Direction des Sciences de la Matière
Département d'Astrophysique, de Physique des Particules, de Physique Nucléaire et de l'Instrumentation Associée
Service d'Electronique des Détecteurs et de l'Informatique

NOTE

Date :	05/04/2005- rev 21/10/2009	Objet : description of Files created by the MATACQ Labview program.
N/Réf :	ED010405	V/Réf :1.61
De :	E. DELAGNES	A :

Description of Files created by the Labview program reading the MATACq boards.

History :

V1.1 : errors corrected
V1.2 : New braw file structure
V1.3: - Addition of Vali, Valp in the raw and braw structures.
- English version.
- Decimal separator in cor and cal files
- Cfg Files
V1.4: - Description of the ecor file structure
V1.5:-Description of the ebcor file structure
V1.6:- Description of the par file structure
V1.61:- Some minor correction on the ebcor file structure description

Centre de Saclay
DAPNIA/SEDI – Bât. 141 – 91191 Gif sur Yvette Cédex
Tél. 33 (01) 69 08 22 52 – Secrét. 33 (01) 69 08 58 03 – Fax 33 (01) 69 08 31 47

1. raw Files : ASCII raw measurements.

REC0 ;REC1 ;…. RECi ;…. RECn
VER0 ;VER1 ;….VERi ;….VERn
Data0x0 ; Data0x1 ;….DATA0xi ;……DATA0xn
…….
Datajx0 ; Datajx1 ;….DATAjxi ;……DATAjxn
…
Data2559x0 ; Data2559x1 ;….DATA2559xi ;……DATA2559xn
VALI0;VALI1;…;VALIi;…VALIn
VALP0;VALP1;…;VALPi;…VALPn

Where :

- RECi is the value of the TRIG_REC (also called REC_CP) register for channel i.
- VERi is the value of the « vernier » for channel i.
- Datajxi is the value of (j+1)th sample of channel i
- VALIi is the value of the VALI register of channel i (new, for expert users only)
- VALPi is the value of the VALP register of channel i (new, for expert users only)

All these numbers are integers separated with the semicolon « ; » character. Each line is terminated with carriage return + line feed.

2. braw Files: raw data binary files.

NBCH NBCOL
REC0 REC1 …. RECi …. RECn
VER0 VER1 ….VERi ….VERn
Data0x0 Data0x1 ….DATA0xi ……DATA0xn
…….
Datajx0 Datajx1 ….DATAjxi ……DATAjxn
…
Data2559x0 Data2559x1 ….DATA2559xi ……DATA2559xn
VALI0 VALI1…VALIi…VALIn
VALP0 VALP1…VALPi…VALPn

Where :

- NBCH is the number of channels.
- NBCOl is the number of samples per channel.
- RECi is the value of the TRIG_REC (also called REC_CP) register for channel i.
- VERi is the value of the « vernier » for channel i.
- Datajxi is the value of (j+1)th sample of channel i
- VALIi is the value of the VALI register of channel i (new, for expert users only)
- VALPi is the value of the VALP register of channel i (new, for expert users only)

All these numbers are long integers (16 bits). There is no separator between values and no CR + LF.

Since the 1/08/2006 version all the acquisitions of the same run are stored consecutively (without any separators) in the same .braw file. For instance, for a Nacq acquisition run, the above structure is repeated Nacq times in the file.

3. calib_ctes.cal File: calibration file.

This is a calibration ASCII file needed to correct raw data. Its structure is:

DELTAT0_0 ;DELTAT0_1;….DELTAT0_ i;…. DELTAT0_199
GAIN0;GAIN1;....GAINi;.....GAIN199
MINVER0;MINVER1;....MINVERi;.....MINVER199
MAXVER0;MAXVER1;....MAXVERi;.....MAXVER199
ADD0;ADD1;.....ADDi;.....ADD199
PEDEST0x0 ; PEDEST1x0 ;….PEDESTjx0 ;……PEDEST2559x0
…….
PEDEST0xi ; PEDEST1xi ;….PEDESTjxi ;……PEDEST2559xi
…
PEDEST0xn ; PEDEST1xn ;….PEDESTjxn ;……PEDEST2559xn

Where :

- DELTAT0_i is the offset delay in ns of channel i (default=0) : real number with 3 decimal places)
- GAINi is the gain of channel i (default=0.25mv/ADC) : real number with 3 decimal places)
- MINVERi is the minimum value of the vernier of channel i : 16 bits integer.
- MAXVERi is the maximum value of the vernier of channel i : 16 bits integer.
- ADDi is the address of the board where channel i is located.
- PEDESTjxi is the pedestal value of the jth cell of channel i.: real with 2 decimal places.
- n is the number of channels.

The decimal separator is now the dot character “.”. In previous versions of MATACQ LABVIEW (up to 12/02/2007) it was dot or coma depending on the Labview configuration. MATACQ Labview is now able to read back automatically the 2 formats.

