



DØ SMT Status Report

Old Milestones

- ❑ 1/3/00: 6-chip ladder fabrication 20% complete
 - Not met
 - » Problems with sensors, need for visual inspection
 - » Inadequate sensor delivery rate from Micron
 - Met 1/31/00, 3.8 week late

- ❑ 1/19/00: F Wedge Assemblies 20% complete
 - Met 1/24/00, 0.4 weeks late

- ❑ The DØ Silicon group, however, has now formally adopted the split silicon support cylinder as its baseline design with a new schedule:
 - First half cylinder by August 1, 2000
 - Second half cylinder by November 1, 2000

New Schedule

- New Schedule adopted based on split support cylinder:
 - » First half cylinder by August 1
 - » Second half cylinder by November 1

Milestone	Finish Date
Barrel 1 Complete	April 18, 2000
Barrel 2 Complete	May 23, 2000
Barrel 3 Complete	June 28, 2000
Barrel 4 Complete	July 27, 2000
Barrel 5 Complete	August 24, 2000
Barrel 6 Complete	September 22, 2000
F Disk 0 Complete	March 28, 2000
F Disk 1 Complete	April 11, 2000
F Disk 2 Complete	April 25, 2000
F Disk 3 Complete	May 9, 2000
F Disk 4 Complete	May 23, 2000
F Disk 5 Complete	June 21, 2000
F Disk 6 Complete	July 6, 2000
Three End F-Disks Complete	July 18, 2000
F Disk 7 Complete	July 20, 2000
F Disk 8 Complete	August 3, 2000
F Disk 9 Complete	August 17, 2000
F Disk 10 Complete	August 31, 2000
F Disk 11 Complete	September 15, 2000
F Disk 12 Complete	October 6, 2000
Six End F-Disks Complete	October 13, 2000
Disk H1 Complete	May 17, 2000
Disk H2 Complete	July 7, 2000
Disk H3 Complete	August 25, 2000
Disk H4 Complete	October 16, 2000

Silicon Sensors

Barrel

- ❑ Axial detectors (3-chip):
 - All sensors in hand
- ❑ 90° detectors (6-chip):
 - Micron delivery this month good: 30/March
 - Some of the later sensors are of high quality
 - Micron implanter being commissioned
 - » implantation done at IBS (Marseille)
 - » will use 10 wafers to quality control implanter
 - » Expectation is that results are more uniform than IBS
 - production paced by sensor delivery
- ❑ 2° detectors (9-chip)
 - Micron:**
 - Overall yield for year 2000 is 57%
 - Recently lost 8 sensors due to residue deposition
 - » residue looks like photoresist, but is due to outgasing of jigs
 - » attacks metal layer, cannot wirebond
 - » 21 sensors at Fermilab which have this problem
 - Full delivery of initial order anticipated in April/May
 - » Still to deliver 40 + 24 (lyr2), 12 + 24 (lyr4) sensors
 - Barely enough sensors in processing(192)

Disks

□ F-Wedge sensors

Micron:

- Full order of sensors (125) received!
- Yields were good. Possibility to purchase at most an additional 18 sensors from production batch

Eurisys:

- Tests on 10 wafers from second batch of 70 wafers started
- Results on p-side look okay
- Breakdown Voltage still 70-80V at $V_{\text{depl}}=15-20$ V
- No change and no change anticipated since implantation is the same
- Delivery:
 - scheduled: 35 on Jan 15, 2000, 30 on Feb 21, 2000
 - actual:
 - » 2nd batch: Mid April
 - » 3rd batch: Early May
 - » 4th batch: Mid July

