

# Update from Technical Coordination:

D. De Gruttola  
*Centro Fermi*

# Summary

- Material requests
- New power supply
- Temperature and pressure monitoring
- New FEA cards
- HV boxes
- “Masking” of noisy channels
- Setup for task force
- Telescopes material

# Material requests

Last stations equipped:

- ◆ **Reggio Calabria** (name tbd) completely equipped
- ◆ **Bitetto** (name tbd) partially equipped

Site with all needed information for technical coordination

[request form](#)

<https://sites.google.com/centrofermi.it/3etech/home>

Material request

\* Required

your email address \*

Your answer

Telescope ID \*  
example: ALTA-01

Your answer

Request (multiple choice is possible) \*

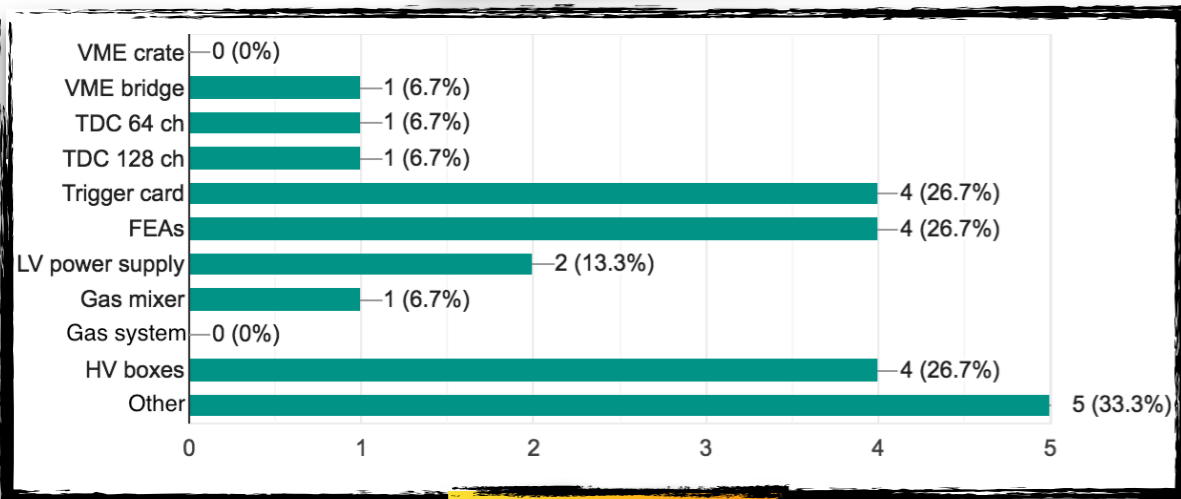
- VME crate
- VME bridge
- TDD 64 ch
- TDC 128 ch
- Trigger card
- FEAs
- Gas mixer

1	Telescope ID	Request (multiple choice is possible)	Please specify the number of needed FEAs	Notes - please ask here the material not included in the list or other special needs	your email address	Please specify the number and the polarity of needed HV boxes	Request [ffff]
14							DONE
15	LECC-02	FEAs	6 (3 left FEAs + 3 right FEAs)		mariapaola.panetta@le.infn.it		DONE
16	LECC-01	TDC 64 ch			mariapaola.panetta@le.infn.it		DONE
17	TORI-01	LV power supply, nothing listed here (please use the last optio		UPS	ignesi@cern.ch		DONE
18	TERA-01	FEAs	1		daniele.degruttola@centrofermi.it		DONE
19	SALE-01	VME bridge, TDC 128 ch			daniele.degruttola@centrofermi.it		DONE
20	FRAS-02	HV boxes			silvia.pisano@inf.infn.it	1 box HV +	DONE
21	ROMA-01	Gas mixer			silvia.pisano@inf.infn.it		DONE
22	GROS-02	LV power supply			edoardo.bossini@cern.ch		DONE
23	LECC-01	HV boxes		We need the EMCO converter	mariapaola.panetta@le.infn.it	2 DC-DC Converters: 1 Negati	DONE
24	SALE-01	Trigger card			daniele.degruttola@centrofermi.it		DONE
25	CAGL-04	Gas system (relief valves + tubes + manometers)		SF6 broken manometer	corrado.cicalo@ca.infn.it		DONE
26	SAVO-01	VME bridge			sgrazzi@ge.infn.it		DONE
27	CARC-01	VME crate, VME bridge, TDC	6	For new telescope of Carcare	sgrazzi@ge.infn.it		6 DONE
28	SAVO-01	TDC 128 ch, Trigger card			sgrazzi@ge.infn.it		DONE
29	BOLO-01	Trigger card			marco.garbini@centrofermi.it		DONE
30	CERN-01	VME crate			raman.zuyeuski@cern.ch		DONE
31	CERN-01	Trigger card			raman.zuyeuski@cern.ch		DONE
32	FRAS-02	LV power supply			silvia.pisano@centrofermi.it		DONE
33	TORI-04	FEAs	4		ivan.gnesi@cern.ch		DONE
34	FERM-01	VME crate, VME bridge, TDC	6	structure+GPS (with new trigge	daniele.degruttola@centroferm		6 DONE
35	LODI-03	HV boxes			sgrazzi@ge.infn.it	2 positive, 1 negative	DONE
36	TORI-03	Trigger card			ivan.gnesi@centrofermi.it		DONE
37	CAGL-03	VME crate		CRATE VME to replace one nc	corrado.cicalo@ca.infn.it		DONE
38	SAVO-03	LV power supply			sgrazzi@ge.infn.it		DONE
39	REND-01	TDC 128 ch			marco.schioppa@unical.it		CANCELLED
40	CAGL-03	TDC 64 ch			corrado.cicalo@ca.infn.it		DONE

