

CMS Week - TECHNICAL BOARD

- ◆ **Status of cables**
- ◆ **Plan for the installation of the Barrel CMS cables**
- ◆ **Routing of cables on detectors**
- ◆ **Routing between UXC55 and USC55**
- ◆ **AOB**

Status of cables

- *Most of cables are ready for PRR, see*
 - *“SUMMARY on Muon Barrel’s Cables – between DETECTOR and UXC55’s towers”*
 - *“Procurement status for cables – between DETECTOR and UXC55’s towers”*

Unspecified cables:

- MB.LV.mc: Carlos is waiting the worst length estimation
 - MB.CA.tr & MB.CA.ro: F. Odorici is testing a prototype in Bologna.
 - RB.CA.sgn: **Is it an orphan cable ?** (~75Km, ~200K euro)
 - At present, **no ALIGNMENT cables are specified !!**
 - **CAEN connectors aren’t still defined. Rules** states:
 - *“Cables have to be delivered tested with connectors mounted on both sides”.*
 - *“Timing and space don’t allow for connector mounting after cables installation”*
- ==> THIS COULD BE A PROBLEM for cables production and delivering before JUNE ‘04.**
- The ‘others’ cables
 - *“SUMMARY on Muon Barrel’s Cables – fully inside UXC55 but not on detector”*
 - *“SUMMARY on Muon Barrel’s Cables – between UXC55’s towers and USC55”*

SPARE GENERAL POLICY

- The minimal set...
- 1 cable/quadrant, the longest.
- to be installed with others
- all leads and screens shall be earthed on both ends

THIS IS TO BE APPROVED !!!

SUMMARY of Muon Barrel's Cables - between DETECTOR and UXC55's towers

WARNING: Further DCS cable named MB.CA.veto is still under discussion.

NEWS: Added DCS cables for T probing, see RB.CA.dcs-1.

		MB							RB							Alignment			Names Legend	
		MB.LV.mc	MB.LV.fe	MB.HV	MB.OF.ttc-mc	MB.OF.sc	MB.CA.sc	MB.CA.tr	MB.CA.ro	RB.LV.fe-8	RB.LV.fe-12	RB.HV	RB.CA.sgn	RB.CA.dcs-7	RB.CA.dcs-10	RB.CA.dcs-1	AB.LV.ps	AB.OF	AB.CA.sgn	
Responsible person		Willmott	Pegoraro	Borsato	Bellato	Bellato	Bellato/Caste	Odorici	Odor/Wil	Ranieri	Ranieri	Ranieri	Ranieri	Ran./Paolu	Ran./Paolu	Paolucci	ECA	ECA	ECA	
Status of the single cable		tbd	defined	defined	defined	defined	defined	tbd	tbd	defined	defined	defined	tbd	defined	defined	defined	tbd	tbd	tbd	
Cable's diameter	[mm]	17.8	11.5	16	4	1.6x3.2	5	7	7	8.4	10.5	8.05	12	7.9	8.9	4	10	5	10	
Rep. bend radius	[mm]	214	138	192	60	50	60	56	56	100	126	96		63	71	48				
Weight	[g/m]	643	245	310	10	16		44	44	134	198	76								
Supplier		Novacavi Intercond KERPEN CERN UNIFIBRE CERN							Novacavi Novacavi Novacavi Novac./Kabr CERN CERN CERN											
Type		0602_03	#RCF1562/SL-V2YCH	04.67.00		04.21.51.055.4				P0826_03	12R3117	P0825_03		04.21.22.7104.21.22.72	04.21.51.01					
Cable description		RS-6w+2w+2t	RS-4w+4w+6w	RS-56w	1 fib/cable	2 fib/cable	RS-1t	CAT6	CAT 6	RS-8w	RS-12w	RS-4w	RST-20p	RST-7p	RST-10p	RT-1p				
Dis. power (worst)	[W/m]	5	0.5	-	-	-	-	-	-	0.5	0.5	-	-	-	-	-	0.1	-	-	
Installation's kind		PS	PS	HV	Fiber	Fiber	CU-sgn	CU-sgn	CU-sgn	PS	PS	HV	CU-sgn	CU-sgn	CU-sgn	CU-sgn	PS	Fiber	CU-sgn	
From (Detectors or boxes on yoke)		yk.PC	MB.SB	yk.JB	MB.MC	MB.MC	MB.MC	MB.MC	MB.MC	RB	RB	RB	RB	RB	RB	RB				
To (Towers' crates or PPanels)		rk's crate:	rk's crate:	rk's crate:	rk's PP:	rk's PP:	rk's crate:	rk's crate:	rk's crate:	rk's crate:	rk's crate:	ft's PP:	rk's crate:	rk's crate:	rk's crate:	rk's crate:				
name in 'RACKS LAYOUT'		DT LV PP	DT LV PP	DT HV	DT TR/RO	TTC-ocDT	Slow Ctrl PFT	TR/RO	Sec. Cf	TR/RO	Sec. Cf	TR/RO	Sec. Cf	TR/RO	Sec. Cf	TR/RO	RPC LV	RPC LV	RPC LV	
COMMENT		waiting worst length from Int.			1300 [nm]			RS 485	testing in Bologna				testing in Bologna						Who buy this ?	T probe
N. cables on W0		50	50	136	50	50	52	100	100	62	12	96	944	62	12	62	16	12	14	
spares		4	4	4	4	4	2	4	0	4	4	4	12	4	4	4				
Estimated medium length	[m]	20	20	20	20	20	48x5+6x20+20	20	20	20	20	30	20	20	20	20	20	20	13	
TOT. LENGTH with spares	[m]	1080	1080	2800	1080	1080	380	2080	2000	1320	320	3000	19120	1320	320	1320	320	240	182	
N. cables on W±1		50	50	136	50	50	52	100	100	62	12	96	944	62	12	62	6	6	0	
spares		4	4	4	4	4	2	4	0	4	4	4	12	4	4	4				
Estimated medium length	[m]	15	15	15	15	15	48x5+6x20	15	15	15	15	20	15	15	15	15	15	15	13	
TOT. LENGTH with spares	[m]	810	810	2100	810	810	360	1560	1500	990	240	2000	14340	990	240	990	90	90	0	
N. cables on W±2		50	50	136	50	50	52	100	100	62	12	96	944	62	12	62	26	12	25	
spares		4	4	4	4	4	2	4	0	4	4	4	12	4	4	4				
Estimated medium length	[m]	15	15	15	15	15	48x5+6x20	15	15	15	15	20	15	15	15	15	15	15	13	
TOT. LENGTH with spares	[m]	810	810	2100	810	810	360	1560	1500	990	240	2000	14340	990	240	990	390	180	325	
N. cables on all WHEELS		250	250	680	250	250	260	500	500	310	60	480	4720	310	60	310	80	48	64	
spares		20	20	20	20	20	10	20	0	20	20	20	60	20	20	20				
TOT. LENGTH with spares	[m]	4320	4320	11200	4320	4320	1820	8320	8000	5280	1280	11000	76480	5280	1280	5280	1280	780	832	