□ H-Wedge sensors

- 60 additional sensors on order

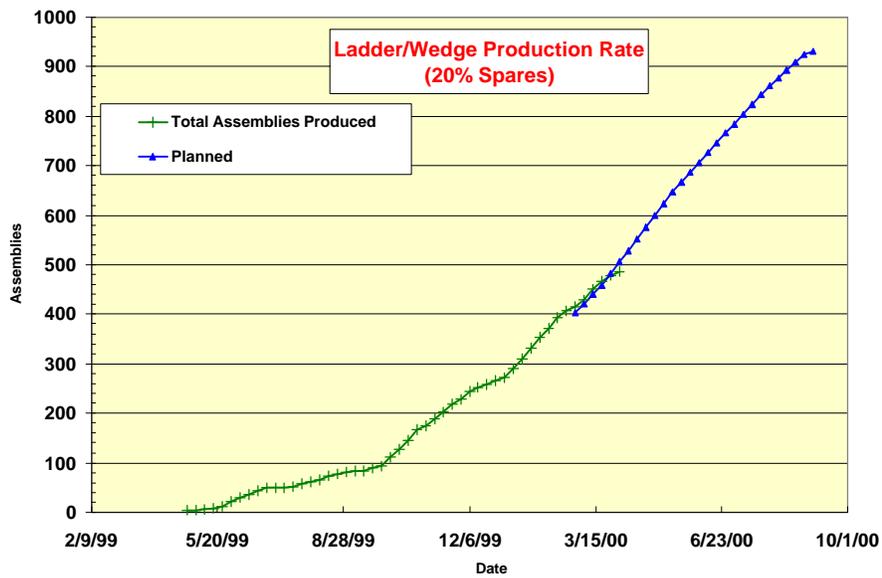
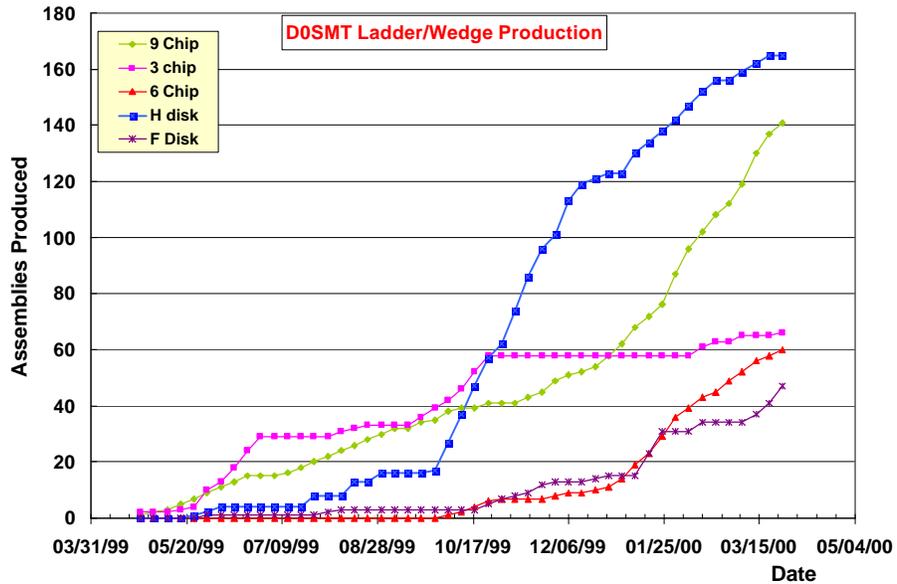
High Density Interconnect (HDI)

- ❑ 9-chip hdi's
 - 50 bare hdi's at Fermilab for lamination
 - » needs Be, which will be shipped week of April 10
 - 45 hdi's received from Promex
 - 27/45 received from KSU and turned into ladders
 - 10 hdi's received from KSU, 9 for repair
 - production will be limited by availability of hdi's
 - extensive effort put on repair of hdi's
- ❑ F-wedge hdi's
 - 15 hdi's being laminated
 - 50 hdi's received from Promex
 - 18 hdi's received at Fermilab
- ❑ H-wedge hdi's
 - All hdi's in hand at Fresno
 - 30 laminated; shipped to Silitronics
- ❑ 6-chip hdi's
 - currently plenty (65) available for ladder production
 - one more round needed at Promex

