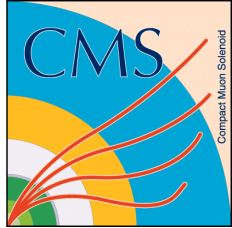


Status of cables and cabling for YB+2

MU integration – March 05

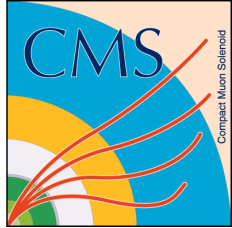
Fabio Montecassiano
INFN PD & EP/CMM



Contents



- Status of procurement
- Sector test
- Cabling YB+2
- AoB



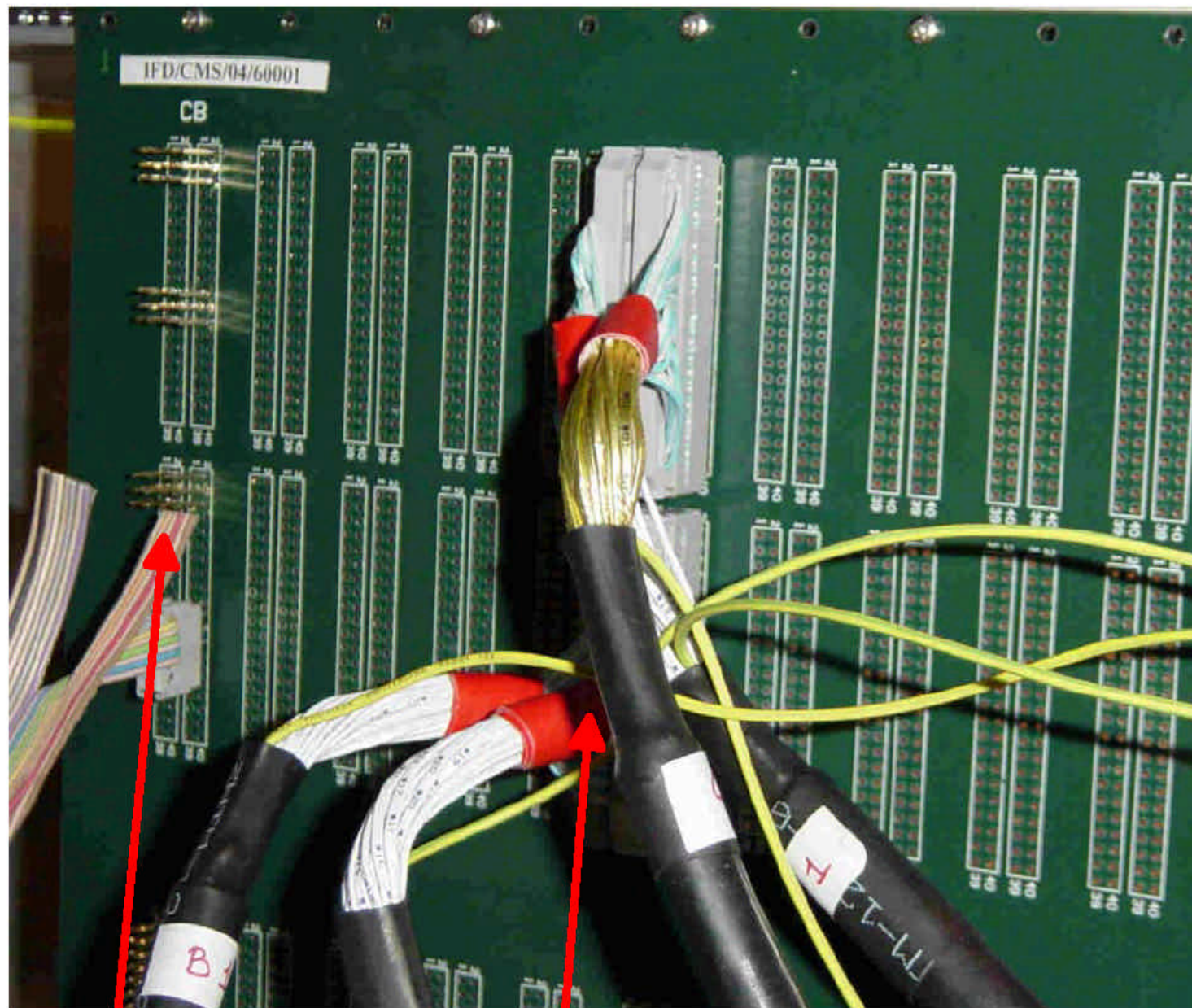
Status of procurement - cables



- **HV cables (12%)** for both MB and RB was fully procured and delivered at CERN.
- **LV cables (9%).**
 - **MB.LV.fe (2.5%): Fully delivered at CERN.**
 - **RB.LV.fe-# (4%): Fully delivered at CERN.**
 - **MB.LV.mc (2.5%): Ordered to NOVACAVI (full prod). Delivery date: 15.03.05**
- **Optical Fibers (5%)**
 - **MB.OF.ttc-mc (2.5%)** Already available BLUE colored at UNIFIBRE.
 - **MB.OF.sc (2.5%) Ordered 7Km BLUE spool. Delivery date: 8.04.05**
note: It was chose to use 'not armored' fibers to be put inside the radial cable-tray.
- **Signal cables (72%)**
 - **MB.CA.tr & ro (10%): Fully delivered at CERN.**
 - **RB.CA.dcs-# & (4%): Fully delivered at CERN**
 - **RB.CA.t-sens (3%): Fully delivered at CERN**
 - **MB.CA.sc (2%):** Q.ty for **sector test delivered** at PD.
Ordering the remaining q.ty from cern store soon.
 - **MB.CA.veto (3%): Ordered to NOVACAVI (full prod). Delivery date: 18.03.05**
 - **RB.CA.sgn (50%): RPC's trigger cable is an OPEN QUESTION**
NOVACAVI delivered 5 Km but could be not enough for the MU barrel 2 sectors test and ENDCAP installation. There are other 3Km from another firm which have to be tested.
Concerns about the full production (70Km) which isn't ordered because the CERN TENDER is not yet closed. **THIS CABLE COULD BE VERY LATE FOR YB+2 INSTALLATION**

Furthermore the connector at LinkBoard side is gone under discussion due to concerns about LBoard's backplane!

