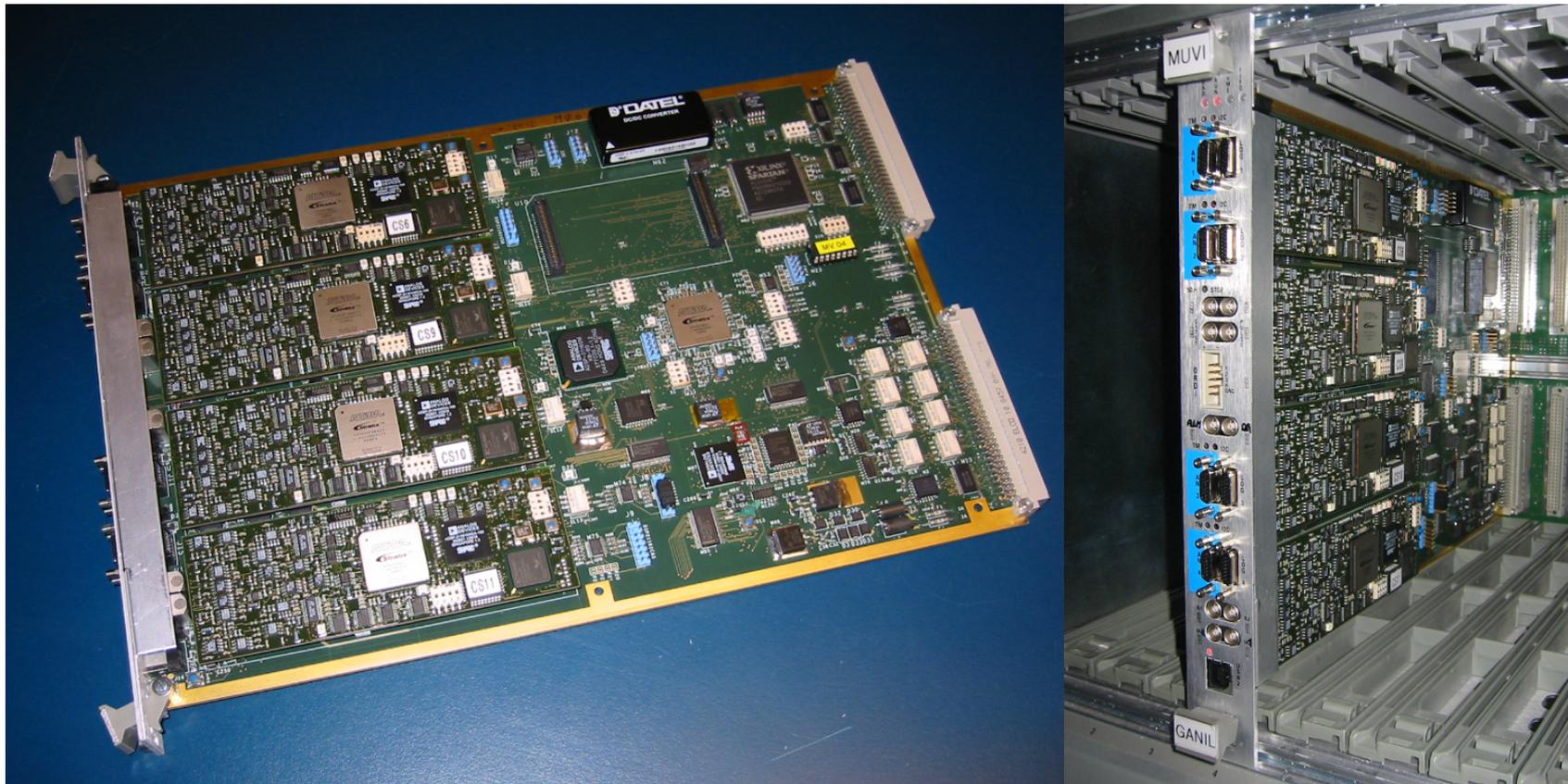


MUST2 MUVI CARD USER MANUAL



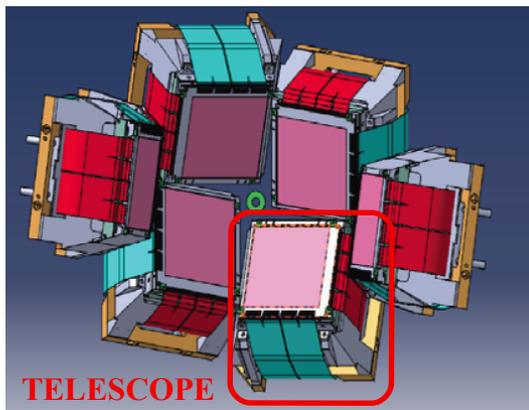
optimal reading with the following tools:
KPDF (LINUX)
ACROREAD (WINDOWS)
APERCU (MAC OS X)

OVERVIEW

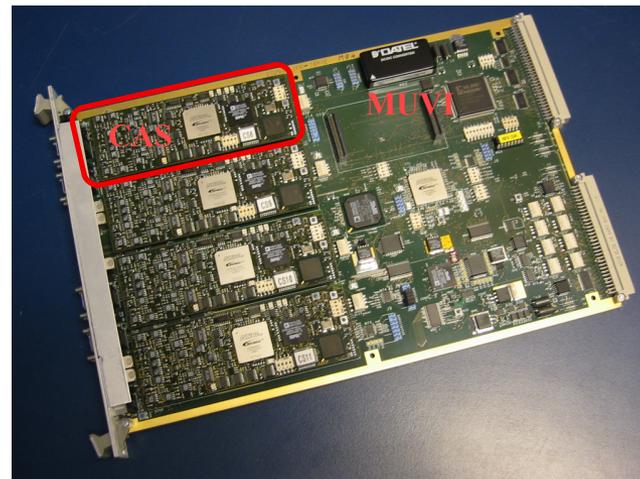
Project **MUST2** (**MUR** à **STrips**) is a multidetector of 10 telescopes; each telescope is made up with two X and Y plans of 128 Si tracks followed by 16 SiLi and 16 CsI. MUST2 is dedicated to the study of the light products produced from the interaction of radioactive beams with a target.

MUST2 Electronics is based on ASICs (Application Specific Integrated Circuit) so called **MATE**. MATEs are housed on **MUFEE** cards located closed to the detectors. In each MATE 16 detector channels are analog processed in order to get the 16 energy (E) and 16 time (T) analog steps. These steps are serially sent to **MUVI**.

MUVI is a C sized VXI card in which are implemented the 14 bits analog to digital conversion, the digital processing, the physics parameters readout and the MATEs control. **MUVI** was specially designed in order to pay attention at the aspects of resolution, density of channel and reduction of the dead time of acquisition. It manages 4 telescopes and delivers more than 2000 E and T parameters processed in 4 **CAS** daughter cards.



LINKs
MUFEE-MUVI



VXI-C STANDARD



CONTENTS

MUVI SETUP

FRONT PANEL

SOURCES of TRIGGER in MUVI and in CAS

BASIC SIGNALS between MUVI and MUFEE

DIGITAL PROCESSING

STOP MANAGEMENT

INTERNAL and EXTERNAL GENERATOR of TESTS

BIAS CURRENTS

CALIBRATIONS

INSPECTION LINES

SCALERS



PAGE 4, 5, 6 et 7

link: direct access to the page



PAGE 3



PAGE 8



PAGE 9, 10 et 11



PAGE 12, 13 et 14



PAGE 15



PAGE 16 et 17



PAGE 18



PAGE 19, 20, 21 et 22



PAGE 23



PAGE 24

MUFEEs SETUP



PAGE 25 et 26

MATEs SETUP



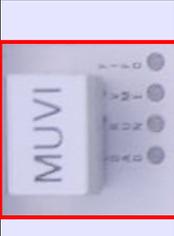
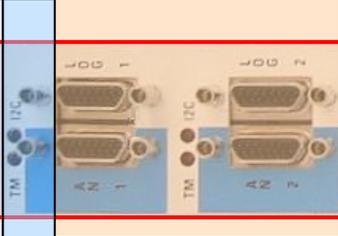
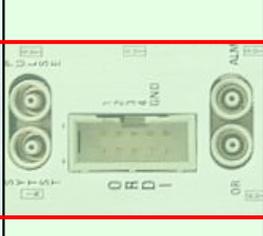
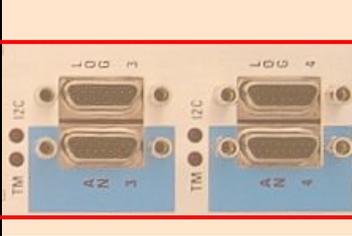
PAGE 27 à 31

APPENDIX



PAGE 32 à 39

MUVI card FRONT PANEL (VXI-C standard)

| | | | | | |
|---|---|---|---|---|--------------------------------|
| <p>LOAD ●</p> <p>RUN ●</p> <p>VME FIFO ●</p> <p>TM ●</p> <p>I2C ●</p> |  | <p>load FPGAs and DSPs : OK</p> <p>loading default acquisition RUN</p> <p>acquisition STOP</p> <p>access to backplane</p> <p>access of events read FIFO</p> <p>dead time of TELESCOPE</p> <p>I2C access in progress</p> | <p>TEMPi</p> <p>SDAI</p> <p>SCLi</p> <p>MRSTi</p> <p>CHAINi</p> <p>SYNTSTi</p> <p>ORDi</p> <p>STOPI</p> <p>HOLDi</p> <p>Cki</p> <p>AN1i</p> <p>AN2i</p> <p>AN3i</p> <p>AN4i</p> <p>CLRI</p> <p>SLOW CONTROL + ANALOG TRANSFERT</p> <p>Micro D ITT Cannon 90° stacked MDSM-30PE</p> | <p>LVDS</p> <p>LVDS</p> <p>LVDS</p> <p>LVDS</p> <p>LVDS</p> <p>LVDS</p> <p>LVDS</p> <p>Analogique</p> <p>Analogique</p> <p>Analogique</p> <p>LVDS</p> | <p>PAGE 9, 10 et 11</p> |
| |  | | | | <p>15</p> |
| <p>STOP</p> <p>NIM INPUT lemo 00 coax</p> |  | | <p>STOP</p> <p>NIM OUTPUT lemo 00 coax</p> | | <p>PAGE 8, 16 et 26</p> |
| <p>SYTST</p> <p>NIM INPUT lemo 00 coax</p> <p>ORDi</p> <p>DISCRI OUTPUT ECL différentiel</p> <p>T&B ANSLEY 622-1606 2c*5r, mâle</p> <p>OR</p> <p>NIM OUTPUT lemo 00 coax</p> |  | | <p>PULSE</p> <p>ANALOGIC OUTPUT</p> <p>lemo 00 coax</p> <p>ALM</p> <p>NIM OUTPUT lemo 00 coax</p> | | |
| |  | | | | <p>PAGE 9, 10 et 11</p> |
| <p>II1</p> <p>OUTPUT NIM lemo 00 coax</p> <p>IA1</p> <p>ANALOGIC OUTPUT lemo 00 coax</p> |  | | <p>II2</p> <p>OUTPUT NIM lemo 00 coax</p> <p>IA2</p> <p>ANALOGIC OUTPUT lemo 00 coax</p> | | <p>23</p> |
| |  | | | | |

DAS GUI => MUVI card SETUP

GANIL DAS v6.01 [Language : français(fr)] muvtest

Fichier Utilitaires Mise à jour Acquisition Visualisation Réservé

Ajouter un chassis Supprimer chassis Offline

VXI_1

VXI Chassis : 1 Branche : 1 : VXI_1

Ajouter module Supprimer module Déplacer module

INSPECTION ADC MUVI GMT

[MUVI Slot(s), Type(MUVB)]

Interface Utilisateur Interface Générique Paramètres

- Configuration Matérielle
- Configuration Fonctionnelle
- MUVI**
- CAS/TELESCOPE 1
- CAS/TELESCOPE 2
- CAS/TELESCOPE 3
- CAS/TELESCOPE 4

Mode Acquisition

Temps mort commun

Mode Lecture Donnée

VME Standard

Cycle d'acq courants de polarisations

Executer Lecture

Entrée STOP terminée sur 50 Ohms

RAZ Automatique

Horloge Locale

Echelles

| Nom | Comptage | M/A |
|--------|----------|--|
| ORD1 | 0 | <input checked="" type="checkbox"/> Lire <input checked="" type="checkbox"/> Raz |
| DECS1 | 0 | <input checked="" type="checkbox"/> Lire <input checked="" type="checkbox"/> Raz |
| STOP1 | 0 | <input checked="" type="checkbox"/> Lire <input checked="" type="checkbox"/> Raz |
| ORD2 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| DESC2 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| STOP2 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| ORD3 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| DECS3 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| STOP3 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| ORD4 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| DECS4 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| STOP4 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| VAL | 0 | <input checked="" type="checkbox"/> Lire <input checked="" type="checkbox"/> Raz |
| STOP | 0 | <input checked="" type="checkbox"/> Lire <input checked="" type="checkbox"/> Raz |
| CK_TST | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| ST_BUS | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |

Lecture RAZ

Test

Synchro Test

SYN_TST généré par ST_BUS :

SYN_TST généré par l'horloge CKTST interne MUVI :

CTST : 0.3 4.8 76.8 12209830 1228.8 Hz

Génération d'un signal STOP de test à partir de SYN_TST :

