

# ISR Work Progress Report

CMS Week March 16th 2004

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## HVB Failures Since November 2003

Date	Chamber	HVB	HV-time	Last on HV
28/11/03	MB3C14 Phi2 A	W1e(865)	2490	03/07/2003
28/11/03	MB3C12 Phi2 B	?(617)	2444	26/06/2003
05/12/03	MB3C04 Theta B	W1b(2329)	2513	26/06/2003
14/01/04	MB3C04 Theta A	W2b(2330)	~ 3000	18/12/2003
15/01/04	MB3C24 Theta B	W2g	>2000	18/12/2003
16/01/04	MB3C02 Phi1 B	W1d	2600	04/07/2003
16/01/04	MB3C06 Theta B	W2d	2090	22/04/2003
20/01/04	MB3C09 Theta B	W1c	2590	26/04/2003

We did not have any additional HVB failures

The decision was taken to replace the HVB for the YB2+ bottom with HVB\_I (enlarged distance wire/ground) and produce a new HVB for the remaining chambers.

- ✓ The second round of alignment calibration (**39 chambers**) went very smoothly and quickly, 4 DT calibrated/day.
- ✓ Kerstin repaired most of the MB1 with problems, and selected the MB to install in YB2+
- ✓ HVB\_I have been installed in 7MB2, 5MB3 and one MB1 but HVB20 still to be exchanged.
- ✓ Another shipment of 5 MB3 arrived on February 24th. The chambers went through the HV acceptance test; **no problems were found**.

- ✓ 5 MB2 will arrive at the end of March bringing the total to 115 chambers.
- ✓ We should plan the next alignment calibration period after the next shipment of 2 MB4/4 from Legnaro (May/June but conflicts with YB2+ installation)
- ✓ Additional space is carved out in the I3 tunnel by reshuffling the shelves in two rows ~ 4 stack

## DT Chambers at ISR

Type	@ISR	Align		HV/Gas	HV Cable	CR TEST
		L	R			
MB1P	23	12	11	23	17	23
MB1M	9	5	4	9	6	9
MB4/9,11	4	2	2	0	0	4
<b>All MB1/4</b>	<b>36</b>	<b>19</b>	<b>17</b>	<b>32</b>	<b>23</b>	<b>36</b>
MB2P	23	12	10	22	13	18
MB2M	10	5	5	10	6	5
MB4/10 L	3	2	1	0	0	3
MB4/10 R	3	2	1	0	0	3
<b>All MB2/4</b>	<b>39</b>	<b>21</b>	<b>17</b>	<b>32</b>	<b>19</b>	<b>29</b>
MB3P	23	9	9	18	18	18
MB3M	10	5	5	10	10	10
MB4/4	2	0	2	0	0	2
<b>All MB3/4</b>	<b>35</b>	<b>14</b>	<b>16</b>	<b>28</b>	<b>28</b>	<b>30</b>

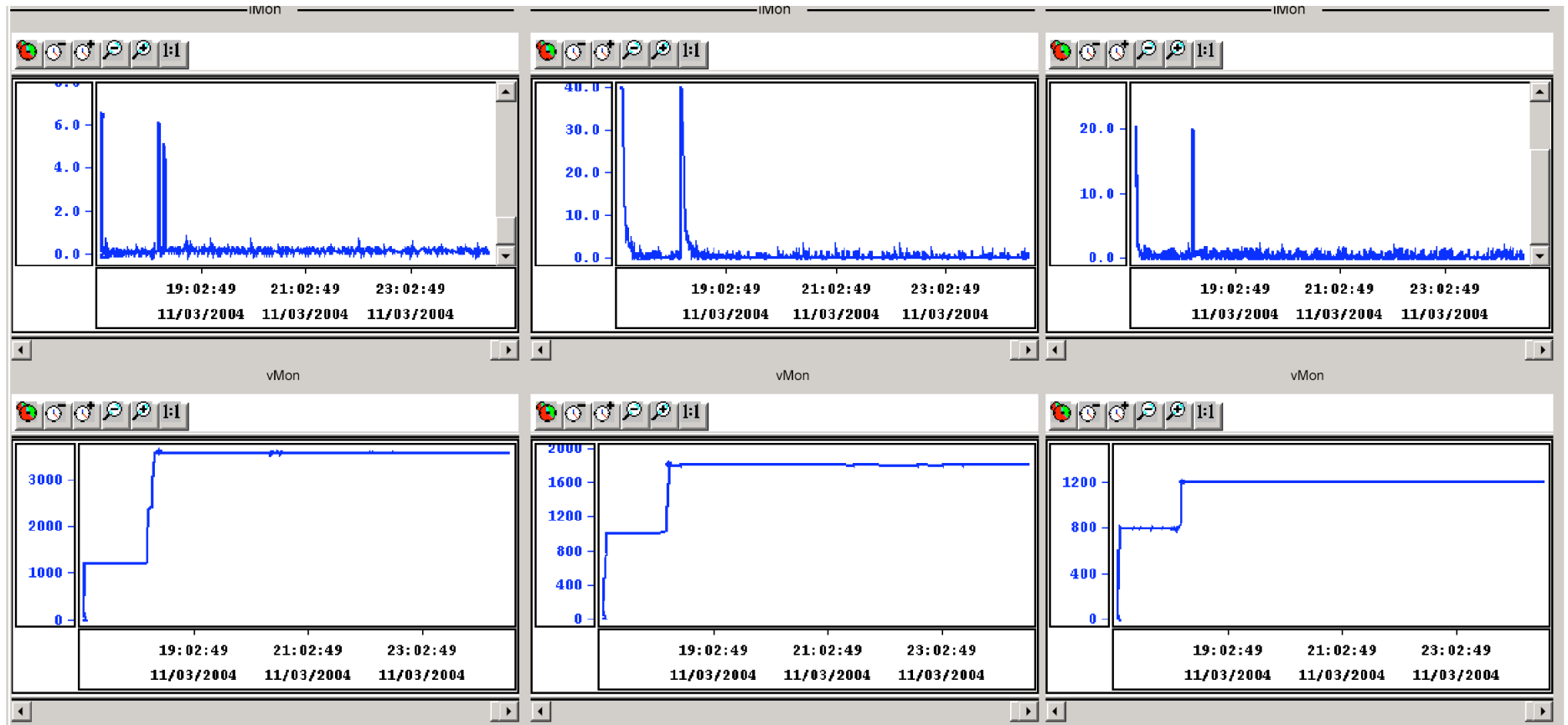
A total of  
110 Chambers  
in 22 stacks  
+ 5 MB2

