



Main Injector BPM Upgrade

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CD Accelerator Activity Meeting

September 20, 2005

Outline

- Project status.
- Schedule/milestones.
- Recent accomplishments.
- Risks/open issues.

MI BPM Upgrade Project

- The MI BPM upgrade project has ramped up and has many people fully engaged.

- From July-August Effort Reporting:

<u>Month</u>	<u>AD Effort</u>	<u>CD Effort</u>	<u>Total Effort</u>
July, 2005	2.1	2.4	4.5
August, 2005	1.4	2.7	4.1
SUM	3.5	5.1	8.6

- **General project:**
 - Weekly meetings
 - Wbs, project reporting
 - Effort reporting
 - Budgeting, purchasing

Schedule

- **Schedule has been developed and is fully effort loaded.**

- **We report every month to the Run 2 Luminosity upgrade project on the status.**

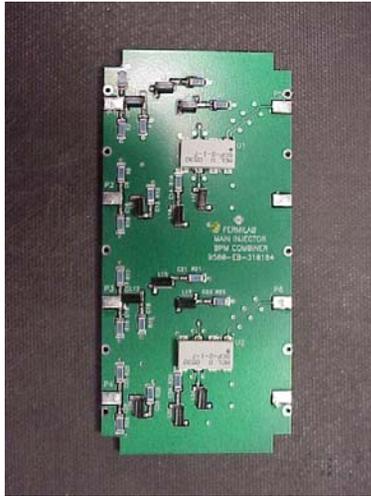
- **Milestones:**

MI BPM: Review (Milestone)	7/25/2005
All Combiner boards available	10/15/2005
Transition module - PO issued	12/1/2005
MI BPM system complete	8/21/2006

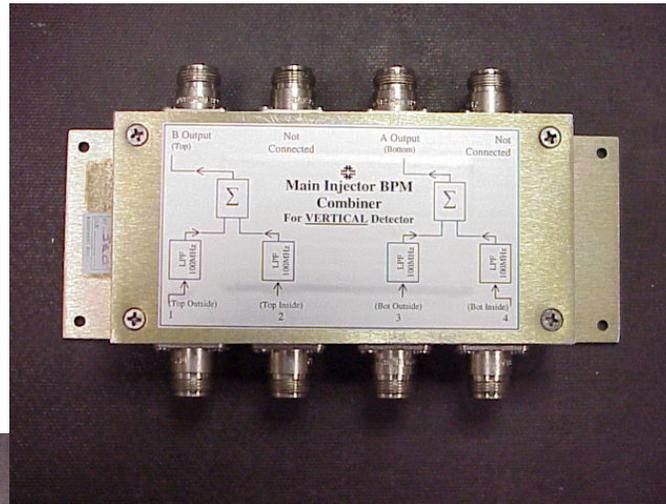
Recent Accomplishments

- “Finished” the requirements document.
 - A big step for the project
 - Design work can move forward.
- **Combiner boards**
 - 101 boards are in hand and are being tested by Tim Kasza's group
 - Will be installed in MI when accesses allow.
 - Remaining boards will be fabricated as soon as possible
 - Some problems with lost or broken parts at vendor