Retard : 0 100 200 300 ns

Modifié vendredi 10 février 2006 13:15:26 GMT : Ajouter module < muvtest.das >

EXPERT

PAGE 18

PAGE 15

NA
(Not Available)

PAGE 24

PAGE 8

PAGE 15

DAS GUI => CAS/TELESCOPE daughter card SETUP

GANIL DAS v6.01 [Language : français(fr)] muvitest

Fichier Utilitaires Mise à jour Acquisition Visualisation Réservé

Ajouter un chassis Supprimer chassis Offline

VXI_1

VXI Chassis : 1 Branche : 1 : VXI_1

Ajouter module Supprimer module Déplacer module

INSPECTION ADC MUVI GMT

MUVI Slot(s), Type(MUVb)

Interface Utilisateur Interface Générique Paramètres

- Configuration Matérielle
- Configuration Fonctionnelle

MUVI

- CAS/TELESCOPE 1
- CAS/TELESCOPE 2
- CAS/TELESCOPE 3
- CAS/TELESCOPE 4

Traitement Numérique

Suppression des données Temps en dépassement:

Suppression des données Energie en dépassement:

Donnée Energie supprimé <SBE<donnée E<SHE:

Valeurs de Seuils appliqués aux paramètres Energie

| | Seuil Haut | Seuil Bas |
|-------------|------------|-----------|
| MATE 1 à 8 | 10000 | 7000 |
| MATE 9 à 16 | 10000 | 7000 |
| MATE 17 | 10000 | 7000 |
| MATE 18 | 10000 | 7000 |

Normalisation des pedestaux aux valeurs brutes des ADC: Visualisation des Piedestaux

Application du coeff de correction de Gain (Ge/Gb) à chaque valeur numérique Nadc du paramètre Ei:

Application du coeff de correction de Gain (Gt/Gd) à chaque valeur numérique Nadc du paramètre Tj:

Signaux de Déclenchement

ORD: déclenchement CAS par le signal ORD de son secteur

SYN_TST: déclenchement par SYN_TST de la carte mère

VAL: déclenchement par le signal VAL (FT) issu du trigger GMT

DECD: déclenchement par le signal DECD venant de la carte mère

Réglages signaux acquisition

Période horloge CKI: us

Retard RshP(transition positive) du signal HOLDi: ns

Retard RshP(transition négative) du signal HOLDi: ns

Réglage du point de validation

us

Amplitude générateur de test interne

Amplitude: V Remise à zéro

NA

PAGE 13

PAGE 12

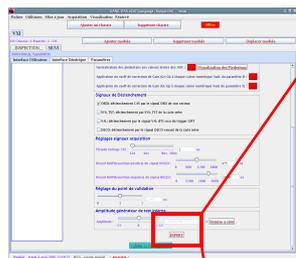
NA

PAGE 8

PAGE 9

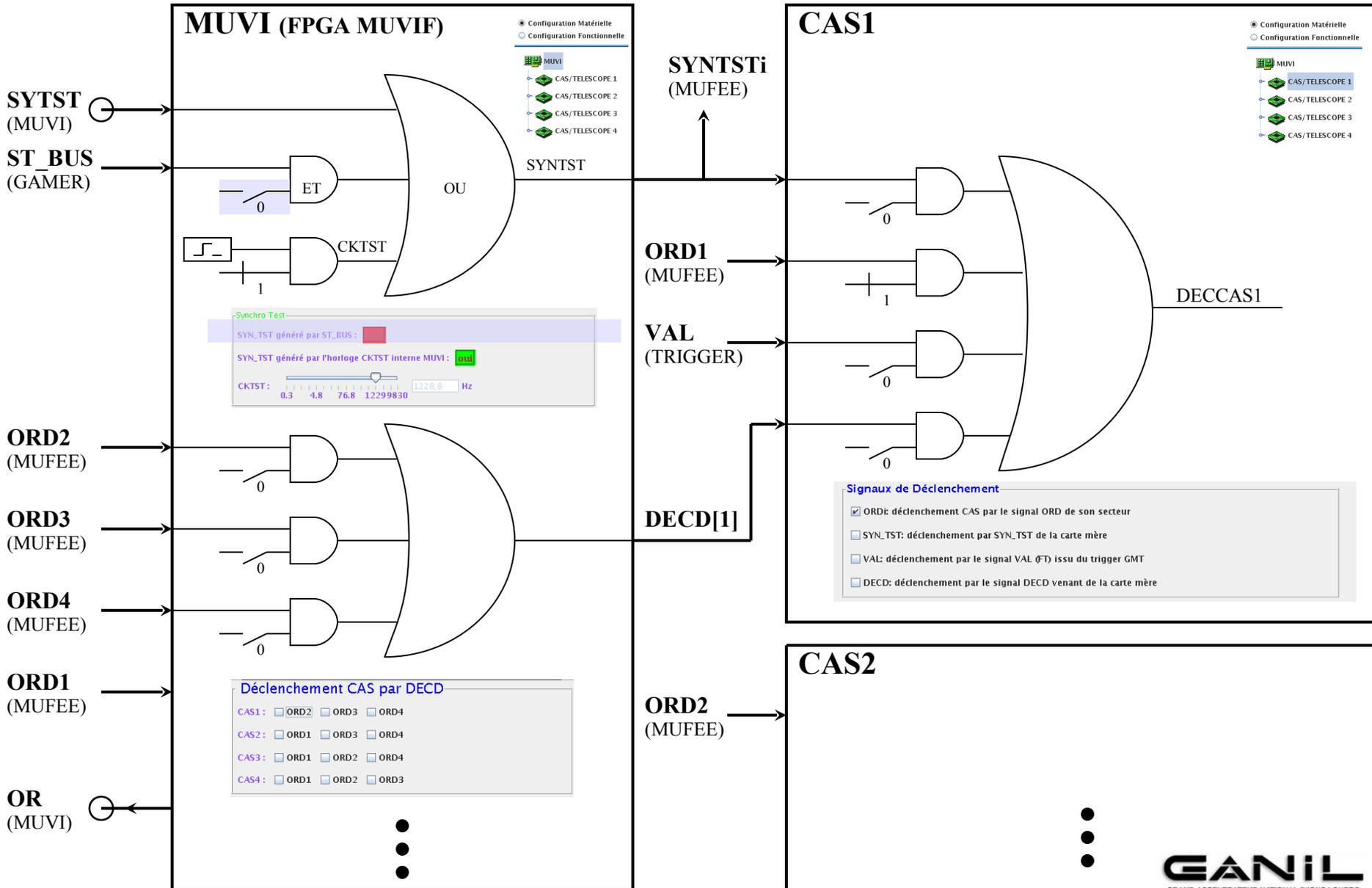
PAGE 34

DAS GUI => CAS/TELESCOPE daughter card SETUP => EXPERT



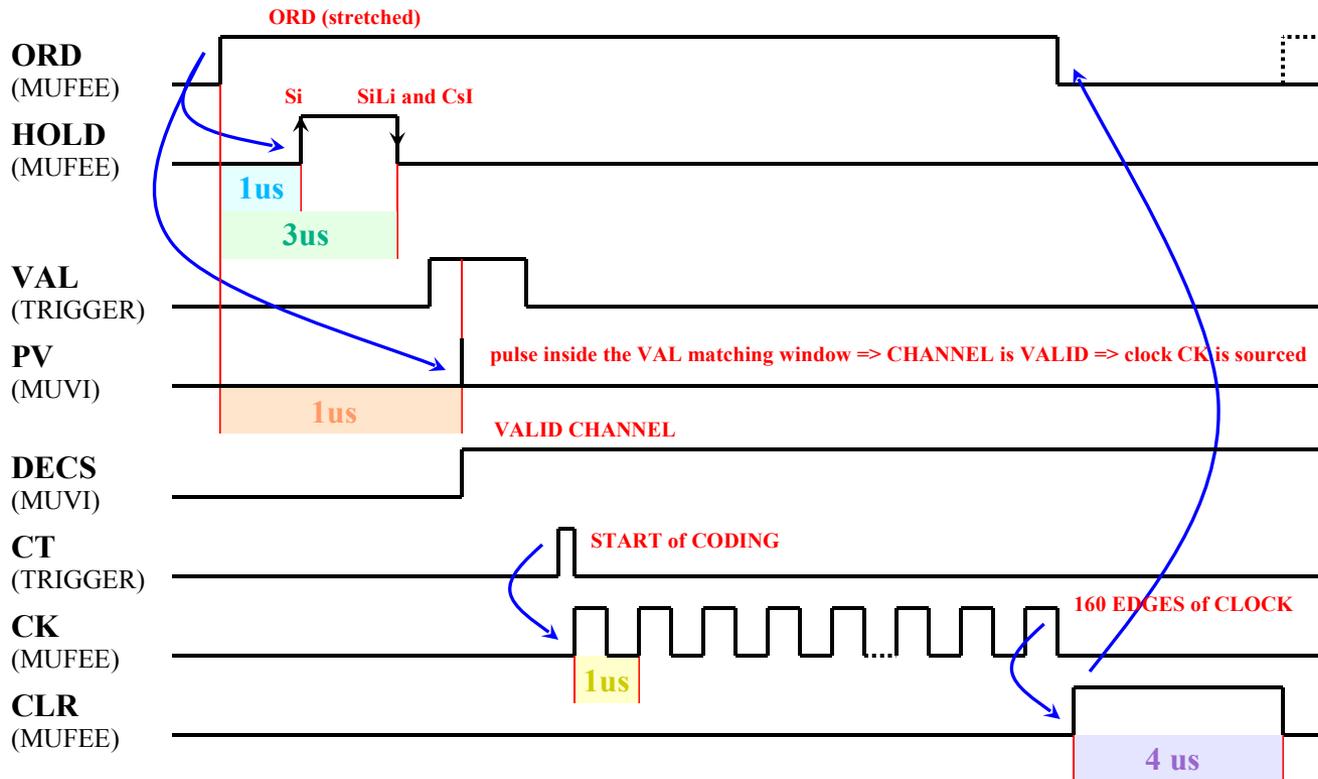
| | | | | | | | | | | | | | | | | | | | | | |
|--|---|---------------------|---------------------|---------------------|--------|--|---------------------|---------------------|---------------------|---------------------|--|--------|--------|--------|--------|--|--------------|--------------|--------------|--------------|-----------------------|
| <p>Expert CAS</p> <p>Correction</p> <p>Nouvelle ajustement électriques des chaînes A/N: <input type="button" value="Sélection courant"/> <input type="button" value="Executer"/></p> | <p>NA</p> | | | | | | | | | | | | | | | | | | | | |
| <p>Correction DNL par méthode Echelle Glissante: Nouvelle calibration: <input type="button" value="Executer"/> Correction DNL: <input type="button" value="Executer"/></p> <p>Chargement des coefficients Utilisateurs: <input type="button" value="Executer"/></p> <p>Chargement des coefficients détermines en Laboratoire: <input type="button" value="Executer"/></p> <p>Paramètres de correction appliqués en ligne—</p> <p>Charger les coefficients : <input checked="" type="radio"/> EEPROMI <input type="radio"/> EEPROMu <input type="radio"/> Fichier Sauvegarder les coefficients : <input type="button" value="Save"/></p> <p>Coefficient K correction DNL chaîne : A/N1: <input type="text"/> A/N2: <input type="text"/> A/N3: <input type="text"/> A/N4: <input type="text"/></p> <p>Gain A ajustement électrique chaîne : A/N1: <input type="text"/> A/N2: <input type="text"/> A/N3: <input type="text"/> A/N4: <input type="text"/></p> <p>Décalage B ajustement électrique chaîne : A/N1: <input type="text"/> A/N2: <input type="text"/> A/N3: <input type="text"/> A/N4: <input type="text"/></p> | <p>PAGE 14</p> | | | | | | | | | | | | | | | | | | | | |
| <p>Paramètres indication des MATEs sur chaîne A/Ni</p> <table border="0"> <tr> <td><input]<="" td="" type="button" value="A/N1"/> <td>Rang 1</td> <td>Rang 2</td> <td>Rang 3</td> <td>Rang 4</td> </td></tr> <tr> <td></td> <td>Si jonction: Mate 2</td> <td>Si jonction: Mate 4</td> <td>Si jonction: Mate 6</td> <td>Si jonction: Mate 8</td> </tr> <tr> <td></td> <td>Rang 5</td> <td>Rang 6</td> <td>Rang 7</td> <td>Rang 8</td> </tr> <tr> <td></td> <td>Non transmis</td> <td>Non transmis</td> <td>Non transmis</td> <td>Non transmis</td> </tr> </table> | <input]<="" td="" type="button" value="A/N1"/> <td>Rang 1</td> <td>Rang 2</td> <td>Rang 3</td> <td>Rang 4</td> | Rang 1 | Rang 2 | Rang 3 | Rang 4 | | Si jonction: Mate 2 | Si jonction: Mate 4 | Si jonction: Mate 6 | Si jonction: Mate 8 | | Rang 5 | Rang 6 | Rang 7 | Rang 8 | | Non transmis | Non transmis | Non transmis | Non transmis | <p>PAGE 32</p> |
| <input]<="" td="" type="button" value="A/N1"/> <td>Rang 1</td> <td>Rang 2</td> <td>Rang 3</td> <td>Rang 4</td> | Rang 1 | Rang 2 | Rang 3 | Rang 4 | | | | | | | | | | | | | | | | | |
| | Si jonction: Mate 2 | Si jonction: Mate 4 | Si jonction: Mate 6 | Si jonction: Mate 8 | | | | | | | | | | | | | | | | | |
| | Rang 5 | Rang 6 | Rang 7 | Rang 8 | | | | | | | | | | | | | | | | | |
| | Non transmis | Non transmis | Non transmis | Non transmis | | | | | | | | | | | | | | | | | |
| <p>Durée 1 du signal CLRI si transfert analogique : <input type="text" value="1000"/> ns</p> <p>Durée 2 du signal CLRI si pas de transfert : <input type="text" value="1000"/> ns</p> | <p>PAGE 9</p> | | | | | | | | | | | | | | | | | | | | |
| <p>Retard RSC à la conversion : <input type="text" value="28"/> ns</p> | <p>PAGE 11</p> | | | | | | | | | | | | | | | | | | | | |
| <p>Piedestaux</p> <p>Piedestaux nominaux Pe (en LSB) du Si à pistes : <input type="text" value="8192"/> Cst: <input type="text" value="8192"/> SILI à Q>0 : <input type="text" value="0"/> SILI à Q<0 : <input type="text" value="16383"/></p> <p>Piedestal nominal Pt (en LSB) : <input type="text" value="8192"/></p> <p>Calibration des Piedestaux de chaque voie E & T : <input type="button" value="Executer"/> <input type="button" value="Charger les piedestaux"/> <input type="button" value="Sauvegarder"/></p> | <p>PAGE 12</p> | | | | | | | | | | | | | | | | | | | | |
| <p>Gains</p> <p>Gains nominaux Ge (en LSB/Mev) des détecteurs Si à pistes : <input type="text" value="0"/> SILI: <input type="text" value="0"/> Cst: <input type="text" value="0"/></p> <p>Calibration des Gains Gi pour les paramètres Energie Ei : <input type="button" value="Executer"/> <input type="button" value="Charger les gains Gi"/> <input type="button" value="Sauvegarder"/></p> <p>Gains nominaux Gt (en LSB/ns) des détecteurs Si à pistes : <input type="text" value="0"/> SILI: <input type="text" value="0"/> Cst: <input type="text" value="0"/></p> <p>Calibration des Gains Gj pour les paramètres Temps Tj : <input type="button" value="Executer"/> <input type="button" value="Charger les gains Gj"/> <input type="button" value="Sauvegarder"/></p> <p>Application de la méthode Dithering : <input type="button" value="Executer"/></p> | <p>NA</p> | | | | | | | | | | | | | | | | | | | | |
| <p>Commande I2C</p> <p>Ligne MRST du bus I2C: <input type="text" value="MRST"/> Libération et Etat du bus I2C: <input type="text" value="LIB"/></p> | <p> EXPERT</p> | | | | | | | | | | | | | | | | | | | | |