Lbox backplane

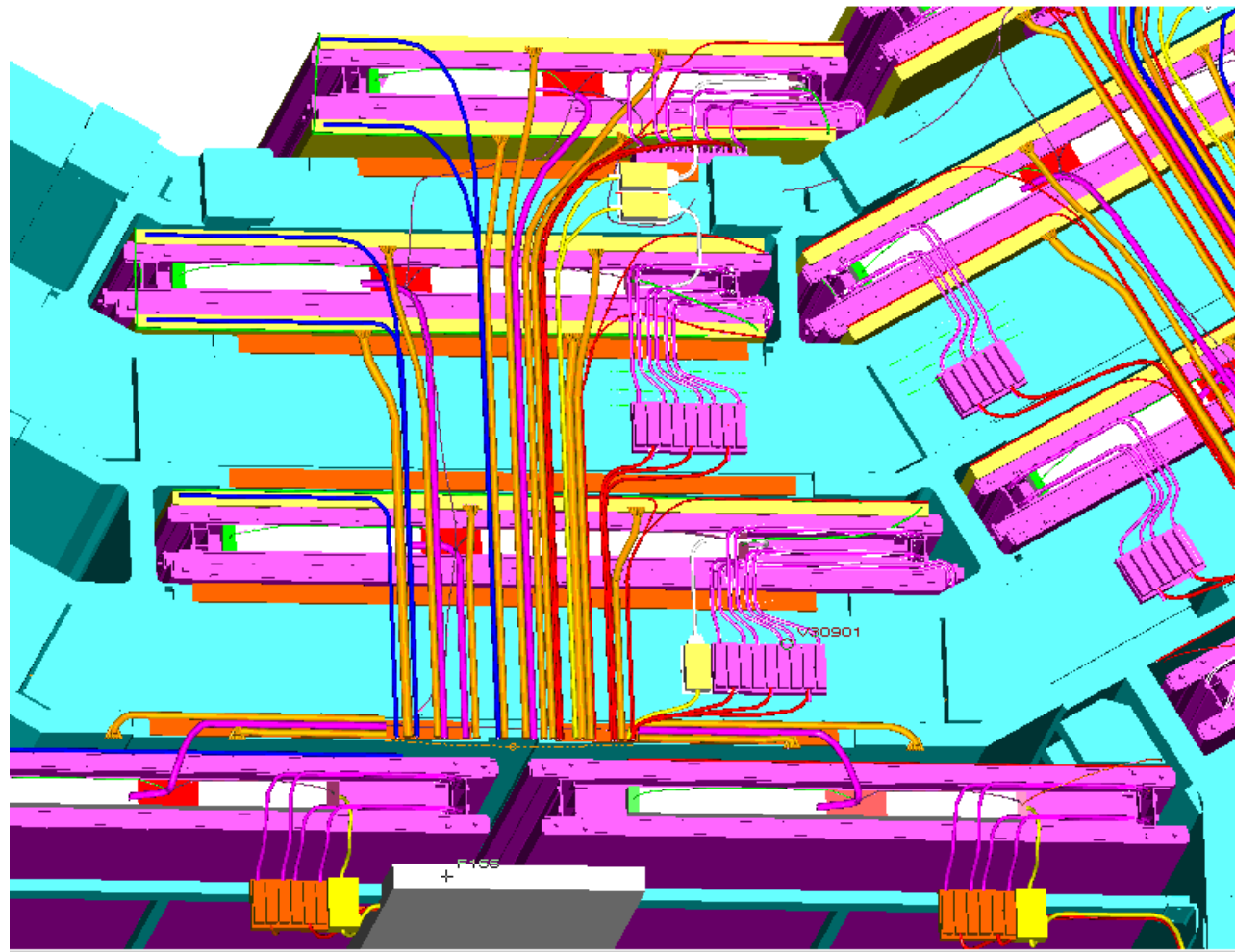


RPC I2c cable

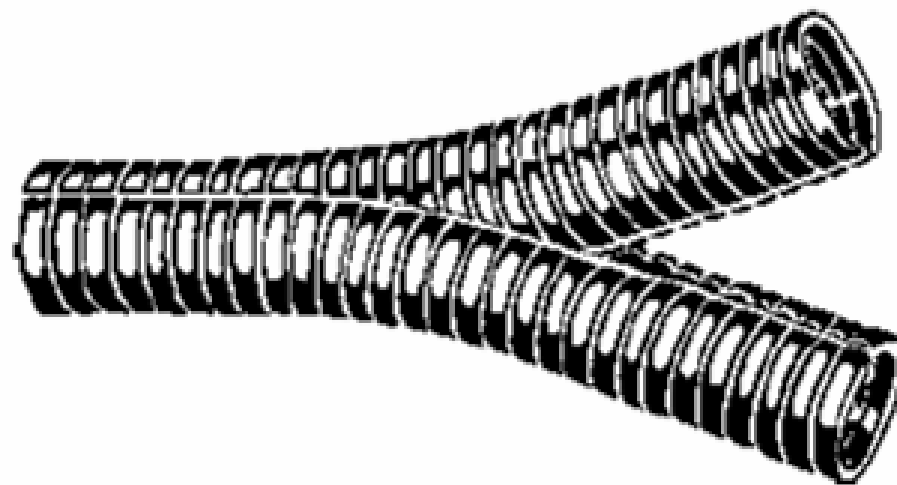
RPC data cables

More details about RPC trigger connector at Linkboard side

There are concerns about the reliability of the present solution (see picture). So this connector is now undefined. **It could take long time to be solved. Sectors test and YB+2 cabling could be affected!**



- DT fibers will be installed removable along the radial cable-tray
→ we need to protect them.
- A **divisible corrugated tube** could be fine.
- Looking for such product I discovered the **PMA Paco** but **it was not accepted by TIS** being UL94 –V2 (UL94-V0 or V1 required).
- Continuing the search I had found another firm offering a similar product (ANA-QUICK) but it's also UL 94 – V2 rated.
- We need about 1.5 Km in the radial part (60 sectors) for a total of ~ 60Kg