- Names Legend**
- The UPPER CASE initial part follows the CMS' Dbase guidelines.
 - LV: power supply
 - HV: power supply
 - CA: copper signal
 - OF: Optical Fiber
- The lower case ending part comes from the MU local name.
- FROM/TO Legend**
- JB: Junction Box
 - MB: Muon DT Barrel
 - MC: MiniCrate
 - PC: Patch Connector
 - PP: patch panel
 - RB: RPC Barrel
 - SB: Split Board
- ft: foot
 - rk: rack
 - yk: yoke

W0
W±1
W±2
ALL 5

~ 1880 cables
~ 62 spares
~ 39.0 [Km]

~ 1850 cables
~ 62 spares
~ 28.7 [Km]

~ 1901 cables
~ 62 spares
~ 29.4 [Km]

~ 9382 cables
~ 310 spares
~ 155.4 [Km]

NOTES

- * GREEN numbers are released from owners. We assume that they will not change!
- * ORANGE numbers are proposal from the owners.
- * RED numbers are pure estimation
- * BLANK CELLS are DANGEROUS !! ==> SEND ME INFORMATION !

- * CMS GLIMOS says that the cables' color it's VERY IMPORTANT for safety issues. We have to buy **BLU** cables or to demonstrate why we can't. Anyway, **HV cables** have to be **red**
- * Spares could be installed during the main installation or after, when needed.

See http://cern.ch/Fabio.Montecassiano/pub_doc/CABLES/cables_detector-towers.pdf for updates.

Each responsible person have to check his cables and signal any changes early!!

Procurement status for MB & RB cables - between DETECTOR and UXC55's towers

(No one alignment cable is foreseen here because no final specification was received)

Components parts of a whole cable	NOTE *) The cost of cables and connectors is on sub-detector budget.	Cable	MB Further DCS cable named VETO is still under discussion.										RB																			
			Cable's name		MB.LV.mc		MB.LV.fe		MB.HV		MB.OF.sc		MB.CA.sc		MB.CA.tr		MB.CA.ro		RB.LV.fe-8		RB.LV.fe-12		RB.HV		RB.CA.sgn		RB.CA.dcs-7		RB.CA.dcs-10		RB.CA.dcs-1	
			Responsible persons		Willmott	Pegoraro	Borsato	Bellato	Bellato	Bellato/Castel	Odorici	Odorici	Ranieri	Ranieri	Ranieri	Ran./Paolucci	Ran./Paolucci	Ran./Paolucci	Ran./Paolucci	Ran./Paolucci	Ran./Paolucci	Ran./Paolucci	Ran./Paolucci	Ran./Paolucci	Ran./Paolucci	Ran./Paolucci	Ran./Paolucci	Ran./Paolucci	Ran./Paolucci	Ran./Paolucci	Ran./Paolucci	Ran./Paolucci
			Supplier's internal reference	Novacavi	Intercond	KERPEN	CERN	UNIFIBRE	CERN			Novacavi	Novacavi	Novacavi		CERN	CERN	CERN														
			Supplier's internal reference	0602_03	RCF1562/S	SL-v2YCH	04.67.00	B255-MT/MT-X	04.21.51.055			P0826_03	12R3117	P0825_03																		
			Producer's internal reference	-	-	-	-	-	-			-	-	-																		
			Description of internal wires	RS-6w+2w+2t	RS-4w+4w+6w	RS-56w	1 fib/cable	2 fib/cable	RS-1t	CAT 6	CAT 6	RS-8w	RS-12w	RS-4w	RST-20p	RST-7p	RST-10p	RST-1p														
			CERN IS23 compliant [YES/should be/NO]	YES	YES	YES	YES	should be	YES			YES	YES	YES		YES	YES	YES														
			The COLOR is RIGHT [BLUE or RED for HV]	should be	YES	YES	NO	YES	NO			YES	YES	YES		NO	NO	NO														
			It will be ordered through CERN* [yes/no]	see Aachen	-	-	-	no	no			no	no	no																		
			Estem. delivery time since order	7 weeks	-	-	-	~10 week	-			5 weeks	2 months	8 weeks	2 months																	
			~ [cost/m]	3.90	-	-	-	5.00	1.10			1.30	2.10	0.80	2.60	7.00	7.80	0.60														
			value	EURO	-	-	-	CHF	CHF			EURO	EURO	EURO	EURO	CHF	CHF	CHF														
			Tot. nr. of cables (All wheels, without spares)	250	250	680	250	250	260	500	500	310	60	480	4720	310	60	310														
			Est. TOT Length with spares [m]	4400	4400	11200	4400	4400	2000	8400	8000	5400	1400	11000	76600	5400	1400	5400														
			Q.ty to be ordered (see offers) [m]	5500	5500	-	-	-	-	-	-	-	-	-	-	-	-	-														
			Estimated TOT cost	21450	-	-	25000	2200	-	-	-	7020	2940	6400	199160	37800	10920	3240														
			Comment	waiting worst case length			waiting worst case length	costs include connect & work		testing sample in Bologna	testing sample in Bologna				who buy this ? which type ?																	
			Connector's SUPPLIER		DIN 41612-M	-	-	-	-						CPEItalia (M)																	
			Supplier's internal reference		ERNI	-	-	-	-						28.002.512-4																	
			Connector's PRODUCER		ERNI	-	-	-	-																							
			Producer's internal reference		P/N 593782	-	-	-	-																							
			Description of the base material		PBT 30% GF	Noryl	ST/PC plug	MTEC	Noryl																							
			CERN IS41 compliant [YES/should be/NO]		NO - UL 94V-0	should be	should be	should be	should be																							
			It will be ordered through CERN* [yes/no]		no	-	-	-	-																							
			Estem. delivery time since order		12 weeks	-	-	-	-																							
			~ [cost/unit]		-	-	-	-	-																							
			value		-	-	-	-	-																							
			TOT needed [units]	250	250	680	250	250	260			370			4720		1110															
			Estimated TOT cost				see cable	see cable																								
			Comment	AMP HD22, fem.	small q.ty	HV custom	the same in both side	the same in both side		the same in both side	the same in both side	CERN - 09.55.03.310.0			both side	09.55.03.340.4-C																
			Connector's SUPPLIER			-	-	-	-						CPEItalia (M)																	
			Supplier's internal reference			-	-	-	-						28.002.512-4																	
			Connector's PRODUCER			-	-	-	-																							
			Producer's internal reference			Radiall	ST/PC plug	MTEC	Noryl																							
			Description of the base material			691802002	ST/PC plug	MTEC	Noryl																							
			CERN IS41 compliant [YES/should be/NO]			should be	should be	should be	should be																							
			It will be ordered through CERN* [yes/no]			-	-	-	-																							
			Estem. delivery time since order			-	-	-	-																							
			~ [cost/unit]			-	-	-	-																							
			value			-	-	-	-																							
			TOT needed [units]			680	250	250	260						4720		1110															
			Estimated TOT cost				see cable	see cable																								
			Comment	up to the DT LV PatchPanel	up to the DT LV PatchPanel	52 pin	the same in both sides	the same in both sides		the same in both sides	the same in both sides	waiting CAEN	waiting CAEN	waiting CAEN	waiting CAEN	the same in both sides	09.55.03.340.4-C															
			SUMMARY																													
			CABLE IS READY FOR PRR [YES/NO]	NO	NO	YES	YES	YES	YES	NO	NO	YES (CAEN ?)	YES (CAEN ?)	YES	NO		YES															
			Wished order date for cables and connectors	Jan-Feb '04	end '03	-	-	-	-			end '03	end '03	end '03	2 months		Jan-Feb '04															
			Worst delivery time between cable & connector			-	-	-	-			5 weeks	2 months	8 weeks	2 months																	
			Estem. work time to build all complete cables		2 months	-	-	-	-																							
			Date in which it's foreseen to have at 1 Wheel			May '04																										
			CERN 'READY TO INSTALL' cables. all Wheels comment			waiting cut lengths in order to produce		need cut lengths in order to buy		TR = RO	TR = RO																					
			Comment about global cable status	could be late	could be late		could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late	could be late		