SOURCES of TRIGGER in MUVI and in CAS



BASIC MUVI-MUFEE SIGNALS

A) VALID CHANNEL in COMMON DEAD TIME (trigger ORD=DECCAS)



- Configuration Matérielle
- Configuration Fonctionnelle

- MUVI
- CAS/TELESCOPE 1
- CAS/TELESCOPE 2
- CAS/TELESCOPE 3
- CAS/TELESCOPE 4

Réglages signaux acquisition

Période horloge CKi: 1 us

Retard RshP(transition positive) du signal HOLDi: 1012 ns

Retard RshP(transition négative) du signal HOLDi: 2198 ns

Réglage du point de validation

0 1 2 0,945 us

Expert CAS

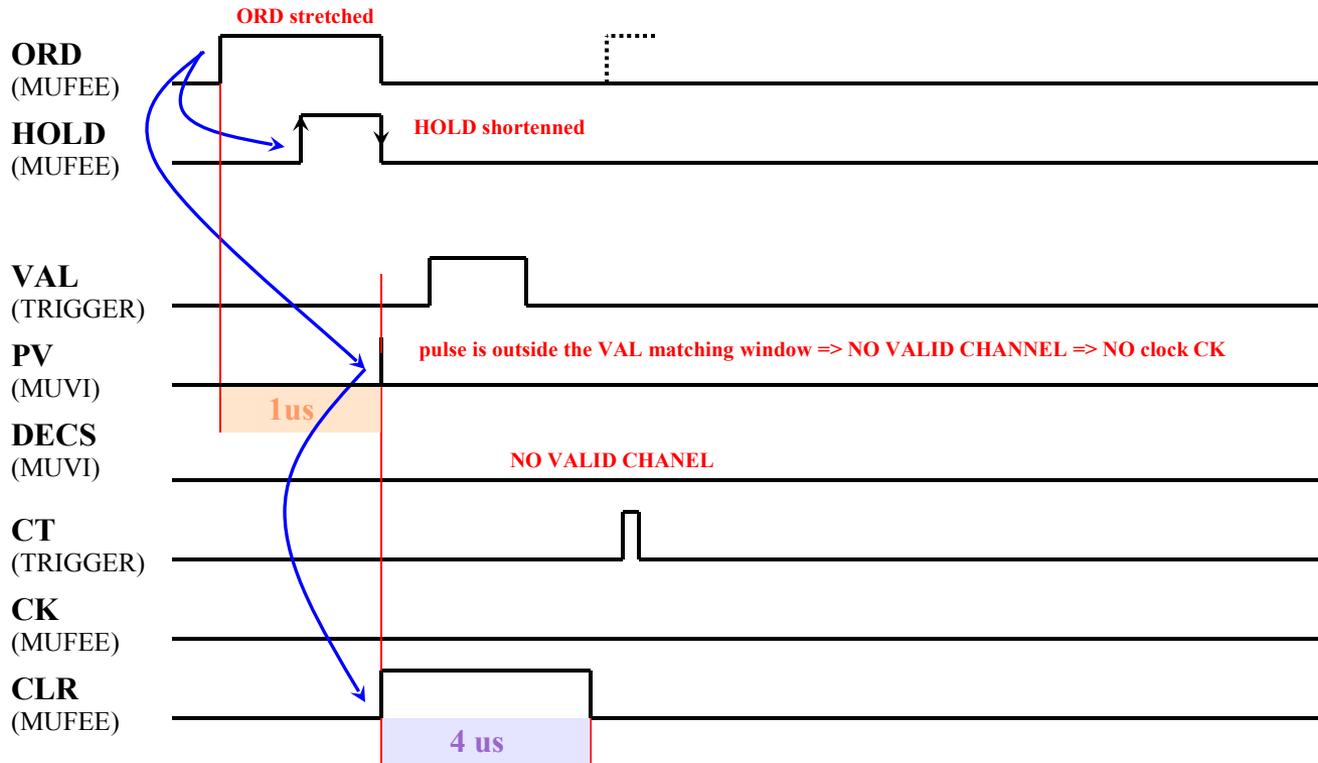
Durée 1 du signal CLRi si transfert analogique: 1000 ns

Durée 2 du signal CLRi si pas de transfert: 1000 ns

steps of parameter are:
 CKi, PV et CLRi 100ns
 HOLD 7.5ns

BASIC MUVI-MUFEE SIGNALS

B) NO VALID CHANNEL in COMMON DEAD TIME (trigger ORD=DECCAS)



● Configuration Matérielle
○ Configuration Fonctionnelle

- MUVI
- CAS/TELESCOPE 1
- CAS/TELESCOPE 2
- CAS/TELESCOPE 3
- CAS/TELESCOPE 4

Réglages signaux acquisition

Période horloge CKi: us
 1us 4us 8us 10us

Retard RshP(transition positive) du signal HOLDi: ns
 0 600 1200 1800

Retard RshP(transition négative) du signal HOLDi: ns
 0 1200 2400 3600

Réglage du point de validation

us
 0 1 2

Expert CAS

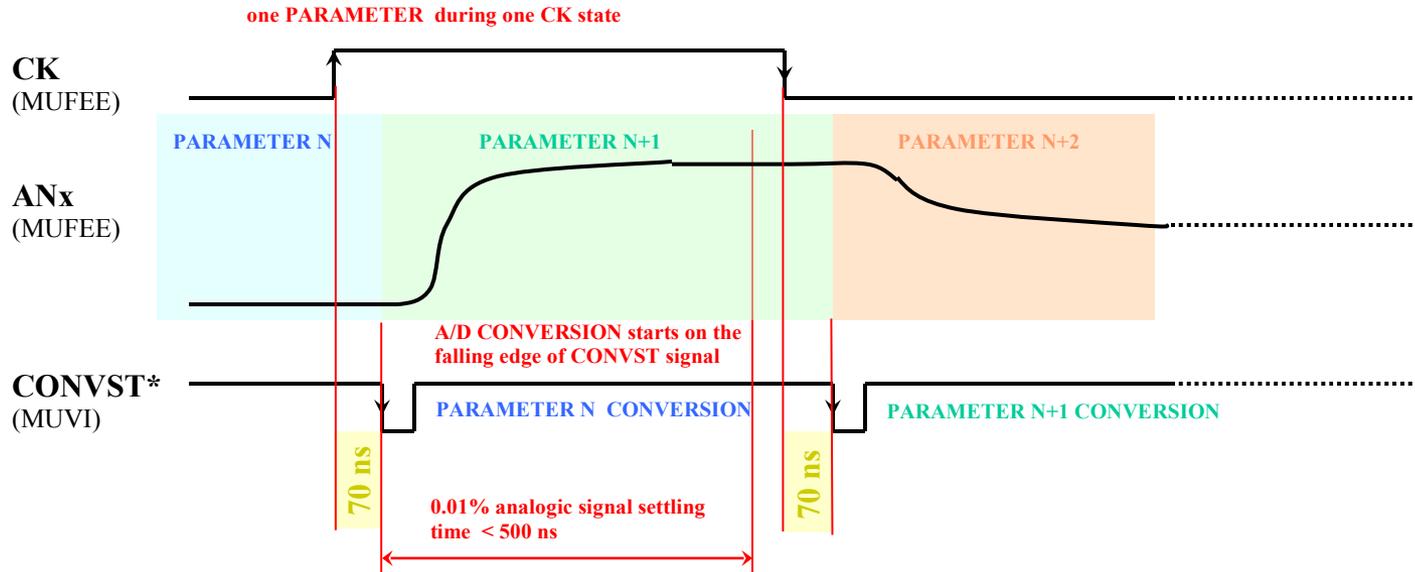
Durée 1 du signal CLRi si transfert analogique: ns

Durée 2 du signal CLRi si pas de transfert: ns

steps of parameter are:
 CKi, PV et CLRi 100ns
 HOLD 7.5ns

BASIC MUVI-MUFEE SIGNALS

C) ANALOGIC SIGNALS TRANSMISSION on ANx lines



Delaying the start of A/D conversion cancels the delays due to the cables and the buffers (estimated at 70ns), then keeps the CK half period dedicated to the analogic signal settling. This cancellation delay is 500ps steps programmable.

- Configuration Matérielle
- Configuration Fonctionnelle

- MUVI
- CAS/TELESCOPE 1
- CAS/TELESCOPE 2
- CAS/TELESCOPE 3
- CAS/TELESCOPE 4



DIGITAL PROCESSING

A) PIEDESTALS CALIBRATION, PARAMETER NORMALIZATION

=> ACQ in STOP state during the calibration:

- the calibration of pedestals is processed on line (during the transmission of the analogic signals, clock CK);
- for each detector channel, the pedestal average value (from 2304 values) is computed
- CK, CLR and HOLD signals are automatically sourced; no external trigger is needed

=> ACQ in RUN mode:

For each detector channel E and T parameter of the 4 A/Ni channels ($1 \leq i \leq 4$), the normalization relation is :

$$N1i = ADC1i - (P1i - Pnom)$$

$$N2i = ADC2i - (P2i - Pnom)$$

$$N3i = \dots$$

Avec: $N1i$ => value of parameter 1 once corrected
 $ADC1i$ => raw value of parameter 1
 $P1i$ => average pedestal (processed or loaded) of parameter 1, from 2304 pedestals
 $Pnom$ => nominal pedestal depends on the detector

Energy parameter

$Pnom = 8192$ => Si and CsI detectors

$Pnom = 0$ => SiLi Q < 0 detectors

$Pnom = 16383$ => SiLi Q > 0 detectors

Time parameter

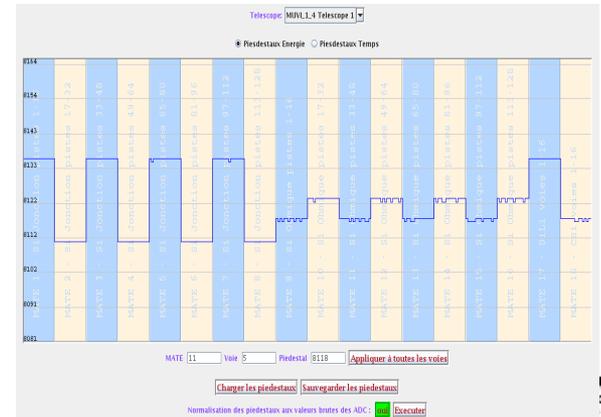
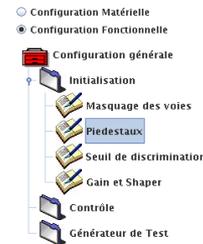
$Pnom = 8192$ => Si, CsI and SiLi detectors

1) TO RUN the calibration OR TO LOAD the pedestals (starting from a textual file): P1i,P2i...P2304i



