01/25/2010
LG

FY10 tasks and status of Pixel RDO and Electronics

The major tasks planned for the next year include:

1. Probe testing
2. RDO firmware / software and documentation
3. Infrastructure testing and cable development
4. Beam test of Phase-2 sensors
5. Project CD2-3
6. Beam test at PHENIX

Each of these tasks can be summarized below:
The project timeline shown with each project below corresponds only to my estimate of the real task duration. The tasks are not yet resource loaded and are intended to serve as a starting point for a schedule discussion. The full schedule showing cross-task dependencies is attached at the end of the document.

Probe Testing

Status:

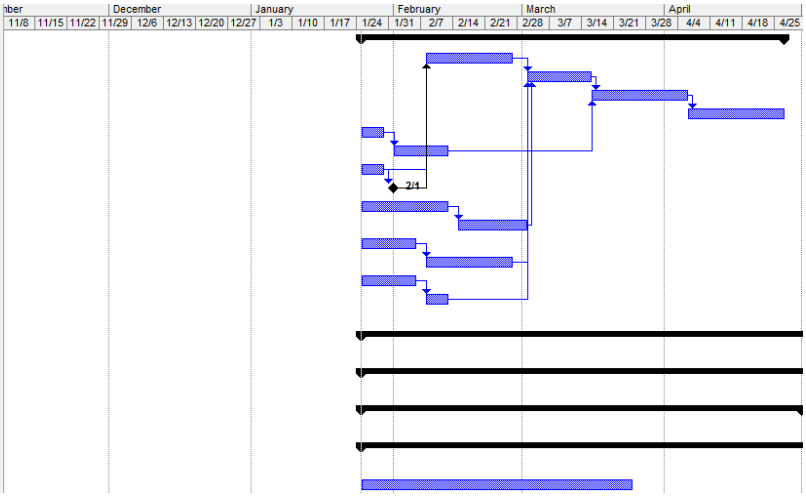
We have a set of documentation that describes what we are attempting to do. It may be found at http://rnc.lbl.gov/hft/hardware/docs/Phase1/Probe_Testing_Phase1.pdf. As the system converges and we gain more information, we should check periodically if what is described in the document is still valid and update as required.
We have in hand:

- Loaded probe card with Phase-2 sensor mounted and wire bonded to probe contact points. This has been tested and is working
- Loaded probe card with probe pins mounted.
- Probe testing machine, tested and working.
- Firmware and software to allow for the automated testing of sensors. This is mostly tested. There are a few minor issues to be worked out. We expect to have the whole system working to the level described in the documentation within 2 weeks.
- The design for the 20 sensor vacuum chuck is complete (2nd version) and has been sent out for fabrication. We expect the vacuum chuck to be completed within 2-3 weeks.

We have some electro-mechanical things to add such as source/LED holders and actuators. We should fix requirements and design these. This should be accomplished in the next few weeks as well.

Proposed Timeline milestones:

	Task Name	Duration
1	**Probe testing**	**66 days**
2	probe test of individual thick sensors	15 days
3	probe test batch thick sensors	10 days
4	probe test individual thinned sensors	15 days
5	probe test batch thinner sensors	15 days
6	negotiate sensor thinning with Aptek	5 days
7	thin 2 wafers of Phase-2	10 days
8	prototype firmware and software for automated tes	5 days
9	firmware/software ready	5 days
10	design chip carriers tracking system mechanical	15 days
11	prototype chip carrier	11 days
12	design chip tracking database	10 days
13	prototype database	15 days
14	vacuum chuck fabricate	10 days
15	vacuum chuck test	5 days
16		
17	**RDO and documentation**	**97 days**
28		
29	**Infrastructure testting and cable development**	**239 days**
49		
50	**Beam test Phase-2 sensors**	**70 days**
70		
71	**Beam test run at PHENIX**	**330 days**
89		
90	CD-2/3	43 days