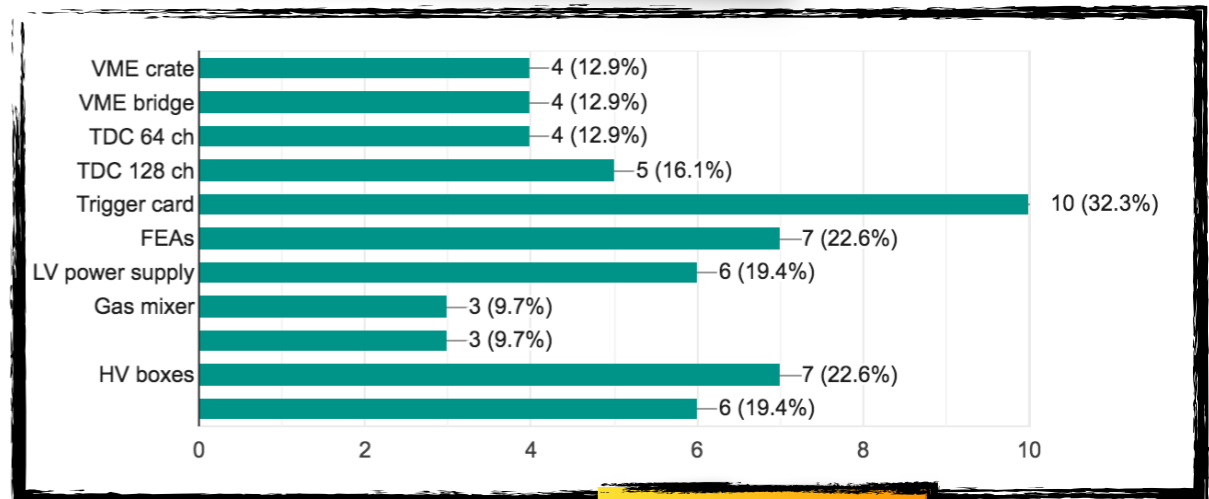
- Material requests via this [form](#) (please avoid emails)
- Easy tracking of requests
- Possibility to produce a useful **summary**

