

## Short Summary of the DT Session

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Some selected  
transparencies on:

DT chamber production

HVB (high voltage board)

MiniCrate prod.

Test of HV supplies

Installation & Commissioning

Same areas as in Dec. 2004 -  
report progress update, here

## Main areas:

- HVB\_v5 (new HV distribution boards) production and retrofitting.
- MiniCrate (readout and local trigger) mass production.
- Further work at CERN (mount services etc. on DTs, installation; commissioning starting) while ensuring smooth assembly at external sites.
- Wheel cabling.
- DT schedule for installation and commissioning; also strongly driven by general CMS schedule... and conversely.



## Status of MB4 Production



<b>Mechanically finished SL</b>	<b>19</b>
<b>Assembled SL</b>	<b>18</b>
<b>Tested SL</b>	<b>15</b>
<b>Completed Chambers</b>	<b>6</b>
<b>Chambers @ CERN</b>	<b>3</b>



## Next deliveries



- 1<sup>st</sup> week of april 4 chambers to CERN (wheel YB+2 completed)
- 1<sup>st</sup> week of may 4 chambers to CERN (wheel YB+1 completed)
- 1<sup>st</sup> week of june 3 chambers to CERN (3 chambers for YB0)

# Chamber Production Status @ Aachen

Status of 14.03.2005 full production (incl. spares) = 214 SL

Production Step	No. of SL	Remarks
Mechanically finished	<b>204 SL</b>	Contains 2 spare feet-SL without HV+FE assembly.
Fully assembled with HV + FE	<b>173 SL</b>	Limited by availability of HVB.
Fully tested SL	<b>171 SL</b>	2 SL are used for system tests.
HVB available for	0 24 SL → <b>197 SL</b>	New HVB_v5 ISR HVB_v1
Other materials available for	<b>184 SL</b>	Wire bunches for 1 SL missing
Chambers completed	<b>59</b>	
Chambers to be glued	<b>1</b>	Based on available, tested SL

Chambers at CERN = 43 MB1 + 9 Feet (Last shipment 8 chambers 03.12.2004)

To be done: 10 chambers **or** 10 SL

# Legnaro production status

## Summary ( 11/3/05)

**57 CHAMBERS** completed :      **48 MB3(23-, 25+)** **1 MB3chim**  
**(50 at CERN)**                              **8 MB4-4** (all but spare one!)

**179 SuperLayers standard (> 80%!)**

**(123 phi, 56 theta)** (2 more chambers ready to be assembled) +

**2 theta chimney , 5 phi chimney**

~730 Layers

**one table devoted to phi chimney production**  
**table modification started end of september,**  
**now at 100% efficiency(see details...)**

( delay due to) ...

**lack of Al plates: standard production stopped at the end of 2004**  
**(table working slowly at present because of manpower....)**