HV Cable => Connectors soldered on Phi SL cables and tested

## HV Test Upgrades

- New monitoring program (S. Braibant, P. Giacomelli, M. Giunta) gives online displays of current and voltage for each channel. Statistics of time under HV, trips et cetera is push button retrievable from database. Installed on two SY127 crates (24 Chambers)
- A version suitable for the CAEN SY1527 is now operational, 4 chambers are under HV in the final configuration.
- Old System (Mary-Cruz) still used for acceptance tests and to identify problem boards.
- The HV ON/OFF sequence has been revised with many more steps and a 1 hour pause at 1200/1000/-800V for “Cold” (after ~days without HV) turn ON.

# Cold Start-up



- 1) 1200/1000/-800 V at 10V/sec, 10/40/20 micro A
- 2) 2400/1800/-1200 V
- 3) 3400/1800/1200 V, 3 micro A
- 4) 3600/180/1200 V, 3Micro A

~ 1 hour +

15 minutes

To Ramp -up

## HV Monitoring Chamber: MB3C16

13/03/2004 14:23:34

### SL PHI1

### SL THETA

Trend	V0 (V)	VMon (V)	I0 (uA)	IMon (uA)	Trip (s)	Status
L1 ANOD0	3600	3600	2	0.02	100	
L1 ANOD1	3600	3600	2	0	100	
L1 STRIP	1800	1800	5	0	100	
L1 IBEAM	1200	1200	5	0	100	
L2 ANOD0	3600	3600	2	0.02	100	
L2 ANOD1	3600	3600	2	0.02	100	
L2 STRIP	1800	1800	5	0	100	
L2 IBEAM	1200	1200	5	0	100	
L3 ANOD0	3600	3600	2	0	100	
L3 ANOD1	3600	3600	2	0	100	
L3 STRIP	1800	1800	5	0	100	
L3 IBEAM	1200	1200	5	3333	100	
L4 ANOD0	3600	3600	2	0	100	
L4 ANOD1	3600	3600	2	0.04	100	
L4 STRIP	1800	1800	5	0	100	
L4 IBEAM	1200	1200	5	0	100	

RU<sub>Up</sub> (V/s)   ON

RD<sub>wn</sub> (V/s)   ON

RU<sub>Up</sub> (V/s)   ON

RD<sub>wn</sub> (V/s)   ON

RU<sub>Up</sub> (V/s)   ON

RD<sub>wn</sub> (V/s)   ON

RU<sub>Up</sub> (V/s)   ON

RD<sub>wn</sub> (V/s)   ON

Trend	V0 (V)	VMon (V)	I0 (uA)	IMon (uA)	Trip (s)	Status
L5 ANOD0	3600	3598	2	0.04	100	
L5 ANOD1	3600	3598	2	0	100	
L5 STRIP	1800	1798	5	0	100	
L5 IBEAM	1200	1199	5	0	100	
L6 ANOD0	3600	3598	2	0.04	100	
L6 ANOD1	3600	3598	2	0.04	100	
L6 STRIP	1800	1799	5	0	100	
L6 IBEAM	1200	1199	5	0	100	
L7 ANOD0	3600	3598	2	0	100	
L7 ANOD1	3600	3598	2	0.02	100	
L7 STRIP	1800	1799	5	0	100	
L7 IBEAM	1200	1199	5	0	100	
L8 ANOD0	3600	3598	2	0.04	100	
L8 ANOD1	3600	3598	2	0.04	100	
L8 STRIP	1800	1798	5	0	100	
L8 IBEAM	1200	1199	5	0	100	