Ladder and Wedge Production

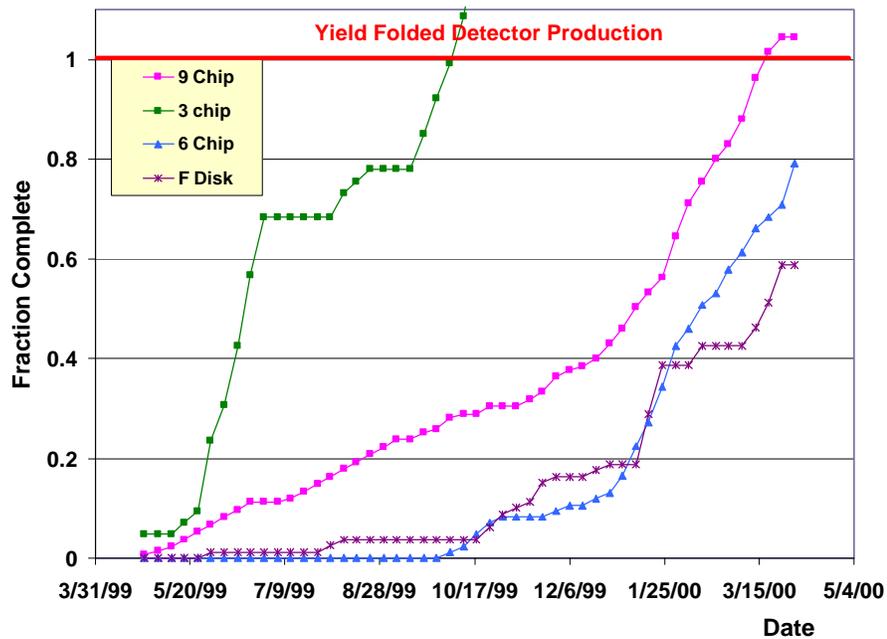
- ❑ Axial detectors (3-chip):
 - Production picked up again
 - Ladders built at slow but steady pace
- ❑ 2° detectors (9-chip):
 - Production lagging, out of hdi's
 - Out of Be mounting pieces. New order to arrive April 10
- ❑ 90° detectors (6-chip):
 - Paced by Micron delivery, 58 sensors built so far
- ❑ F Wedges (14-chip):
 - Limited by availability of hdi's
 - Started up again last week
 - Eurisys order is late. Lower acceptance criteria for sensors
 - Encapsulation of wire bonds very time consuming process
- ❑ H Wedges (6-chip):
 - 160 half wedges produced to date
 - Set up procedures for full wedge production
 - bi-facial accuracy ~5-10 microns
 - Glued 18 full wedges of which ~5 mechanical
 - Also here, encapsulation slow process: 2 half-wedges / day
 - Will start up production again when hdi's are received from Silitronics

Production Status



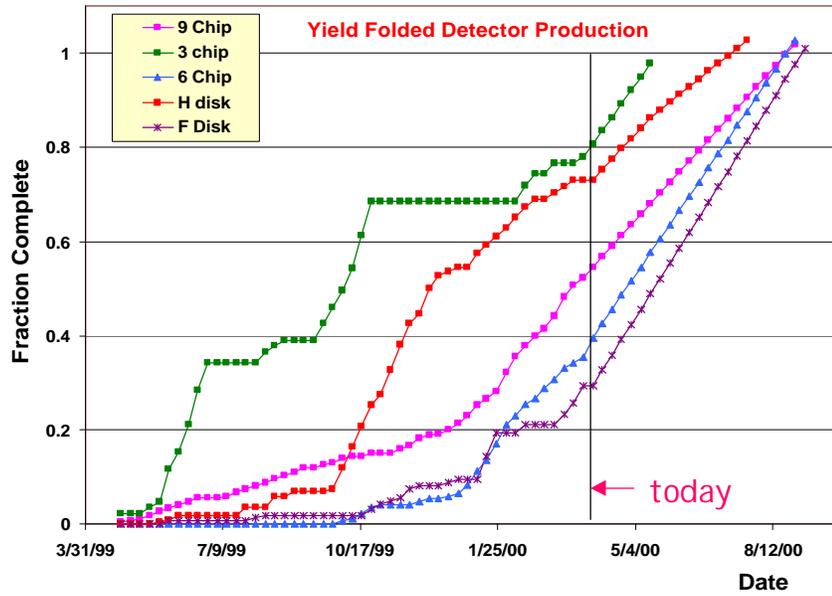
Production Status for first half cylinder

- New Schedule based on split support cylinder:
 - First half cylinder by August 1
 - Second half cylinder by November 1
- Last dates for detector production:
 - F Wedges: June 26, 2000
 - 6-chip ladders: June 12, 2000



- Assumed Yields:
 - 9-chip: 80%
 - 3-chip: 85%
 - 6-chip: 85%
 - H-wedge: 85%
 - F-wedge: 90%