# Material requests

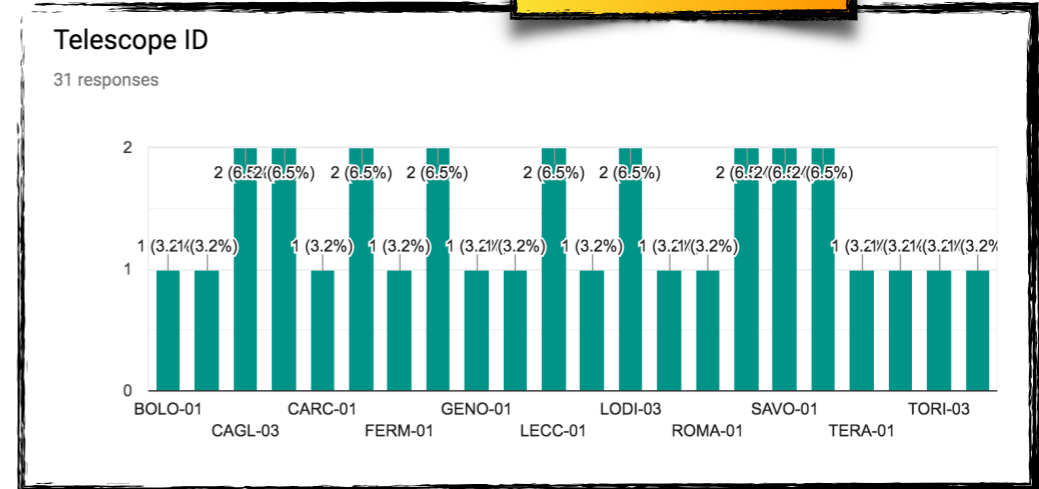
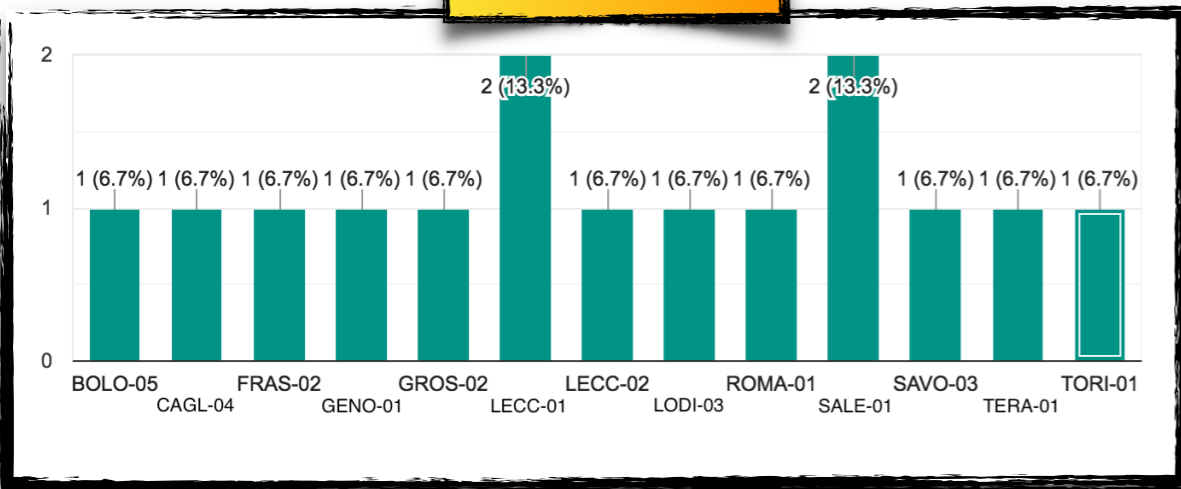
- Tracking requests
- Percentage of requests can help with spotting:
  - weakness in terms of material
  - telescopes requiring more interventions/replacements



January 2019



July 2019



Orders for new stations are listed together with replacement requests (to be separated)

# New power supply

14/01/2019

- ◆ Power supply (RS) with **3 independent channels** to supply **DC/DC** converters + 1 channel for **FEAs**
- ◆ **Remote control** with possibility to be connected via USB to the computer
- ◆ The cost is 649 € (2 already bought and delivered to Centro Fermi)
- ◆ **Reading voltage and currents in a separate homemade module** (N. Mazziotta, C. Pellegrino, F. Coccetti, D. De Gruttola)



## FEATURES

- 4 Independent Isolated Output ( $V_{out}$  0→30 V, 0→5 V,  $I_{out}$  0→1 A, 3 x 0→3 A)
- 4 LED Display Sets : 3 Digits After Decimal Point (IPS-2303S/3303S/4303S)
- Minimum Resolution : IPS-2303S/3303S/4303S (1mV/1mA)  
IPS-3303D (100mV/10mA)
- Digital Panel Control (Rotary Encoder Switch, Rubber Key With Indicator)
- User-Friendly Operation, Coarse/Fine Volume Control
- 4 Sets Save/Recall
- Key-Lock
- Output ON/OFF
- Tracking Series and Parallel Mode
- Smart Cooling Fan Achieving Low Noise
- Compact Design
- PC Software & USB Driver
- USB Standard Interface

[link to RS Datasheet](#)

- ◆ 2 PS tested in Lodi and at Centro Fermi **OK**

Saving more than 50% wrt previous solution → possibility to supply **each single DC/DC polarity separately** by using 2 of them