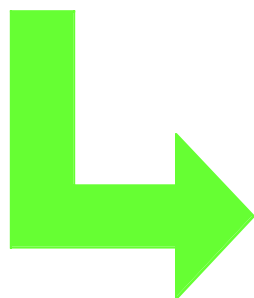
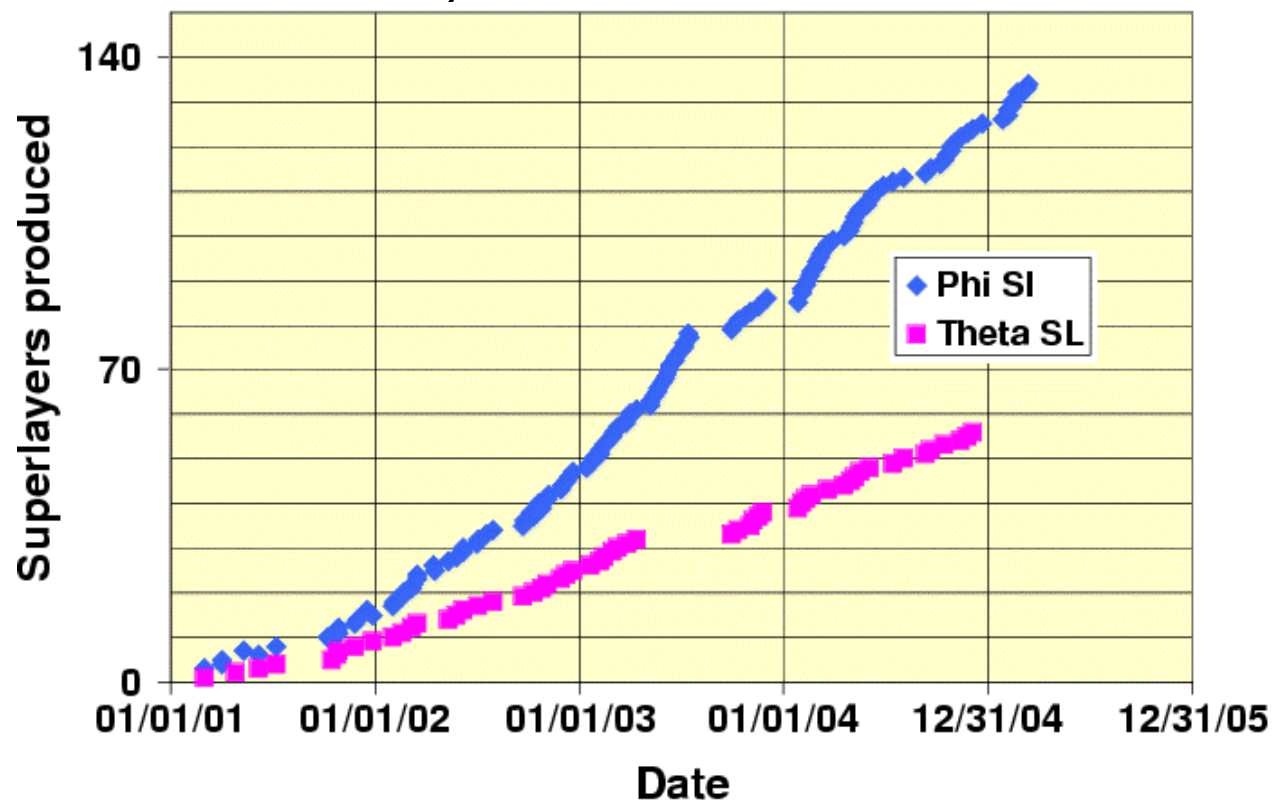
# DT Assembly at Madrid

## Chamber Status.

### SL's mechanically assembled

88% of SL's

25 SL's left  
(including spares)



~ 4-5 months to finish

## Summary of HVB\_v5 assembly:

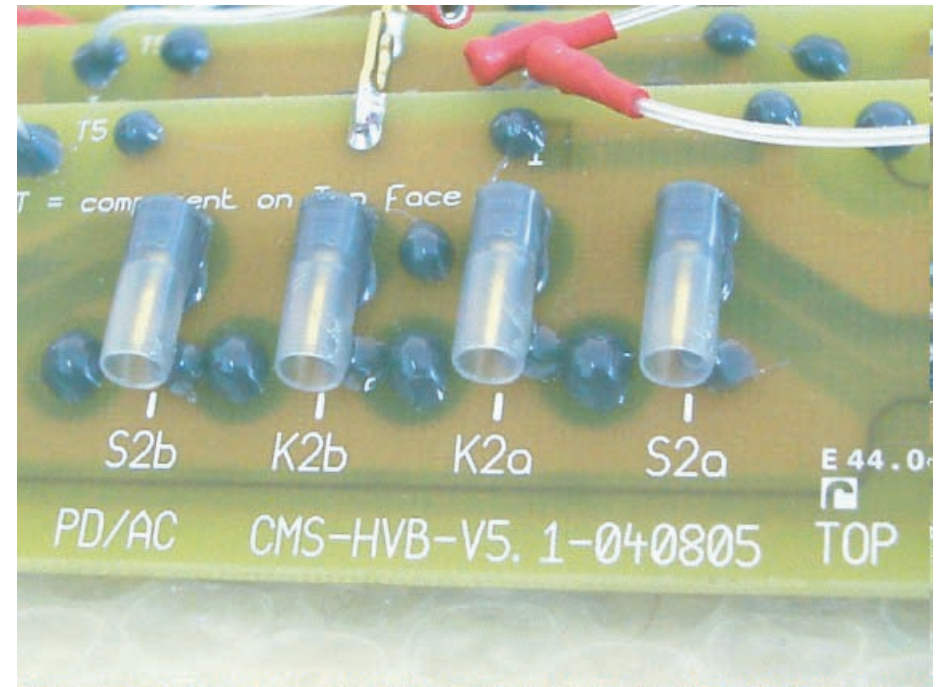
Visit and discussions at the assembly site were important and fruitful.

