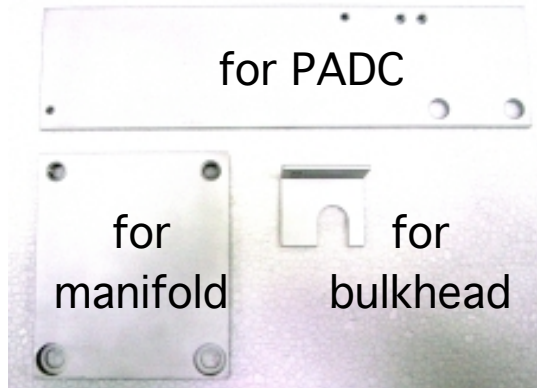
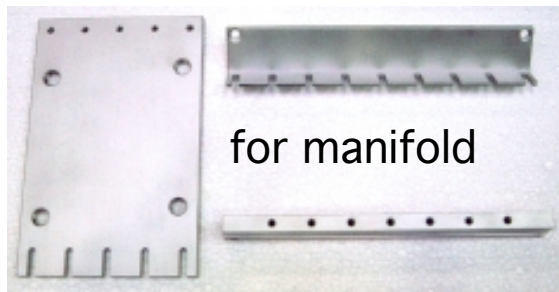


DT CHAMBERS: Gas Manifolds, Honeycomb Panels, etc.

Hans Reithler, 031209



At **REAR** side
(inside C-profile)



At **FRONT** side
(outside C-profile,
attached to frame of SL))

At front, despite multitude of shifts between holes in SL frames (geometry), could build a single “universal” type of support (watch instructions in manual).

All support pieces done.

Irradiation Test:

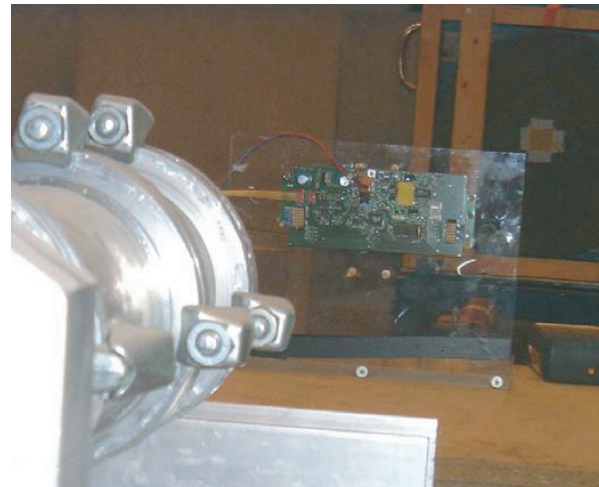
- Protons 172 MeV (at Uppsala)
- 0.3×10^{10} P/cm² reached (1×10^{10} P/cm² intended)
- PADC running during irradiation (ADC, memory, readout - full operation thus)
- **NO error** seen, until PADC **stopped**
- **AT90S8535 chip affected**, others fine.

Next:

- Irradiate with neutrons, photons (at Debrecen)
- Decide on use of either chip above or substitute, for mass production.

Note:

- Large irradiation safety factor, from: (a) global factor, (b) max. of rates, (c) spectrum (here all as hi-E used)
- Provision to ease maintenance.



Picture 4. The PADC board in front of the beam-line (1).

From/by
Debrecen Group:
Jozsef Molnar
Dezso Novak
Zsolt Szabo

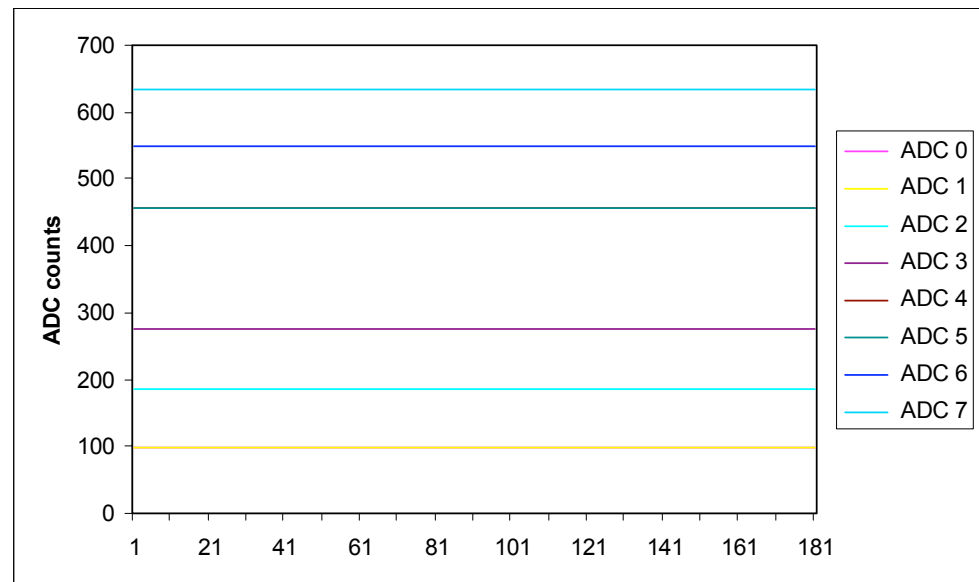


Figure 1. The 8 ADC channels during the measurement as function of time.