All the values are separated by a semi-coma (“;”) character. Each line is terminated by a Carriage return + Line Feed.
Nota : due to the four first lines of the file structure, the use of this file is limited to a maximum of 200 channels.

4. Front_pannel.cal File: State of the Front Pannel during the calibration.

This is an ASCII File. All the information is stored in a single line.

NBBOARD ;FREQ ;TRIGSLOPE,TRIGGERTYPE,PRETRIG ;POSTRIG ;THRESH ;CTRL_REG;OFFSET_DAC;LSB_DAC ;ANNEE ;MOIS ;JOUR ;HEURE ;MINUTE ;SECONDE ;DATE_ABSOLUE

Where :
NBBOARD : number of boards.
FREQ : SAmpling Frequency :1 means 2 GHz, 2 means 1 GHz, 4 is for 500 MHz…. 20 is for 100MHz. For old version compatibility 0 means also 1GHz.
TRIGSLOPE : polarity of trigger edge 0: falling, 1 : rising.
TRIGGERTYPE : trigger type.
PRETRIG : pretrig value
POSTRIG : postrig value.

THRESH : Threshold value.
CTRL_REG : control register value.
OFFSET_DAC : Offset for the threshold DAC.
LSB_DAC : LSB value (in mV) for the threshold DAC.
ANNEE ;MOIS…….SECONDE : time of the acquisition .
DATE_ABSOLUE : absolute date of the acquisition (number of seconds since the jan 1st 1904)
All the values are stored as real numbers with 2 decimal positions.

The decimal separator is now the dot character ".". In previous versions of MATACQ LABVIEW (up to 12/02/2007) it was dot or coma depending on the Labview configuration. MATACQ Labview is now able to read back automatically the 2 formats.
The values are separated by a semicolon character « ; ». The lines are terminated by a Carriage Return + Line Feed.

5. histver.cal : calibration data file for verniers.

This file is not needed for correction of raw data. The file structure is:

HISTVER0x0;.....;HISTVER0xi;.....;HISTVER0xn
.....
HISTVERjx0;.....;HISTVERjxi;.....;HISTVERjxn
…….
HISTVER4095x0;.....;HISTVER4095xi;.....;HISTVER4095xn

where HISTVERjxi is the number of entries for the bin j in the histogram of the vernier of the channel i obtained during the calibration.

6. .cor Files : Ascii Files for corrected data.

1 file is created for each event

T0x0;V0x0 ;T0x1 ;V0x1 ;……T0xi ;V0xi ;……..T0xn ;V0xn
T1x0;V1x0 ;T1x1 ;V1x1 ;……T1xi ;V1xi ;……..T1xn ;V1xn
……
Tjx0;Vjx0 ;Tjx1 ;Vjx1 ;……Tjxi ;Vjxi ;……..Tjxn ;Vjxn
…….
T2559x0;V2559x0 ;T2559x1 ;V2559x1 ;……T2559xi ;V2559xi ;……..T2559xn ;V2559xn

Where
Tjxi is the time of the j+1th sample of channel i.
and Vjxi is the voltage (in mV) of the the j+1th sample of channel i.

All the values are real numbers with two decimal places. **The decimal separator is now the dot character ".". In previous versions of MATACQ LABVIEW (up to 12/02/2007) it was the coma. MATACQ Labview is now able to read back automatically the 2 formats**. Carriage Return + Line Feed are terminating each line.

7. .ecor Files : Ascii Files for corrected data with extended format.

All the acquisitions of the same run are stored consecutively events after events in the same .ecor file. For instance, for a Nacq events acquisition run, the following structure is repeated Nacq times in the file.

Run_Nb
Event_Nb
Nb_of_Channels (=n+1)
Nb_of_Samples =(s+1)
Nb_of_Days
Nb_of_Sec
T0x0;V0x0 ;T0x1 ;V0x1 ;……T0xi ;V0xi ;……..T0xn ;V0xn
T1x0;V1x0 ;T1x1 ;V1x1 ;……T1xi ;V1xi ;……..T1xn ;V1xn
……
Tjx0;Vjx0 ;Tjx1 ;Vjx1 ;……Tjxi ;Vjxi ;……..Tjxn ;Vjxn
…….
Tsx0;Vsx0 ;Tsx1 ;Vsx1 ;……Tsxi ;Vsxi ;……..Tsxn ;Vsxn

Where:
Run_Nb :is the index of the run
Event_Nb: is the index of the event
Nb_of_Channels (=n+1) : is the number of channels saved
Nb_of_Samples =(s+1) : is the number of samples saved
Nb_of_Days : is the number of days since january 1st 1904
Nb_of_Sec: is the number of second since the the beginning of the day
These 6 numbers are stored as real numbers with 3 decimal places.

Tjxi is the time of the $j+1^{th}$ sample of channel i.
and Vjxi is the voltage (in mV) of the the $j+1^{th}$ sample of channel i.

The time and voltage values are real numbers with two decimal places. **The decimal separator is the dot character ".".** Carriage Return + Line Feed are terminating each line.

8. .ebcor Files : Binary Files for corrected data with extended format.