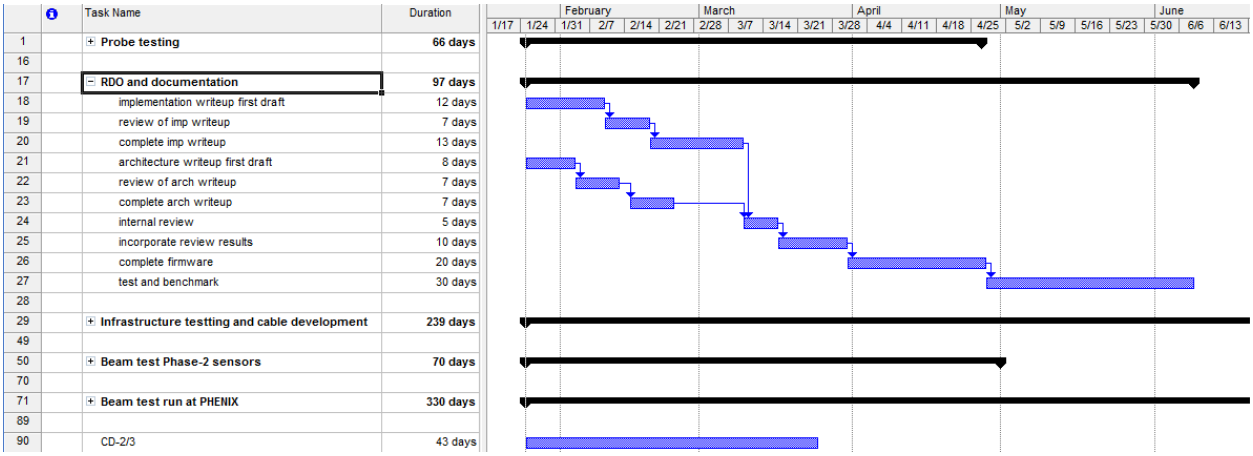


RDO and Documentation

Status:

The new architecture design is currently being implemented in a test manner to gauge feasibility and performance of the firmware components. This process is sufficiently advanced to begin the documentation process. Xiangming will begin this process by generating architecture and implementation documentation that allows for a non-project person to read and understand the function and implementation of our system. Thorsten will assist by providing feedback. We will then prepare an internal-to-the-group review including Jo and perhaps one external person (Gerard?).
We need benchmarking and simulation to show dead time performance. We will need to generate the testing plan and procedures. In addition, we will work out with Jo, when he has time available, the plans for slow controls, data monitoring and quality assurance and the other tasks that aren't addressed above. These will be added later.

Proposed Timeline milestones:



	Task Name	Duration
1	Probe testing	66 days
16		
17	RDO and documentation	97 days
18	implementation writeup first draft	12 days
19	review of imp writeup	7 days
20	complete imp writeup	13 days
21	architecture writeup first draft	8 days
22	review of arch writeup	7 days
23	complete arch writeup	7 days
24	internal review	5 days
25	incorporate review results	10 days
26	complete firmware	20 days
27	test and benchmark	30 days
28		
29	Infrastructure testting and cable development	239 days
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50	Beam test Phase-2 sensors	70 days
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90	CD-2/3	43 days

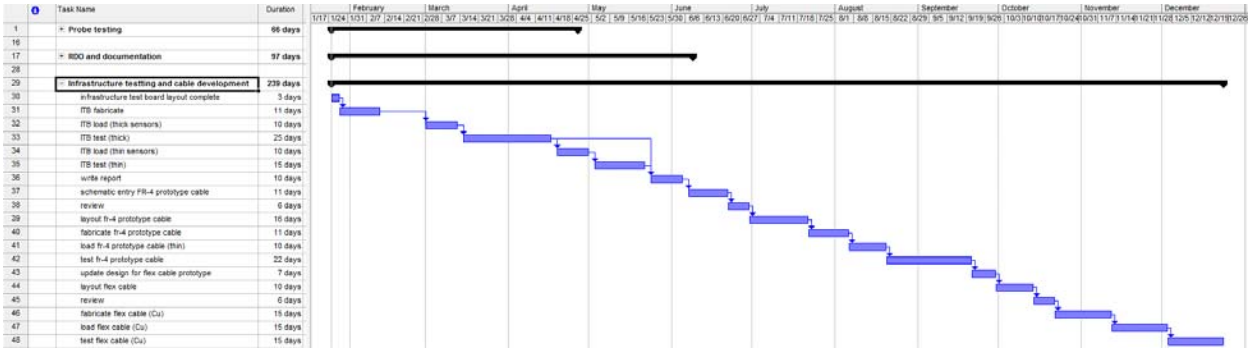
Infrastructure Testing and Cable Development

We have extensive write-ups on this including what was submitted after the cd-1 review. I think that it is still valid. This may be found here
http://rnc.lbl.gov/hft/hardware/docs/cd1/PXL_flex_cable_and_sys_test_v1.1.doc .
The development effort is a multi step process, we need to complete at least 2 stages this year. Hopefully we will do more stages and also do a small test of the Al capability of our selected vendor.