OR In the FUNCTIONAL VIEW, in a single window, all the following commands EXECUTION, VISUALIZATION, LOADING, SAVE of pedestal by telescope are available

2) On line, CALIBRATION of the pedestals with their Pnom nominal pedestals and DISPLAY

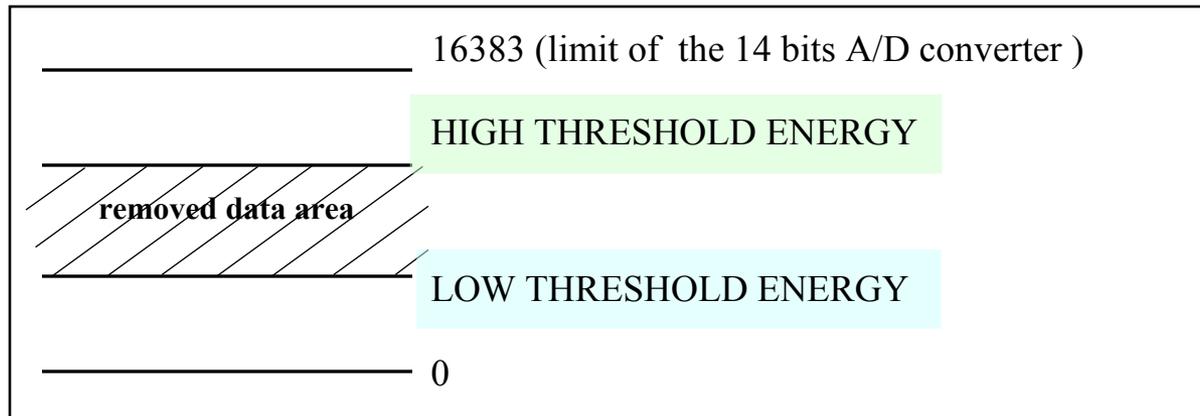


DIGITAL PROCESSING

B) DATA SUPPRESSION (REDUCTION)

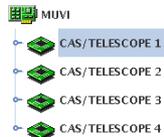
=> Because only 8 registers per telescope are dedicated to programmable thresholds, a standardization of pedestal is needed in order to make more efficient the data suppression

=> DATA are REMOVED if they are within the interval (LIMITS NOT INCLUDED)



 If the E energy parameter is removed from the vent readout, the associated T time parameter is also removed

- Configuration Matérielle
- Configuration Fonctionnelle



Donnée Energie supprimé (SBE < donnée E < SHE): 

Valeurs de Seuils appliqués aux paramètres Energie

| | Seuil Haut | Seuil Bas |
|-------------|------------------------------------|-----------------------------------|
| MATE 1 à 8 | <input type="text" value="10000"/> | <input type="text" value="7000"/> |
| MATE 9 à 16 | <input type="text" value="10000"/> | <input type="text" value="7000"/> |
| MATE 17 | <input type="text" value="10000"/> | <input type="text" value="7000"/> |
| MATE 18 | <input type="text" value="10000"/> | <input type="text" value="7000"/> |



Compression enable (some E and T parameters are removed)



Compression disable (All the parameters (576) of the TELESCOPE are kept)



Identical values for the thresholds HIGH and LOW keep the whole data in the event readout

DIGITAL PROCESSING

C) DNL (Differential No Linearity) CORRECTION by SLIDING SCALE

=> ACQ in STOP state: calibration of the sliding scale (NO reset needed)

=> ACQ in RUN state:

→ the correction of the DNL is made on line (during the reception of the analogic signals synchronized by CK clock)

→ For each E and T parameter of detector channels sent on the 4 A/Ni channels ($1 \leq i \leq 4$), the relation is :

$$N1i = ADC1i - (ki.DACi)$$

$$N2i = ADC1i - (ki.DACi)$$

$$N3i = \dots$$

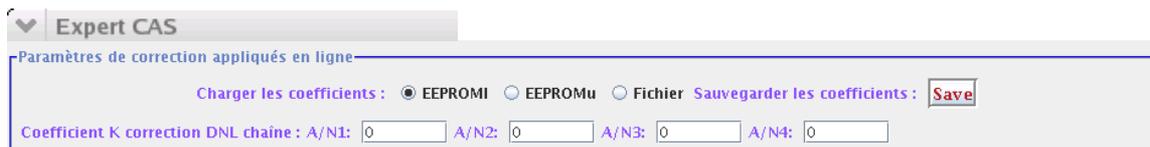
With: $N1i$
 $ADC1i$
 ki
 $DACi$

=> corrected value of the parameter l
=> raw value of parameter l
=> corrective coefficient of the A/D channel i associated to the A/Ni analogic channel
=> value of DAC (sliding scale on 8 bits)

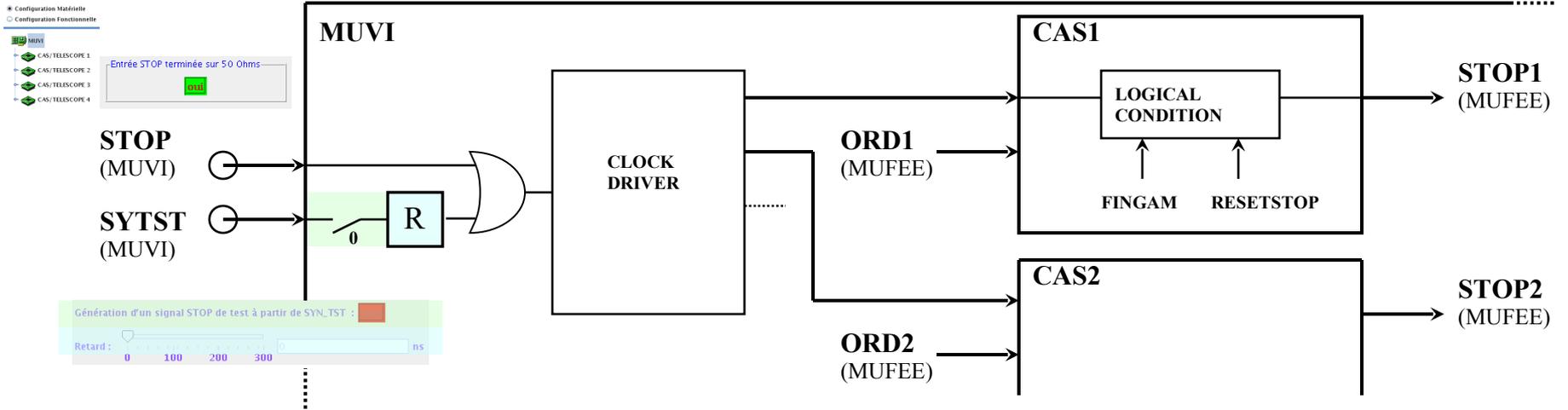
1) EXECUTE calibration AND ENABLE DNL correction



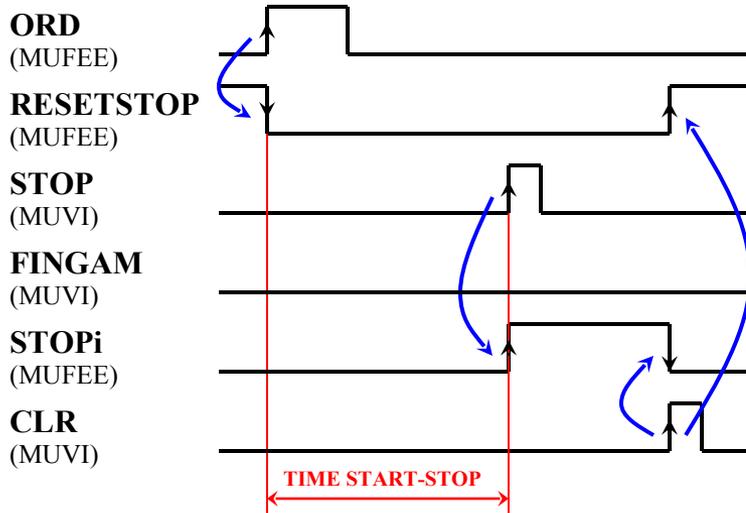
2) VISUALIZATION of the coefficients (k1 to k4) AND SAVE



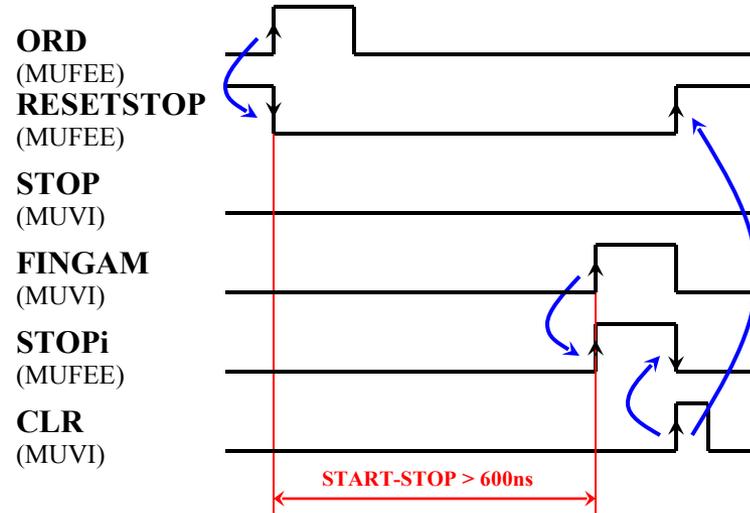
STOP MANAGEMENT



A) START-STOP < range

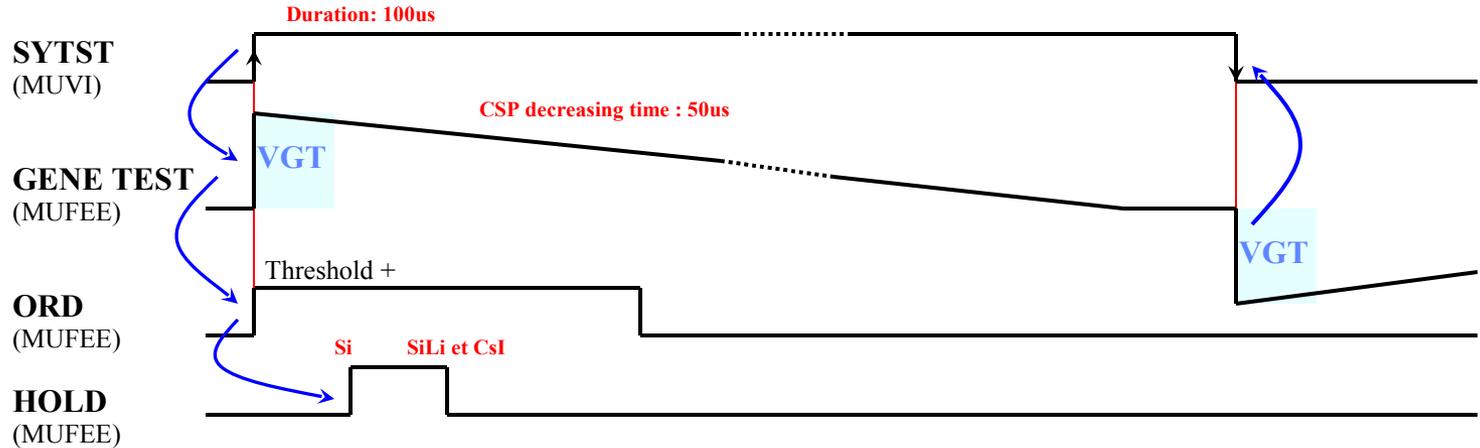


B) START-STOP > range



There is a **60 ns TAC DEAD ZONE** (due to the propagation delay of ORD signal from MUFEE to MUVI (30ns) and the one of STOP from MUVI to MUFEE (30ns))

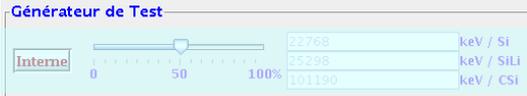
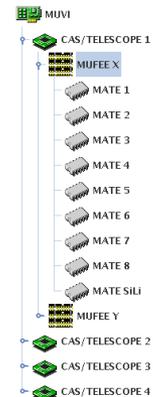
INTERNAL GENERATOR OF TESTS



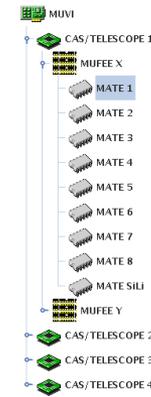
1) CHOOSE INTERNAL generator of tests started by **SYTST** signal of **VGT** amplitude

2) CHOICE of a MATE channel to be in TEST (1 among 16)

- Configuration Matérielle
- Configuration Fonctionnelle



- Configuration Matérielle
- Configuration Fonctionnelle



Charge test Qt

Voie en test : Aucune 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16



VGT amplitude must be $>$ discri threshold of channel in test, and with **the same polarity as the discri threshold one**. **SYTST** signal can be internally generated by CKTST clock of MUVI card

EXTERNAL GENERATOR OF TESTS

Output of the EXTERNAL generator must be connected to the following inputs:
GX for MUFEE X and GY for MUFEE Y (SUPPORT signals MUFEE)

GENERATOR
(BNC PB4)