See http://cern.ch/Fabio.Montecassiano/pub_doc/CABLES/cables_detector-towers-PRR.pdf for updates.

* BLANK CELLS have to be filled ASAP !!

SPARE GENERAL POLICY

The minimal set...
- all leads and screens shall be earthed on both ends

SUMMARY of Muon Barrel's Cables - fully inside UXC55 but not 'on detector'

THIS IS TO BE APPROVED !!!

Responsible person Status of the only cable	MB									
	MB.CA.lv-ctrl_ux	MB.LV.48V_ux	MB.HV.shv_rkux	MB.LV.hv_rkux	MB.LV.hv_ux	MB.CA.hv-ctrl_rkux	MB.CA.hv-ctrl_ux	MB.OF.ttc-oc_ux	MB.OF.loc-da_ux	
	Willmott	Willmott	Borsato	Borsato	Borsato	Borsato	Borsato	Bellato	Bellato	
	tdb	tdb	tdb	tdb	defined	defined	defined	tdb	tdb	
Cable's diameter [mm]			5.5		17.4	9.6	9.6	6	6	
Rep. bend radius [mm]					210	115	115			
Weight [g/m]					489	104	104			
Producer-Supplier					Novacavi	Novacavi	Novacavi			
Type					P0784_03-1	P0784_03-2	P0784_03-2			
Cable description			SHV	-2p	RS-8p	RS-4p	RS-4p			
Dis. power (worst) [W/m]	-									
Installation's kind	CU-sgn	PS	HV	PS	PS	CU-sgn	CU-sgn	Fiber	Fiber	
From (Towers' crates or PPanels) name in 'RACKS LAYOUT'	rk's crate: DT LV	rk's crate: DT LV	rk's crate: DT HV	rk's crate: DT HV	rk's PP: DT HV PP	rk's crate: DT HV	rk's PP: DT HV PP	rk's PP: DT TR/RO TTC oc		
To (Towers' crates or PPanels) name in 'RACKS LAYOUT'	ft's PP: ft - LV PPanel	AC/DC box	rk's PP: DT HV PP	rk's PP: DT HV PP	ft's PP: DT ft - HV PP	rk's PP: DT HV PP	ft's PP: DT ft - HV PP	rk's crate: (?) DT TR/RO Sec. Col. (?)		
Q.ty needed links / Wheel spares			50 x 2 x (2w) 2 4 (x2w)/balcony	50 x 2 x (1t)	50 x 2 x (1t)	50 x (1t)	50 x (1t)	2x 2 2*1	2	
COMMENT	1 → 6 LV EASY crates >= 2 cables/Whell	1 x PS crate ?!		1 → 1 A877	1 → 4 A877 8x2xawg15 - no sensing	1 → 1 A877 4x2xawg24	1 → 4 A877 4x2xawg24			?
N. cables on W0 spares to be installed	4	12	100	50	14	50	14	4	2	~ 250 cables ~ 12 spares
Estimated medium length [m]	22		3	3	22	1	22	3		
TOT. LENGTH with spares [m]	88		336	150	308	50	308	12		~ 1.3 [Km]
N. cables on W±1 spares to be installed	4	12	100	50	14	50	14	4	2	~ 250 cables ~ 12 spares
Estimated medium length [m]	20		3	3	20	1	20	3		
TOT. LENGTH with spares [m]	80		336	150	280	50	280	12		~ 1.2 [Km]
N. cables on W±2 spares to be installed	4	12	100	50	14	50	14	4	2	~ 250 cables ~ 12 spares
Estimated medium length [m]	20		3	3	20	1	20	3		
TOT. LENGTH with spares [m]	80		336	150	280	50	280	12		~ 1.2 [Km]
N. cables on all WHEELS spares to be installed	20	60	500	250	70	250	70	20	10	~ 1250 cables ~ 60 spares
TOT. LENGTH with spares [m]	408		1680	750	1428	250	1428	60		~ 6.0 [Km]