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## FEATURES

- 4 Independent Isolated Channels, 0→5 V, I<sub>out</sub> 0→1 A, 3 x 0→3 A)
- 4 LED Display
- Minimum Error: 3303S/4303S (1mV/1mA)
- Digital Display: 3303S/4303S (100mV/10mA)
- Digital Potentiometer, Rotary Encoder Switch, Rubber Key With Indicator
- On/Off, Coarse/Fine Volume Control
- ON/OFF
- Working Series and Parallel Mode
- Smart Cooling Fan Achieving Low Noise
- Compact Design
- PC Software & USB Driver
- USB Standard Interface

Alternative solution: self-powered CAEN HV boxes (waiting news from CAEN)

~649 €

[link to RS Datasheet](#)

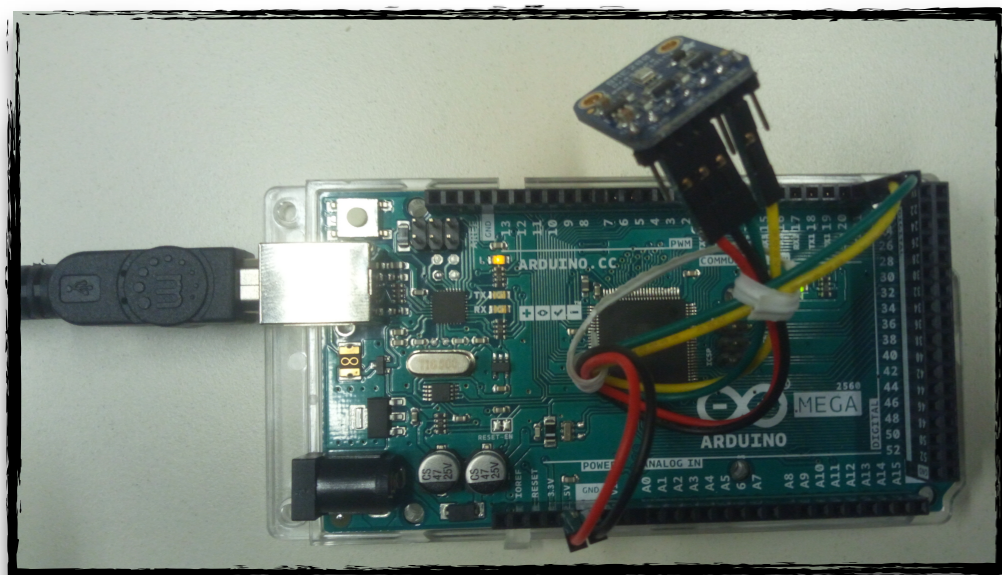
- ◆ 2 PS tested in Lodi and at Centro Fermi **OK**

Saving more than 50% wrt previous solution → possibility to supply **each single DC/DC polarity separately** by using 2 of them

# T and p monitoring

14/01/2019

- ◆ New telescopes need sensors
- ◆ Some old telescopes have broken sensors and need new ones
- ◆ Oregon station can no longer be used (issue with software compatibility)
- ◆ Homemade solution using Raspberry (N. Mazziotta, C. Pellegrino, F. Coccetti, D. De Gruttola)
- ◆ System is almost ready (hope to use them on a couple of telescopes very soon)
- ◆ Two systems tested in Bari and Bologna (for several months) **OK**



- ◆ Current situation:
- ◆ Arduino system with internal T, p and humidity Installer ready
- ◆ Data are saved in the required format for EEE DAQ
- ◆ Code working on Windows and Linux
- ◆ Code available on a repository (private at the moment)
- ◆ Ongoing work to add external T sensor
- ◆ User-friendly graphic interface