Status:

The layout for the Phase-1 based infrastructure test board is complete and out to the group for internal review. The board files may be found here
http://rnc.lbl.gov/hft/hardware/docs/Phase1/infrastructure_test.zip

Proposed Timeline milestones:



	Task Name	Duration
1	Probe testing	66 days
16		
17	RDO and documentation	97 days
28		
29	Infrastructure testting and cable development	239 days
30	infrastructure test board layout complete	3 days
31	ITB fabricate	11 days
32	ITB load (thick sensors)	10 days
33	ITB test (thick)	25 days
34	ITB load (thin sensors)	10 days
35	ITB test (thin)	15 days
36	write report	10 days
37	schematic entry FR-4 prototype cable	11 days
38	review	6 days
39	layout fr-4 prototype cable	16 days
40	fabricate fr-4 prototype cable	11 days
41	load fr-4 prototype cable (thin)	10 days
42	test fr-4 prototype cable	22 days
43	update design for flex cable prototype	7 days
44	layout flex cable	10 days
45	review	6 days
46	fabricate flex cable (Cu)	15 days
47	load flex cable (Cu)	15 days
48	test flex cable (Cu)	15 days

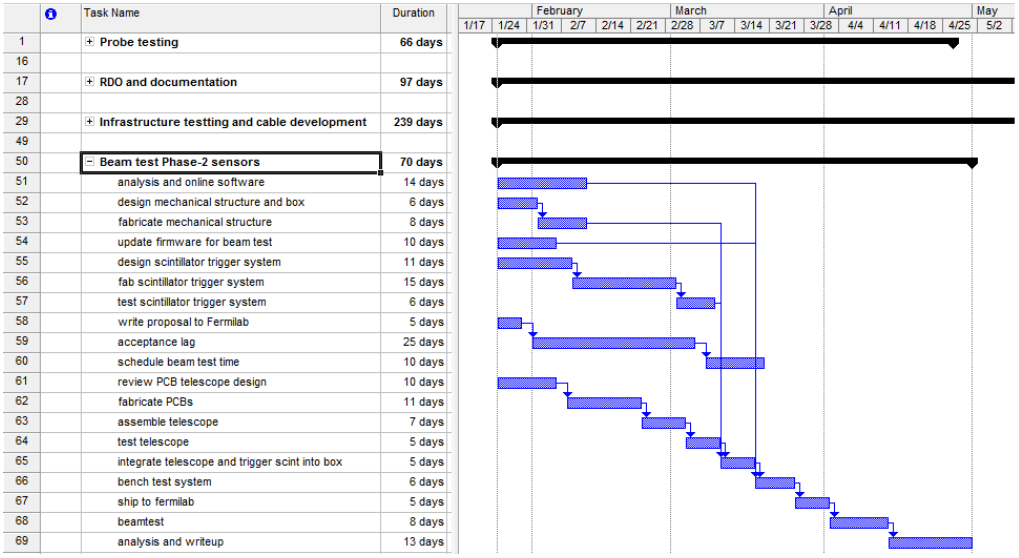
Beam test of Phase-2 Sensors

Status:

A plan for using existing testing boards to serve as components in a beam test telescope and preliminary run plan may be found here http://rnc.lbl.gov/hft/hardware/docs/Phase1/Phase-1_telescope_proposal.pdf. The beam testing is planned for the Fermilab test beam facility. The proposal

and detailed planning for this test beam still needs to be arranged. Additional hardware needed for triggering and DAQ interface needs to be designed and fabricated. Software and firmware need to be developed.
We will use characterized sensors and a testing plan that tests efficiency as a function of discriminator settings and biases. This plan needs to be refine.