All weak points understood; can easily be avoided; cure has been implemented.

Assembly manual updated, to reflect these points.

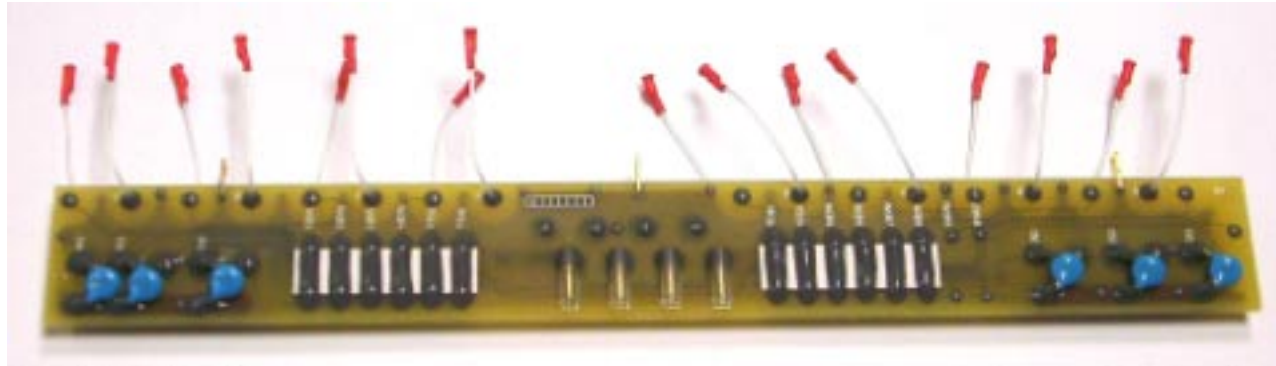
Batch of ~700 HVBs available at IHEP has been retrofitted accordingly, prior to shipment (last Friday).

Looking forward to a rapid assembly of good and safe HVB\_v5.



Detail of a good HVB. The protection around the HV pins is visible; all pads are fully protected by glue.





- ~11,300 PCBs (= all) ordered, ~all received.
- All other components also available.
- Updated test jigs: 1 at Legnaro, 3 new at IHEP.
- Since January assembling **with** pin protection, at IHEP.
- HVB\_v5 delivered for chamber retrofitting: ~250 (Aachen) + ~1500 (IHEP).
- Several improvements in Assembly and Quality Control set up at IHEP.
- Next batch of 700 (IHEP) shipped; 1200-1400/month now.
- Retrofitting in chambers is critical work (time, **schedule**).
- No failure of materials reported so far - neither from assembly nor from test.

# **RO-MINICRATE PRODUCTION STATUS**

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- **80 RO-MC's have already been shipped to Legnaro:**

All MB1-L.

MB2-L and MB3 for ~1 and 1/2 wheel.

Some MB4 have been produced, but in principle only MB4(4/10) will be needed for installation for the moment.

- **If any MB4 of other type is needed for the magnet test, please, tell in advance.**