RU<sub>Up</sub> (V/s)   ON

RD<sub>wn</sub> (V/s)   ON

RU<sub>Up</sub> (V/s)   ON

RD<sub>wn</sub> (V/s)   ON

RU<sub>Up</sub> (V/s)   ON

RD<sub>wn</sub> (V/s)   ON

RU<sub>Up</sub> (V/s)   ON

RD<sub>wn</sub> (V/s)   ON

### SL PHI2

Trend	V0 (V)	VMon (V)	I0 (uA)	IMon (uA)	Trip (s)	Status
L9 ANOD0	3600	3599	2	0.06	100	
L9 ANOD1	3600	3599	2	0	100	
L9 STRIP	1800	1799	5	0	100	
L9 IBEAM	1200	1200	5	0	100	
L10 ANOD0	3600	3598	2	0.04	100	
L10 ANOD1	3600	3599	2	0.04	100	
L10 STRIP	1800	1799	5	0	100	
L10 IBEAM	1200	1200	5	0	100	
L11 ANOD0	3600	3599	2	0	100	
L11 ANOD1	3600	3598	2	0.02	100	
L11 STRIP	1800	1799	5	0	100	
L11 IBEAM	1200	1200	5	0	100	
L12 ANOD0	3600	3599	2	0.02	100	
L12 ANOD1	3600	3599	2	0.04	100	
L12 STRIP	1800	1799	5	0	100	
L12 IBEAM	1200	1200	5	0	100	

RU<sub>Up</sub> (V/s)   ON

RD<sub>wn</sub> (V/s)   ON

RU<sub>Up</sub> (V/s)   ON

RD<sub>wn</sub> (V/s)   ON

RU<sub>Up</sub> (V/s)   ON

RD<sub>wn</sub> (V/s)   ON

RU<sub>Up</sub> (V/s)   ON

RD<sub>wn</sub> (V/s)   ON

Low Voltage  ON

Global Cathode  ON

Global Anode  ON

Chamber ON/OFF

Set chamber values

Trip auto-recover  ON

Chamber stat.

Print this panel

Chamber trending



# HV Current Spikes

## Typology:

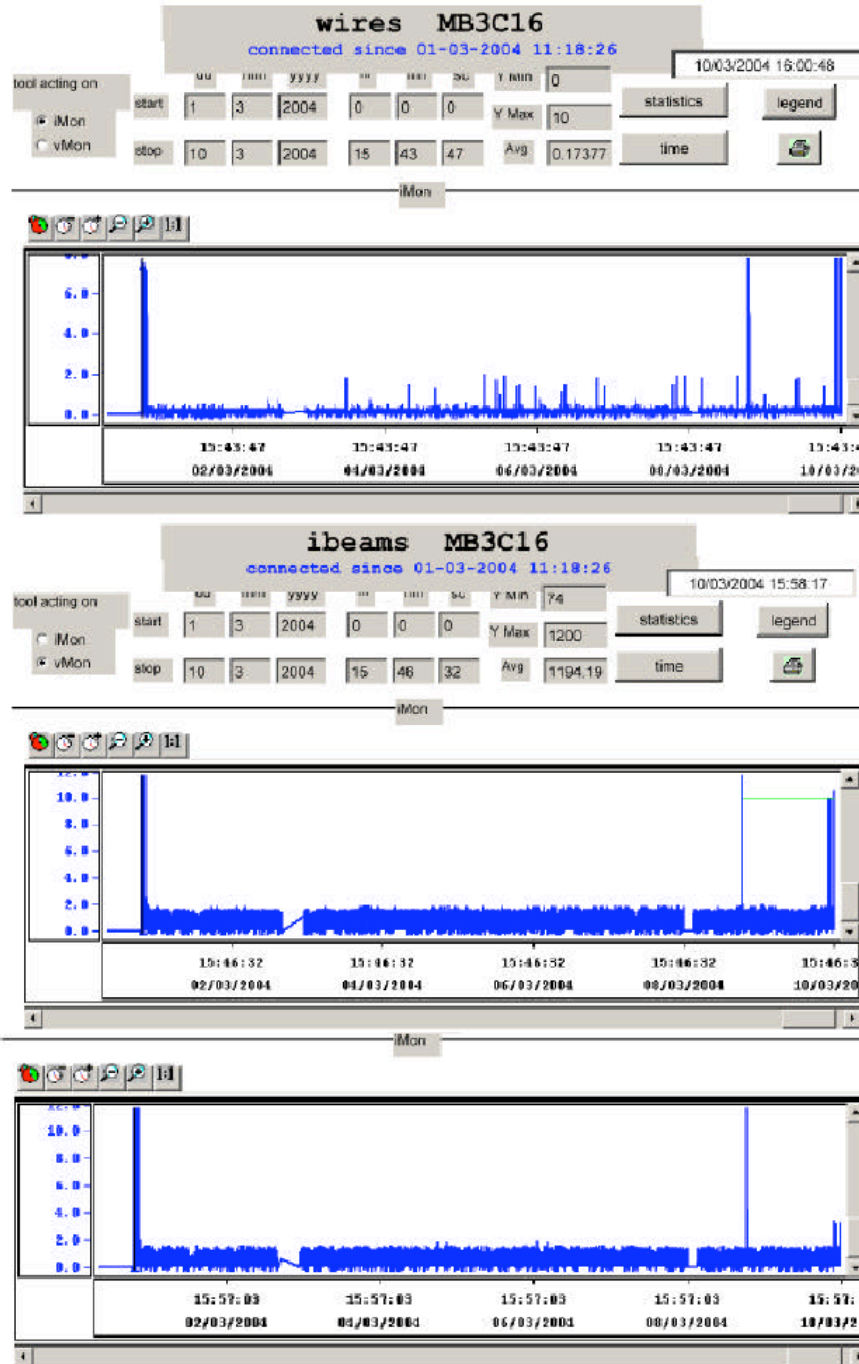
- 1) isolated current spikes in the wires HV line, (**Most Common**)
- 2) current spikes in the wire and cathode HV lines, (**predominantly MB3**)
- 3) current spikes in the wire and strip HV lines (**rare**)
- 4) current spikes in all electrodes. (**rare**)

