 Jul 2005
- [1909-v6 MI BPM Review: BPM HARDWARE OVERVIEW](#) [Manfred Wendt](#) 25 Jul 2005
- [1908-v3 MI BPM Upgrade Review -- Overview Talk](#) [Bob Webber](#) 25 Jul 2005
- [1905-v5 MI BPM Upgrade - Cost and Schedule](#) [Steve Wolbers](#) 25 Jul 2005
- [1907-v2 Main Injector BPM Console Application Software](#) [Brian S. Hendricks](#) 25 Jul 2005
- [1906-v3 MI BPM Online Software Overview](#) [Luciano Piccoli](#) 25 Jul 2005
- [1904-v5 MI BPM requirements talk](#) [David P Capista](#) 24 Jul 2005
- [1786-v4 Requirements for the Main Injector BPM upgrade](#) [Alberto Marchionni](#) *et. al.* 20 Jul 2005
- [1526-v1 MI BPM Meeting Notes and Minutes](#) [Steve Wolbers](#) 17 Jul 2005
- [1834-v9 BPM Buffers](#) [David P Capista](#) *et. al.* 30 Jun 2005
- [1874-v1 MI States and BPMs](#) [Brian E. Chase](#) 17 Jun 2005
- [1865-v1 Combiner Board Slides from MI BPM 6/7/05 Meeting](#) [Bob Webber](#) *et. al.* 09 Jun 2005
- [1849-v1 BPM Filter Module for Transfer Lines](#) [Nathan Eddy](#) 31 May 2005
- [1845-v1 Beam Sync Clocks](#) [Gregory L. Vogel](#) 25 May 2005
- [1810-v1 TeV BPM Timing Generator Fanout \(TGF\) Features](#) [Bill Haynes](#) 13 May 2005

[1824-v1 MI Electrostatic BPM's with Extra Wide Aperture: Analysis of Position Characteristic and Linearity Manfred Wendt](#) 12 May 2005

[1822-v1 MI Service Building Survey \(BPM electronics space\) Marv Olson](#) 12 May 2005

[1807-v1 MI Abort line bpm's Dallas Heikkinen et. al.](#) 04 May 2005

[1806-v1 MI States and Clock Events David P Capista](#) 03 May 2005

[1803-v1 MI Stripline BPM: Analysis of Position Characteristic and Output Signals Manfred Wendt](#) 02 May 2005

[1780-v1 Proton and PBar Beam Measurements in the Main Injector Peter Prieto et. al.](#) 13 Apr 2005

[1550-v1 MI BPM Upgrade \(Talk given at CD Accelerator Activities Coord. Mtg 1/25/05\) Steve Wolbers](#) 28 Jan 2005

[1542-v1 Summary of Tevatron BPMs for Main Injector Jim Steimel et. al.](#) 25 Jan 2005

[1533-v1 Recycler BPM's - My impression David E. Johnson](#) 21 Jan 2005

[1523-v1 Towards a final MI BPM requirements document-MI BPM meeting 1-11-05 Alberto Marchionni](#) 11 Jan 2005

[1524-v1 MI BPM Upgrade Steve Wolbers](#) 11 Jan 2005

Sub-project leader reports

No sub-project leader reports have been written thus far.

V0.2 08/12/05