Names Legenda

The UPPER CASE initial part follows the CMS' Dbase guidelines.
- LV: power supply
- HV: power supply
- CA: copper signal
- OF: Optical Fiber

The _rkux postfix means that cable is fully inside the UXC55's rack.
The _ux postfix means that cable is outgoing from the rack but is fully inside the UXC55.

The lower case ending part before _rkux and _ux postfixes comes from the MU local name.

FROM/TO Legenda

- JB: Junction Box
- MB: Muon DT Barrel
- MC: MiniCrate
- PC: Patch Connector
- PP: patch panel
- RB: RPC Barrel
- SB: Split Board

- ft: foot
- rk: rack
- lw rk: lowest rack
- yk: yoke

W0

W±1

W±2

ALL 5

NOTES

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- * CMS GLIMOS says that the cables' color it's VERY IMPORTANT for safety issues. We have to buy **BLU** cables or to demonstrate why we can't. Anyway, **HV cables** have to be **red**
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SPARE GENERAL POLICY

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- all leads and screens shall be earthed
on both ends

SUMMARY of Muon Barrel's Cables - fully inside UXC55 but not 'on detector'

THIS IS TO BE APPROVED !!!

	RB							AB
	RB.CA.lv-ctrl_ux	RB.LV.48V_ux	RB.OF.ttc-oc_ux	RB.OF.lb_ux	RB.OF.sc_ux	RB.CA.sc-ccu_ux	RB.LV.lb_ux	
Responsible person	Ranieri ?	Ranieri ?	Kudla	Kudla	Kudla	Kudla	Ranieri ?	
Status of the only cable	tdb	tdb	tdb	tdb	tdb	tdb	tdb	
Cable's diameter [mm]	6							
Rep. bend radius [mm]								
Weight [g/m]								
Producer-Supplier								
Type								
Cable description								
Dis. power (worst) [W/m]	-	-	single fiber	1 ribbon with 8 fibers	-	-	-	
Installation's kind	CU-sgn	PS	Fiber	Fiber	Fiber	CU-sgn	PS	
From (Towers' crates or PPanels) name in 'RACKs LAYOUT'	rk's crate: RPC LV	rk's crate: RPC LV	rk's crate: RPC LBC	rk's crate: RPC LBC	lw rk's crate: RPC LBC	rk's crate: RPC LBC	rk's crate: RPC LBC	
To (Towers' crates or PPanels) name in 'RACKs LAYOUT'	ft's PP: ft - LV PPanel	AC/DC box	lw rk's PP: RPC TTCoc	ft's PP: RPC ft - TR & SC PPRPC ft - TR & SC PP	ft's PP: RPC LBC	rk's crate: RPC LBC	rk's crate: RPC LV	
Q.ty needed links / Wheel spares			12 x2	12x5	4			
COMMENT	1 → 6 LV EASY crates min 2 cables/W	1 x PS crate ?!	all same length ? singlemode	all same length!! CERN STORE	singlemode	circular daisy-chain	Which LV supply the central LBC ?	
	space in cables-tray ?		10 [m] are enough ?	could be avoid ?				
N. cables on W0	2	8	24	60	2	24	12	
spares to be installed								
Estimated medium length [m]	15		10	10	10	5		
TOT. LENGTH with spares [m]	30		240	600	20	120		
N. cables on W±1	2	8	24	60	2	24	12	
spares to be installed								
Estimated medium length [m]	15		10	10	10	5		
TOT. LENGTH with spares [m]	30		240	600	20	120		
N. cables on W±2	2	8	24	60	2	24	12	
spares to be installed								
Estimated medium length [m]	15		10	10	10	5		
TOT. LENGTH with spares [m]	30		240	600	20	120		
N. cables on all WHEELS	10	40	120	300	10	120	60	
spares to be installed								
TOT. LENGTH with spares [m]	150		1200	3000	100	600		

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FROM/TQ Legenda
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- ft: foot
- rk: rack
- lw rk: lowest rack
- yk: yoke

W0
W±1
W±2
ALL 5

~: 132 cables
~: 0 spares
~: 1.0 [Km]
~: 132 cables
~: 0 spares
~: 1.0 [Km]
~: 132 cables
~: 0 spares
~: 1.0 [Km]
~: 660 cables
~: 0 spares
~: 5.1 [Km]

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- * RED numbers are pure estimation
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* CMS GLIMOS says that the cables' color it's VERY IMPORTANT for safety issues.
We have to buy BLU cables or to demonstrate why we can't.
Anyway, HV cables have to be red
* Spares could be installed during the main installation or after, when needed.

Each responsible person have to check his cables and signal any changes early!!

SPARE GENERAL POLICY

- The minimal set....
- 1 cable/wheel, the longest.
- to be installed with others
- all leads and screens shall be earthed on both ends

THIS IS TO BE APPROVED !!!