OVC spike rates vary from less than one/day to several/hour

Type 1) is due to discharges outside the drift cell, mostly to the aluminum plane or to a cathode wire. Can be reduced by adding Mylar tape on aluminum plane but looks like a design feature

Type 2) is due to a “tappino” that does not have a side cover.

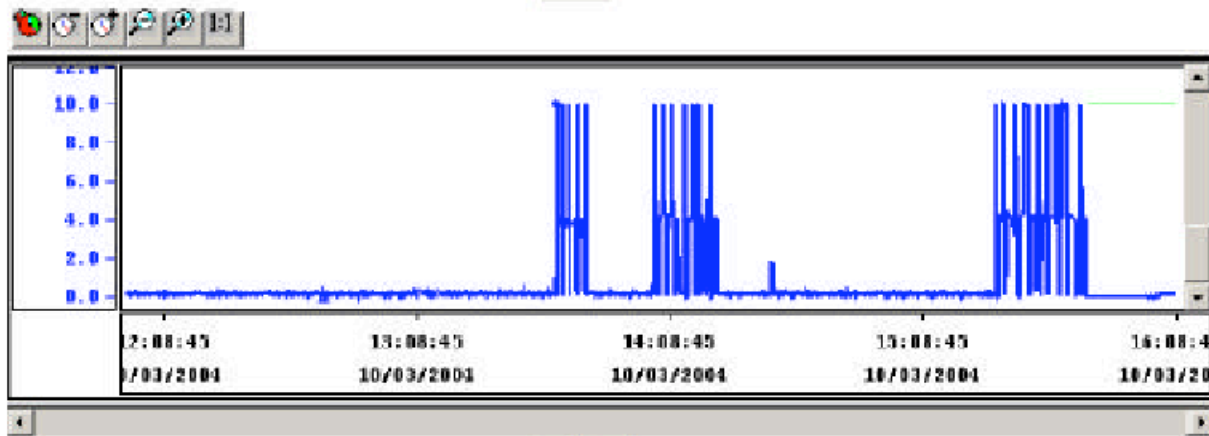
Type 2) is a real problem since discharges can result on repeated HV trips and requires the chamber to be turned off in order to disappear.



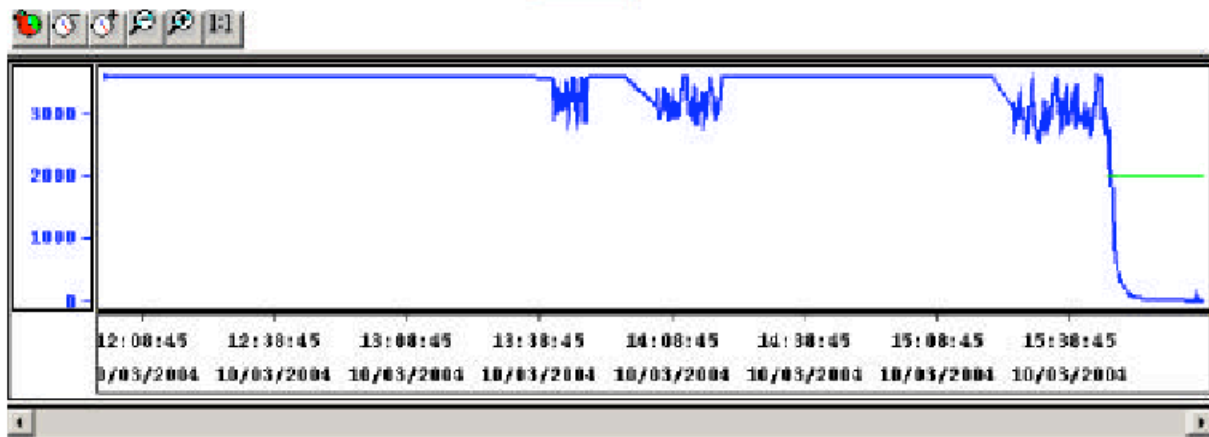
HVB replaced end of February.