Expect
at
10 a LHC:

From: Mika Huhtinen, Optimization of the CMS forward shielding, CMS Note 2000/068, p. 14
 Note 1: The PADCs are all located in the region $Z = 0 - 4$ m, therefore the second line does not apply.
 Note 2: Figures are expected values for 10 years LHC operation, no safety factor applied yet.

	Neutron Flux			Ch. Hadr	Dose
	Total	E> 100 keV	E> 20 MeV		
BARREL MUON					
MB1 (Z=0-4)	$1.41 \pm 0.02 \times 10^{10}$	$3.47 \pm 0.04 \times 10^9$	$4.8 \pm 0.1 \times 10^8$	$1.31 \pm 0.09 \times 10^7$	0.07 ± 0.01
MB1 (Z=4-6.6)	$3.03 \pm 0.04 \times 10^{10}$	$8.9 \pm 0.1 \times 10^9$	$1.87 \pm 0.04 \times 10^9$	$7.9 \pm 0.8 \times 10^7$	0.21 ± 0.02
MB2 (Z=0-6.6)	$7.67 \pm 0.07 \times 10^9$	$3.05 \pm 0.02 \times 10^9$	$1.81 \pm 0.03 \times 10^8$	$4.9 \pm 0.5 \times 10^6$	$2.3 \pm 0.2 \times 10^{-2}$
MB3 (Z=0-6.6)	$2.50 \pm 0.06 \times 10^9$	$5.2 \pm 0.1 \times 10^8$	$1.5 \pm 0.1 \times 10^7$	$2.2 \pm 0.4 \times 10^5$	$6 \pm 1 \times 10^{-3}$
MB4 (Z=0-6.6)	$1.99 \pm 0.04 \times 10^{10}$	$4.3 \pm 0.1 \times 10^9$	$2.0 \pm 0.1 \times 10^8$	$9 \pm 3 \times 10^5$	$5.9 \pm 0.4 \times 10^{-2}$

Max.
N.A.
Min.

Table 5: Fluences (cm^{-2}) and absorbed dose (Gy) in regions of the CMS cavern, muon system and HCAL where potentially radiation sensitive electronics will be positioned. Values correspond to $5 \times 10^5 \text{ pb}^{-1}$, which corresponds to 5×10^7 seconds at peak luminosity.

PADC irradiation:

	Neutron Flux		Ch. Hadr	Dose
	E> 100 keV	E> 20 MeV		
Achieved (Nov. 2003):	-	-	$300 \times 10^7 \text{ cm}^{-2}$	1.8 Gy
Safety factor w.r.t. expected max.:	-	-	230	26
Safety factor w.r.t. expected min.:	-	-	1.3×10^4	300

Conclude: Safety margin w.r.t. 10 a LHC is fine; irradiation with neutrons to be done.

Component:	Status:	Schedule:
Manifold (incl. sensor, preampl.)	o.k. ~50% done & calibrated	machining rest; next batch 0403
Fitting, bulkhead	o.k.	- (1)
Tube (Cu & flexible)	o.k.	-
PADC board	first irradi. test done (2)	define 0401
Cable (signal, LV)	o.k.	-
Support rear (manifold, PADC)	o.k.	- (3)
Support front (manifold)	o.k.	- (4)

(1) Need further spares (several damaged at installation; up to 20%)

(2) By Debrecen

(3) Including additional/modified pieces to grant spare handling access on rear C-profile

(4) Additional components, not needed originally; only recently front manifold moved to chamber.

Components delivery coping with chamber production.
 PADC late (unchanged); evaluating action from irradiation test result.