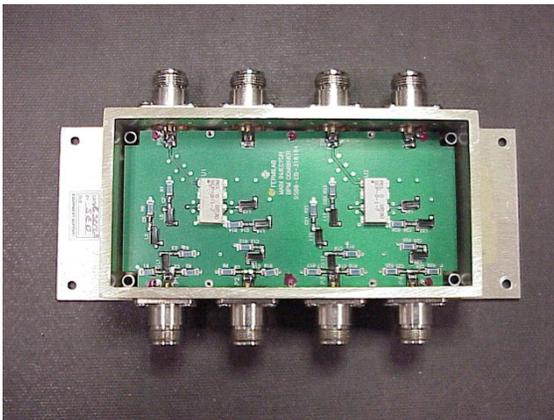
Combiner boards



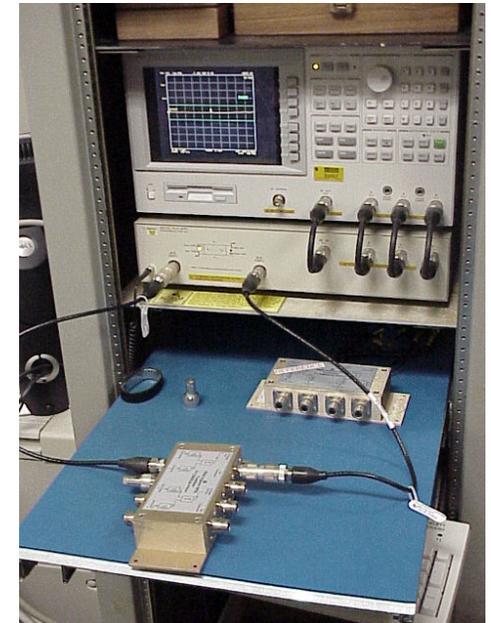
Bare Board



In box with cover



In box



Test stand

Other Progress

- Transition board
 - 2 channel prototype looks good.
 - 8 channel full prototype is close to layout.
- VME subrack acquisition.
 - In purchasing.
- MVME
 - Would like to use 5500
 - Newer, faster, more memory, longer support
- Service Building preparation (next slide)
- MI30 test stand
 - The ability of the timing board FPGA to provide a suitable digitizer clock for the EchoTek boards is found to be acceptable.
 - Measurements with prototypes look good.
- FCC3 test stand
 - Up and running with all AD signals.

Service building preparation



September 20, 2005

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CD Accelerator Activities

MI30 - recent results

**Pbar
Transfers
(beams-doc-1958)
Using Recycler-style
software**

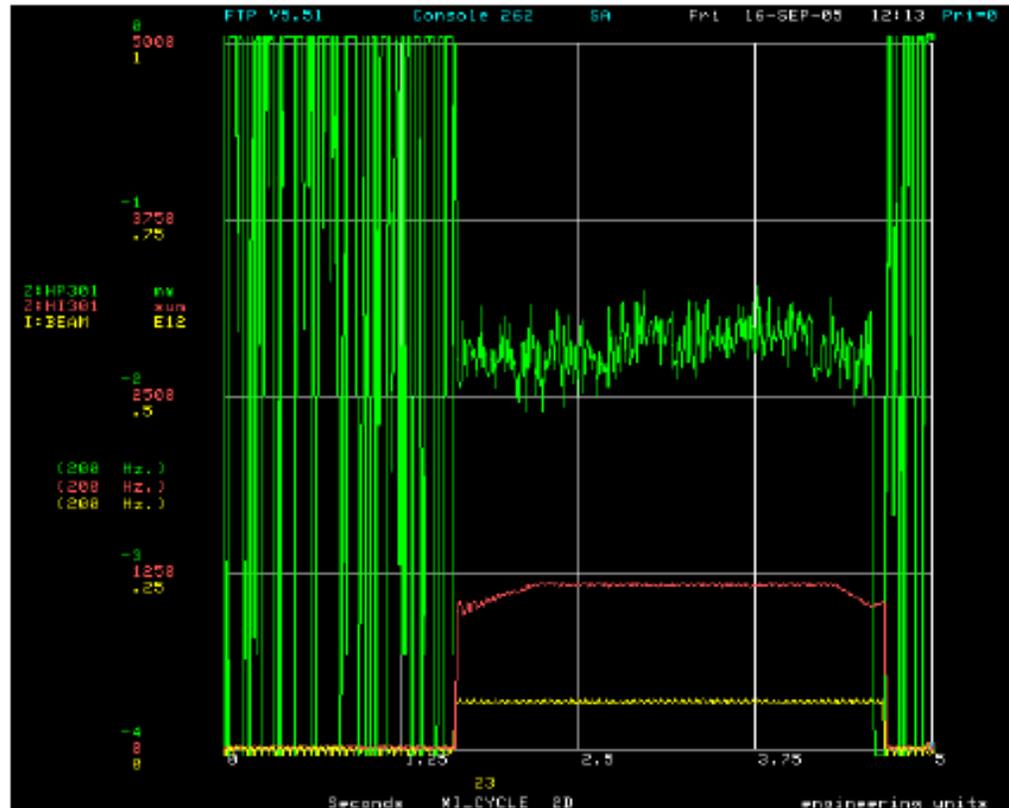


Figure 7. Transfer #4

Risks/worries

- Still working in detail on the design of data acquisition spec.
- Many cycles, insertions and extractions (and locations) leads to plenty of debugging.
- The usual board design/fabrication delays (e.g. the combiner board).