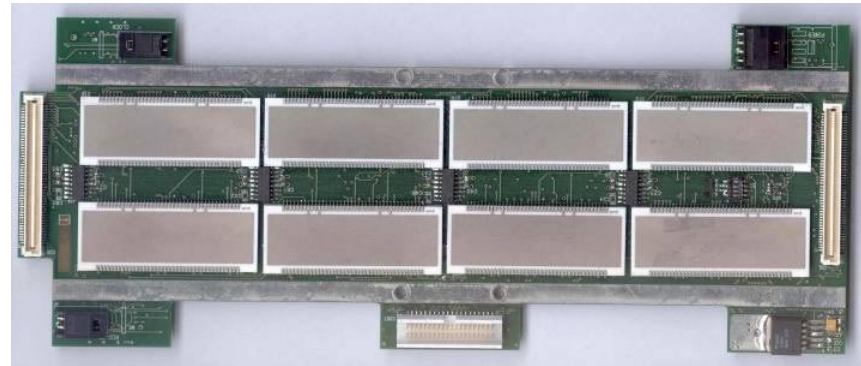
## **OTHER DETAILS:**

- **CCB/SB's and its cabling are being assembled at Madrid since beginning 05.**
- **Nevertheless, CCB link board is not fixed on the MC to avoid damage during shipment.**
- **Since January, LV terminals are also being installed at Madrid.**

## summary

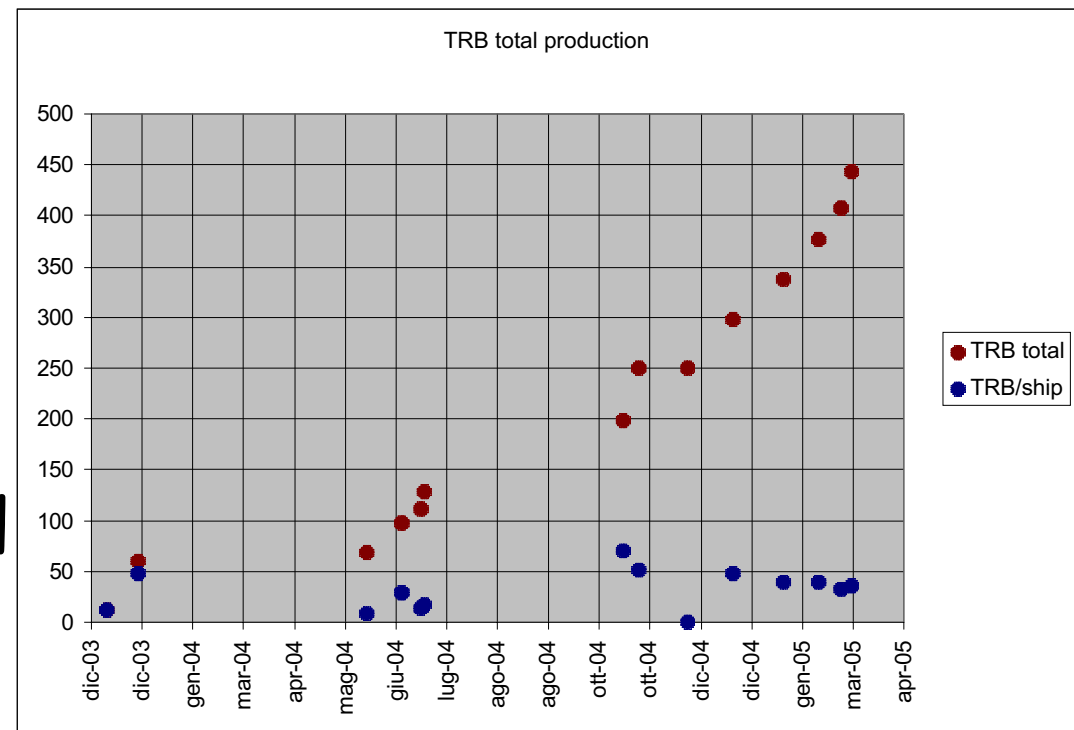
after 3.5 months of MC assembly in Bologna:

- set-up 100% functional and reliable
  - 5 (soon 8) people in shifts of 2/week
- global production rate 0.75 MC/Week
  - limited by low TRB production rate
  - **NEED URGENT ACTION**
- true assembly rate 1 MC/week
  - limited by TRB fault rate
  - projected assembly rate 6 MC/month (it needs 14 good TRBs/week/site)
- introduction of TRB screening stage can boost the assembly rate (up to 9 MC/month)



## TRB

- Produced up to now:
  - 275 TRB phi
  - 155 TRB theta
  - 14 TRB phi32
- Production rate still too slow