Summary of honeycomb panels

File:031209hc_inventaire.xls

Last update 031207 HR

contract
020130

031209:

Panel type	for Lab	Qty to install	Qty spares	Qty orders	Qty done earlier	Qty in contract	Qty done contract
Contract F341/EP/CMS, signed 30 January 2002							
Panel MB1	A	58	4	62	5	57	37
Panel MB2	M	58	4	62	11	51	51
Panel MB3	L	58	4	62	9	53	26
Panel MB4	T	29	3	31	2	29	15
Panel MB4/4	L	8	1	9		9	9
Panel MB4/8,12	T	10	1	11		11	11
Panel MB4/9,11	A	10	1	11		11	10
Panel MB4/10	M	10	1	11		11	11
Panel MB1 chimney	A	2	0	2		2	0
Panel MB2 chimney	M	2	0	2		2	0
Panel MB3 chimney	L	2	0	2		2	2
Panel MB4 chimney	T	1	0	1		1	1
Panel MB4/4 chimney	L	2	0	2		2	2
Totals		250	19	268	27	241	175

History of total cost of Contract F341/EP/CMS: Total in EUR

- 1- Contract (242 panels, wrong breakdown): 549.357,98
- 2- Contract (242 panels, correct breakdown): 556.101,11
- 3- Change a) reduce 242 to 241 panels: 552.412,98
- 4- Change b) further tooling, adjustments etc.: 581.032,98

Figures in **blue/bold** are actual

Honeycomb Panels Schedule

Produced 175 (175 + 27 = 202 of 268)
 Finish further 42 in December 2003
 Produce last 24 in January 2004

H. Reithler, Phys. Inst. 3A, RWTH Aachen

File: 0311209hc_Inventaire.xls

Printed: 2003.12.7

031204: 031219: 0401: 0401:

ready to ship 0312:

ready to ship 0401:

Panel type:	for Lab:	done 031204	next 0312	next 0401	totals:
MB1	A	37		20	57
MB2	M	51			51
MB3	L	26	27		53
MB4	T	15	14		29
MB4/4	L	9			9
MB4/8,12	T	11			11
MB4/9,11	A	10	1		11
MB4/10	M	11			11
MB1 chimney	A	0		2	2
MB2 chimney	M	0		2	2
MB3 chimney	L	2			2
MB4 chimney	T	1			1
MB4/4 chimney	L	2			2
Totals:		175	42	24	241

to To:	to L:
	27
29	
11	
1	
	2
41	31

to Ac:	to M (CERN?):
20	
1	
2	
	2
23	2

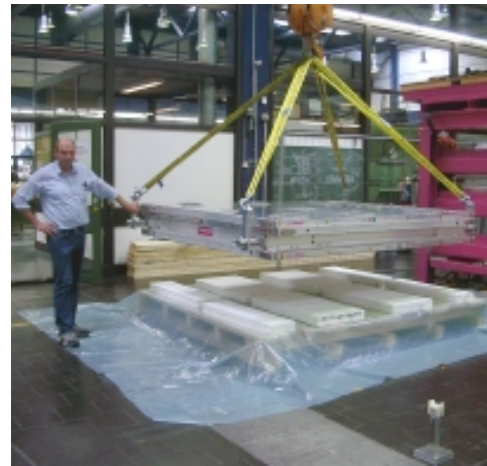
Can ship >22 to Torino next week
 Other shipments ~end of January
 Labs are asked to confirm destination for shipment

updated 031215

Version 1:



Simple.
In use at ISR since long time.



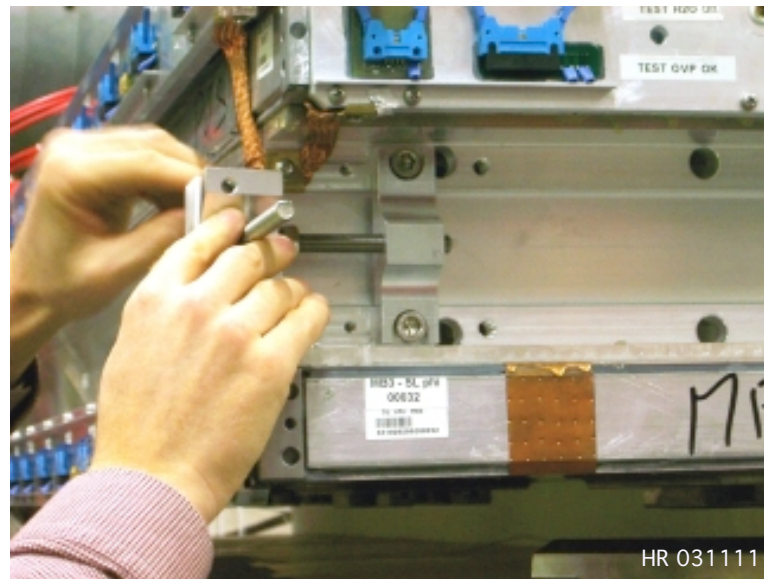
Permits to lift a chamber
while maintaining the
lateral fixation points
of the DT free.

Version 2:



Fancier.
Turnable axis; can be posed on
feet. Modifications being made.

Mounted on two sides of the chamber, the “DT Z-stops” attach it to the supporting rail and prevent unwanted sliding along the Z axis.



Status: 50 sets are at ISR.
Schedule: full lot of 270 sets finished 0401.