SUMMARY of Muon Barrel's Cables - between UXC55's towers and USC55

Names Legend

The UPPER CASE initial part follows the CMS' Dbase guidelines.
 - LV: power supply
 - HV: power supply
 - CA: copper signal
 - OF: Optical Fiber

The _uxus ending part means the cable start in UXC55 and end in USC55.

The lower case part before the _uxus postfix comes from the MU local name.

FROM/TO Legend

- JB: Junction Box
- MB: Muon DT Barrel
- MC: MiniCrate
- PC: Patch Connector
- PP: patch panel
- RB: RPC Barrel
- SB: Split Board

- ft: foot
- rk: rack
- lw rk: lowest rack
- yk: yoke

		MB								
		MB.CA.lv-ctrl_uxus	MB.HV.main_uxus	MB.LV.lv_uxus	MB.CA.lv-ctrl_uxus	MB.OF.ttc-ex_uxus	MB.OF.sc_uxus	MB.OF.seco-ctrl_uxus	MB.OF.tr_uxus	MB.OF.ro_uxus
		Willmott	Borsato	Borsato	Borsato	Willmott/Bellato	Bellato	Bellato	Odorici	Willmott
Responsible person										
Status of the only cable		<i>tdb</i>	<i>defined</i>	<i>defined</i>	<i>defined</i>	<i>tdb</i>	<i>tdb</i>	<i>tdb</i>	<i>tdb</i>	<i>tdb</i>
Cable's diameter [mm]		10	16	17.4	9.6	6	15	6	15	15
Rep. bend radius [mm]			100	210	115	60		60		
Weight [g/m]			310	489	104	10	200	10	150	150
Producer-Supplier			KERPEN	Novacavi	Novacavi					
Type			SL-V2YCeH	P0784_03-1	P0784_03-2					
Cable description			RS-56w	RS-8p	RS-4p	1 fiber	72 fibers	2 fibers		
Dis. power (worst) [W/m]		-				-	-	-	-	-
Installation's kind		<i>CU-sgn</i>	<i>HV</i>	<i>PS</i>	<i>CU-sgn</i>	<i>Fiber</i>	<i>Fiber</i>	<i>Fiber</i>	<i>Fiber</i>	<i>Fiber</i>
From UXC55's crates or PPanel name in 'RACKS LAYOUT'		ft's PP: ft - LV PPanel	rk's PP: DT HV PP	ft's PP: DT ft - HV PP	ft's PP: DT ft - HV PP	rk's PP: DT TR/RO TTC oc	rk's PP: DT Slow Ctrl PP	rk's crate: DT TR/RO Sec. Col.	rk's crate: DT TR/RO Sec. Col.	rk's crate: DT TR/RO Sec. Col.
To USC55's rack position crates or PPanels		Zone S1 - G10:14 DT LV's SY1527	Zone S1 - G10:14 DT HV PP	Zone S1 - G10:14 DT HV PP	Zone S1 - G10:14 DT HV PP	Zone S1 - E01 TTC Opt. Cpl.	Zone S1 - G01 DT/RO/SC	Zone S1 - G01 DT/RO/SC	Zone S1 - F02:04 DT TrkFnd	Zone S1 - G01 DT/RO/SC (ddu)
Q.ty needed links / Wheel spares		2	2x 50	50	14	2	50x 2f+2x 2f+2??	12*6	12	8
COMMENT		1 → 6 LV EASY crates >= 2 cables/Whell	1 → 12/13 A877	1 → 4 A877 8x2xawg15- no sensing	1 → 4 A877	all same length ? Split point TBV	all same length ? Split point TBV	all same length ? Split point TBV	merge with RO ?	merge with TR ?
N. cables on W0		4	4	14	14	2	2	2	1	1
spares to be installed		1	1	1	1	2	2	1	0	1
Estimated medium length [m]		100	100	100	100	70	70	70	70	70
TOT. LENGTH with spares [m]		500	500	1500	1500	280	280	210	70	140
N. cables on W±1		4	4	14	14	2	2	2	1	1
spares to be installed		1	1	1	1	2	2	1	0	1
Estimated medium length [m]		100	100	100	100	70	70	70	70	70
TOT. LENGTH with spares [m]		500	500	1500	1500	280	280	210	70	140
N. cables on W±2		4	4	14	14	2	2	2	1	1
spares to be installed		1	1	1	1	2	2	1	0	1
Estimated medium length [m]		100	100	100	100	70	70	70	70	70
TOT. LENGTH with spares [m]		500	500	1500	1500	280	280	210	70	140
N. cables on all WHEELS		20	20	70	70	10	10	10	5	5
spares to be installed		5	5	5	5	10	10	5	5	5
TOT. LENGTH with spares [m]		2500	2500	7500	7500	1400	1400	1050	350	700
Split point/PATCH PANEL in UXC55		<i>feet lev.</i>	<i>racks lev.</i>	<i>feet lev.</i>	<i>feet lev.</i>	<i>lw racks lev.</i>	<i>lw racks lev.</i>	<i>lw racks lev.</i>	<i>lw racks lev.</i>	<i>lw racks lev.</i>

~: 44 cables

~: 10 spares

~: 5.0 [Km]

~: 44 cables

~: 10 spares

~: 5.0 [Km]

~: 44 cables

~: 10 spares

~: 5.0 [Km]

~: 220 cables

~: 50 spares

~: 24.9 [Km]

NOTES

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* ORANGE numbers are proposal from the owners.

* RED numbers are pure estimation

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See http://cern.ch/Fabio.Montecassiano/pub_doc/CABLES/cables_UXC-USC.pdf for updates.

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 - to be installed with others
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Names Legenda

The **UPPER CASE** initial part follows the CMS' Dbase guidelines.