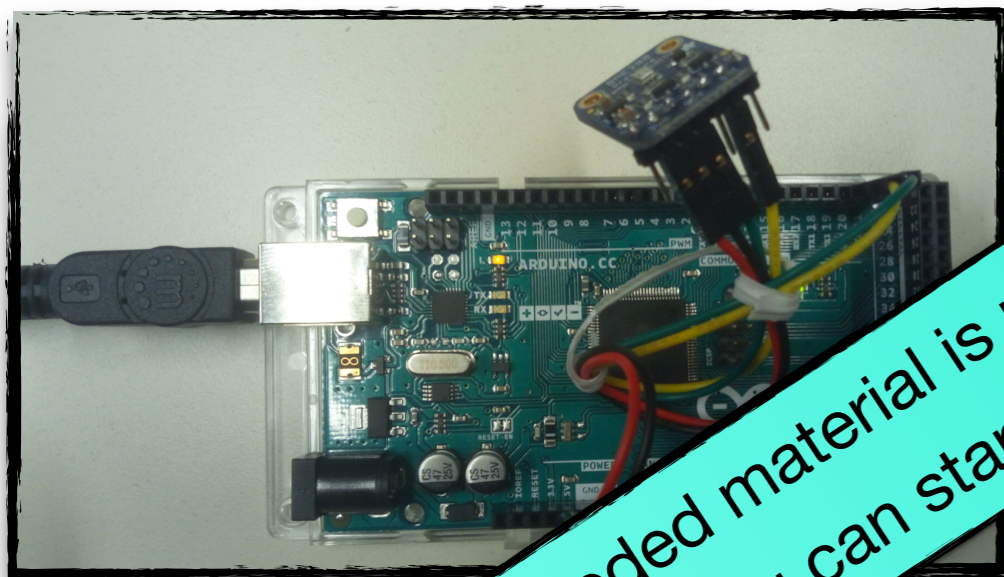
Reading of voltage and current can be easily added to this system (channel already prearranged)

Outlet power cycle could be added too

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- ◆ System is almost ready (hope to use them on a couple of telescopes very soon)
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All needed material is now available at Centro Fermi  
Assembling can start (and possibly committed to schools)



- ◆ Current
- ◆ ... with internal T, p and humidity Installer ready
- ◆ ... ed in the required format for EEE DAQ
- ◆ ... working on Windows and Linux
- ◆ ... available on a repository (private at the moment)
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Outlet power cycle could be added too



# New FEA cards

14/01/2019

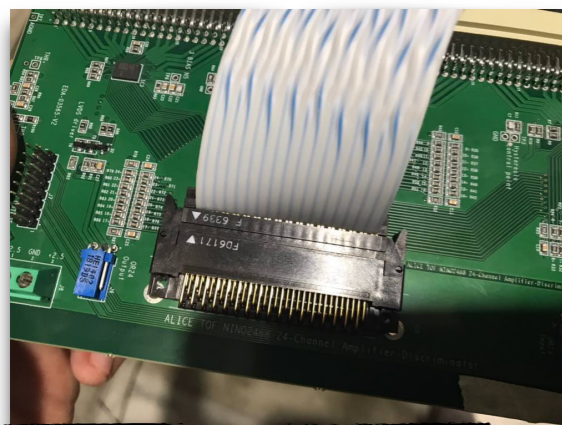
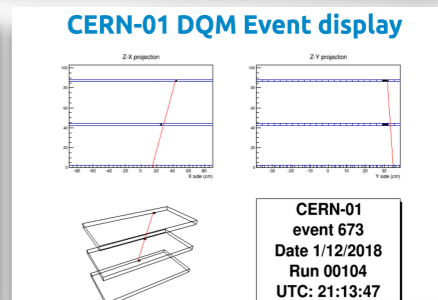
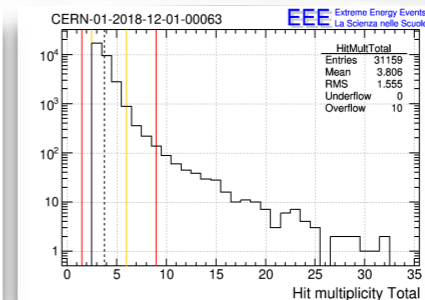
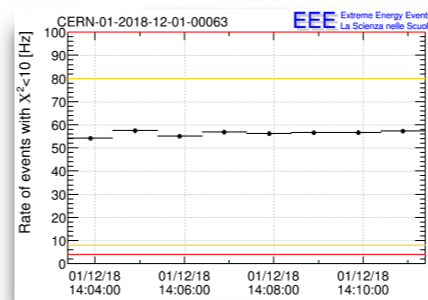
- ◆ Same technology as old cards (NINO ASIC)
- ◆ **Optimization** of PCB and new connector
- ◆ Shielded Amphenol cables needed with old FEAs
- ◆ New FEAs use **flat cables** (twisted pairs)
- ◆ Easier to handle
- ◆ No need of Amphenol-TDC adaptors used with old cards
- ◆ **160 cards** produced by an Italian Company (INGEL) and delivered at mid-November at Centro Fermi
- ◆ 160 cables and a card to test them can be done by a technician in Salerno University in the coming weeks



old FEA with Amphenol cable



Amphenol-TDC adaptor



New FEA with flat cable

- All quantities checked with DQM
- The cards **work properly** (15 bad cards will be reworked by company)
- Good quality of data in terms of telescope performance and coincidences
- **Long period test** performed on random samples (more than 1 month)
- CERN-01 taking data with new FEAs