Conclusions

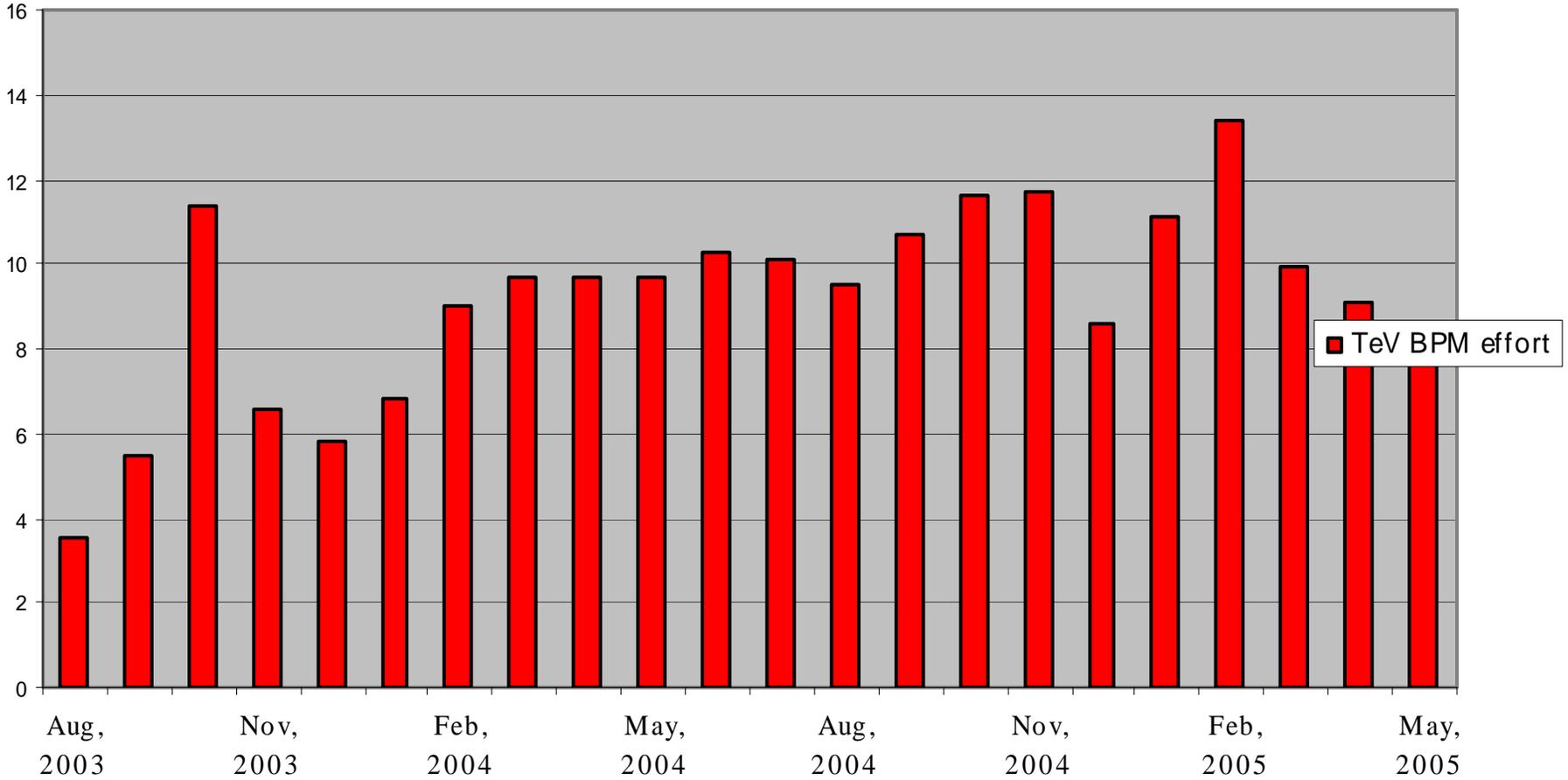
- MI BPM Upgrade Project is ramping up.
- Experienced people from other BPM upgrades are available and working.
- Much of the hardware is available or will be acquired soon.
- We will push forward as quickly as possible to build, install, debug and commission the new system.