I'm going to ask a **DEROGATION** for the **PMA Paco tube (LSZH UL94 V-2)**

Status of MB and RB cables

Cable name	Supplier	Respons. person	% length	TIS (fire tests)	Order status (full prod.)	Delivering time		Manufacture time (working weeks)		
						sect test	full prod.	sect test	1 wheel	5 wheels
MB.LV.mc	NOVACAVI	Willmott	2.3	not yet tested	ordered	15.03.2005 (full production)		2 w @ CERN	2 w @ CERN	7 w
MB.LV.fe	INTERCOND	Pegoraro	2.3	accepted	delivered	delivered	delivered	1 w @ CERN ?	3 w @ CERN ?	12 w @ CERN ?
MB.HV	KERPEN	Borsato	6	accepted	delivered	delivered	delivered	done	done	done
MB.OF.ttc-mc	UNIFIBRE	Bellato	4	accepted	not ordered ²⁾	available @ UNIFIBRE		3 w @ UNIFIBRE	3 w @ UNIFIBRE	3 w @ UNIFIBRE
MB.OF.sc	UNIFIBRE	Bellato	4	accepted	pre-ordered ²⁾	08.04.2005 (full production)		3 w @ UNIFIBRE	3 w @ UNIFIBRE	3 w @ UNIFIBRE
MB.CA.sc	CERN STORE	Bellato	1.5	accepted	not ordered	delivered	6 w (worst ³⁾)	1 w @ CERN ?	2 w @ CERN ?	4 w @ CERN ?
MB.MCA.veto	NOVACAVI	Bellato	4	not yet tested	ordered	18.03.2005 (full production)		1 w @ CERN ?	3 w @ CERN ?	12 w @ CERN ?
MB.CA.tr	DAETWYLER	Odorici	7.8	accepted	delivered	delivered		6-8 w @ DAETWYLER	6-8 w @ DAETWYLER	6-8 w @ DAETWYLER
MB.CA.ro			7.8	accepted						

RB.LV.fe-8	NOVACAVI	Ranieri	2.8	accepted	delivered	delivered	delivered	3 w @ ?	3 w @ ?	5 w @ ?
RB.LV.fe-12	NOVACAVI	Ranieri	0.5							
RB.HV	NOVACAVI	Ranieri	6	accepted	delivered	delivered	delivered	3 w @ ?	3 w @ ?	5 w @ ?
RB.CA.sgn ¹	NOVACAVI	Ranieri	43	accepted but..	CERN tender	delivered but ..	?	3 w @ ?	3 w @ ?	6 w @ ?
RB.CA.dcs-6	NOVACAVI	Piccolo	3.2	not yet tested	delivered	delivered		3 w @ ?	4w @ ?	6 w @ CPE
RB.CA.dcs-9			0.6							
RB.MCA.t-sens			3.2							

WORST CASE	18.03.2005	RB.CA.sgn undefined !	6 w (DT tr-ro cables)	8 w (DT tr-ro cables)	12 w (DT LV fe & veto)
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REMARKS

- 1) Procurement of the RPC's trigger cables (RB.CA.sgn) is not defined!
- 2) DT fibers need cutting lengths to be ordered. MB.OF.sc was pre-ordered to get BLUE color
- 3) To be bought from CERN STORE

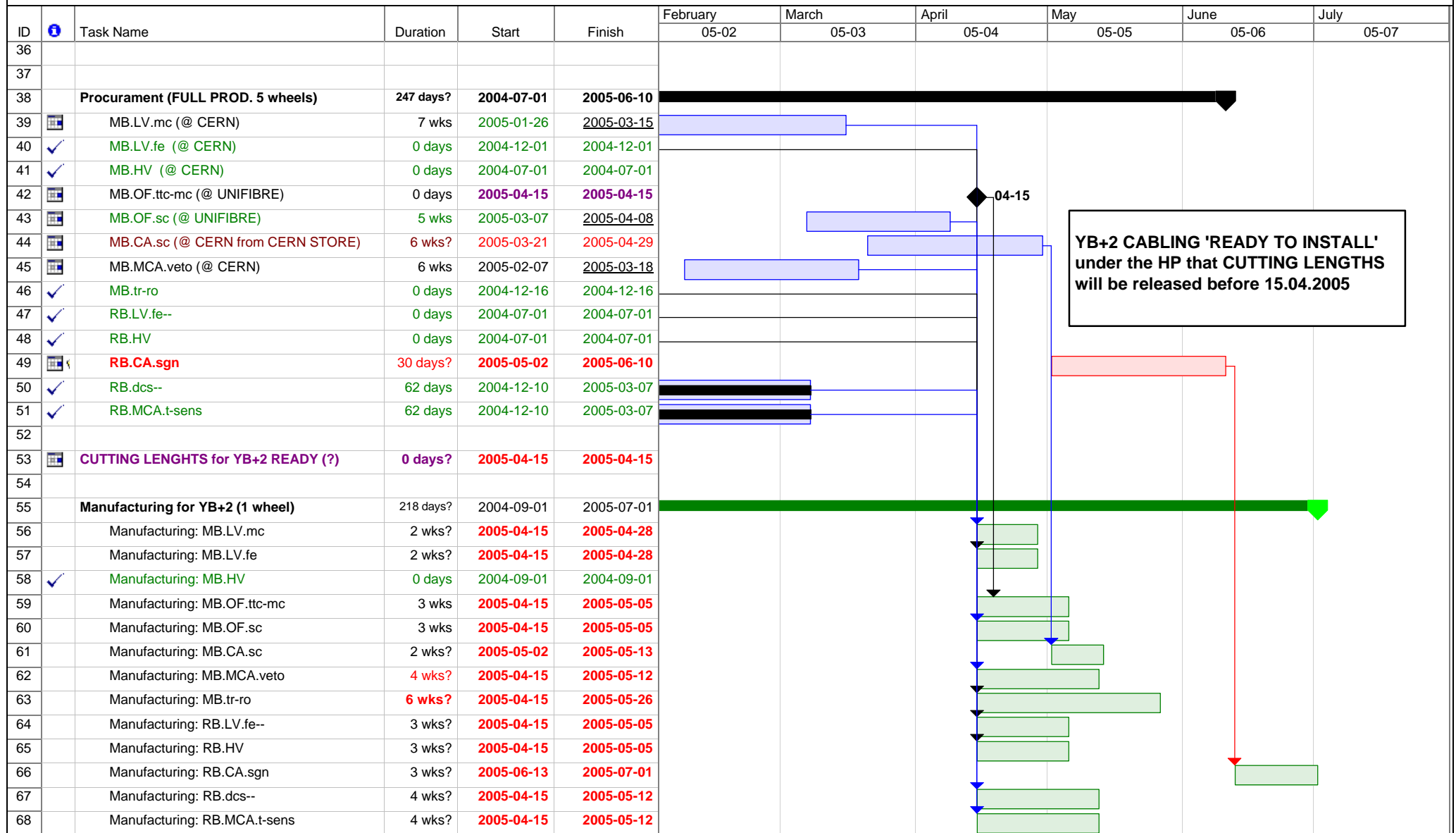
for updates see: http://cern.ch/montecas/pub_doc/CABLES/UXC-status-short.pdf