1 missing cover on PHI1 and another in Theta SL

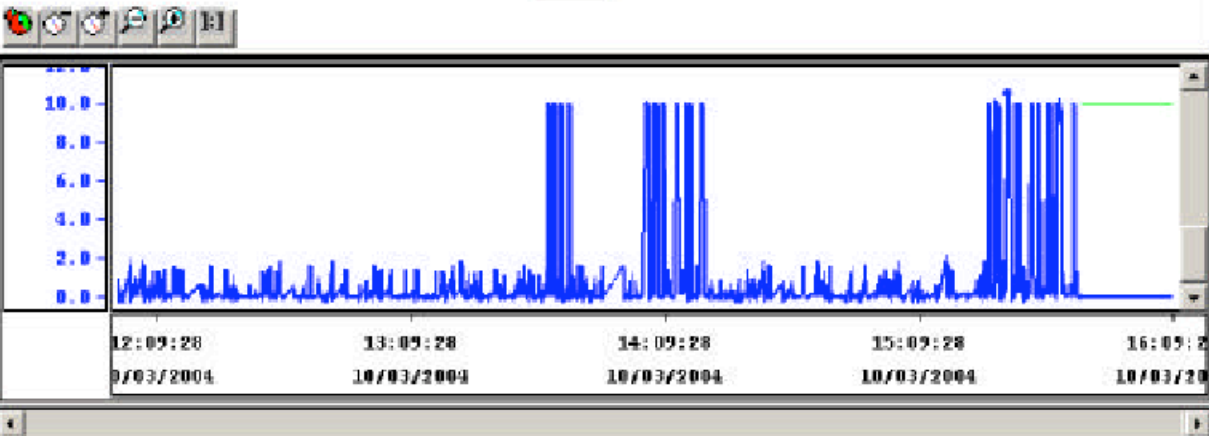
Probably some missing on Front-end side



vMon



vMon



MB3C16 on  
March 10th

Discharges appeared  
for no obvious reason.

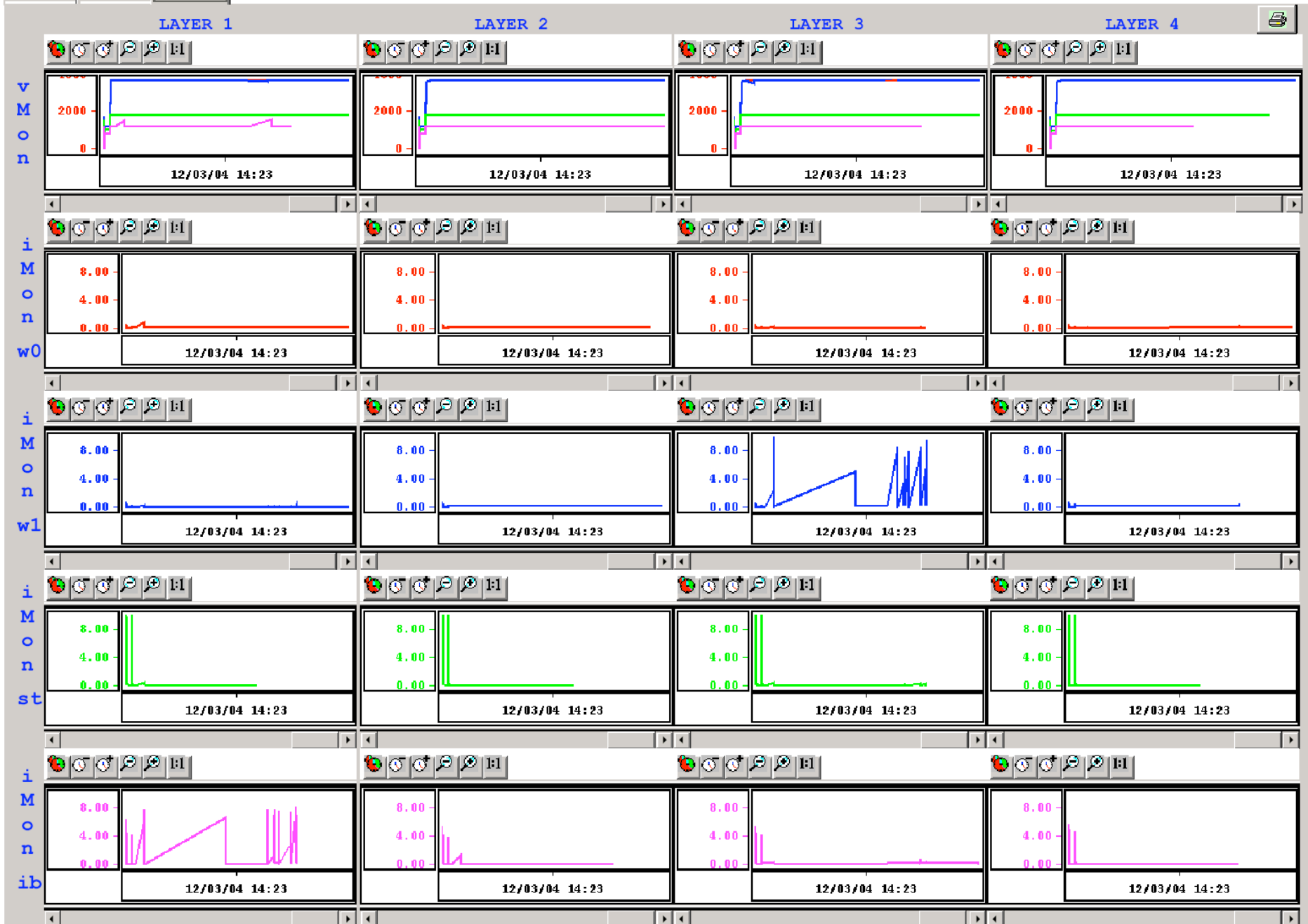
Oscillation due to  
Monitor program  
attempt to recover  
OVC