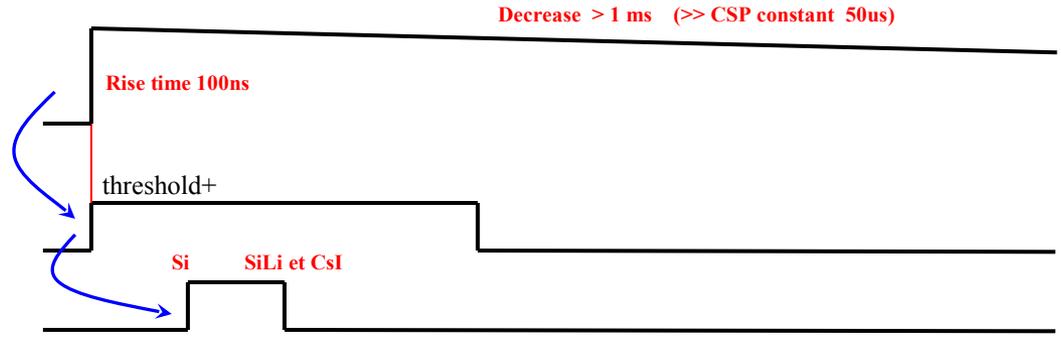
FREQUENCY 250 Hz
RISE TIME 0.1 us
FALL TIME 1ms

VOUT

VOUT
(GENE)

ORD
(MUFEE)

HOLD
(MUFEE)

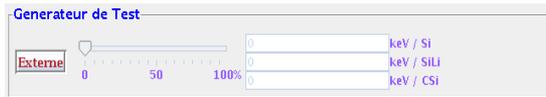
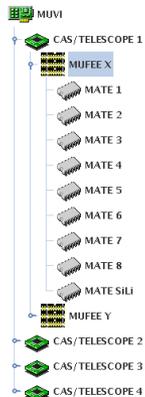


 the analog amplitude of gene must be $>$ threshold
BUT $<$ 1V (on 50 ohms load)

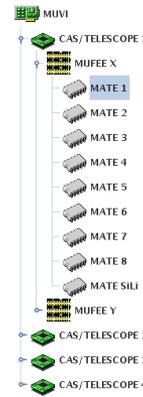
1) CHOOSE EXTERNAL generator of test

2) CHOOSE one MATE channel o be TESTED (1 among 16)

● Configuration Matérielle
○ Configuration Fonctionnelle



● Configuration Matérielle
○ Configuration Fonctionnelle



VOUT amplitude must be $>$ discri
threshold of in test channel, and with
the polarity of the threshold.

BIAS CURRENT

The bias currents of the Si detectors strips are only measured on the ohmic side ie in the MATE 9 to 16 of MUFFEE Y card

1) ACQ in STOP mode

2) RUN

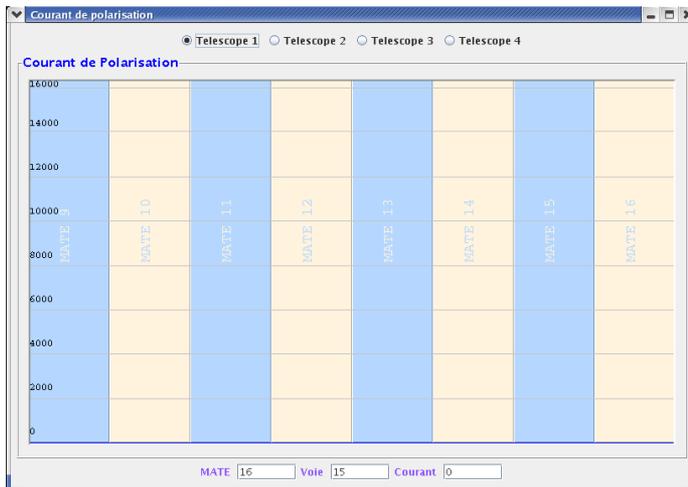
- Configuration Matérielle
 - Configuration Fonctionnelle
- MUVI
- CAS/TELESCOPE 1
 - CAS/TELESCOPE 2
 - CAS/TELESCOPE 3
 - CAS/TELESCOPE 4



OR

- Configuration Matérielle
 - Configuration Fonctionnelle
- Configuration générale
- Initialisation
 - Masquage des voies
 - Piedestaux
 - Seuil de discrimination
 - Gain et Shaper
 - Contrôle
 - Générateur de Test

3) READ

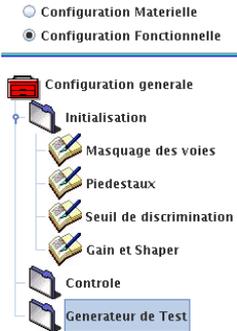


CALIBRATIONs of ENERGY et TIME

For the calibration of the ENERGY data, the INTERNAL generators on the level of each MUFEE card are requested, it is also possible to use an EXTERNAL generator. **The source of trigger being INTERNAL SYTST (ORD for acquisition).**
 For the calibration of the data TIME, an EXTERNAL generator of type TIME CALIBRATOR is essential. **The source of trigger being EXTERNAL SYTST (SYTST for acquisition)**
 The choice between the 2 types of calibration is carried out by ITEM the source of trigger.

CALIBRATION of ENERGY INTERNAL trigger

CALIBRATION of TIME EXTERNAL trigger



Operat

Sélection Voie
 Telescope: 1 (green), 2 (red), 3 (green), 4 (red)
 Mufee: X (green), Y (red)

| | | | | |
|-----------|---|---|---|---|
| Mate 1 | 1 | 2 | 3 | 4 |
| Mate 2 | 1 | 2 | 3 | 4 |
| Mate 3 | 1 | 2 | 3 | 4 |
| Mate 4 | 1 | 2 | 3 | 4 |
| Mate 5 | 1 | 2 | 3 | 4 |
| Mate 6 | 1 | 2 | 3 | 4 |
| Mate 7 | 1 | 2 | 3 | 4 |
| Mate 8 | 1 | 2 | 3 | 4 |
| Mate SiLi | 1 | 2 | 3 | 4 |

Generateur de Test
 Déclenchement: Interne Externe
 Ctrl Rampe
 Statistique: 1000
 Fréquence: 1 Coup
 Avec masquage des voies

0 50 100% 4821 keV / Si
 5356 keV / SiLi
 21425 keV / CSI

Starting of the cycle → **Démarrer**

Sélection Voie
 Telescope: 1 (green), 2 (red), 3 (green), 4 (red)
 Mufee: X (green), Y (red)

| | | | | |
|-----------|---|---|---|---|
| Mate 1 | 1 | 2 | 3 | 4 |
| Mate 2 | 1 | 2 | 3 | 4 |
| Mate 3 | 1 | 2 | 3 | 4 |
| Mate 4 | 1 | 2 | 3 | 4 |
| Mate 5 | 1 | 2 | 3 | 4 |
| Mate 6 | 1 | 2 | 3 | 4 |
| Mate 7 | 1 | 2 | 3 | 4 |
| Mate 8 | 1 | 2 | 3 | 4 |
| Mate SiLi | 1 | 2 | 3 | 4 |

Generateur de Test
 Déclenchement: Interne Externe
 Ctrl Rampe
 Statistique: 1000
 Fréquence: 1 Coup
 Avec masquage des voies

0 50 100% 4821 keV / Si
 5356 keV / SiLi
 21425 keV / CSI

Starting of the cycle → **Démarrer**

- CHANNEL in TEST
- NO TEST

before starting a cycle of CALIBRATION put acquisition in START

CALIBRATION of ENERGY by internal generator

This function allows the injection of test charges from the internal generator located on each MUFEE card, that only for one amplitude (CTRL) or N equidistant values of amplitude (SLOPE). This procedure can be specific (1 blow) or repetitive (all 3 min, 1H...). Switching of the various channels in test are carried out in an automatic way.

Only 1 value of amplitude generator (CTRL)

OR

N value of amplitude generator (SLOPE)

Operating mode → Déclenchement Interne Externe
 Ctrl Rampe

Starting of the cycle → Démarrer

Operating mode → Déclenchement Interne Externe
 Ctrl Rampe

Min: 4821 keV / Si, 5356 keV / SiLi, 21425 keV / CSI

Max: 45000 keV / Si, 50000 keV / SiLi, 200000 keV / CSI

nb val: 2

Starting of the cycle → Démarrer



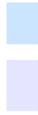
CHOICE of TELESCOPES and MUFEE



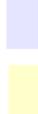
DO NOT request the MUFEE X and Y at the same time, because of the difference in polarity between Si detectors of MUFEE X and Y, this remark is identical for SiLi



CHOICE of the MATE channel on which a charge is injected (only one CHANNEL per MATE is requested simultaneously)



CHOICE of the MINIMUM amplitude of test for a slope, CONSTANT for CTRL mode, this value must be > disci threshold



CHOICE of the MAXIMUM amplitude of test for a slope, with the choice of N equidistant values (nb val)



CHOICE of the number of blows for each value of generator (Statistic) and the frequency of occurrence of the cycle. Only the channels selected in the masking box have their disci enable.

TIME CALIBRATION => PROCEDURE of TIME CALIBRATOR

This functionality uses a TIME CALIBRATOR. A GATE & DELAY module is needed for fitting signals to MUVI inputs

TIME CALIBRATOR
(ORTEC 462)



PERIOD 20ns

RANGE 320ns

GATE & DELAY
(LECROY 222)



Duration > 40us

STOP

SYTST

Duration > 100ns

MUVI
(GANIL)



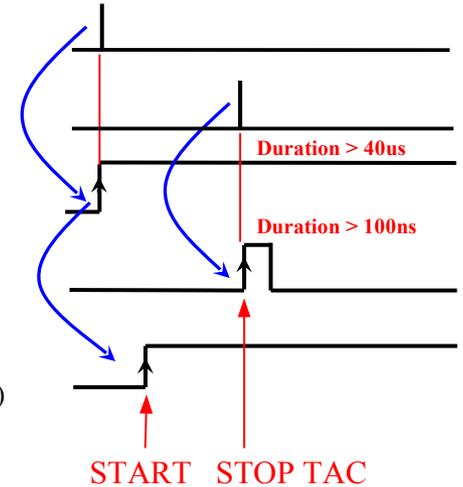
START
(TC)

STOP
(TC)

SYTST
(MUVI)

STOP
(MUVI)

ORD
(MUFEE)



STOP input of MUVI must be loaded on 50 ohms

- Configuration Matérielle
 - Configuration Fonctionnelle
- MUVI
 - CAS/TELESCOPE 1
 - CAS/TELESCOPE 2
 - CAS/TELESCOPE 3
 - CAS/TELESCOPE 4



TIME CALIBRATION by external generator (TIME CALIBRATOR)

This functionality allows the injection of a test charge which starts the TAC of the matching MATE channel. This procedure can be specific (1 blow) or repetitive (all 3 min, 1H...).

EXTERN means that source of trigger is SYNTST signal from TIME CALIBRATOR

Sélection Voie

| Mate | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | SiLi |
|-----------|---|---|---|---|---|---|---|---|------|
| Mate 1 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Mate 2 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Mate 3 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Mate 4 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Mate 5 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Mate 6 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Mate 7 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Mate 8 | ● | ● | ● | ● | ● | ● | ● | ● | ● |
| Mate SiLi | ● | ● | ● | ● | ● | ● | ● | ● | ● |

Générateur de Test

Déclenchement: Interne Externe

Ctrl: Ctrl Rampe

Statistique: 1000

Fréquence: 1 Coup

Avec masquage des voies

Starting of the cycle → Démarrer



CHECK PV signal.
CAS card is triggered by SYNTST and NOT by ORD

Operating mode

Starting of the cycle

CHOICE of TELESCOPES and MUFEE



DO NOT request the MUFEE X and Y at the same time, because of the difference in polarity between Si detectors of MUFEE X and Y, this remark is identical for SiLi

CHOICE of MATE channels on which a charge is injected (only one CHANNEL per MATE is requested simultaneously)

CHOICE of the test amplitude starting a trigger ORD, therefore a START of TAC this value must be > discri threshold

CHOICE of the number of blows for each value of gene (Statistic) and the frequency of occurrence of the cycle. Only the channels selected in the masking box have their discri enable.



HT ON for calibration

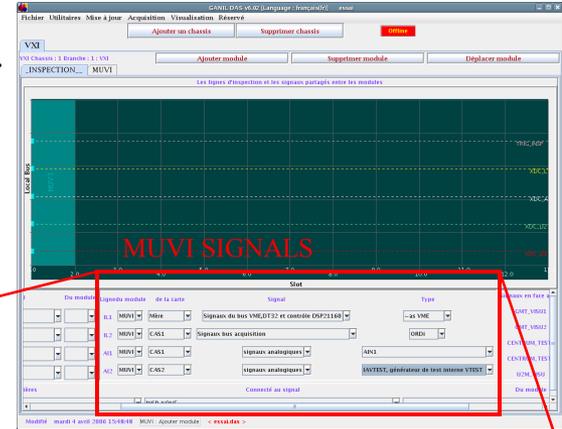
INSPECTIONS LINES

4 lines are implemented for the inspection of MUFEE, MUVI and CAS 1 to 4 signals

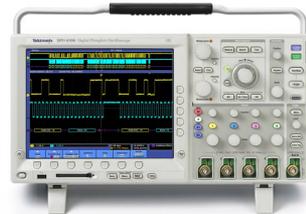
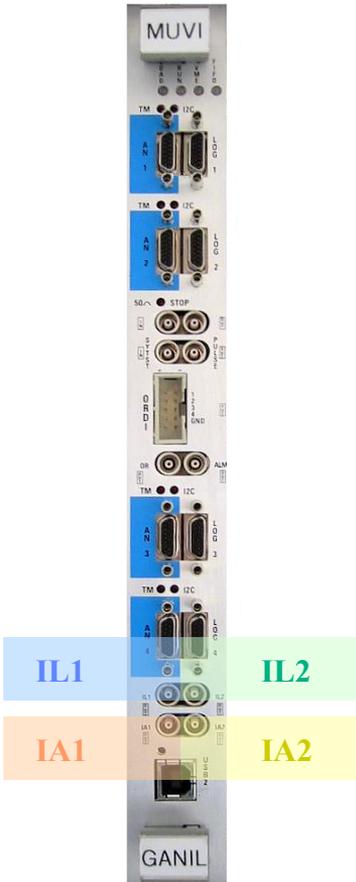
=> IL1 and IL2 numeric signals (ORDi, CK ...)