The ebcor files are similar to the ecor files but are using binary data rather than ascii. Typically the size of a ebcor file is approximately the same as the one of a braw file.

All the acquisitions of the run are stored consecutively in the same ebcor file.
The file structure is the following: for each acquisition, all the following data are stored consecutively without any separator
.

- Run number: 32 bits integer.
- Acquisition index: 32 bit integer.
- Number of ms since 1 janv 2004 modulo (2^31): 32 bit integer
- Number of ms since 1 janv 2004 / 2^31 (integer division: 32 bit integer.
- *Nbchan* : Number of channels 32 bit integer.
- *Nbsamp*: Number of samples / channel: 32 bit integer.

- 1/sampling frequency (in ns) if sampling frequency < 1GHz or sampling frequency (in GHZ) for sampling frequency = 1 or 2 GHz. 32 bit integer.
- For all the channels: time of the first sample in ps 32 bit integers.
- Only if Fsample <= 1GHZ (if the masks are use): time difference of the consecutive samples coded by a : 16 bit integers
    - DeltaT0x0
    - DeltaT1x0
    - ….
    - DeltaTnbsamp-1x0
    - DeltaT0x1
    - DeltaT1x1
    - ….
    - DeltaTnbsamp-1x1
    - ….
    - DeltaT0xi
    - DeltaT1xi
    - ….
    - DeltaTjxi
    - ….
    - DeltaTnbsampxi
    - ….
    - DeltaT0xnbchan-1
    - DeltaT1xnbchan-1
    - ….
    - DeltaTjxnbchan-1
    - ….
    - DeltaTnbsamp-1xnbchan-1

Where DeltaTjxi is the time difference in ps (coded in 16 bit integer) between the sample j and j-1 for the channel i. If j=0, this is the time difference in ps between sample 0 and the time offset.

- Y values : 16 bit integers
    - YYT0x0
    - YYT1x0
    - ….
    - YYnbsamp-1x0
    - YY0x1
    - YY1x1
    - ….
    - YYnbsamp-1x1
    - ….
    - YY0xi
    - YY1xi
    - ….
    - YYjxi
    - ….
    - YYnbsamp-1xi
    - ….
    - YY0xnbchan-1
    - YY1xnbchan-1
    - ….
    - YYjxnbchan-1
    - ….
    - YYnbsamp-1xnbchan-1

Where YYjxi is 8 * the voltage in mV (coded by 16 bit integer) for the sample j of the channel i.

9. .cfg Files : Configuration files.

These binary files, located in the directory containing the application, are created when the MATACQ Labview Setup is saved. They can be copied and reused by the user if needed, but should not be modified.

10. .par Files : Ascii Files for extracted parameters.

With versions of the labview MaTACQ software starting from the 010908 versions, parameters can be extracted to build histo (histogram2 menu). If the "save params in file" is selected in the glob_histo_config window, for each acquisition this parameters will be saved in a .par file located at the path defined in Data Files Menu of the main MATACQ window.
The structure of this file is quite similar to the one of the .ecor file:
All the parameters of a same run are stored consecutively, event after event, in the same .par file. For instance, for a Nacq events acquisition run, the following structure is repeated Nacq times in the file.

Run_Nb
Event_Nb
Nb_of_Channels (=n)
Nb_of_Parameters =(14)
Nb_of_Days
Nb_of_Sec
P0x0;P0x1;……;P0xn-1
P1x0;P1x1;……;P1xn-1
…..
Pjx0;Pjx1;……..;Pjxn-1
……..
P13x0;P13x1;……..;P13xn-1

Where:
Run_Nb :is the index of the run
Event_Nb: is the index of the event
Nb_of_Channels (=n+1) : is the number of channels saved
Nb_of_Samples =(s+1) : is the number of samples saved
Nb_of_Days : is the number of days since january 1st 1904
Nb_of_Sec: is the number of second since the the beginning of the day
These 6 numbers are stored as real numbers with 3 decimal places.

Pjxi is the value of the jth parameter extracted for channel i. The list of the parameters is the following:

Parameter 0	is	0.0
Parameter 1	is	the event number
Parameter 2	is	the channel #

Parameter 3	is	1 if a hit is detected, 0 if not.
Parameter 4	is	the time of the threshold crossing
Parameter 5	is	the time of peak.
Parameter 6	is	the simulated CFD time
Parameter 7	is	the baseline value.
Parameter 8	is	the sigma of the baseline.
Parameter 9	is	the value of the Peak.
Parameter 10	is	the signal Amplitude Value.
Parameter 11	is	the signal Integral Value.
Parameter 12	is	the signal width Value.
Parameter 13	is	the signal Time Over Threshold.

If the corresponding parameter is not defined in the left part glob_histo_config window it is set to 0.

If for some reason, the parameter cannot be extracted, the parameter can be set to the “NaN” value.

The parameters are real numbers with two decimal places. **The decimal separator is the dot character “.”.** Carriage Return + Line Feed are terminating each line.