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- ft: foot
- rk: rack
- lw rk: lowest rack
- yk: yoke

	RB					AB	
	RB.CA.lv-ctrl_uxus	RB.HV.main_uxus	RB.OF.ttc-ex_uxus	RB.OF.lb_uxus	RB.OF.sc_uxus	AB.OF_uxus	AB.CA.cam-bus_uxus
Responsible person	Ranieri ?	Ranieri	Kudla	Kudla	Kudla	ECA	ECA
Status of the only cable	tdb	tdb	tdb	tdb	tdb	tdb	tdb
Cable's diameter [mm]	10	27	10	10	10	10	10
Rep. bend radius [mm]		162					
Weight [g/m]		826		150	150		
Producer-Supplier							
Type			2 fibers	20 fibers	2 ribbon x 8 fibers		
Cable description							
Dis. power (worst) [W/m]		-	-	-	-	-	-
Installation's kind		HV	Fiber	Fiber	Fiber	Fiber	CU-sgn
From UXC55's crates or PPanel name in 'RACKs LAYOUT'	ft's PP: ft - LV PPanel	ft's PP: RPC ft - HV PP	lw rk's PP: RPC TTCoc	ft's PP: RPC ft - TR & SC PPRPC	ft's PP: ft - TR & SC PP		
To USC55's rack position crates or PPanels	Zone S1 - E11:14-F12:13 RPC LV's SY1527	Zone S1 - E11:14-F12:14 RPC B HV	Zone S1 - E01 TTC Opt. Cpl.	Zone S1 - D03:10 RPC Trig	Zone S1 - -## ?		
Q.ty needed links / Wheel spares			2	12x5	2		
COMMENT	all same length !!						
	1 → 6 LV EASY crates >= 2 cables/Whell		singlemode	850[nm], m.mode, 1600 Mbit	singlemode		
W0							
N. cables on W0	4	12	2	4	2	2	2
spares to be installed	1	2	0	0	0	1	1
Estimated medium length [m]	100	100	70	70	70	70	100
TOT. LENGTH with spares [m]	500	1400	140	280	140	210	300
W±1							
N. cables on W±1	4	12	2	4	2	1	0
spares to be installed	1	2	0	0	0	1	0
Estimated medium length [m]	100	100	70	70	70	70	100
TOT. LENGTH with spares [m]	500	1400	140	280	140	140	0
W±2							
N. cables on W±2	4	12	2	4	2	8	2
spares to be installed	1	2	0	0	0	2	1
Estimated medium length [m]	100	100	70	70	70	70	100
TOT. LENGTH with spares [m]	500	1400	140	280	140	700	300
ALL 5							
N. cables on all WHEELS	20	60	10	20	10	20	6
spares to be installed	5	10				7	3
TOT. LENGTH with spares [m]	2500	7000	700	1400	700	1890	900
Split point/PATCH PANEL in UXC55	feet lev.	feet lev.	lw racks lev.	feet lev.	feet lev.	feet lev.	feet lev.

~: 28 cables

~: 5 spares

~: 3.0 [Km]

~: 25 cables

~: 4 spares

~: 2.6 [Km]

~: 34 cables

~: 6 spares

~: 3.5 [Km]

~: 146 cables

~: 25 spares

~: 15.1 [Km]

NOTES

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See http://cern.ch/Fabio.Montecassiano/pub/doc/CABLES/cables_UXC-USC.pdf for updates.

Fabio Montecassiano - INFN PD @ CERN EP/CMM

Tot. cross-section for the MU-cables going through 1 cables [cm^2] ≅ 335

NOTES

- * LV.power @400Hz NOT computed !
- * packing of cables NOT computed !
- * a lot of pure estimation (RED numbers)
- * safety factor x3 already applied to take account of the 'RED' uncertainty

Plan for the installation of the MU Barrel cables

- For the Mu barrel cables, Integration Office stated an **installation in two phases**
 - from **June '04 to August '04 (50 days)** First 2000 cables (equiv. 1 wheel) installed
 - from **November '04 to March '05 (88 days)** The remaining 8000 cables (eq. 4 wheels).

After March '05 there will be the surface **MAGNET TEST** and it will begin the **LOWERING OF MAJOR COMPONENTS**.

This means that **our goal is to have all the cables for one wheel before June '04**, with both the connectors, tested and ready to be installed.

The remaining ~8000 cables have to be ready at Cern before the end of October.

No time recovery will be possible in the surface: if we lose the first 50 days window, we will have to install all the ~10000 cables in the second time window, with only 88 days and without any experience!

See

- "*CMS cabling summary*" - ver. Aug 28 '03 - by *G. Faber*

ID	Task Name	days	'04												'05												'06													
			8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9
1	Confirm services cross sections	1d	◆ 9/8																																					
2	YE2 CSC Muon system Cabling test	20d	■ 72 YE2 CSC Muon system Cabling test																																					
3	YE2,3 CSC/RE Muon syst cabling	282d	8316 ■ 2808+3672+1836 YE2,3 CSC/RE Muon syst cabling																																					
4	YE1 Prep for cabling	105d	■ YE1 Prep for cabling																																					
5	YE1 Cabling ES/EE/HE/ME/RE	205d	10 632 ■ YE1 Cabling ES/EE/HE/ME/RE1																																					
6	MB (DT/RB) 1st wheel cabling test	50d	2 000 ■ MB (DT/RB) 1st wheel cabling test																																					
7	MB (DT/RB) cabling window	88d	8 000 ■ MB (DT/RB) cabling window																																					
8	Magnet test	64d	■ Magnet test																																					
9	Lowering major elements	80d	■ Lowering major elements																																					
10	Equip. cavern with cables ways	141d	■ Equip. cavern with cables ways																																					
11	Infrastructure cabling	200d	T.B.D. ■ Infrastructure cabling																																					
12	Installation cable chain	50d	■ Installation cable chain																																					
13	HF +/- cable chain & service inst.	64d	400 estimated ■ HF +/- cable chain & service inst.																																					
14	Installation Tracker	5d	■ Installation Tracker																																					
15	Cabling Central barrel detectors	284d	Cabling Central barrel detectors ■ 7 324																																					
16	Cabling UX/US connection	420d	Cabling UX/US connection 8026 ■																																					
17	US counting / SX control room cabling	290d	US counting / SX control room cabling ■ T.B.D.																																					