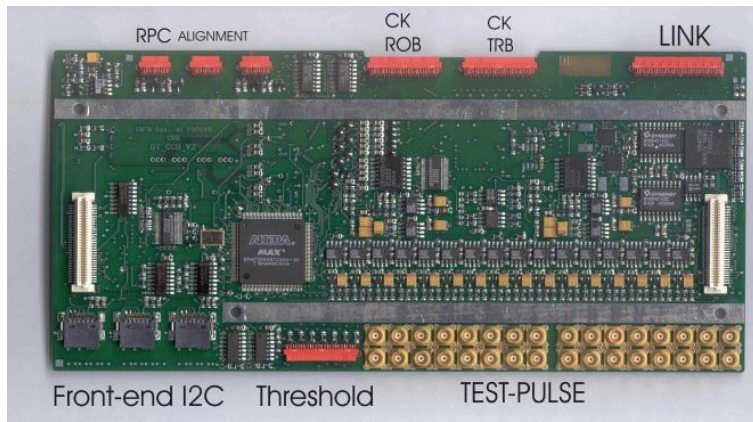
BTI module fault distribution is clearly non-random.

BTI inner modules have a problem.

Since modules are all similar, very likely the problem is in using them and not when producing them

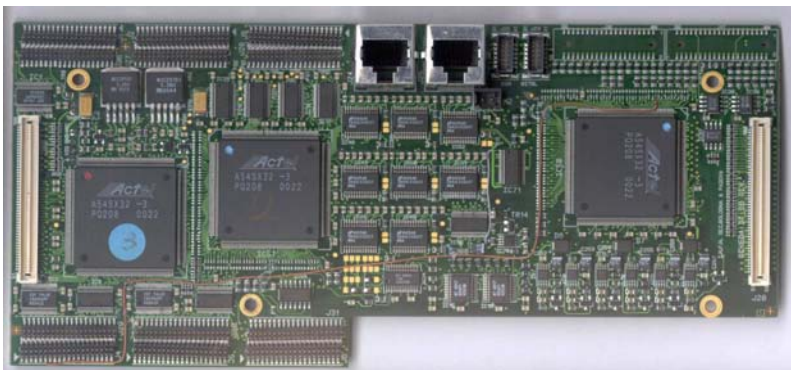
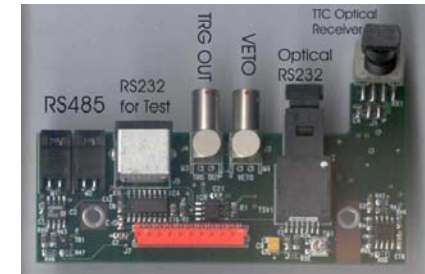
For instance:

- thermal profile during module bonding on TRBs
- problem with traces on TRB PCB (clock distribution, data traces Xtalk, etc..)