=> IA1 and IA2 analogic signals (ANi ...)

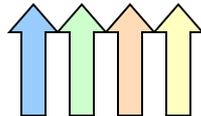
INSPECTION PART



| Ligne du module | de la carte | Signal | Type | |
|-----------------|-------------|--------|--|--|
| IL1 | MUVI | Mère | Signaux du bus VME,DT32 et contrôle DSP21160 | ~ as VME |
| IL2 | MUVI | CAS1 | Signaux bus acquisition | ORDi |
| AI1 | MUVI | CAS1 | signaux analogiques | AIN1 |
| AI2 | MUVI | CAS2 | signaux analogiques | IATEST, générateur de test interne VTEST |

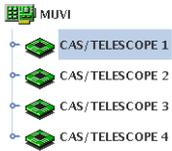


To display NIM (0, -800mV) signals on the oscilloscope, end line on 50 Ω



SCALERS

- Configuration Matérielle
- Configuration Fonctionnelle



Echelles

| Nom | Comptage | M/A |
|--------|----------|---|
| ORD1 | 0 | <input checked="" type="checkbox"/> Lire <input type="checkbox"/> Raz |
| DECS1 | 0 | <input checked="" type="checkbox"/> Lire <input type="checkbox"/> Raz |
| STOP1 | 0 | <input checked="" type="checkbox"/> Lire <input type="checkbox"/> Raz |
| ORD2 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| DESC2 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| STOP2 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| ORD3 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| DECS3 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| STOP3 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| ORD4 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| DECS4 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| STOP4 | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| VAL | 0 | <input checked="" type="checkbox"/> Lire <input type="checkbox"/> Raz |
| STOP | 0 | <input checked="" type="checkbox"/> Lire <input type="checkbox"/> Raz |
| CK_TST | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |
| ST_BUS | 0 | <input type="checkbox"/> Lire <input type="checkbox"/> Raz |

SCALERS

- ORDi: TELESCOPE i « physical » trigger
- DECSi: validated ORDi
- STOPi: conditioned stop of TAC of TELESCOPEi (END of RANGE included)
- VAL: TRIGGER validation
- STOP: common STOP of MUVI TAC
- CK_TST: internal source of MUVI trigger
- ST_BUS: source of trigger coming from GAMER

➔ Individual READOUT of a scaler (notch RUN/STOP of the scaler)

➔ General READOUT of all the scalers



AUTOMATIC READOUT
of all the scalers



Visualisation d'échelles v10.06 [Language : français(f)]

- Analyseur d'échelles -

| U2M_1_10 | | | | | | | |
|-------------|------------|------|--------------------------|-------------|----------|------|--------------------------|
| Voie | Comptage | Fréq | Visu | Voie | Comptage | Fréq | Visu |
| U2M_1_10.1 | 14542726 | 0 | <input type="checkbox"/> | U2M_1_10.21 | | | <input type="checkbox"/> |
| U2M_1_10.2 | 1056754795 | 0 | <input type="checkbox"/> | U2M_1_10.22 | | | <input type="checkbox"/> |
| U2M_1_10.3 | 433649538 | 0 | <input type="checkbox"/> | U2M_1_10.23 | | | <input type="checkbox"/> |
| U2M_1_10.4 | 345764784 | 0 | <input type="checkbox"/> | U2M_1_10.24 | | | <input type="checkbox"/> |
| U2M_1_10.5 | 349059522 | 0 | <input type="checkbox"/> | U2M_1_10.25 | | | <input type="checkbox"/> |
| U2M_1_10.6 | 91109 | 0 | <input type="checkbox"/> | U2M_1_10.26 | | | <input type="checkbox"/> |
| U2M_1_10.7 | 0 | 0 | <input type="checkbox"/> | U2M_1_10.27 | | | <input type="checkbox"/> |
| U2M_1_10.8 | 0 | 0 | <input type="checkbox"/> | U2M_1_10.28 | | | <input type="checkbox"/> |
| U2M_1_10.9 | | | <input type="checkbox"/> | U2M_1_10.29 | | | <input type="checkbox"/> |
| U2M_1_10.10 | | | <input type="checkbox"/> | U2M_1_10.30 | | | <input type="checkbox"/> |
| U2M_1_10.11 | | | <input type="checkbox"/> | U2M_1_10.31 | | | <input type="checkbox"/> |
| U2M_1_10.12 | | | <input type="checkbox"/> | U2M_1_10.32 | | | <input type="checkbox"/> |
| U2M_1_10.13 | | | <input type="checkbox"/> | U2M_1_10.33 | | | <input type="checkbox"/> |
| U2M_1_10.14 | | | <input type="checkbox"/> | U2M_1_10.34 | | | <input type="checkbox"/> |
| U2M_1_10.15 | | | <input type="checkbox"/> | U2M_1_10.35 | | | <input type="checkbox"/> |
| U2M_1_10.16 | | | <input type="checkbox"/> | U2M_1_10.36 | | | <input type="checkbox"/> |
| U2M_1_10.17 | | | <input type="checkbox"/> | U2M_1_10.37 | | | <input type="checkbox"/> |
| U2M_1_10.18 | | | <input type="checkbox"/> | U2M_1_10.38 | | | <input type="checkbox"/> |
| U2M_1_10.19 | | | <input type="checkbox"/> | U2M_1_10.39 | | | <input type="checkbox"/> |
| U2M_1_10.20 | | | <input type="checkbox"/> | U2M_1_10.40 | | | <input type="checkbox"/> |

| MUVI | | | |
|--------|------------|------|--------------------------|
| Voie | Comptage | Fréq | Visu |
| ORD1 | 1069079341 | 0 | <input type="checkbox"/> |
| DECS1 | 5693122 | 0 | <input type="checkbox"/> |
| STOP1 | 22913090 | 0 | <input type="checkbox"/> |
| ORD2 | 643632812 | 0 | <input type="checkbox"/> |
| DESC2 | 3065231 | 0 | <input type="checkbox"/> |
| STOP2 | 14347573 | 0 | <input type="checkbox"/> |
| ORD3 | 565919113 | 0 | <input type="checkbox"/> |
| DECS3 | 2506705 | 0 | <input type="checkbox"/> |
| STOP3 | 13791889 | 0 | <input type="checkbox"/> |
| ORD4 | 538722838 | 0 | <input type="checkbox"/> |
| DECS4 | 2522017 | 0 | <input type="checkbox"/> |
| STOP4 | 13843137 | 0 | <input type="checkbox"/> |
| VAL | 16823599 | 0 | <input type="checkbox"/> |
| STOP | 167799627 | 0 | <input type="checkbox"/> |
| CK_TST | 34879509 | 152 | <input type="checkbox"/> |
| ST_BUS | 0 | 0 | <input type="checkbox"/> |

Modifié : vendredi 1 décembre 2006 08:39:38 Affichage de toutes les voies < testindra_echelles.sav >

DAS GUI => MUFEEs SETUP

The screenshot shows the GANIL DAS v6.02 software interface. The main window is titled "GANIL DAS v6.02 [Language : français(fr)] essai". The menu bar includes "Fichier", "Utilitaires", "Mise à jour", "Acquisition", "Visualisation", and "Réservé".

At the top, there are buttons for "Ajouter un chassis", "Supprimer chassis", and "Offline". Below this, there are buttons for "Ajouter module", "Supprimer module", and "Déplacer module".

The interface is divided into several sections:

- VXI Section:** Shows "VXI Chassis : 1 Branche : 1 : VXI" and "INSPECTION... MUVI".
- Configuration Section:** Has radio buttons for "Configuration Matérielle" (selected) and "Configuration Fonctionnelle".
- Tree View:** A hierarchical tree on the left shows the system structure:
 - MUVI
 - CAS/TELESCOPE 1
 - MUFEE X** (highlighted with a red box and a red arrow pointing to it)
 - MATE 1
 - MATE 2
 - MATE 3
 - MATE 4
 - MATE 5
 - MATE 6
 - MATE 7
 - MATE 8
 - MATE SiLi
 - MUFEE Y
 - CAS/TELESCOPE 2
 - CAS/TELESCOPE 3
 - CAS/TELESCOPE 4

- Générateur de Test:** A section with a slider and numerical values for "Interne" (22768 keV / Si, 25298 keV / SiLi, 103190 keV / CSI).
- Paramètres de calibration:** A section with a "Sélection Mate" dropdown (set to 1) and a table of coefficients.

| Coefficient/Mate | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|------------------|---|----|----|----|----|----|----|----|
| Coeff 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Coeff 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Coefficient/Mate | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
| Coeff 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Coeff 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
- Voies en Panne:** A section with a "Sélection Mate" dropdown (set to 1) and a table of channels.

| Voie : | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|--------|---|----|----|----|----|----|----|----|
| | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |

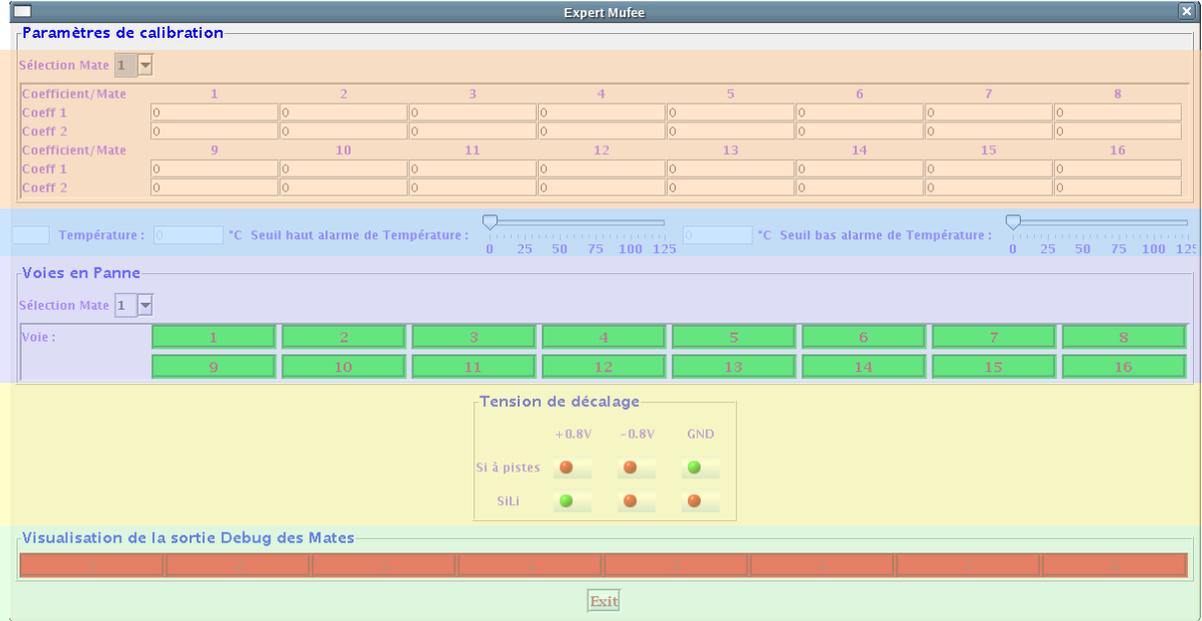
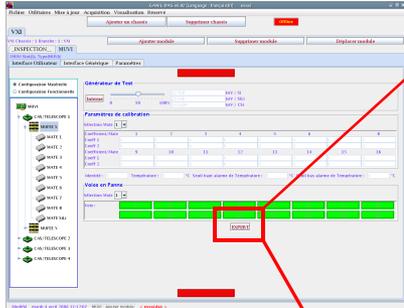
At the bottom, there is an "EXPERT" button and a status bar showing "Modifié mardi 4 avril 2006 11:12:07 MUVI : Ajouter module < essai.das >".