MB and RB procurement and manufacturing

ID	Task Name	Duration	Start	Finish	February	March	April	May	June	July
					05-02	05-03	05-04	05-05	05-06	05-07
1										
2	Procurement for TEST SECTOR	203 days?	2004-07-01	2005-04-11						
3	MB.LV.mc (@ CERN)	7 wks	2005-01-26	2005-03-15						
4	MB.LV.fe (@ CERN)	0 days	2004-12-01	2004-12-01						
5	MB.HV (@ CERN)	0 days	2004-07-01	2004-07-01						
6	MB.OF.ttc-mc (@ UNIFIBRE)	0 days	2005-04-01	2005-04-01						
7	MB.OF.sc (@ UNIFIBRE)	5 wks	2005-03-07	2005-04-08						
8	MB.CA.sc (@ PD)	0 days	2004-12-01	2004-12-01						
9	MB.MCA.veto (@ CERN)	6 wks	2005-02-07	2005-03-18						
10	MB.tr-ro (@ CERN)	0 days	2004-12-16	2004-12-16						
11	RB.LV.fe-- (@ CERN)	0 days	2004-07-01	2004-07-01						
12	RB.HV (@ CERN)	0 days	2004-07-01	2004-07-01						
13	RB.CA.sgn	0 days	2004-12-20	2004-12-20						
14	RB.dcs--	62 days	2004-12-10	2005-03-07						
15	RB.MCA.t-sens	62 days	2004-12-10	2005-03-07						
16	CORRUGATED TUBE (need derogation!)	3 wks?	2005-03-22	2005-04-11						
17										
18	CUTTING LENGHTS for TEST READY (?)	0 days?	2005-04-01	2005-04-01						
19										
20	Manufacturing for TEST SECTOR	177 days?	2004-09-01	2005-05-05						
21	MB.LV.mc (@ CERN by spanish tech.)	2 wks	2005-04-01	2005-04-14						
22	MB.LV.fe (@ CERN by ?)	2 wks?	2005-04-01	2005-04-14						
23	MB.HV (@ ISR)	0 days	2004-09-01	2004-09-01						
24	MB.OF.ttc-mc (@ UNIFIBRE)	3 wks	2005-04-01	2005-04-21						
25	MB.OF.sc (@ UNIFIBRE)	3 wks	2005-04-11	2005-04-29						
26	MB.CA.sc (@ PD ?)	2 wks	2005-04-01	2005-04-14						
27	MB.MCA.veto (@ CERN by ?)	2 wks?	2005-04-01	2005-04-14						
28	MB.tr-ro (@ DAETWILER)	5 wks?	2005-04-01	2005-05-05						
29	RB.LV.fe-- (@ ?)	3 wks?	2005-04-01	2005-04-21						
30	RB.HV (@ ?)	3 wks?	2005-04-01	2005-04-21						
31	Manufacturing: RB.CA.sgn (@ ?)	3 wks?	2005-04-01	2005-04-21						
32	Manufacturing: RB.dcs-- (@ ?)	3 wks?	2005-04-01	2005-04-21						
33	Manufacturing: RB.MCA.t-sens (@ ?)	3 wks?	2005-04-01	2005-04-21						
34										
35										

SECTOR TEST on YB+2 under the HP that CUTTING LENGHTS will be released before 1.04.2005