CCB

CCB link

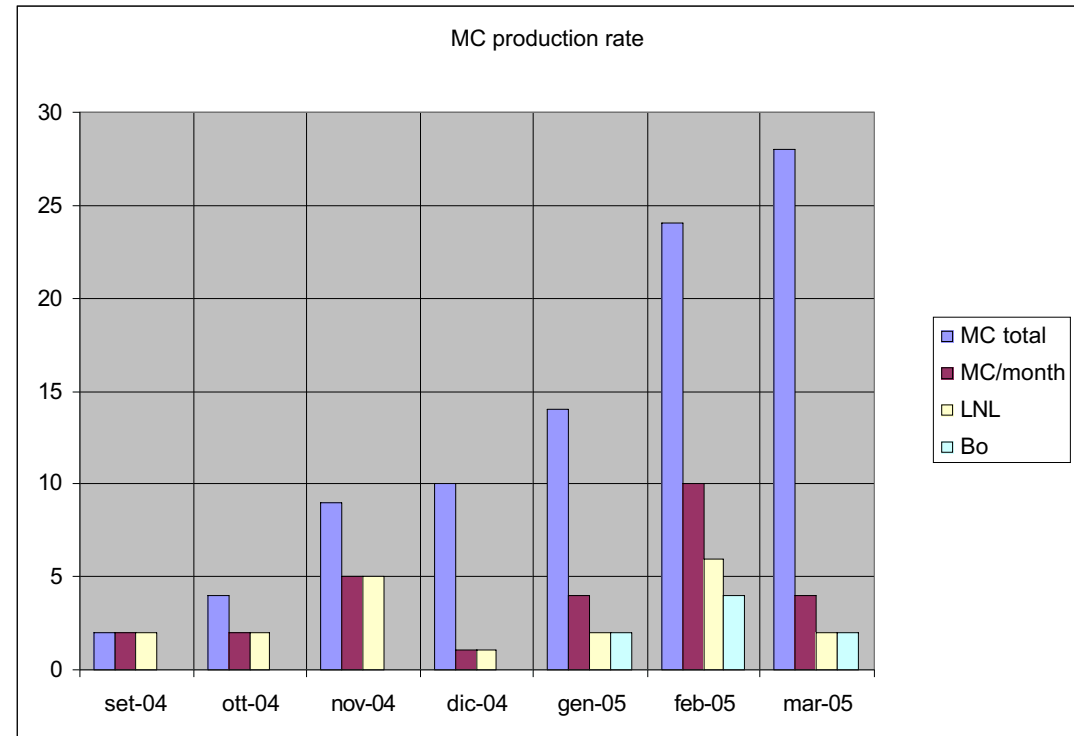


SB

Production completed (290 sets).

## Trigger part: Legnaro + Bologna

	A	B	C	D	E	F
1	MC type Label	MC type barcode	spediti da CIEMAT	presenti a PD	presenti a BO	spediti al CERN
2	MB1-L /S-	102	28	12	6	10
3	MB1-R /S+	111				
4	MB1-L Ch./S-	122				
5	MB1-R Ch./S+	131				
6	MB2-L /S+	201	13	3	1	9
7	MB2-R /S-	212				
8	MB2-L Ch./S+	221				
9	MB2-R Ch./S-	232				
10	MB3-L /S0	300	14	8	1	5
11	MB3-L Ch./S0	320				
12	MB4(s)-L /S+	401	3	3		
13	MB4(s)-L /S-	402				
14	MB4(s)-R /S+	411				
15	MB4(s)-R /S-	412				
16	MB4(s)-R Ch./S-	432				
17	MB4(4)-L /S0	500	2			2
18	MB4(4)-R /S0	510				
19	MB4(4)-R Ch./S0	530				
20	MB4(8-12)-L /S+	601				
21	MB4(8-12)-L /S-	602				
22	MB4(8-12)-R /S+	611				
23	MB4(8-12)-R /S-	612				
24	MB4(9-11)-L /S0	700	3	1	2	
25	MB4(9-11)-R /S0	710				
26	MB4(10)-L /S+	801				1
27	MB4(10)-L /S-	802	2			1
28	MB4(10)-R /S+	811				
29	MB4(10)-R /S-	812				
30			65	27	10	28
31						



Production rate still too slow.