PAGE 16

PAGE 26



DAS GUI => MUFEEs SETUP => EXPERT



ALM

In a non volatile memory for MUFEE cards storage of a and b calibration coefficients (equation of the non linearity correction : $y=ax+b$)

When the temperature of a MUFEE card exceeds the HIGH threshold, ALM signal is ASSERTED. ALM is DEASSERTED once the temperature goes down below of the LOW threshold (hysteresis)

History of the broken channels, stored in non volatile memory in MUFEE card

Shift of the numerical values => +0.8V (2000) -0.8V (14000) GND (8000)
default values: strips Si GND SiLi (IPN) +0,8V SiLi (JULICH) GND and CsI GND

Choose the MATEs channel (signals CHOICE: SEE page 23), visualization of the signals connected directly to MUFEE, independently of MUVI

DAS GUI => MATEs SETUP

GANIL DAS v6.02 [Language : français(fr)] essai

Fichier Utilitaires Mise à jour Acquisition Visualisation Réserve

Ajouter un chassis Supprimer chassis Offline

VXI

VXI Chassis : 1 Branche : 1 : VXI

Ajouter module Supprimer module Déplacer module

INSPECTION MUVI

[MUVI Slot(C), Type(MUVI)]

Interface Utilisateur Interface Générique Paramètres

Valider la Configuration

● Configuration Matérielle
○ Configuration Fonctionnelle

MUVI

- CAS/TELESCOPE 1
 - MUFEE X
 - MATE 1**
 - MATE 2
 - MATE 3
 - MATE 4
 - MATE 5
 - MATE 6
 - MATE 7
 - MATE 8
 - MATE SILI
 - MUFEE Y
- CAS/TELESCOPE 2
- CAS/TELESCOPE 3
- CAS/TELESCOPE 4

Autorisation des Voies

| | | | | | | | | |
|--------|------|---|----|----|----|----|----|----|
| Voie : | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | 1410 | 0 | 19 | 11 | 12 | 14 | 19 | 10 |

Seuils des discriminateurs

Seuil: + [Slider] 94.49 keV

Charge test Qt

Voie en test: Aucune 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

Configuration et Requête Mate

Mode de Lecture: Energie & Temps Energie seule

Constante Shaper: 1us 3us

Gain du PAC: Si SiLi CSI 4.6pF

Gamme de conversion du TAC: 300 ns 600 ns

EXPERT

Valider la Configuration

Modifié mardi 4 avril 2006 11:11:29 MUVI : Ajouter module < essai.das >

PAGE 29

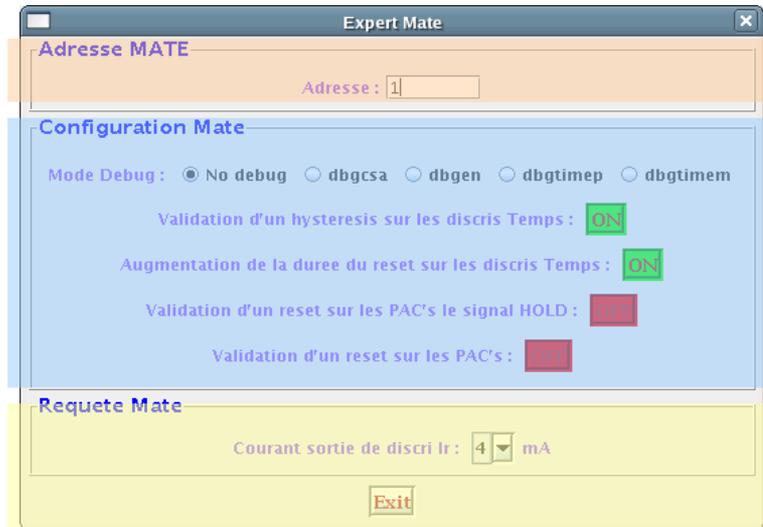
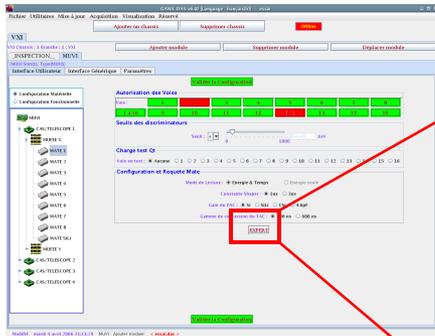
PAGE 30

PAGE 16

PAGE 31



DAS GUI => MATEs SETUP=> EXPERT



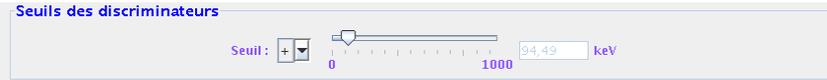
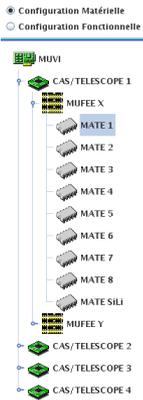
single address of MATE **DO NOT MODIFY**

Choice of the DEBUG signals, **only for the channel number 16**
example: dbgcsa, signal of the CSP output ...
SEE DOC of the MATE ASIC for more details

Must be of 4mA **DO NOT MODIFY**

DAS GUI => MATEs SETUP => INITIALIZATION => DISCRI THRESHOLD

=> From the HARDWARE CONFIGURATION view, set of the trigger threshold of the MATE channels
 One MATE at a time (1 threshold per MATE adjustable in energy and polarity)



Thresholds polarity with "PHYSICS":

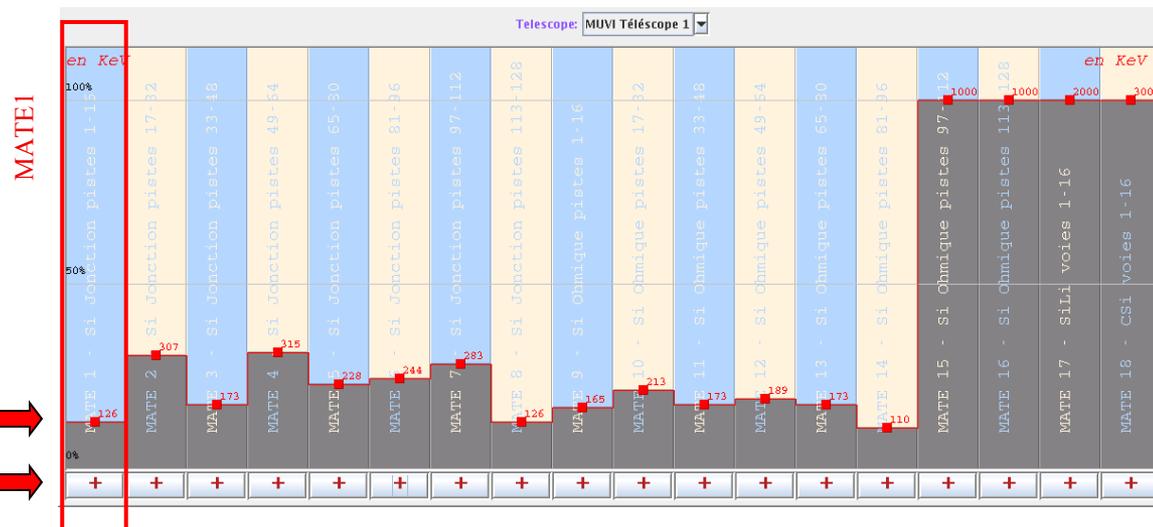
Thresholds polarity with TEST GENERATOR

- + Si MUFEE X
- Si MUFEE Y
- SiLi (IPN)
- + SiLi (JULICH)
- CsI

- + Si MUFEE X
- Si MUFEE Y
- SiLi (IPN)
- + SiLi (JULICH)
- CsI

OR

=> Synthetic vision (FUNCTIONAL CONFIGURATION) of the channels of MATEs in order to set a threshold for one MATE at a time or for the TELESCOPE

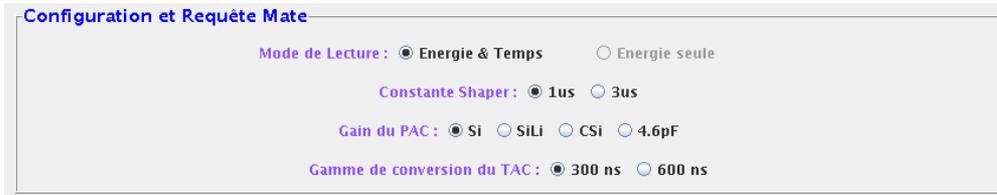
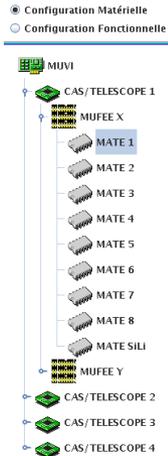


Threshold →

Polarity →

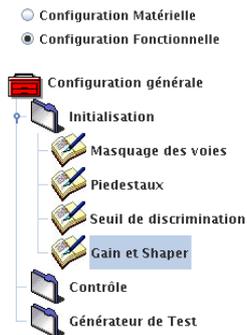
DAS GUI => MATEs SETUP => INITIALISATION => GAIN and SHAPER

=> From the **HARDWARE CONFIGURATION** view, set the values of the **SHAPING** constant and the **CSP** (one MATE at a time)



OR

=> The synthetic view (**FUNCTIONAL CONFIGURATION**) shows both parameters (shaping and gain) of the MATEs in a TELESCOPE



Telescope: MUVI Téléscope 1

| | MATE 1 | MATE 2 | MATE 3 | MATE 4 | MATE 5 | MATE 6 | MATE 7 | MATE 8 |
|------------------|---------|---------|---------|---------|---------|---------|---------|---------|
| Gain du PAC | Si |
| Constante shaper | 3us | 1us |
| | MATE 9 | MATE 10 | MATE 11 | MATE 12 | MATE 13 | MATE 14 | MATE 15 | MATE 16 |
| Gain du PAC | Si |
| Constante shaper | 1us |
| | MATE 17 | MATE 18 | | | | | | |
| Gain du PAC | SILi | CSi | | | | | | |
| Constante shaper | 1us | 1us | | | | | | |



SEE DOCUMENT on the MATE ASIC (CEA/DAPNIA) for more details about these parameters.

APPENDIX

A) ANALOG CHAINS of MATEs

1 MATE => 16 CHANNELS with 32 parameters (alternatively E and T...)

MATE 1 to MATE 16 => linked to detector Si

MATE 17 => linked to detector SiLi

MATE 18 => linked to detector Csi

| | | | | | | | |
|-----|----|----|----|----|----|----------------------------|------------|
| AN1 | 2 | 4 | 6 | 8 | | => 32 x 4 = 128 parameters | => MUFEE X |
| AN2 | 1 | 3 | 5 | 7 | 17 | => 32 x 5 = 160 parameters | => MUFEE X |
| AN3 | 9 | 11 | 13 | 15 | 18 | => 32 x 5 = 160 parameters | => MUFEE Y |
| AN4 | 10 | 12 | 14 | 16 | | => 32 x 4 = 128 parameters | => MUFEE Y |

total 576 (E and T parameters) for 1 telescope
2304 (E and T parameters) for 4 telescopes

- Configuration Matérielle
- Configuration Fonctionnelle



Expert CAS

Paramètres indication des MATEs sur chaîne A/NI

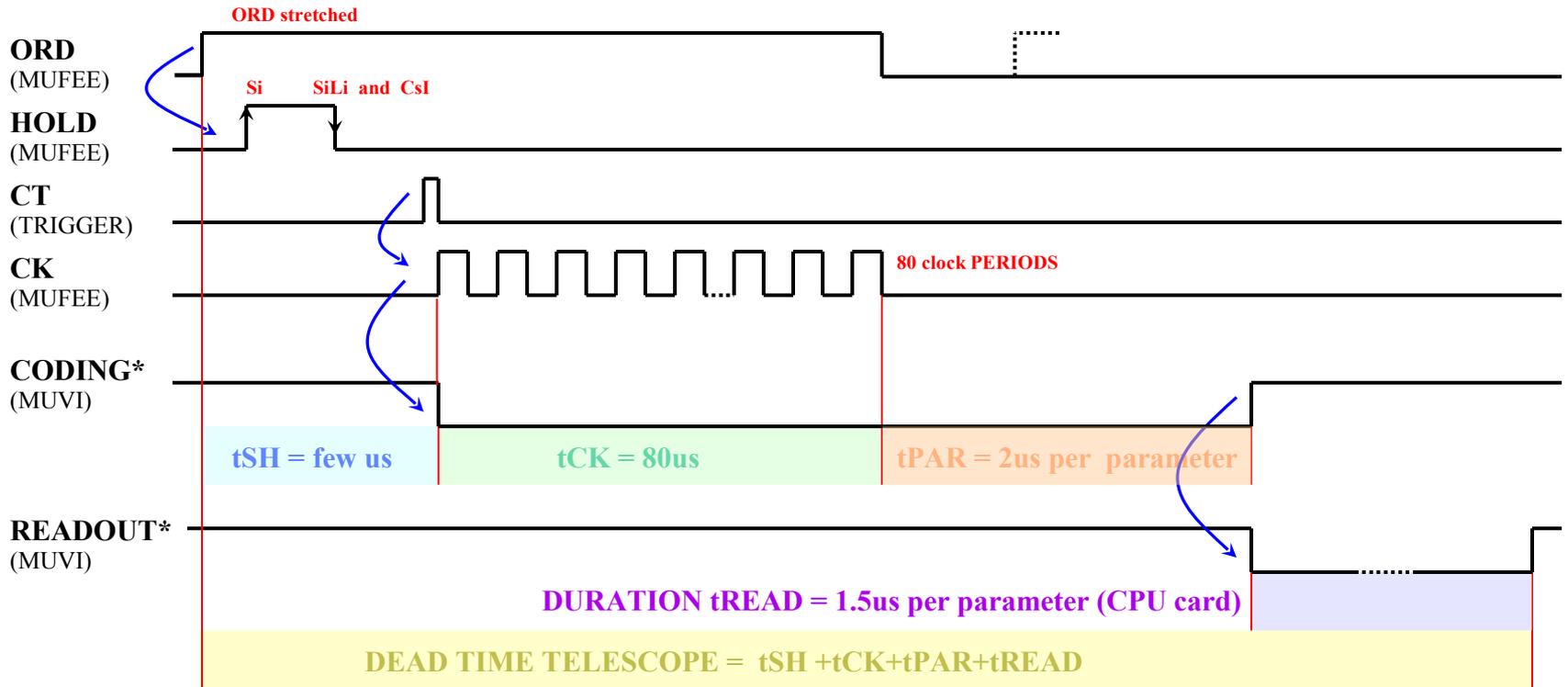
| | | | | |
|------|---------------------|---------------------|---------------------|---------------------|
| | Rang 1 | Rang 2 | Rang 3 | Rang 4 |
| A/N1 | Si jonction: Mate 2 | Si jonction: Mate 4 | Si jonction: Mate 6 | Si jonction: Mate 8 |
| | Rang 5 | Rang 6 | Rang 7 | Rang 8 |
| | Non transmis | Non transmis | Non transmis | Non transmis |