MB and RB procurement and manufacturing





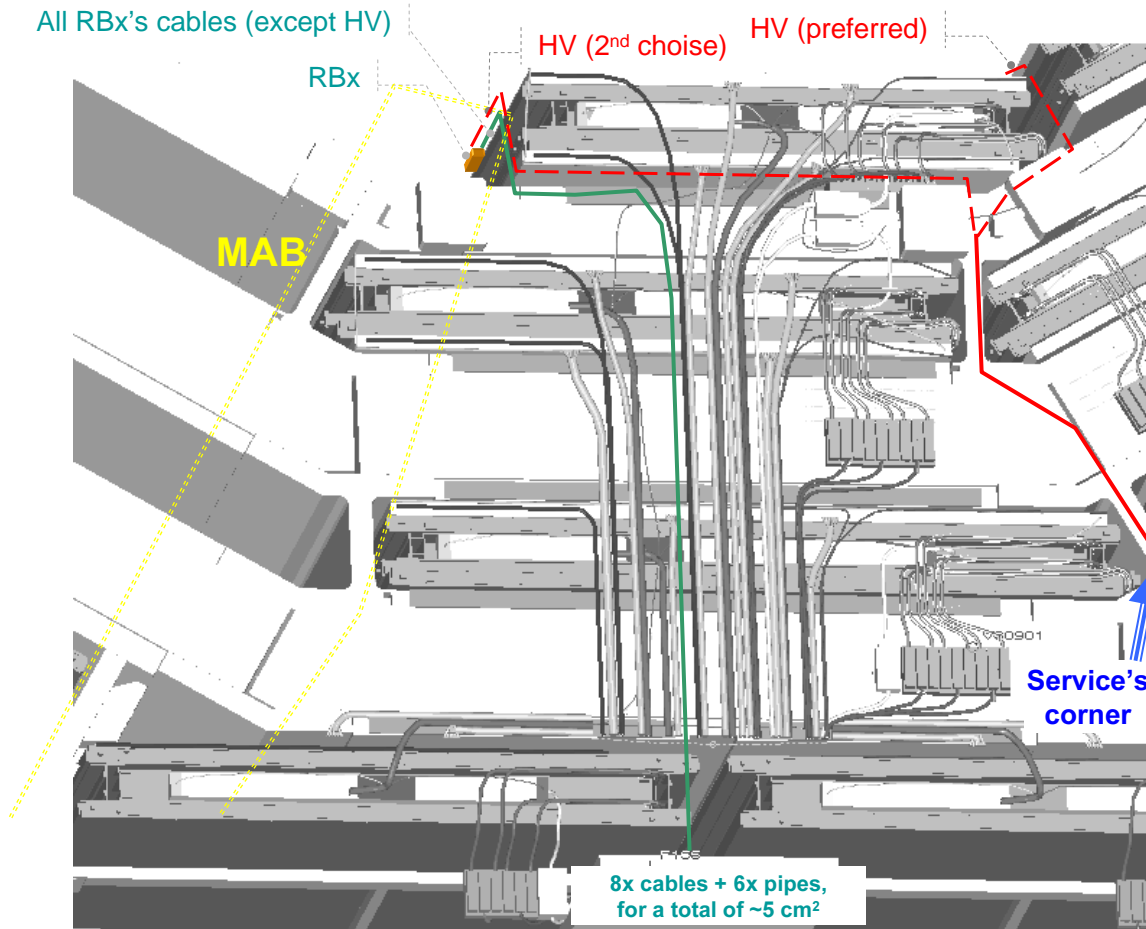
SECTOR TEST - general



- To be done on sectors 10 and 11 of YB+2
- **Cables procurement almost done** for both DT and RPC (except fibers 8.04.05)
- **Worst manufacture time** estimation is **5 weeks** (TR/RO of DT) after releasing cutting lengths.
- If cutting lengths will be ready within first days of April '05 we should get the **latest cables by first days of May '05**.
This not considering the open questions on RPC trigger, which could block the test!
- **Alignment** reported 2 weeks as worst manufacture time.
HO is not clear to me. Copper cables seem to be defined but fibers ...?
If all their cables will be installed below MABs (to be verified) then their installation could be postponed after MU cables installation (to be discussed)
- **Cutting lengths status**
 - Radial part ready.
 - Peripheral part under CAD development by Domenico.
 - Lengths inside racks (lowest diving board only) almost defined.
 - An organization of the feet patch panels was proposed.

NB Cutting lengths for **HO** and **Alignment** will be released by the Int. Office

Baseline is to put all cables and fibers along the MU radial tray

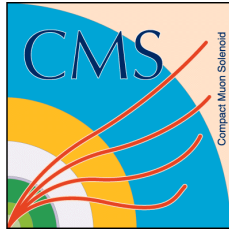


YB+2 sector 10 (ZpL)

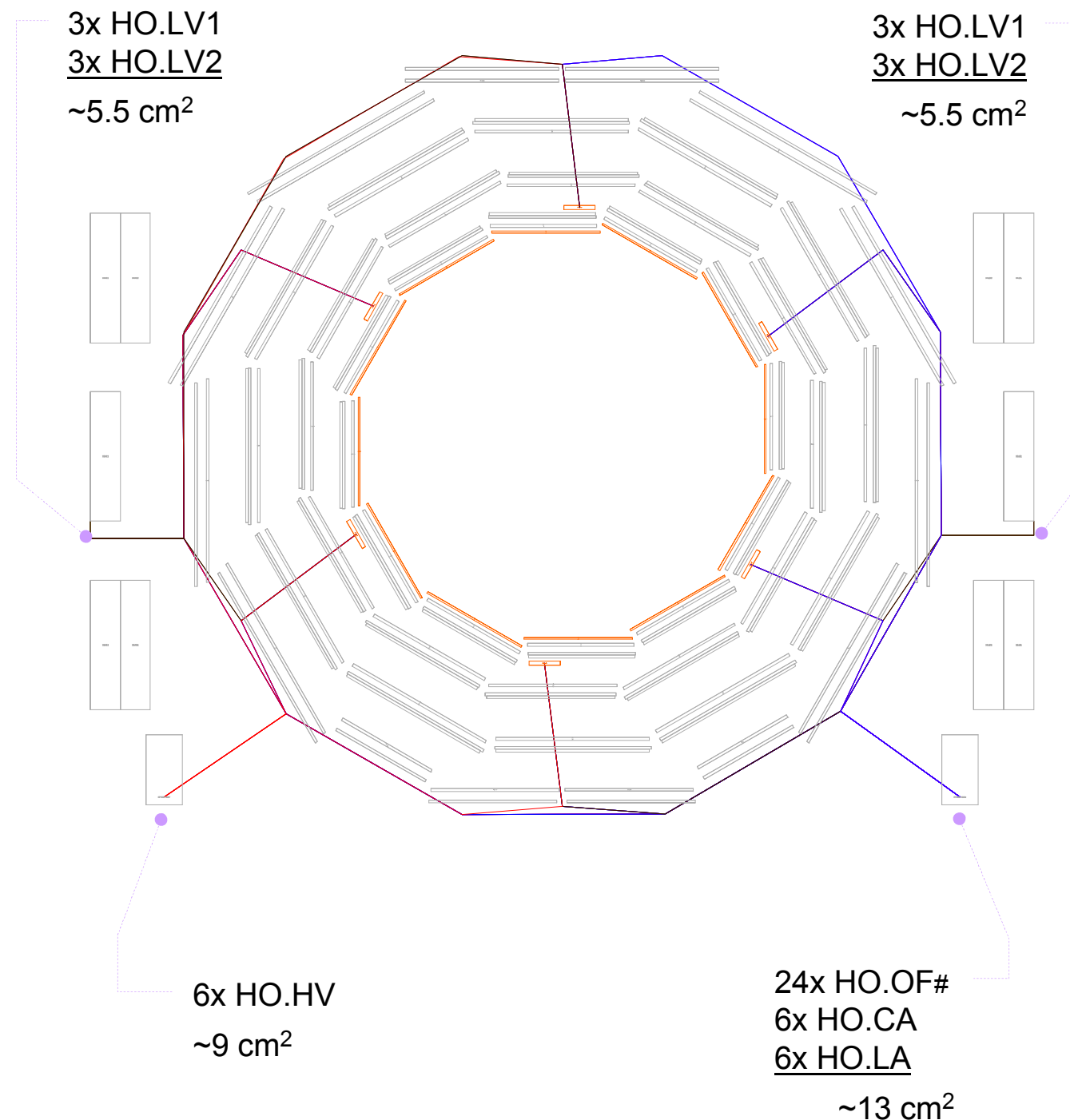
- **Permanent cables:**
1x HV (~1.5 cm²)
- **Removable cables:**
8x cables & fibers (~4 cm²) +
6x pipes (~0.7 cm²)
- It was reserved space, about 3x3 cm² along the MB₁ channel (**green** line).
- **HO is forced to remove all cables (except HV) each time a chamber has to be extracted!**
- Others options should be studied (HO cables & fibers below MAB) by HO and Alignment engineers.