All **160** FEAs have been **tested** at CERN in December  
They will be used on new telescopes  
All cards labelled and corresponding infos stored



FEA	Rate and Mult.	Reco	Date	File	Problem or note
1	ok	ok	01/12/2018	00063-79	-
2	ok	ok	01/12/2018	00063-79	-
3	ok	ok	01/12/2018	00063-79	-
4	ok	ok	01/12/2018	00063-79	-
5	ok	ok	01/12/2018	00063-79	-
6	ok	ok	01/12/2018	00063-79	-
7	ok	ok	01/12/2018	00080-82	-
8	ok	ok	01/12/2018	00080-82	-
9	ok	ok	01/12/2018	00080-82	-
10	ok	ok	01/12/2018	00080-82	-
11	ok	ok	01/12/2018	00080-82	-
12	ok	ok	01/12/2018	00080-82	-
13	ok	ok	01/12/2018	00083-85	-
14	ok	ok	01/12/2018	00083-85	-
15	ok	ok	01/12/2018	00083-85	-
16	ok	ok	01/12/2018	00083-85	-
17	X0		01/12/2018		Power fail (short?)

# New FEA cards

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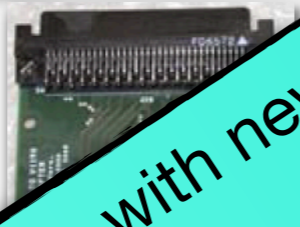
**CERN-01 taking data with new FEAs since Nov 2018**

**CERN-01 taking data with new FEAs soon (end of July)**

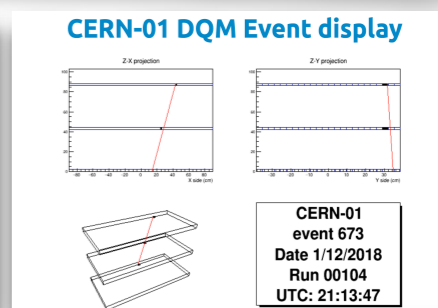
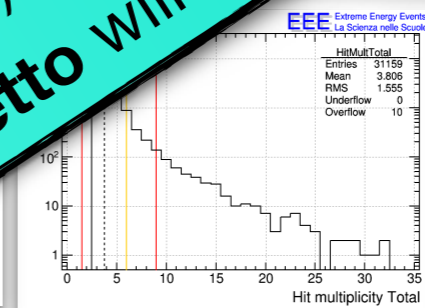
**Bitetto will use new FEAs**



old FEA with Amphenol cable



New FEA with flat cable



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9	ok	ok	01/12/2018	00080-82	-
10	ok	ok	01/12/2018	00080-82	-
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16	ok	ok	01/12/2018	00083-85	-
17	XO		01/12/2018		Power fail (short?)

# Orders and available material

## ◆ Gas mixers

- The order was frozen because of gas crisis..
- We can actually use the mixers in any case (no need of different calibrations)
- 1 mixer is needed at CERN for tests on new gases, 1 is needed in Bitetto and 1 at Centro Fermi
- **Order of 5 mixers ongoing - Precision Fluids (Italian distributor of Bronkhorst)**

## ◆ 11 sets of gas pressure regulators

## ◆ A few **digital manometers** for leakage measurements on all telescopes - to be ordered

## ◆ **CAEN electronics** available at CF for ~13 telescopes

## ◆ Trigger cards

- 1 Catania/CERN card and 1 Bologna card (+ GPS interface) available at CF
- *Aspek* will deliver **30 cards** in Lecce, where they will be tested (M. Panetta)

## ◆ **Clock cards** → 10 cards available at CF

## ◆ HV boxes

- 2 sets available at CF
- ~20 broken boxes available at CF (possibly to be repaired)
- Waiting news from CAEN on self-powered boxes

# Conclusions

- Material requests → site to easily submit and track requests and material
- New PS → remote control and chip solution (or CAEN self-powered HV boxes)
- T and p monitoring → homemade system design defined and material ready
- New FEA cards → 160 cards (1 set in CERN-01 - 2 sets installed soon)
- T and p monitoring → homemade system design defined and material ready
- Telescopes material → many pieces of information available on tech coord site