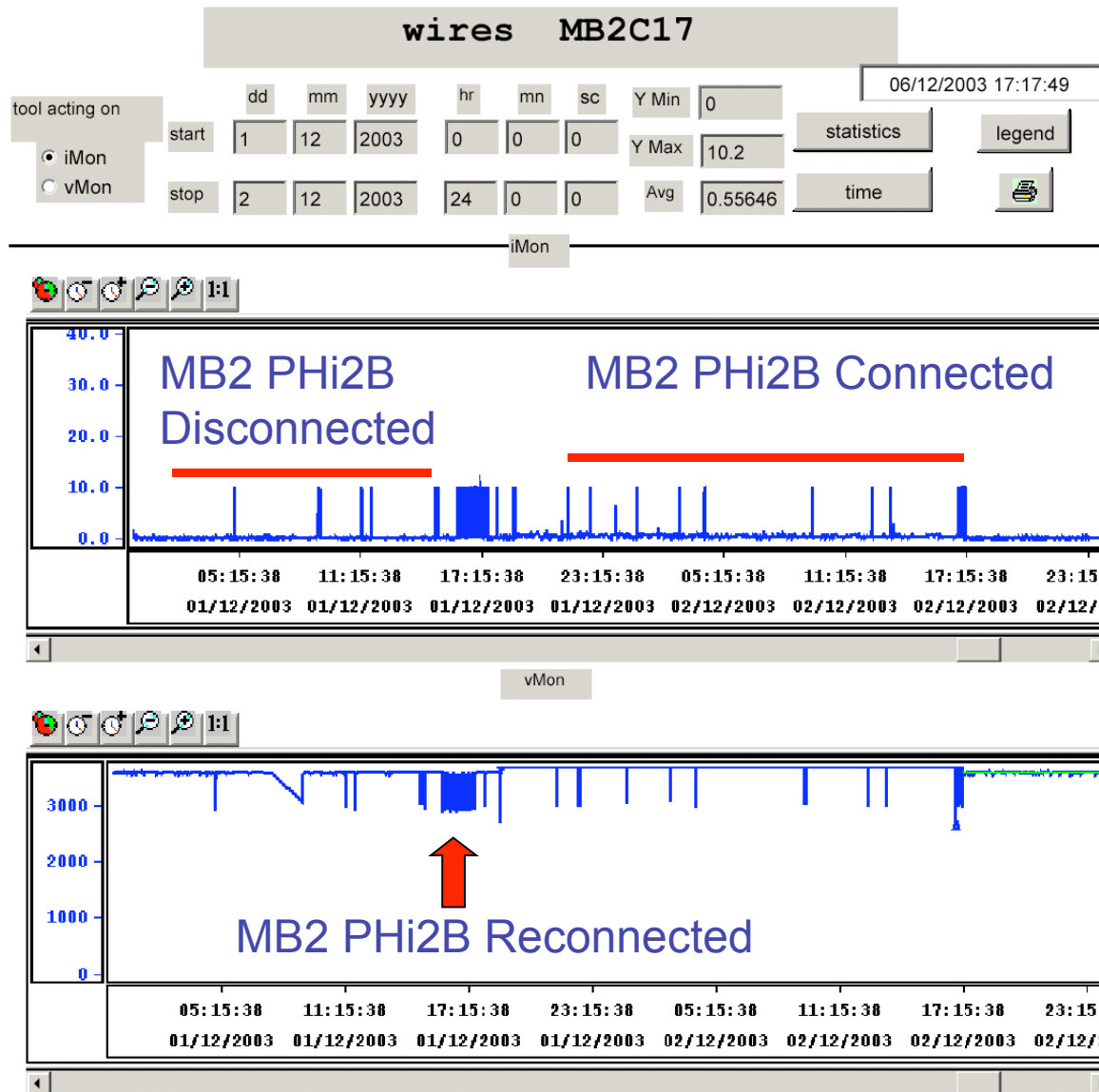
Chamber moved to  
Sys 1527

MB3C16

connected since 11-03-2004 14:38:27

PHI 1 THETA PHI 2