QUESTIONS:

- Do fibers need to be protected ?
- What about bending radius ?
- What are the connectors dimension ?

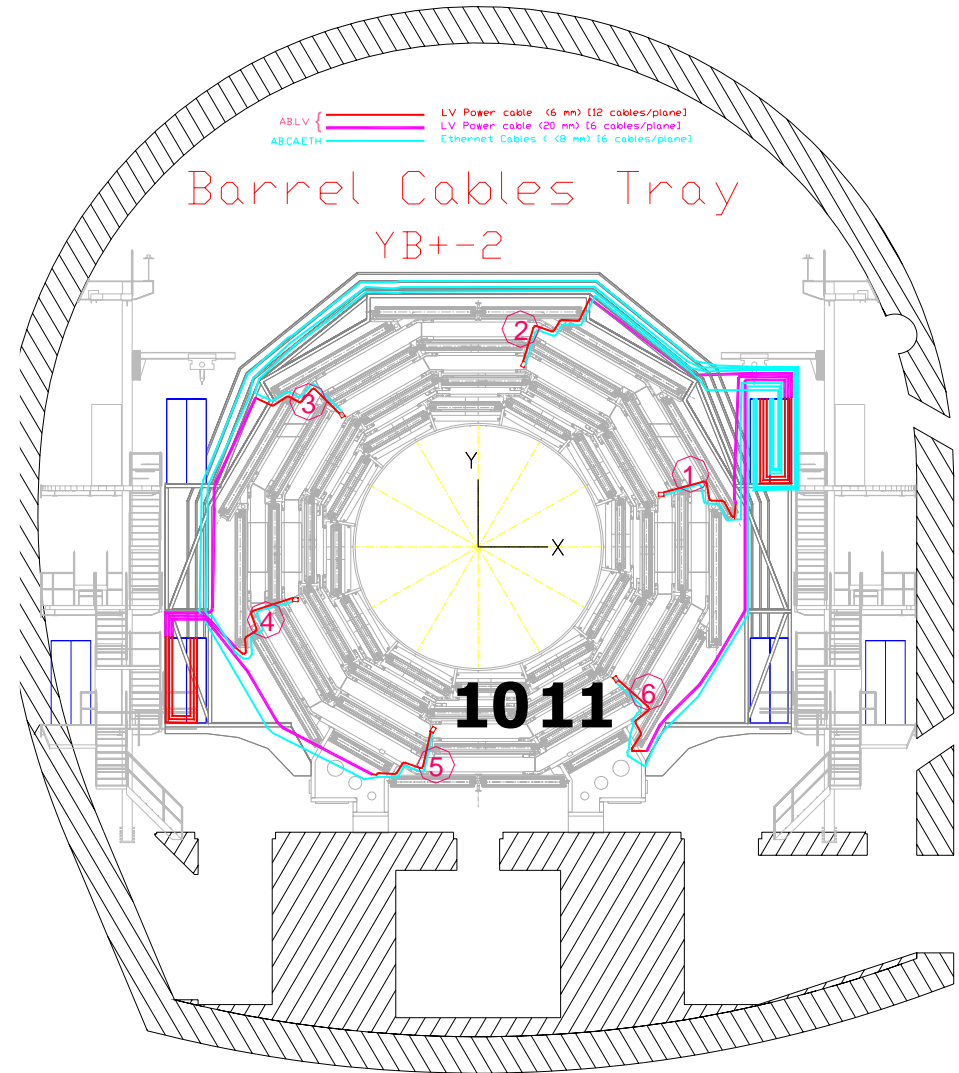
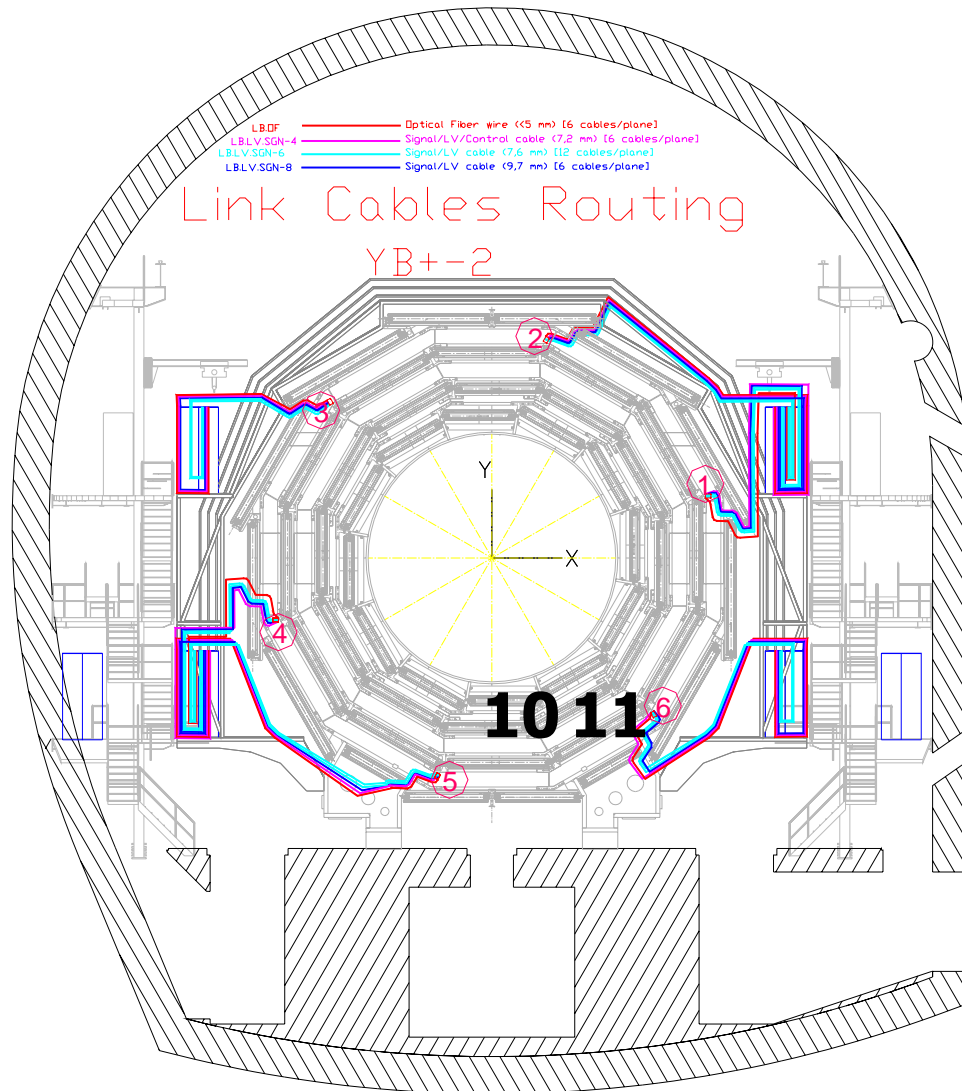