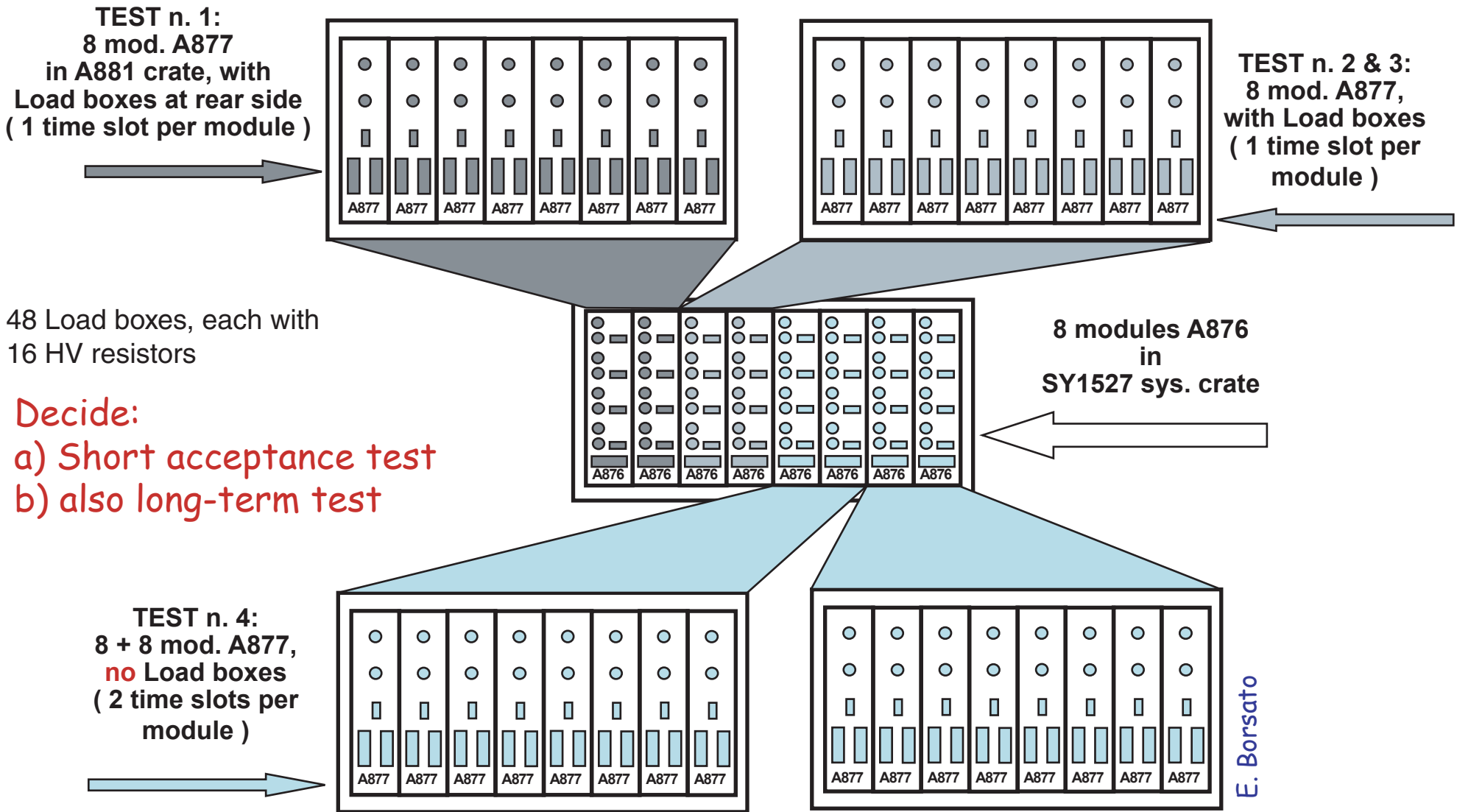
Constraints:

- Limited man power
- Limited TRB availability
- Assembling very complex
- Test rather puzzling