Projection of Production



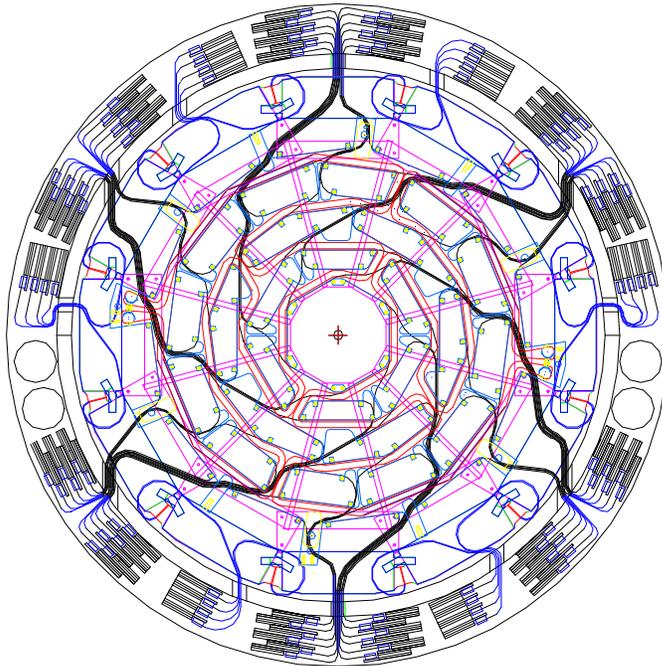
Barrel Assembly

- ❑ Barrel assembly ORC received!
- ❑ Ladders being installed as we speak

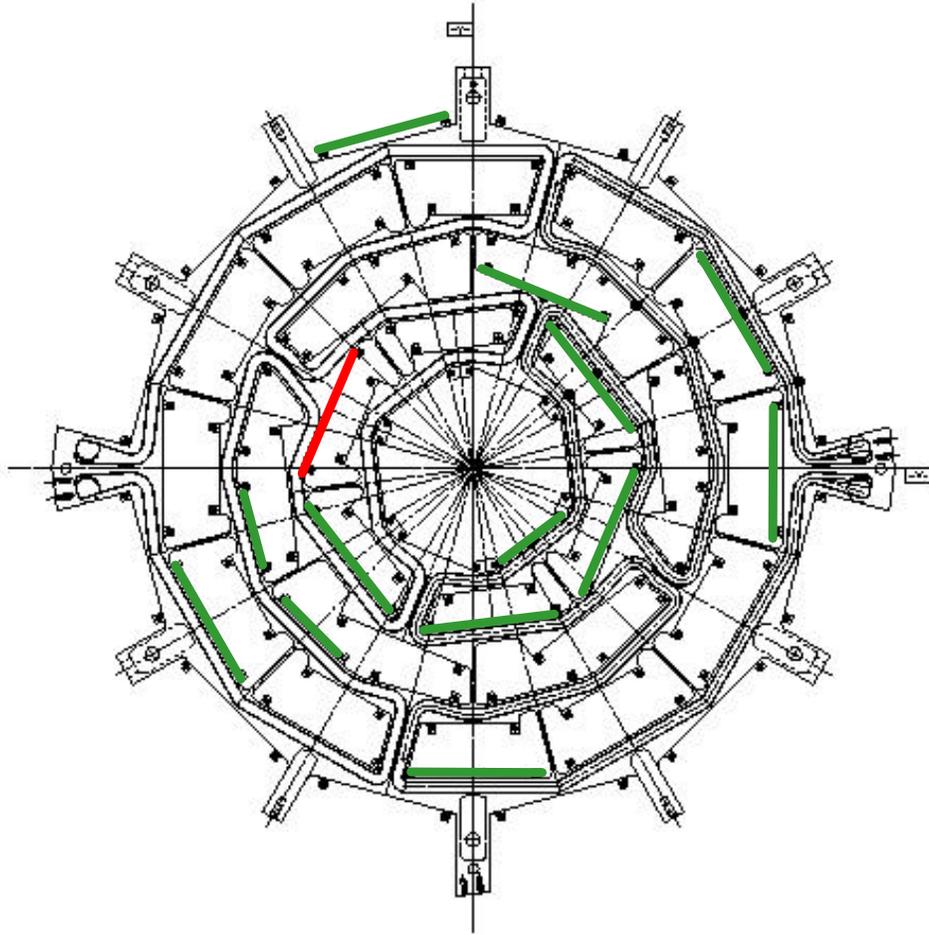
number in sequence	layer	position in layer	ID	number in sequence	layer	position in layer	ID
1	4o	1	9401	37	2o	1	9205
2	4o	3	9410	38	2o	2	9214
3	4o	5	9403	39	2o	3	9212
4	4o	7	9416	40	2o	4	9211
5	4o	9	9418	41	2o	5	9215
6	4o	11	9404	42	2o	6	9213
7	4i	2	9310	43	1o	2	3221
8	4i	4	9314	44	1o	3	3255
9	4i	6	9322	45	1o	4	3257
10	4i	8	9321	46	1o	5	3256
11	4i	10	9315	47	1o	6	3258
12	4i	12	9320	48	1o	1	3243
13	3o	2	3427	49	1i	3	
14	3o	4	3436	50	1i	4	3131
15	3o	6	3466	51	1i	5	
16	3o	8	3459	52	1i	6	3160
17	3o	10	3439	53	1i	1	
18	3o	12	3461	54	1i	2	3159
19	3i	2	3322	55	2i	3	9109
20	3i	4	3305	56	2i	4	9112
21	3i	6	3355	57	2i	5	9120
22	3i	8	3361	58	2i	6	9108
23	3i	10	3356	59	2i	1	9129
24	3i	12	3315	60	2i	2	9124
25	3o	1	3408	61	3i	3	3324
26	3o	3	3463	62	3i	5	3313
27	3o	5	3437	63	3i	7	3318
28	3o	7	3467	64	3i	9	3364
29	3o	9	3460	65	3i	11	3337
30	3o	11	3448	66	3i	1	3358
31	4o	12	9405	67	4i	3	9311
32	4o	2	9408	68	4i	5	9312
33	4o	4	9402	69	4i	7	9313
34	4o	6	9413	70	4i	9	9304
35	4o	8	9406	71	4i	11	9309
36	4o	10	9419	72	4i	1	9323