Extra slides

ID	WBS Name	Start	Finish
130	1.1.3.2 MI BPM System	5/22/2005	8/22/06
131	1.1.3.2.1 MI BPM design	5/22/2005	9/21/05
132	1.1.3.2.1.1 MI BPM Electronics Design	5/22/05	12/19/05
133	1.1.3.2.1.1.1 Combiner box design		
134	1.1.3.2.1.1.1.1 Combiner box specification complete		
135	1.1.3.2.1.1.1.2 Comibiner box prototype testing		
136	1.1.3.2.1.1.2 MIBPM TFG electronics design		
137	1.1.3.2.1.1.2.1 TFG module design modification		
138	1.1.3.2.1.1.2.2 TFG prototype layout		
139	1.1.3.2.1.1.2.3 Crate and processor specification		
140	1.1.3.2.1.1.2.4 TFG electronics specification complete		
141	1.1.3.2.1.1.3 MIBPM transition module design		
142	1.1.3.2.1.1.3.1 Transition module specification & investigation		
143	1.1.3.2.1.1.3.2 Transition module decision complete		
144	1.1.3.2.1.1.3.3 Transition module prototype schematics and layout		
145	1.1.3.2.1.1.3.4 Transition module prototype production		
146	1.1.3.2.1.1.4 MIBPM electronics design review complete		
147	1.1.3.2.1.1.5 Begin system commissioning plan		
148	1.1.3.2.1.2 MI BPM: Review (Milestone)	6/25/05	
149	1.1.3.2.1.3 MI BPM Software [design]		
150	1.1.3.2.1.3.1 MIBPM frontend DAQ SW specification and design		
151	1.1.3.2.1.3.2 MIBPM Online SW design		
152	1.1.3.2.1.3.3 MIBPM SW specification review complete		
153	1.1.3.2.1.3.4 MIBPM Data validation design		
154	1.1.3.2.2 MI BPM system fabrication	9/30/04	10/31/05
155	1.1.3.2.2.1 MI BPM Procurement		
156	1.1.3.2.2.1.1 MI BPM FY04 Obl		
157	1.1.3.2.2.1.2 MI BPM DDC Electronics Purchase		
158	1.1.3.2.2.1.3 MI BPM DDC Electronics Delivery		
159	1.1.3.2.2.1.4 MI BPM DDC Electronics Budget Adjustment		
160	1.1.3.2.2.1.5 MI BPM Misc Electronics Purchase		
161	1.1.3.2.2.1.6 MI BPM Misc Electronics Delivery		
162	1.1.3.2.2.1.7 MI BPM Filter Board Electronics Purchase		
163	1.1.3.2.2.1.8 MI BPM Filter Board Electronics Delivery		
164	1.1.3.2.3 MI BPM Implementation	5/22/05	4/28/06
165	1.1.3.2.3.1 MI BPM Electronics implementation		
166	1.1.3.2.3.1.1 Combiner box implementation		
167	1.1.3.2.3.1.1.1 Combiner box PO complete		
168	1.1.3.2.3.1.1.2 Combiner box assembly and testing		
169	1.1.3.2.3.1.1.3 Combiner box QC		
170	1.1.3.2.3.1.2 MIBPM TFG electronics implementation		
171	1.1.3.2.3.1.2.1 TFG implementation		
172	1.1.3.2.3.1.2.2 TFG PO complete		
173	1.1.3.2.3.1.2.3 TFG QC		
174	1.1.3.2.3.1.3 MIBPM Transition module implementation		
175	1.1.3.2.3.1.3.1 Transition module - PO issued		
176	1.1.3.2.3.1.3.2 Transition module - first article production		
177	1.1.3.2.3.1.3.3 Transition module - production complete		
178	1.1.3.2.3.1.3.4 Transition module QC		
179	1.1.3.2.3.1.4 MIBPM Misc hardware		
180	1.1.3.2.3.1.4.1 Crate and processor specification		