Proposed Timeline milestones:



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1	Probe testing	66 days
16		
17	RDO and documentation	97 days
28		
29	Infrastructure testting and cable development	239 days
49		
50	Beam test Phase-2 sensors	70 days
51	analysis and online software	14 days
52	design mechanical structure and box	6 days
53	fabricate mechanical structure	8 days
54	update firmware for beam test	10 days
55	design scintillator trigger system	11 days
56	fab scintillator trigger system	15 days
57	test scintillator trigger system	6 days
58	write proposal to Fermilab	5 days
59	acceptance lag	25 days
60	schedule beam test time	10 days
61	review PCB telescope design	10 days
62	fabricate PCBs	11 days
63	assemble telescope	7 days
64	test telescope	5 days
65	integrate telescope and trigger scint into box	5 days
66	bench test system	6 days
67	ship to fermilab	5 days
68	beamtest	8 days
69	analysis and writeup	13 days

Project CD2-3

Status:

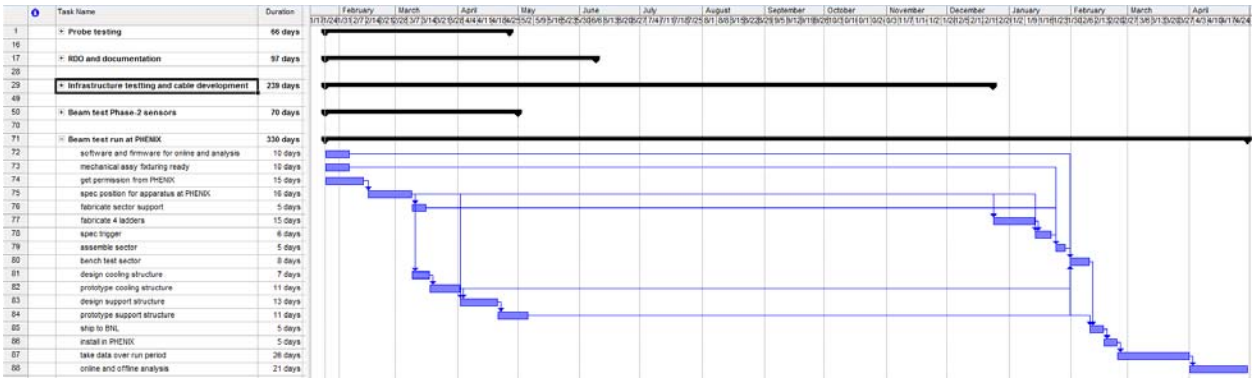
It is hoped that we will be in a position to have our project CD-2/3 review sometime near the middle of this year. Though preparation for this review is not explicitly listed in our project effort estimates, if the effort required for the CD-1 review is any guide, there will probably be ~1 month of effort required for review preparation. The schedule for the review is not yet set and some homework tasks from the CD-1 review remain to be completed. The most likely outcome of this task will manifest itself as a several month period where LG will have limited availability for the other tasks listed above.

Beam test run at PHENIX -

We hope to install a working prototype sector in the PHENIX experimental area for the FY11 run. This will require permission and space from the PHENIX collaboration and a full setup for assembly, test, rdo, and a custom cooling solution. The details and plan for this effort still need to be worked out.

Proposed Timeline milestones:

The large gap seen in the schedule shown below corresponds to the dependency of needing the flex cable development to be completed before sector assembly can begin.



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71	Beam test run at PHENIX	330 days
72	software and firmware for online and analysis	10 days
73	mechanical assy fixturing ready	10 days
74	get permission from PHENIX	15 days
75	spec position for apparatus at PHENIX	16 days
76	fabricate sector support	5 days
77	fabricate 4 ladders	15 days
78	spec trigger	6 days
79	assemble sector	5 days
80	bench test sector	8 days
81	design cooling structure	7 days
82	prototype cooling structure	11 days
83	design support structure	13 days
84	prototype support structure	11 days
85	ship to BNL	5 days
86	install in PHENIX	5 days
87	take data over run period	26 days
88	online and offline analysis	21 days

Miscellaneous Items

We need to begin versioning and tracking our software and firmware. Nothing has come from our efforts at getting CVS installed on the LBNL server that handles our web pages, so I am thinking of going to an outside company that was recommended by software professionals that work outside the lab. There are three options, CVS, SVN and GIT. CVS or SVN would be hosted for us, GIT we could host ourselves.

http://www.nongnu.org/cvs/
http://subversion.tigris.org/
http://git-scm.com/

Any opinions on this would be welcome.