Project: CMS cabling summary
Date: Aug 28 '03

Task ■ Milestone ◆
Progress ■ Summary ◆

Rolled Up Task ■ Rolled Up Progress ■
Rolled Up Milestone ◆

Routing of cables on detectors

- **STARTING POINTS** (connectors and patch panels at detector's side):

They are all frozen except the positions of the “LV minicrate Patch Connector” which is not yet finalized.

- **ENDING POINTS** (crates/patch panels inside the towers' racks and Feet Patch Panels):

Still under discussion, see

- “Crates layout”

- RPC staff (both INFN and Warsaw) agrees with the proposed position for the VME LinkBoard crates.
- Position of others crates inside racks are to be froze

RPC HV cables run up to the **FEET PATCH PANEL**, **these are to be finalized:**

- **RPC staff** has to produce a layout specifying dimension etc...(already requested to Ranieri/Paolucci)
- **Integration office** has to freeze their position.

Time limit for these should be **end of January** in order to calculate cutting lengths asap!

KNOWN RULES**Concerning CRATES**

- RPC LBC** * Each wheel has 12x 6U crates. These must be in the 6 external racks, one on the top and a second on the bottom.
* **Cables** from detector / Leaving-Balcony / Locals-to-Balcony:
RB.CA.SGN (~90/crate), RB.CA.DCS-xx (~7/crate) / RB.LB.Tr (5/crate), RB.SC.ccu (2/crate), RB.TTC-oc (2/crate), RB.SC.ol-short (1/lw crate) / RB.LBC-Iv (1/crate)
- RPC TTCoc** * This is a 1U oc each lowest rack, as in the M. Kudla request (mail). Each 1U oc has 16 channel (2x 6 used).
* **Cables** from detector / Leaving-Balcony / Locals-to-Balcony:
- / RB.ttc-oc (8/oc) / RB.ttc-oc (4/oc)
- RPC LV** * Easy crate. It has only front cables --> could be placed in the internal rack.
* **Cables** from detector / Leaving-Balcony / Locals-to-Balcony:
RB.LV.fe-xx (~20/quadrant) / LV.48V (1/crate) / RB.LBC-Iv (-)
- RPC LV** in the Central Balconies * It's only for LV supply to the 2 **RPC LBC** crates. It's to be understood whether it's really necessary.
* **Cables** from detector / Leaving-Balcony / Locals-to-Balcony:
- / LV.48V (1/crate) / RB.LBC-Iv (-)
- DT HV** * Due to the need to build a "REDUCED HV SYSTEM" (see 'Crate Allocation on Balconies - Some consideration', M. DeGiorgi), the 2x 6U crates (in the 4 external racks) must be always one near to the other both in the same rack. If possible, they should be separated by 1 heat exchanger.
* (21.11.03) E. Borsato agreed to organizza the Sect 4 in a different way respect the doc "REDUCED HV SYSTEM". We would like to connect both the 2 DT in Sect 4 to the same top balcony. No restriction about which balcony will be used.
* **Cables** from detector / Leaving-Balcony / Locals-to-Balcony:
- / - / -
- DT HV-LV-CTRL PPanel** * It's to be nearest DT HV crates. It perform the KERPEN--> SHV cables transform, the LV and CTRL (for HV A877) distribution.
* **Cables** from detector / Leaving-Balcony / Locals-to-Balcony:
- / - / -
- DT LV** * Easy crate. It has only front cables --> could be placed in the internal rack.
* **Cables** from detector / Leaving-Balcony / Locals-to-Balcony:
- / - / -
- DT LV - PPanel** * Added in order to map the EASY power modules' channels into the DT LV cables which run to the chambers. Should be nearest to the **DT LV**, that means in the internal rack and only with front cables.
* **Cables** from detector / Leaving-Balcony / Locals-to-Balcony:
- / - / -
- DT Slow Ctrl PPanel** * Could be placed anywhere, outside the racks at feet level too.
* **Cables** from detector / Leaving-Balcony / Locals-to-Balcony:
- / - / -
- DT TR/RO Sec. Coll.** * As requested by Odorici/DallaValle, now all these crates are in the lowest external rack near USC55. This is still to be approved by the integration team. It depend on how will be difficult to route cables in W0 from a tower to the other.
* **Cables** from detector / Leaving-Balcony / Locals-to-Balcony:
- / - / -
- DT TR/RO TTC oc** * **Cables** from detector / Leaving-Balcony / Locals-to-Balcony:
- / - / -
- Alignment - 3 U** * **Cables** from detector / Leaving-Balcony / Locals-to-Balcony:
- / - / -
- Heat Exch. Here we use 1U heat exchanger/1000 W.

Notes

- 1) **Balcony near Sect 1,2,3** * In the central wheel, due to dewar, we need to split the two racks in 15+40 U (1U lost). Furthermore, it's better to avoid cables going from this balcony to the sector 4. --> I apply this rule on all wheels, up to it will be possible.
- 2) **Power Supply rack** Each rack will be equipped with a *Power Supply* for local needs (monitoring units, turbine fan unit., source A. Gaddi, mail 24.09). This rack's basic components isn't still defined completely (up to 15.09.2003); It's foresee to be 4 U, 200 [mm] depth, the same used in ATLAS (but ATLAS's racks are 1000 [mm] depth vs. the CMS 900[mm]). So there are three possibilities for its internal collocation:
1) in the higher top back side (the ST/EL proposal) --> If so, it could affect the presented RPC cables layout.
2) in the higher front face --> In this case we lost 4 useful units for our crates
3) in the back side, below thetop "RPC LBC" crate --> This is only an idea, it's to be verified.
- 3)

HISTORY on changes

dd.mm.yy text

Work in progress

- **PATHS**

Integration Office knows all our proposed routing. It is verifying that this routing is possible (feet and cryogenic areas) for both external and central wheels. The common feeling is that it should be possible.

Furthermore Integration Office has to reply about the worst case length for

- FE RPC cables
- TR/RO DT cables
- LV minicrate cables

both in the central and external wheels. It should reply before the end of this year.