Mary Cruz fixed the problem during the Dec03 CMS week (protection on HVB8)

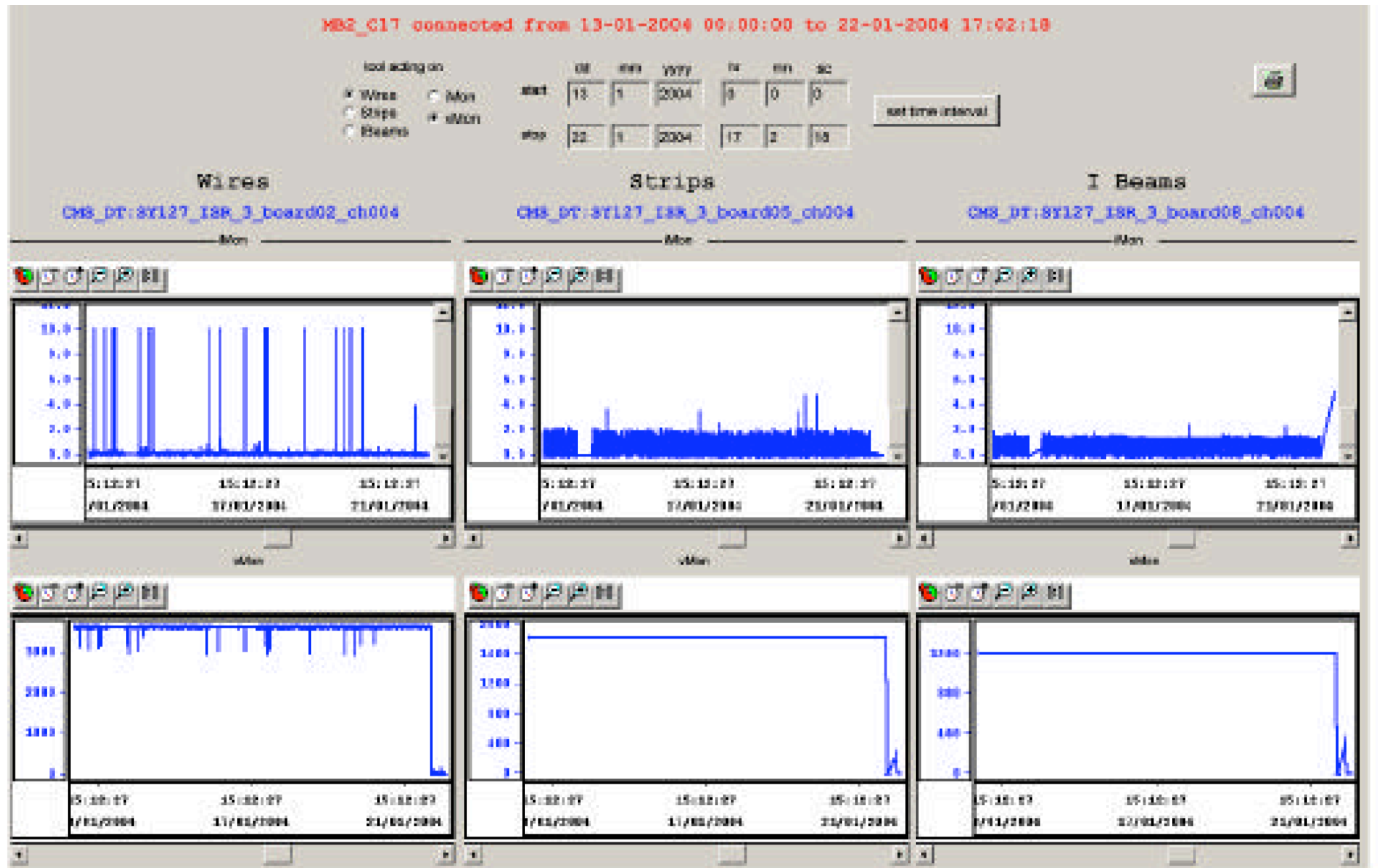
MB2P17 and MB2P24 are on the same HV channel.