181	1.1.3.2.3.1.4.2	BPM consolidated crate PO complete		
182	1.1.3.2.3.1.4.3	Cable/panel specification/implementation		
183	1.1.3.2.3.1.4.4	Misc HW PO complete		
184	1.1.3.2.3.1.5	Begin MIBPM integration test		
185	1.1.3.2.3.2	MIBPM SW implementation		
186	1.1.3.2.3.2.1	Front end DAQ SW implementation		
187	1.1.3.2.3.2.2	Online SW implementation		
190	1.1.3.2.3.2.3	Data validation for implementation		
191	1.1.3.2.4	MI BPM Installation/Commissioning	11/1/05	8/22/06
192	1.1.3.2.4.1	Install Combiner boxes in tunnel BPMs		
193	1.1.3.2.4.2	All Combiner boxes available		
194	1.1.3.2.4.3	Fully loaded prototype crate testing before shutdown		
195	1.1.3.2.4.4	First production quality crate installation begins		
196	1.1.3.2.4.5	Testing, QC, & validation		
197	1.1.3.2.4.6	Design validation complete		
198	1.1.3.2.4.7	All MI BPM crates functionally available or installed		
199	1.1.3.2.4.8	MI BPM Frontend commissioning		
200	1.1.3.2.4.9	MIBPM Online SW commissioning		
201	1.1.3.2.4.10	Data validation for commissioning		
202	1.1.3.2.4.11	MI BPM system commissioning		
203	1.1.3.2.4.12	First house system commissioning		
204	1.1.3.2.4.13	Full scale system commissioning complete		
205	1.1.3.2.4.14	MIBPM SW complete		
206	1.1.3.2.4.15	MIBPM maintenance manual		
207	1.1.3.2.4.16	MIBPM SW user/programmer guide		
208	1.1.3.2.5	MI BPM Technical/Project Coordination	5/22/05	8/22/06
209	1.1.3.2.5.1	Technical coordination		
210	1.1.3.2.5.2	System requirements support		
211	1.1.3.2.5.3	End system commissioning with fully loaded HW/SW		
212	1.1.3.2.5.4	Ongoing MI BPM support plan		
213	1.1.3.2.5.5	Project closeout		
214	1.1.3.2.5.6	Project management support		
215	1.1.3.2.6	MI BPM system complete		

TeV BPM effort



M&S Cost

- \$900K allocated by Run 2 Luminosity Upgrade project
- \$540K was spent for 75 Echotek boards.
 - Remainder (\$360K) is for:
 - Combiner boxes (230)
 - Transition boards + racks (75)
 - VME subracks (11)
 - MVME processors (11)
 - Timing boards (11)
 - Cables
 - Miscellaneous
 - Detailed estimate of the cost of these items is not yet complete.
 - For TeV BPM :
 - Total M&S = \$1.66M
 - Echotek = \$1.08M
 - Remainder = \$0.58M
 - MI BPM has \$0.54 in Echotek.

Personnel Cost

- Personnel costs have been estimated using TeV BPM as a guide.
 - TeV BPM required about 10 FTE for 17 months (see next page)
 - We estimate that the MI BPM project will need a similar effort but for a somewhat shorter duration (about one year)
- Justification:
 - Echotek hardware is already checked out and ready.
 - Timing board is similar to TeV BPM version.
 - Front-end software is based on TeV BPM.
 - Almost everyone has experience with the hardware and software.
 - But the MI is a complicated machine and a great deal of work is required.
- It is not possible to precisely estimate the effort required while the requirements and details of design are still being worked out.
- A fully loaded WBS with latest information is being developed.

Main Injector BPM Upgrade Organizational Chart