Concerning 3D models for cables cutting lengths

- **No progress on the radial cables-tray design**
- **No progress on the peripheral cables tray design**

THIS TAKES A BIG WORRY IN ORDER TO GET THE CUTTING LENGTH BEFORE MARCH '04

Copper cables length estimation between UXC55 and USC55-Lower floor-row G 12 (DT HV middle rack)

(no fibers are foreseen here)

Between *higher* towers' rack and Feet Patch Panels

	W+2		W+1		W-1		W-2	
	far-side	error	near-side	error	far-side	error	near-side	error
inside Rack	4	1	4	1	4	1	4	1
safety - below Rack	2		2		2		2	
along the Cables tray	10	3	10	3	10	3	10	3
inside Foot PPanel	5	5	5	5	5	5	5	5
safety - near PPanel	3		3		3		3	
	24	9	24	9	24	9	24	9

Central Wheel		
far-side	error	near-side
4	1	4
2		2
13	3	13
3		3

Between Feet Patch Panels and USC - Lower Floor - row G 12

	W+2		W+1		W-1		W-2	
	far-side	error	near-side	error	far-side	error	near-side	error
inside Foot PPanel	5	5	5	5	5	5	5	5
safety - near PPanel	3		3		3		3	
c.chain --> low. floor: H01	80	8	61	7	79	8	58	6
low. floor: H01 --> G12 base	15	5	15	5	15	5	15	5
inside Rack	4	1	4	1	4	1	4	1
safety - below Rack	10		10		10		10	
	117	19	98	18	116	19	95	17

Central Wheel		
far-side	error	near-side
5	5	5
3		3
15	5	15
4	1	4
10		10

Total lengths (max)

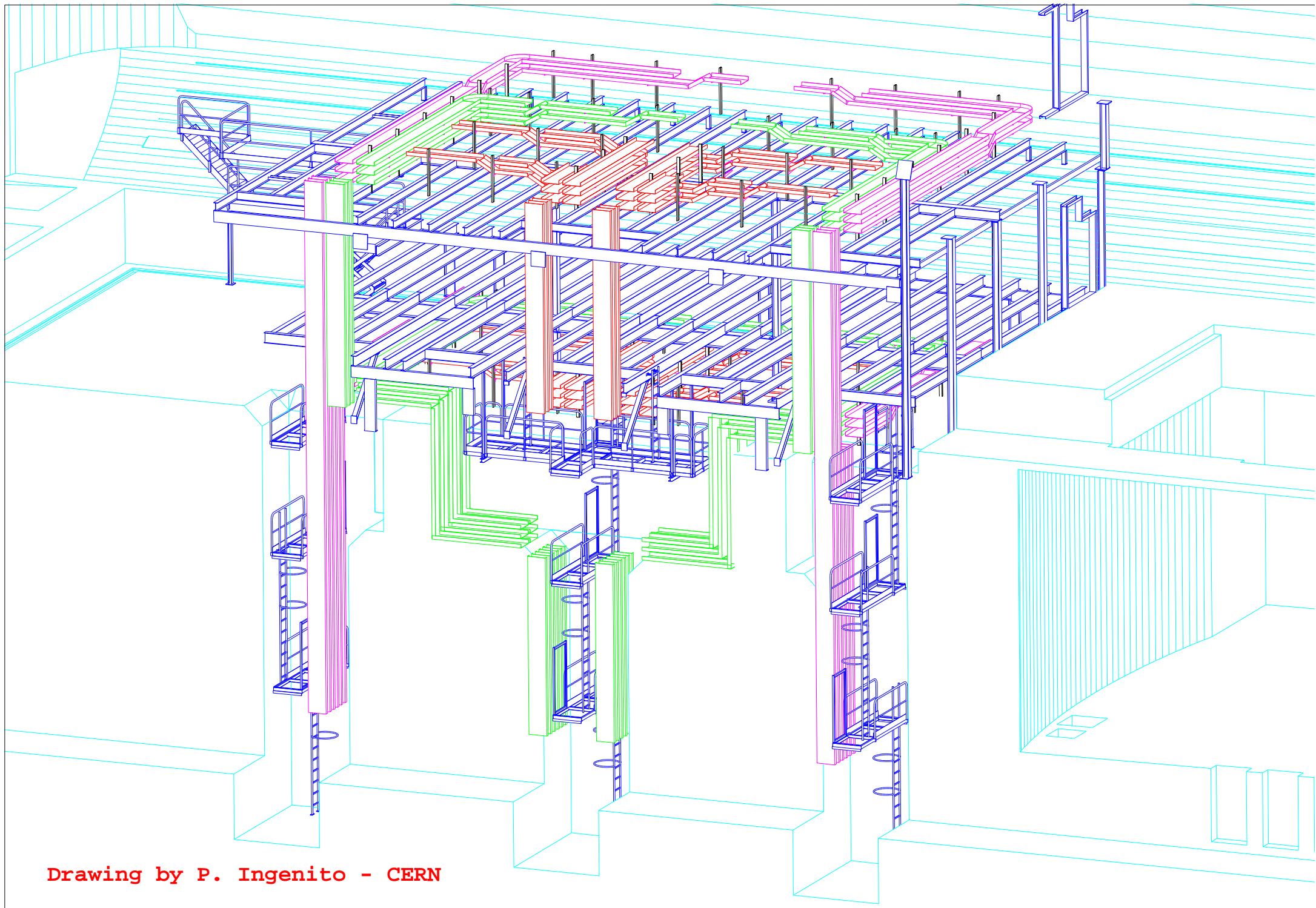
	W+2		W+1		W-1		W-2	
	far-side	error	near-side	error	far-side	error	near-side	error
	141	28	122	27	140	28	119	26

Central Wheel		
far-side	error	near-side

NOTES

- * Measures are in [m]
- * GREEN numbers comes from integration office.
- * BLU numbers are proposal.
- * RED numbers are pure estimation
- * BLANK CELLS are missing informations.

Medium length [m]	122	27
--------------------------	------------	-----------



Drawing by P. Ingenito - CERN