HO Peripheral cables routing – FULL LAYOUT

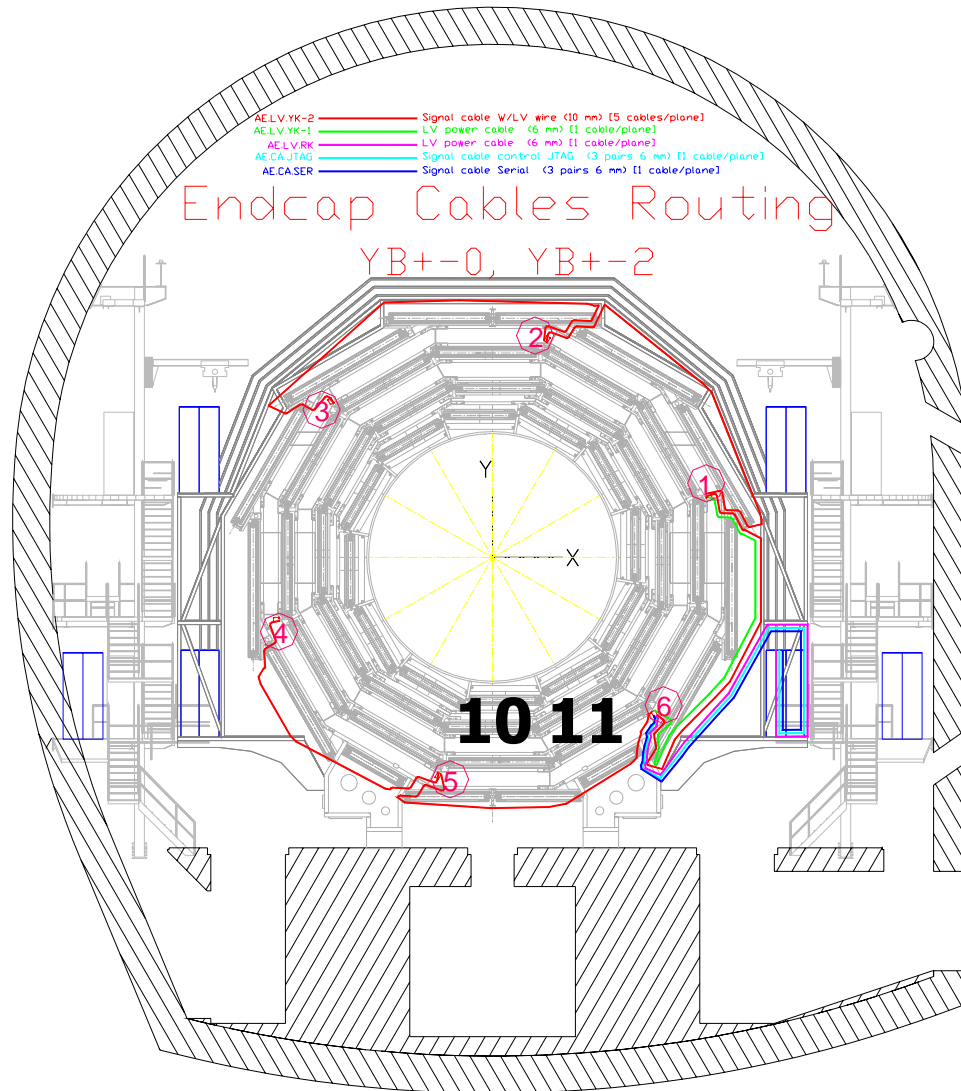


- A total of 54 cables per wheel
 - Feet are choke points. Their cross section is very limited.
 - Cables running through each foot have to be installed asap because they block the installation of feet MB chambers.
- A solution in order to put all these cables in front of feet without entering inside is under study.

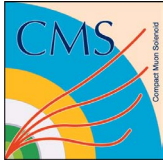
SECTOR TEST - Alignment



SECTOR TEST - Alignment



- Routing is very different from the RPC and DT one
- The wheel must be equipped with all cables trays



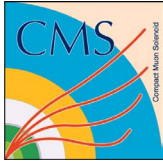
Cabling YB+2



- **It has to begin in July '05.**
- **Worst manufacture time** estimation is **6-8 weeks** (TR/RO of DT) after releasing cutting lengths.
- (Not considering RPC trigger cable) If cutting lengths will be ready within **half of April '05** we should get the **latest cables by end of May '05**
A late arrival of the TRIGGER RPC cable will have a big impact !
- **Alignment** and **HO** are requested to provide 'ready to install' cables in the due time.
- **Cutting lengths status:**
 - Radial part ready.
 - Peripheral part to be done
 - Lengths inside racks to be done.

NB Cutting lengths for **HO** and **Alignment** will be released by the Int. Office
- About manpower
 - 2 teams of 2 technician which will work in parallel on 1 wheel
 - 1 leader english spoken + 1 supervisor (MARTIN)
 - 1 technician for logistic and cable preparation.

We need at least 2 further persons (1 per installation team) to do the racks cabling work.
→ 8 persons required + subdetector experts + Martin



Others



- **Moke up**
the make up of racks inside the lowest diving board is under preparation.
Racks was procured, mechanical parts are coming....
Waiting a confirm about the availability of dummy cables!
- **Feet Patch panel**
A proposal about how to place user patch panel is ready to be discussed.