Assembly Sequence

- ❑ Currently 3 ladders installed in first barrel
- ❑ Delays encountered
 - sign off on pORC
 - LK CMM acting up
 - Readout electronics acting up
 -
 - In short, bugs being worked out
- ❑ Start with outer ladders, every 60°, work radially inward
- ❑ Six HDI pigtail bundles of 8 and 4 bundles each
- ❑ First barrel may take a while



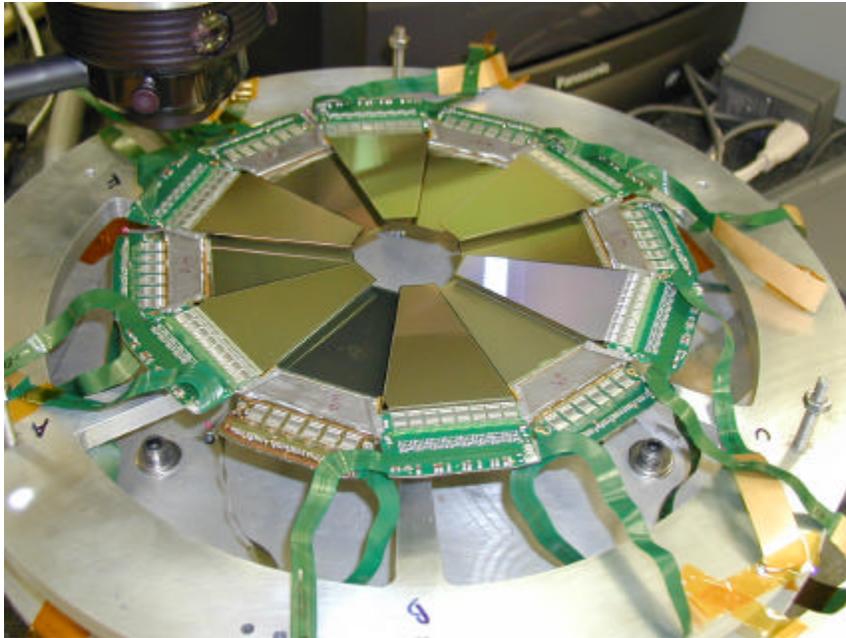
First Barrel Assembly



- Grade B (electrical)
- Grade C (electrical)

Completed Subassemblies

- 14th F-disk complete!
 - Mainly mechanical grade ladders (1 detector grade)
 - Used to establish procedures and alignment



- 1st F-disk schedule:
 - Waiting for pORC