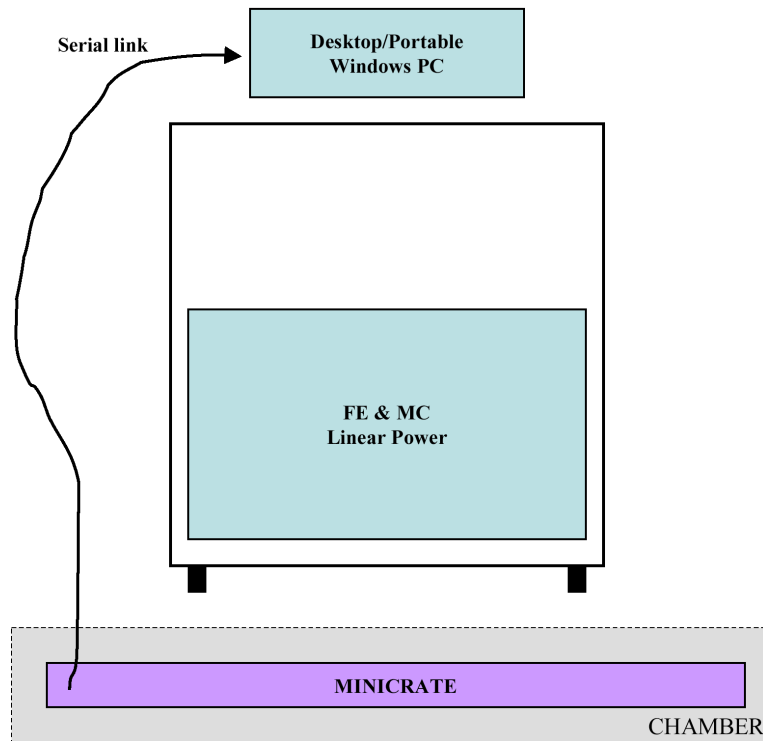
# Rack for Test of HV Supplies

**BASIC TEST UNIT:** 1 rack housing 1 SY1527 crate and 4 A881 crates



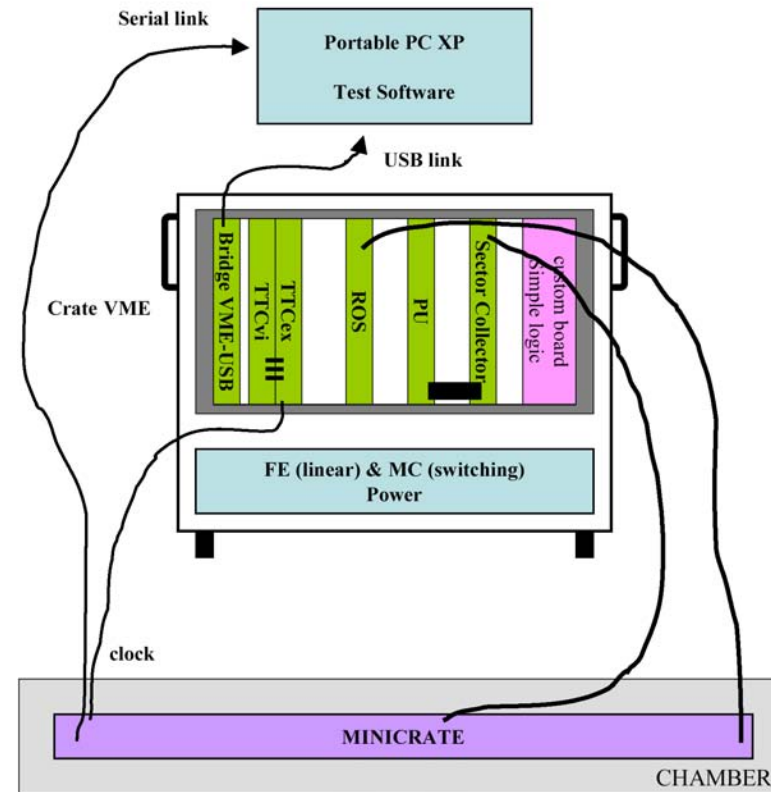
Cycle the tests through all modules (=4 time slots). Resistive loads needed for tests 1-3.

## Boundary Scan Test



Very fast, checks interconnectivity and boards integrity

## Portable Functionality Test



Used at SX5 from the scissor lift with the MC connected to the chamber. It takes 1hour if there are no problems

## YB+2 MiniCrate Installation Status

- 24 (out of 34) MC have been installed, ~5+9 have been tested, connectors completed on 9
- 5 MC(3MB3, 2MB4/10) arrived on March 13th at the ISR and will be installed this week. This completes the top part of YB+2
- Still missing 4MB3 and 1 MB2 MCs to be installed first week in April
- Functionality test will start again Thursday for one week. Soldering PADC connectors, connection to the cooling manifold et cetera will proceed in parallel as much as possible
- HV Connections to patch panels (MB1s are tricky) should be completed after Easter



- **DT** chamber assembly progressing well; Torino attempting to increase rate from 2 to 3 DT/month.
- **HVB\_v5** mass production improving in quality and rate; 34 DTs retrofitted
- **MiniCrate** mass production improving rate; Readout part is fine, Trigger part limited mainly by delivery and rejection rate of TRB boards; 28 MCs installed.
- **Installation** start now YB+1
- **Cabling** after commissioning MCs; one sector in ~6 weeks; YB+2 July
- **HV supplies:** defined tests; setting-up for bulk test
- **Commissioning** of MCs: test systems being improved; limiting factor is availability of cooling.