MB2P17 was discharging (clicking) the problem was localized on MB2P17 Phi2 B connector that was removed until 01/12 at 16:30 when it was put back to take data with scalers.

Since this did not help to find the problem, Phi2B was put under HV on the CLONE system (allows to isolate HV boards) but the clicking disappeared.

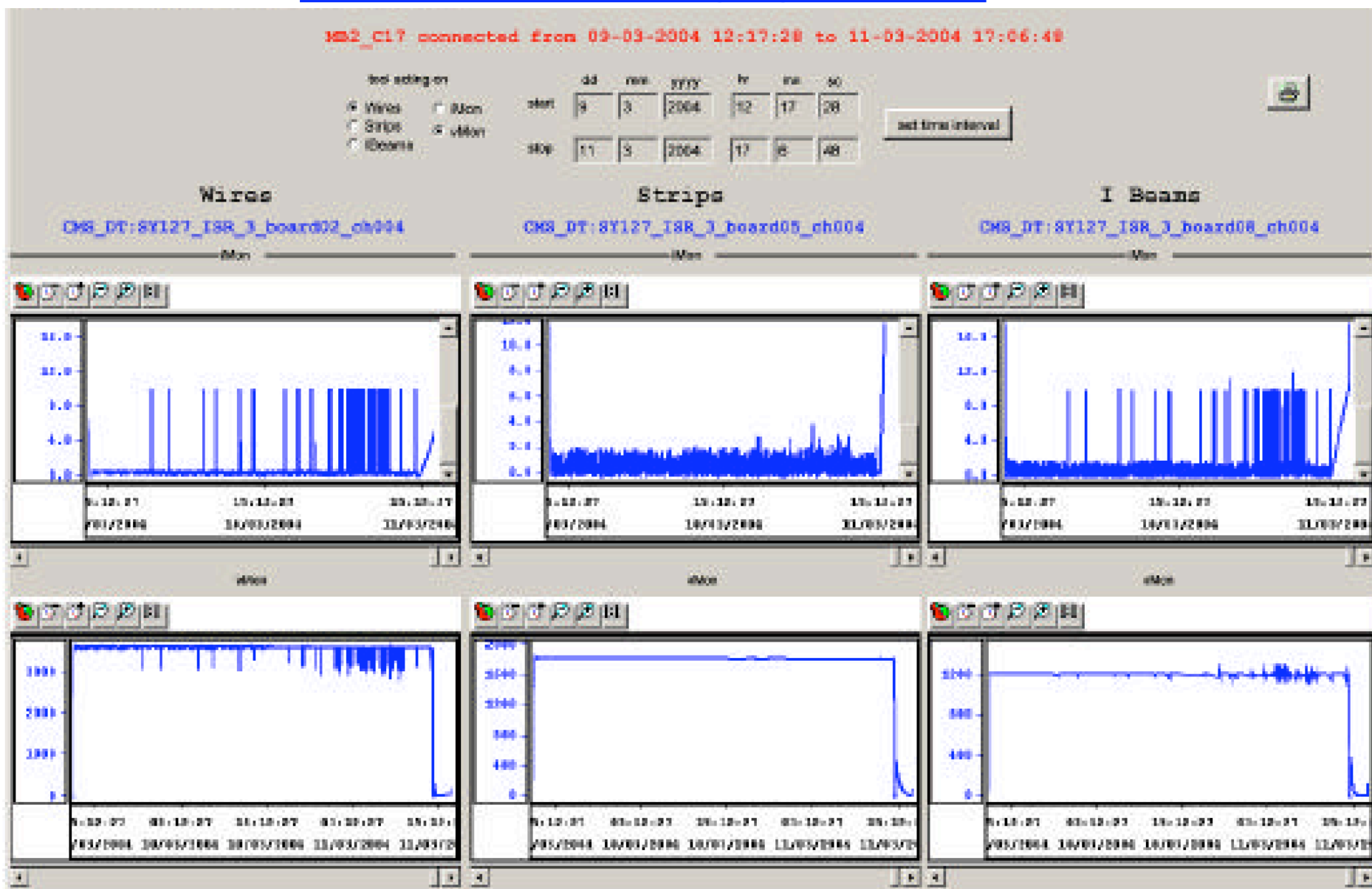
Back to the standard HV system still low clicking rate????

# MB2C17 Before Changing HVB



Discharges reduced to 1-2 /day

## MB2C17 after changing the HVB



Wire to cathode discharges appeared, problem not yet localized

## Summary

- The current spikes problem is still with us, better QC is needed at the sites to ensure that all “tappino “covers are inserted and the aluminum surface is covered with mylar tape.
- We must decide if we should open the front-end side for the chambers with wire to cathode discharges.
- Replacing HVBs is not a simple operations, some wires were lost in the process, repair work is often needed afterwards.
- Chamber dressing is progressing but some items have to be postponed until the HVBs are replaced
- The space situation in the ISR tunnel is becoming critical