DO NOT MODIFY This set of analog chains corresponds to the physical order of MATEs cabled on the MUFEE X and Y cards

APPENDIX

B) RECKONING of MUVI-MUFEE DEAD TIME



=> **EXAMPLE:** for one TELESCOPE **WITHOUT compression** (=> readout of 576 parameters)
 $t_{CODING} (t_{CK} + t_{PAR}) = 1.2\text{ms}$ and $t_{READOUT} (t_{READ}) = 860\mu\text{s}$ => **TM = 2 ms**

WITH compression (=> readout of 10 parameters)
 $t_{CODING} (t_{CK} + t_{PAR}) = 100\mu\text{s}$ and $t_{READOUT} (t_{READ}) = 15\mu\text{s}$ => **TM = 115 us**

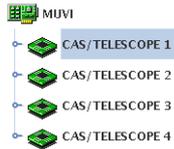


The t_{READ} readout time is drastically reduced with the implementation of the FAST READOUT ENGINE running in the GAMER module: t_{READ} goes down to 200ns per parameter

APPENDIX

C) ADDITIONAL FUNCTIONS

- Configuration Matérielle
- Configuration Fonctionnelle



Extra OFFSETs for the 4 ADC chains of a telescope (null value = 0 V)



This generator is implemented in each CAS card and has nothing to do with the inner test generator of MUFEE card

APPENDIX

D) START PROCEDURE (HARDWARE)

1) POWER CAEN (ON for all LOW VOLTAGEs)



ERROR

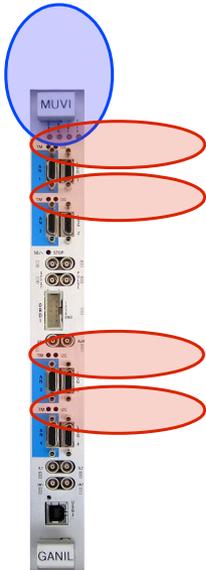
CHECK:

LV & HV cables (inner and outer)
LV cards , overload, overvoltage.
Status of the KILL signal (front panel)
connection box



OK

2) BOOT VXI crate with MUVI card (all MUVI-MUFEE cables are connected)



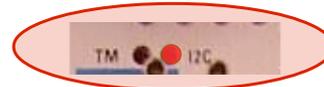
BOOT MUVI card
● programmable components loaded
● acquisition in STOP



TURN OFF/ON the crate
IF PROBLEM contact technical group
GAP/GANIL



● No DEAD TIME (Temps Mort) on this Telescope
● i2C not actif



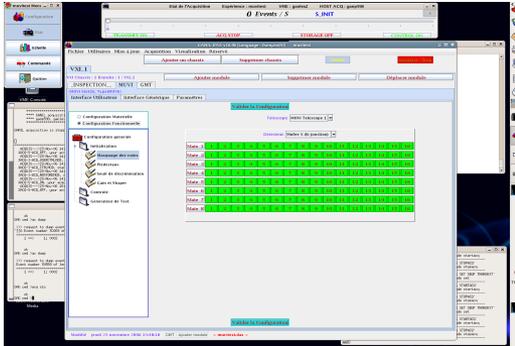
CHECK:
LV are ON
LV and HV cables

TO SOFTWARE START PROCEDURE

APPENDIX

E) START PROCEDURE (SOFTWARE)

3) SETUP of HARDWARE with DAS



OPEN file your_manip.das

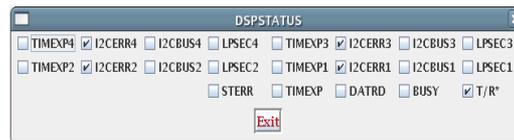


Connect DAS to the hardware (VME)

Online



Write hardware registers



CHECK:
EXTERNAL and INTERNAL MUVI-MUFEE cables of the telescope having an I2C error
LV power (static values)



NO error
START acquisition



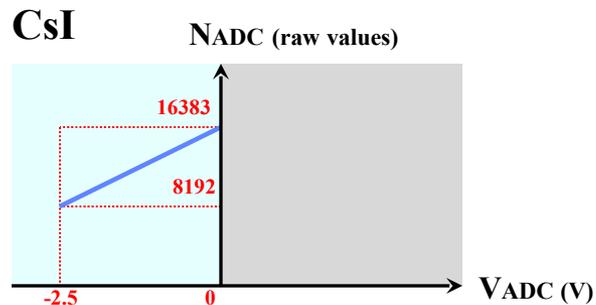
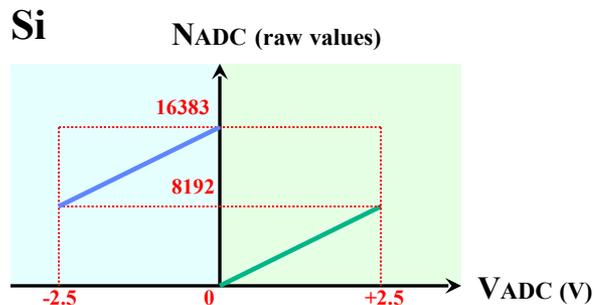
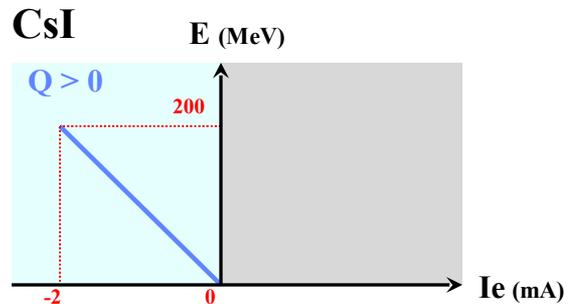
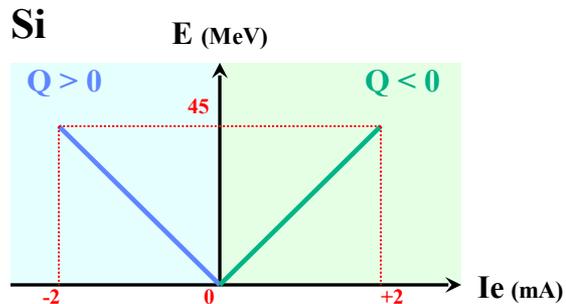
IF PROBLEM, contact technical group
GAP/GANIL



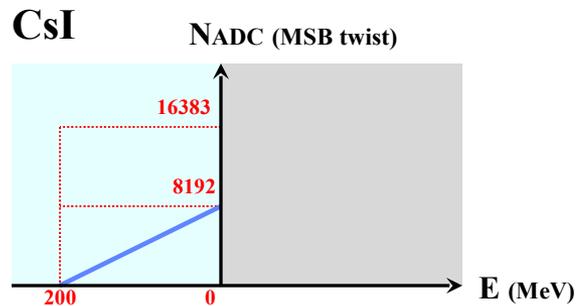
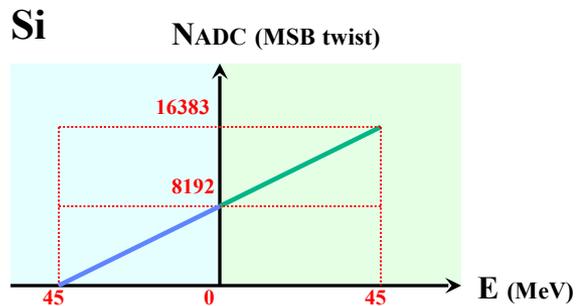
I2c ERROR: NORMAL when one or more telescopes are not linked to MUVI card
START acquisition

APPENDIX

F) ENERGY TRANSFER FUNCTIONS of Si and CsI detectors

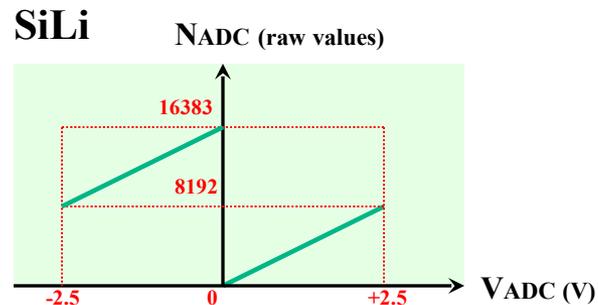
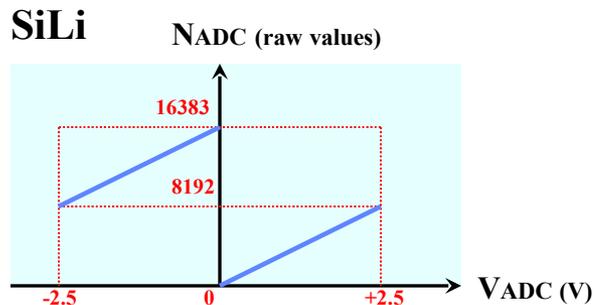
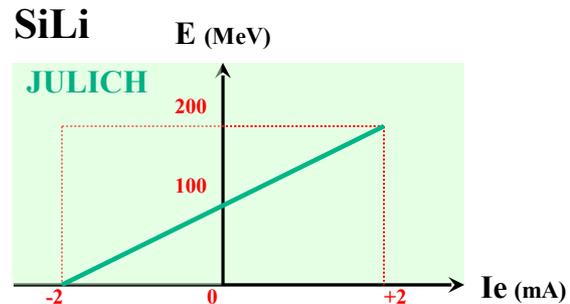
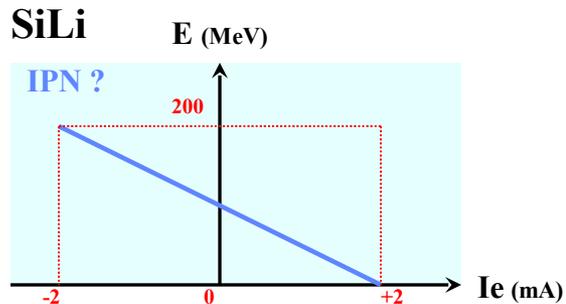


TRANSFER FUNCTIONS implemented in MUVI

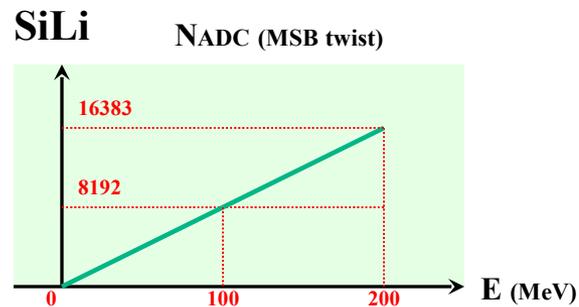
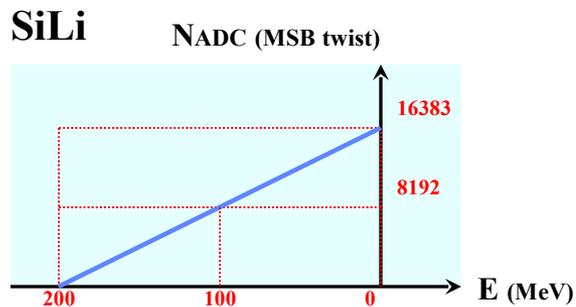


APPENDIX

G) ENERGY TRANSFER FUNCTIONS of SiLi detectors

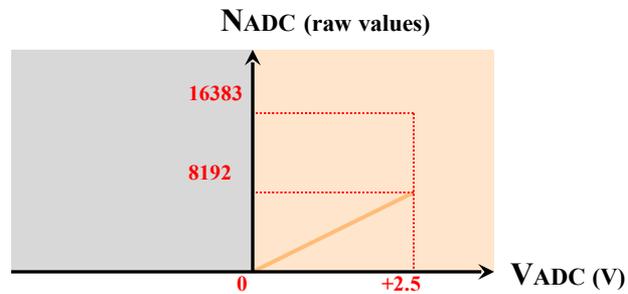
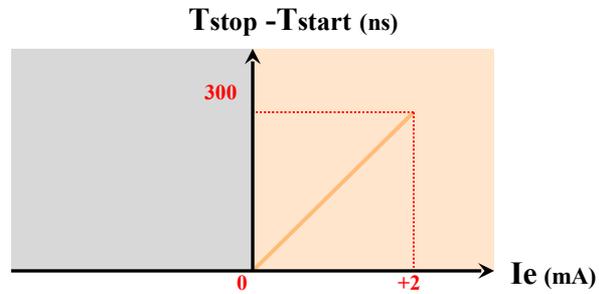


TRANSFER FUNCTIONS implemented in MUVI



APPENDIX

H) TIME TRANSFER FUNCTIONS of Si, CsI et SiLi detectors



TRANSFER FUNCTIONS implemented in MUVI