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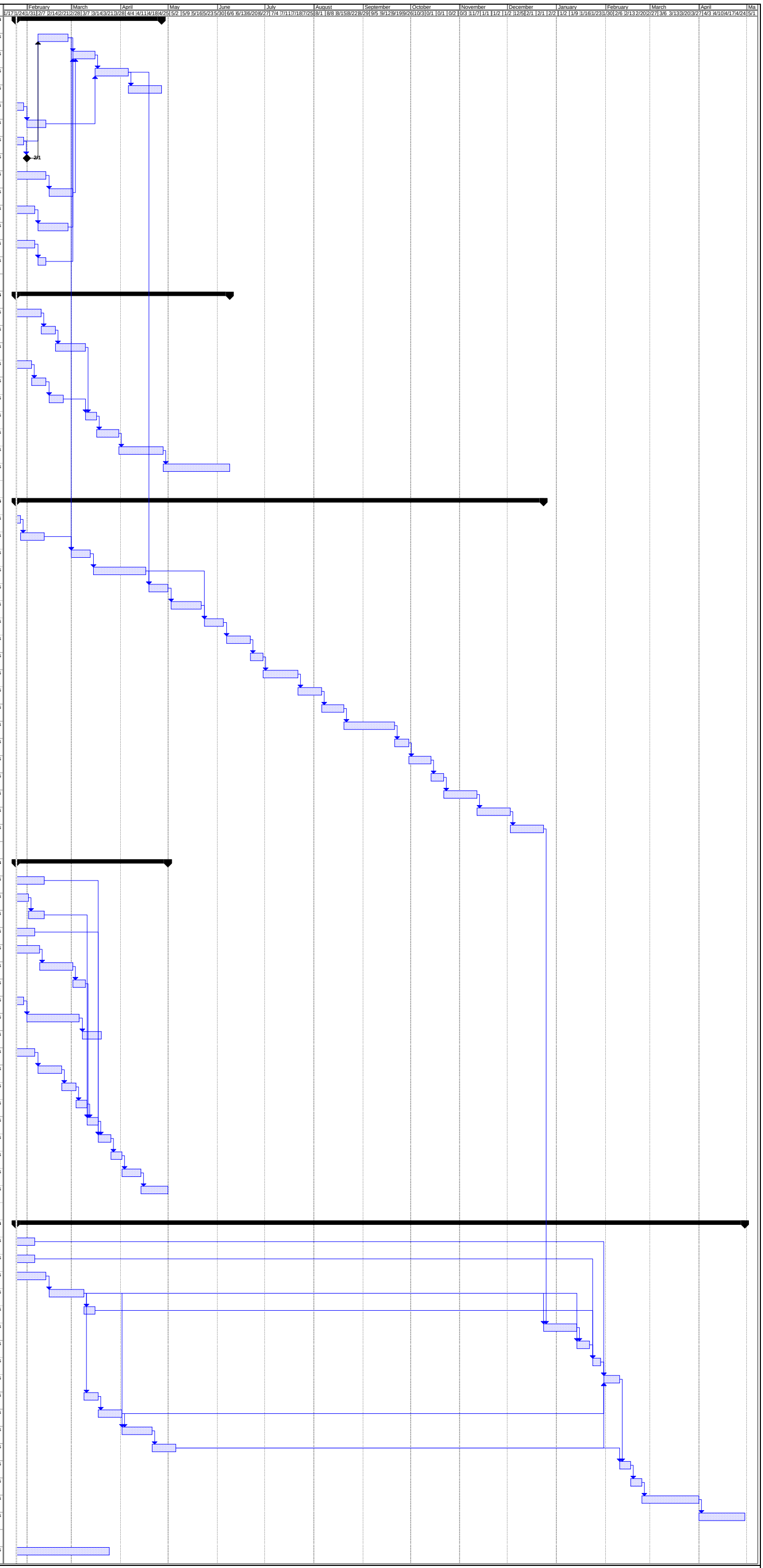

Project: FY10_Pixel_RDO_tasks_
Date: Mon 1/25/10

Task | Split | Progress | Milestone | Summary | Project Summary | External Tasks | External MileTask | Split