U	Lowest LV RACK - X2J22		DP																		
			[W]																		
2	DT Slow Ctrl PP																				
4	Rack ctrl + power																				
2	Distributor of cables on a 2U or 1U heat exchanger																				
6	RPC LV crate	<table border="1"> <thead> <tr> <th>MODULE</th> <th>Layer</th> <th>Sect.</th> </tr> </thead> <tbody> <tr> <td>4-A3009</td> <td>all</td> <td>10</td> </tr> <tr> <td>4-A3009</td> <td>all</td> <td>11</td> </tr> <tr> <td>4-A3009</td> <td>all</td> <td>12</td> </tr> <tr> <td>2-A3801</td> <td>all</td> <td>1,2,3,10,11,12</td> </tr> <tr> <td>- not used -</td> <td></td> <td></td> </tr> </tbody> </table>	MODULE	Layer	Sect.	4-A3009	all	10	4-A3009	all	11	4-A3009	all	12	2-A3801	all	1,2,3,10,11,12	- not used -			
MODULE	Layer	Sect.																			
4-A3009	all	10																			
4-A3009	all	11																			
4-A3009	all	12																			
2-A3801	all	1,2,3,10,11,12																			
- not used -																					
3	AC/DC 2 [KW]	AC/DC 2 [KW]																			
2	Distributor of cables on a 2U or 1U heat exchanger (where needed)																				
6	DT LV crate	<table border="1"> <thead> <tr> <th>MODULE</th> <th>Layer</th> <th>Sect.</th> </tr> </thead> <tbody> <tr> <td>4-A3050 DT-DIG3V3</td> <td>1, 2</td> <td>12</td> </tr> <tr> <td>4-A3050 DT-DIG3V3</td> <td>3, 4</td> <td>12</td> </tr> <tr> <td>4-A3009 DT-DIG5V, DT-AN:</td> <td>all</td> <td>12</td> </tr> <tr> <td>4-A3100 SECT. COL.</td> <td>crate</td> <td></td> </tr> <tr> <td>4-A3100 SECT. COL.</td> <td>crate</td> <td></td> </tr> </tbody> </table>	MODULE	Layer	Sect.	4-A3050 DT-DIG3V3	1, 2	12	4-A3050 DT-DIG3V3	3, 4	12	4-A3009 DT-DIG5V, DT-AN:	all	12	4-A3100 SECT. COL.	crate		4-A3100 SECT. COL.	crate		
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4-A3050 DT-DIG3V3	3, 4	11																			
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MODULE	Layer	Sect.																			
4-A3050 DT-DIG3V3	1, 2	10																			
4-A3050 DT-DIG3V3	3, 4 ₉	10																			
4-A3050 DT-DIG3V3	4 ₁₁	10																			
4-A3009 DT-DIG5V	all	10																			
4-A3009 DT-AN5V, DT-AN2	all	10																			
3	AC/DC 2 [KW]	AC/DC 2 [KW]																			
1	heat exchanger																				
2	Deflector																				
2	DT Slow Ctrl PP																				

55 U used
1 U free

0

U	DT & RPC TRIGGER RACK - X2J--	DP [W]
2	DT TR/RO TTC extra I.	
3	Power supply for rack	
4	Rack cooling and monitor	
1	heat exchanger	
6	RPC LinkBoard Sect. 11	160
3	Alignment: Endcap + Link	10
2	Distributor of cables on a 2U or 1U heat exchanger (where needed)	
9	DT TR/RO Sec. Col.	500
1	DT TR/RO Sec Col. - oc	
2	Distributor of cables on a 2U or 1U heat exchanger (where needed)	
9	DT TR/RO Sec. Col.	500
1	RPC TTC oc	
6	RPC LinkBoard Sect. 11	160
1	heat exchanger	
2	Deflector	
2	DT TR/RO TTC extra I.	

54 U used
2 U free

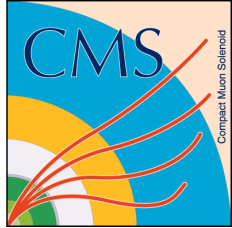
1330 [W]

Foot Patch Panel YB+2 - near side (x>0)

Patch Panel name	Type of cables	Hight [mm]	useful width [mm]	From wheels		To cable-chain		Responsible person	Remarks
				cables	cm ² only cables	cables	cm ² only cables		
Free to cross	HV, LV, sgn, fiber	150	max						
		45	max						
RB fibers	fibers (BOX)	55	500	37	10	2	10	<i>K. Doroba</i>	They come from vert. c-tray, same length
		50	max						
Services	HV, sgn	150	700	20	75	20	75	ESS / A. Gaddi	4 cables/rack x 5 racks 20 cables, TOTAL ~ 75 cm ² min. is 120*700
		50	max						
AC power in	HV, sgn ?	50	300	3	20	3	20	S. Akhtar	There are 10 LV crates per tower, the worst case is 10 AC/DC x 4[KW] converters. Assuming 1x 220 AC 50Hz cable per balcony
		50	max						
RB LV	LV, sgn	100	700	6	30	6	30	A. Ranieri	Assuming 1x 48V service cable/LV crate, 1x FE LV ctrl cable + 1x LBC LV ctrl cable per tower
		50	max						
MB LV	LV, sgn	100	700	8	40	8	40	C. Willmott	
		50	max						
MB HV system	LV, sgn	300	700	7	22	7	22	<i>E. Borsato / L. Modenese</i>	
				7	7	7	7		
		50	max						
Align	LV, sgn, fiber	50	450	9	5	9	5	E. C. Alamillo	
		50	max						
HO	sgn, fiber	200	700	36	13	36	13	P. DeBarbaro	
		50	max						
RB.HV	HV	300	700	50	35	6	55	<i>A. Ranieri</i>	
		50	max						
pipes	-	150	max					<i>D. Dattola</i>	

Tot. **2100** [mm] 183 **257** 104 **277**
cable cm2 cable cm2

- * **RED** numbers are **very guessed** because I'm waiting specification from responsible person
- * **BLUE** numbers are still under discussion



CONCLUSION



- Routing of cables was defined for all systems
- Concerns about procurement of trigger signal cable of RPC and its connector
- Cutting lengths in progress